HILTON
WORLDWIDE

机电设计标准
MEP Design Criteria

希尔顿酒店管理（上海）有限公司
Hilton Hotel Management (Shanghai) Co.,Ltd

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第一部分:系统设计标准
Part I System Design Criteria

第1章. 概要
SECTION 1 GENERAL

1.1. 概要
GENERAL

A. 以下设计与建造标准为希尔顿全球对旗下品牌酒店的设计要求。对于本标准中有偏差之处，希尔顿全球建筑与建造部门(A&C)将负责进行解释。所有业主应采用最新版本标准作为参考。业主方有责任确保本标准相关信息已贯彻到施工文档中。不允许出现低于本标准的情况。
The following Design and Construction Standards, represent the requirements established for design of hotel. If discrepancies are found between these Standards, the Architecture & Construction (A&C) Department of Hilton Worldwide will clarify. All owners are responsible for referencing the most current Standards. It is the owner's responsibility to ensure that this information is incorporated into the Construction Requirement Documents. Reduction of scope below these Standards will not be permitted.

B. 希尔顿全球在项目审批时可能根据当地市场情况、习俗或惯例更改本文件包含的要求。
Hilton Worldwide, when giving approval for projects, may alter requirements contained herein in accordance with the project's local market, custom or practice.

C. 本设计与建造标准适用于以下情况：
The Design and Construction Standards apply to the following situations:

1. 新建酒店
   New construction projects

2. 现有酒店的改建、翻新、改造和增加设施。
   Remodeling, refurbishing, renovation, and additions to existing properties.

3. 酒店业主变更、重签授权协议、变更或重新利用。
   Change of ownership, renewal of a license agreement, conversion, or adaptive reuse.

1.2. 法规
CODES

A. 业主应负责遵守所有适用的法律、法规和/或其它主管机构、地区和设计规范。若当地法规和规范高于本标准要求时，当地法规和规范将成为最低要求。所有标准与其适用的当地法规之间的差异之处，必须告知希尔顿全球。
The owner is responsible for compliance with all applicable laws, codes and/or other governing bodies' district authority and design regulations and code of practice. In the event applicable local codes and regulations exceed the requirements contained herein, the local codes and regulations must be construed as minimum requirements. All discrepancies found between these standards and applicable local codes must be brought to the attention of Hilton Worldwide for resolution.

B. 希尔顿全球并不负责审核文档与当地法规之间的符合性。业主方有责任满足或高于所有当地规范。
Hilton Worldwide is not responsible for review of documents for compliance with local codes. It is the responsibility of the owner to meet or exceed these local codes and regulations.

C. 本品牌标准与当地适用法规应以较严格标准为准。
The more stringent requirement between these Brand Standards and the applicable code(s) must be followed as a minimum standard.

第2章. 垂直交通系统
SECTION 2 VERTICAL TRANSPORTATION SYSTEM

2.1. 概述
General

A. 本章标准所包含的内容仅用于制定最基本的电梯设计标准，而非提供一个工程项目的完整设计方案。
This specification sets the basic requirements for the elevator and escalator system and it is not intended to provide a complete design solution for a project.

B. 各类设计标准之间的差异性\冲突性问题由希尔顿全球确定解决方案。如果地方规范高于希尔顿全球的标准，则按照高的标准执行。
Any conflict between the design standards shall be referred to Hilton Worldwide for clarification and resolution. If the local standards are more stringent than the Hilton Worldwide standards, the local standards shall take precedence.

C. 设计方案中任何与本章节不符之处，设计单位须以书面形式提交希尔顿全球审核，并取得希尔顿全球认可。
Any design deviation from the standards of this section shall be submitted by the design consultant in written form to Hilton Worldwide for review and approval.

D. 电梯的流量分析工作应由专业的电梯顾问完成并经希尔顿全球审批，包括以下内容：
The elevator traffic analysis shall be carried out by a specialized elevator consultant and submitted to Hilton Worldwide for review and approval, which shall consist of the followings:

1. 客梯
   Guest elevator
2. 服务梯（货梯）
   Service elevator (freight elevator)
3. 消防梯
   Fireman elevator
4. 自动扶梯
   Escalator
5. 其它垂直交通方式(若有)
   Other vertical transportation(If possible)

2.2. 设计标准和要求
DESIGN CRITERIA AND REQUIREMENT

2.2.1. 规范和标准
Codes and Standards

A. 电梯设施适用于以下规范和标准，如果规范的要求之间存在矛盾，以更严格规范/标准为准：
The vertical transportation system shall comply with the latest revision of the following codes and standards. If there is any conflict between the codes, the more stringent one shall take precedence:

1. GB 7588 电梯制造与安装安全规范
   GB 7588 Safety Regulations for Manufacturing and Installation of Elevators

2. GB 16899 自动扶梯和自动人行道的制造与安装安全规范
   GB 16899 Safety Regulations for Manufacturing and Installation of Escalators and Automatic Passenger Conveyors

3. GB/T 10058 电梯技术条件
   GB/T 10058 Specifications for Elevators

4. GB/T 24474 电梯乘运质量测量
   GB/T 24474 Quality Measurement for Elevator Transportation

5. GB/T 24477 适用于残障人员的电梯附加要求
   GB/T 24477 Additional Requirements for Elevators for Disabled Persons

6. GB 50045 高层民用建筑设计防火规范
   GB 50045 Code for Fire Protection Design of Tall Buildings

7. JGJ 50 城市道路和建筑物无障碍设计规范
   JGJ 50 Codes for Design on Accessibility of Urban Roads and Buildings

8. GB/T 10060 电梯安装验收规范
   GB/T 10060 Code for Acceptance of Lifts Installation

9. GB 50310 电梯工程施工质量验收规范
   GB50310 Code for Acceptance of Installation Quality of Lifts， Escalators and Passenger Conveyors

10. GB/T 7025 电梯主参数及、井道、机房的型式与尺寸
    GB/T7025 Lifts - Main Specifications and the Dimensions, Arrangements for its Cars, Wells and Machine Rooms

11. 其它当地政府部门颁发适用于电梯及自动扶梯的技术要求
    Other codes for elevator and escalator by local authorities

2.2.2. 交通规划
Traffic Planning

A. 规划电梯性能时需要考虑以下交通要求：
   The following requirements shall be considered when coordinating the elevator performance:-

1. 酒店必须有独立的客用和服务电梯，不允许和其它非酒店的管理区域合用。
   Dedicated guest and service elevators shall be provided for the hotel and shall not be shared with other properties which are not managed by the hotel.

2. 客房层电梯必须在前台/大堂区域可以直接看见。
   The guest elevators shall be visible at the front desk or main lobby.

3. 酒店有地下车库时，应设置车库转换梯/自动扶梯将客人运输到电梯大堂。如果车库仅安装了一部电梯/升降机，则从车库到酒店大堂应设计一部专用楼梯，并与酒店其它前场区同等装修标准。
   If there is basement car park, car park transfer elevators/ escalators shall be provided to transport the guests to the main lobby. If there is only one elevator in the car park, a dedicated staircase shall be provided from the car park to the main lobby and the same

standard of finishes shall be provided for the staircase as per other hotel front of house areas.

4. 当客房楼层超过 25 层或酒店高度大于 100m 时，酒店客梯宜进行分区。当客房起始楼层较高，采用直达客梯无法满足运输要求时，可以考虑穿梭梯+直达客梯的方式，在建筑物内设置空中大堂。
   For hotel with more than 25 floors or over 100 meter height, it is recommended to have different zones for hotel elevators. If the guest rooms are located at higher floors and the guest elevators are not able to meet the transportation requirements, a combination of shuttle elevators and guest elevators with sky lobby can be considered.

5. 在有室外沙滩或泳池的酒店，当距离客房较远时，需要在离沙滩或泳池较近的酒店客房处设置电梯。
   If there is outdoor beach or swimming pool in the hotel and located far from the guest rooms, elevators shall be provided and located at guest rooms which are nearer to the beach or swimming pool.

6. 如果大宴会厅和会议室与街道/大堂不在同一楼层，则必须提供自动扶梯。
   Escalators shall be provided if the grand ballroom and conference room are located on different flours from the street or main lobby.

7. 电梯机房可采用普通机房、小机房或者无机房等各种形式。
   The elevators can be of general machine room, small machine room, machine room-less or other types.

8. 同时设置自动扶梯和垂直客梯时，两者承担的人流量比例如表 2-1 所示：
   Please refer to Table 2.1 for the ratio of passenger flow rate between escalators and guest elevators.

表 2-1 自动扶梯和垂直客梯人流量比例表

Table 2.1 Ratio of passenger flow rate between escalators and elevators

楼层 Floor	自动扶梯 Escalators	垂直客梯 Guest Elevators
2F	90%	10%
3F	75%	25%
4F	50%	50%
5F	25%	75%
6F	10%	90%

9. 同时设置客用楼梯和垂直客梯时，两者承担的人流量比例如表 2-2 所示：
Please refer to Table 2.2 for the ratio of passenger flow rate between stairs and guest elevators.

表 2-2 客用楼梯和垂直客梯人流量比例表

Table 2-2 Ratio of passenger flow rate between stairs and guest elevators

楼层 Floor	客用楼梯 Usage: Guest Stairs	垂直客梯 Usage: Guest Elevators
2F	上行10%，下行15% Up 10%, Down 15%	上行90%，下行85% Up 90%, Down 85%
3F	上行5%，下行10% Up 5%, Down 10%	上行95%，下行90% Up 95%, Down 90%

10. 如果垂直电梯无法满足无障碍要求或无法设置无障碍坡道时，可设置轮椅升降机。
A wheelchair lift can be used in case f the vertical elevator cannot meet the ADA requirement or ADA ramp cannot be set up.

2.2.3. 电梯交付要求
Elevator Handover Requirement

A. 酒店项目竣工投入运营前两个月，应完成电梯及自动扶梯的调试验收，并取得当地相关部门的批文和证书。
The elevators and escalators shall be tested & commissioned, and approved by the local authorities with relevant approval documents and certificates two months before the hotel is completed and put into operation.

B. 酒店开业前用于运送施工物料的电梯，在正式移交给酒店前必须由专业公司进行维保并达到国家规定的使用标准。
If the elevators are used for transporting construction materials before the hotel opens, maintenance and recovery works for these elevators shall be carried out by a specialized company and ensure compliance with authority's standards before official handover of the elevators to the hotel.

C. 自正式移交给酒店之日起，电梯供应商需提供至少 2 年的免费维修保养服务，并保证在紧急情况发生时（如：人关在电梯内）于 30 分钟内赶到现场进行处理。
Minimum two (2) years of free maintenance shall be provided by the elevator supplier from the date of official handover to the hotel. During emergency (e.g. in situation when passengers

are trapped in the elevator), the elevator maintenance personnel shall attend to it within 30 minutes.

D. 移交给酒店时需提供：
The followings shall be provided during the handover of the elevators to the hotel:

1. 当地主管部门验收合格证；
Acceptance certificate issued by local authority;

2. 设备操作手册（包括技术资料，操作指引，维保记录表，建议配件，后备零件，制造商或代理联系资料、售后服务机构信息等）；
Equipment operation manual (including technical data, operation guidelines, maintenance log sheet, recommended accessories, spare parts for replacement, manufacturer or agent contacts, after-sales service information, etc.);

3. 工程图及竣工图；
Engineering drawings and as-built drawings;

4. 维护保养合约(副本)
Maintenance contract (duplicate copy).

2.3. 客梯
GUEST ELEVATOR

2.3.1. 系统设计
System Design

A. 酒店客梯应设置在醒目的位置。在共用电梯厅内，单排的电梯数量不得超过四部。最好采用两组电梯面对面排列方式，也可以根据美观和建筑设计采用其它方式布置电梯。典型的布置方式见图 2.1。电梯厅的宽度设置满足 GB50352 的要求。
Elevators shall be located in such a way that they are easily accessible and visible by the guests. Maximum four (4) numbers of elevators can be arranged in a single row in common lobby. The elevators are preferably arranged in two groups in opposite positions. Other arrangements can also be proposed based on the aesthetics and architectural layout design. Please refer to figure 2.1 for the typical layout of elevator. The width of lift lobby shall comply with GB50352.

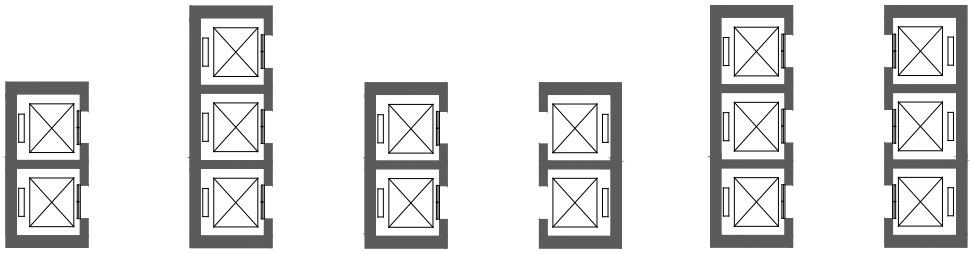


图 2-1 典型电梯平面布置图

Figure 2-1 Typical layout of elevator

B. 酒店客房电梯所有电梯呼梯按钮按无障碍考虑，安装中心线高度为离地 1.0m，电梯厅应设置提示盲道，且电梯厅需设置一个电话和一个电源插座。
The guest elevator call button shall comply with the barrier-free requirements, with installation height of 1.0 meter from the centerline to the floor. Tactile floor shall be provided in the elevator lobby for guidance of the visually impaired. One (1) number telephone point and one (1) number electric socket outlets shall be provided in the elevator lobby.

C. 楼层电梯厅设置厅站呼梯按钮、到站指示灯、到站钟及上下行方向指示器，由室内装饰确定具体样式并提交希尔顿全球审核批准。
The design of hall call button, arrival indicator, arrival gong and directional indicator in the elevator lobby shall be selected by the interior designer and submitted to Hilton Worldwide for review and approval.

D. 电梯厅小门套采用发纹不锈钢；大门套样式由室内设计确定，希尔顿全球审核批准。
The elevator lobby narrow door jamb shall be of hairline finish stainless steel. The design of wide door jamb shall be selected by the interior designer and submitted to Hilton Worldwide for review and approval.

E. 所有电梯厅和电梯轿厢必须具有“火灾情况下禁止使用电梯，请使用疏散楼梯”的标识。
Elevator lobbies and elevator cabs must have signs that read “In fire emergency do not use elevator - use exit stairs.”

F. 酒店客梯的数量、载重量和速度应根据电梯交通流量分析结果进行选择。
The quantity, capacity and speed of the hotel elevator shall base on the traffic analysis.

G. 酒店电梯交通流量分析报告应根据下面的参数进行。
The traffic analysis for the hotel elevators shall base on the following parameters.

表 2-3 酒店客梯主要性能要求参数表

Table 2-3 Main performance parameters for guest elevator

设计参数 Design Parameter	**客房层电梯/转换电梯 Guest Elevator/ Transfer Elevator**	**公共区电梯 Public Elevator**	**车库电梯 Car Park Elevator**
人员估算 Population Estimation	1.8人/客房 入住率100% 1.8 person/ guest room Occupancy: 100%	宴会厅1.5m^2/人； 会议室2m^2/人 全日餐厅2m^2/人 中/西餐厅2.5m^2/人 游泳池/健身房10m^2/人 Ballroom: 1.5m2/person Conference room: 2m2/person All day dining restaurant: 2m2/person Chinese/ western restarurant: 2.5m2/person Swimming pool/gym: 10m2/person	
流量分析 Traffic Flow Analysis	上行和下行各50%双向客流. Up and down Travel 50% of passager flow respectively	结合自动扶梯和客用楼梯进行，分流系数参考表2-1和2-2。 To analyse with incorporation of escalator and stair. Please refer to Table 2-1 and 2-2. 若只有宴会厅，人流模型按100%下行考虑；若同时有宴会厅、会议室和餐厅等，按照90%下行，10%上行考虑。 Down 100% if there is ballroom only. Down 90% and up 10% if there are ballroom, conference room, restaurant, etc.	

设计参数 **Design Parameter**	客房层电梯/转换电梯 **Guest Elevator/ Transfer Elevator**	公共区电梯 **Public Elevator**	车库电梯 **Car Park Elevator**
5分钟处理能力 **5-minutes Handling Capacity**	≥15%	20分钟内完成所有宴会厅人员运输 Transport all guests from a fully occupied ballroom within 20 minutes	
平均等待时间 **Average Waiting Time**	≤35s		
载重 **Capacity**	首选1600kg， 最低≥1350kg Preferred capacity: 1600kg Minimum capacity: ≥1350kg	首选1600kg， 最低≥1350kg Preferred capacity: 1600kg Minimum capacity: ≥1350kg	≥1350kg，最小载重量为1000kg ≥1350kg, minimum capacity of 1000kg
负载率 **Car-fill Factor**	≤50%	≤80%	≤80%
速度 **Speed**	根据流量分析确定；高速电梯梯速通常按照不计算加速、减速及停层时间，在20-30s内到达顶层考虑。 Design based on the traffic analysis. High speed elevator shall reach the topmost floor within 20 to 30 seconds without considering the time for car stop, acceleration or deceleration.	根据流量分析确定，裙房电梯梯速宜为1.5m/s~1.75m/s。 Design based on the traffic analysis. Recommended speed for podium elevator is 1.5m/s ~ 1.75m/s.	
数量 **Quantity**	根据流量分析确定，不低于2台。 Design based on the traffic analysis. Not less than two (2) elevators.	根据流量分析确定。 According to the traffic analysis 仅采用电梯（未设置自动扶梯）做为宴会厅人流疏散时，数量应不低于 2 台 If the elevator is the only means of transportation for the ballroom (no provision of escalator), the elevator shall not be less than two (2) numbers.	不少于2部 Not less than two (2) numbers

设计参数 **Design Parameter**	客房层电梯/转换电梯 **Guest Elevator/ Transfer Elevator**	公共区电梯 **Public Elevator**	车库电梯 **Car Park Elevator**
开门尺寸 **Door Opening Size**	推荐尺寸(WXH)： 1200mmX2400mm最小尺寸(WXH)： 1100mmX2200mm Recommended size: 1200mmX2400mm Minimum size: 1100mmX2200mm	推荐尺寸(WXH)： Recommended size: 1200mm x 2400mm 最小尺寸(WXH)： Minimum size (WXH): 1100mm x 2200mm	最小尺寸(WXH)： Minimum size 1100mmX2100mm
高度 **Car Height**	空顶高度 不低于3200mm， Car internal height ≥3200mm 装修完净高 不低于2800mm Car clear height ≥2800mm	空顶高度 不低于3000mm， Car internal height ≥3000mm 装修完净高 不低于2600mm Car clear height ≥2600mm	空顶高度 不低于2700mm， Car internal height ≥2700mm 装修完净高 不低于2400mm Car clear height ≥2400mm
预留装修重量 **Allowance Weight for Finishes**	1600kg载重量电梯预留装修重量不低于500kg； Minimum allowance weight for interior finishes for 1600kg elevator: 500kg; 1350 kg载重量电梯预留装修重量不低于450kg； Minimum allowance weight for interior finishes for 1350kg elevator: 450kg; 1000 kg载重量电梯预留装修重量不低于400kg。 Minimum allowance weight for interior finishes for 1000kg elevator: 400kg.		
无障碍设施 **Barrier-free Facilities**	客人电梯中应至少包括一部无障碍客梯，无障碍电梯的设置要求包括但不仅限于： There shall be minimum one (1) number of guest elevator provided with barrier-free provisions which shall include but not limited to the following requirements:- 1. 轿厢正面和侧面应设高 0.80~0.85m 的扶手； Handrails shall be provided at the front and side walls of the elevator car with height of 0.80~0.85m; 2. 轿厢侧面应设高 0.90~1.10m 带盲文的选层按钮； Tactile floor button shall be provided at the side wall of the elevator car with height of 0.90~1.10m; 3. 轿厢正面高 0.90m 处至顶部应安装镜子； Mirrors shall be provided at the front of the car from the height of 0.90m till the top of the elevator car; 4. 轿厢上下运行及到达应有清晰显示和报层音响（应中英文报站）。 Clear visual display and audible signals to annouce the arrival and up/ down travelling directions of the elevator shall be provided (in Chinese and English).		

设计参数 Design Parameter	客房层电梯/转换电梯 Guest Elevator/ Transfer Elevator	公共区电梯 Public Elevator	车库电梯 Car Park Elevator
轮椅升降机 Wheelchair Lift	供乘轮椅者使用的升降机应符合下列规定： The lift for wheelchair users shall comply with the following requirements :- 1. 建筑入口 大厅 通道等地面高差处, 进行无障碍建设或改造有困难时，应选用升降升降机取代轮椅坡道； If there is constrain in implementation of the barrier-free facilities, wheelchair lift shall be provided instead of wheelchair ramps to cater for the height difference in building entrance, lobby or corridors. 2. 升降机的尺寸不应小于 1.20m×0.90m 轮椅升降机应设扶手或挡板及启动按钮。 The size of the lift shall not be less than 1.20m X 0.90m. Handrail or safety barrier and start button shall be provided for the wheelchair lift.		

H. 客梯推荐尺寸表见表 2-4：
Please refer to table 2-4 for the recommend size for guest elevators:

表 2-4 客梯推荐尺寸表
Table 2-4 Recommend size for guest elevators

电梯载重(kg) Elevator Capacity (kg)	推荐尺寸(mmXmm) Recommended Size (mmXmm)
1000kg	1600X1400
1150kg	1800X1500
1350kg	2000X1500
1600kg	2000X1750
1800kg	2100x1750
2000kg	2350x1700

2.3.2. 系统配置要求
System Configuration Requirements

A. 需要在项目的设计、建造、交付阶段提供电梯停层表、电梯土建参数表、电梯功能表等相关信息供希尔顿全球知悉确认。客梯主要配置要求参考表 2.5。
The elevator stop level chart, civil engineering parameter table, function table and other relevant information for the elevator shall be provided to Hilton Worldwide for review and approval at the design, construction and handover stage of the project. Refer to Table 2.5 for the general system configuration requirements of the guest elevator.

表 2-5 客梯主要功能配置表

Table 2-5 General function configuration for guest elevator

序号 S/N	功能配置 Function Configuration	要求 Requirements
1	残疾人士功能 Function for Disabled P	至少有一部客房电梯按照无障碍要求设置 Minimum one (1) guest elevator shall be provided with barrier-free requirements.
2	驱动机构 Drive Mechanism	变压变频调速 VVVF
3	轿厢门机 Car Door Operator	变压变频调速 VVVF
4	对重保护装置 Counterweight Safety Gear	当底坑下方有人能够到达，必须设置对重安全钳或将对重缓冲器安装于一直延伸到最底层坚固地面的实心墩。 If the space under the elevator pit is accessible, counterweight safety gear shall be provided or counterweight buffer shall be installed with extension to the solid pier of the ground floor at the lowest level.
5	自动平层和微动平层功能功能 Automatic Leveling and Micro Leveling	需配置 To be provided
6	满载直驶功能 Full Car By-pass	需配置 To be provided
7	电梯门安全保护装置 Car Door Safety Device	红外 3D 光幕感应或者超声波感应 Infra-red 3D screen sensor or ultrasonic sensor
8	消防开关 Fireman Switch	一楼大堂电梯厅需设有消防开关，能手动迫降同一区域所有电梯 Fireman switch shall be provided in the 1st storey elevator lobby for manual homing of all the elevators in the same zone.
9	操作面板 Operating Panel	普通电梯轿厢前侧设置左右两块操作面板；无障碍电梯采用三块操作面板，其中一块副操作面板安装在轿厢侧壁 Two (2) operating panels to be provided at both sides of the car front wall for general elevator. Three (3) operating panels to be provided for barrier-free elevator with the 3rd operating panel located at the car side wall.
10	空调系统 Air Conditioning System	需配置专用于电梯轿厢的分体空调系统，安装在轿厢顶（冷暖型） Dedicated split air conditioning system shall be provided for the elevator car and located at the car top (cooling and heating).

序号 S/N	功能配置 Function Configuration	要求 Requirements
11	到站钟（中英文报站） Arrival Gong (Chinese and English)	到站鸣钟提示乘客轿厢已经到达目的层站（安装在轿厢顶部和底部） On arrival, an arrival audible signal shall be sounded and heard to announce the arrival of the elevator car to the serviced floor (located at the top and bottom of the car).
12	轿内错误指令人工消除 Manual Cancelation of False Command in the Car	误按了轿内指令按钮，连按两次该按钮，可取消该指令 Press the car button twice to cancel false command
13	五方/（六方）通话系统 Five-way/ (Six-way) Intercom System	轿厢、电梯基坑、轿顶、电梯机房(仅有机房电梯)、消防控制中心、（电话总机房）可实现五/（六）方通话 Five-way/ (six-way) intercom shall be provided among elevator car, elevator pit, car top, machine room (if the elevator is of machine room type) and fire command center (and telephone exchange center).
14	门禁系统 Access Control System	客房客梯两块操作面板均需设置门禁读卡系统，门禁刷卡后方能选择客房楼层 Access control system shall be provided for both operating panels in the guest elevator. The guest needs to flash the card against the card reader in order to select the designated guestroom floor.
15	背景音乐/广播 Public Address and Background Music System	配置背景音乐（兼做应急广播），需预留广播位置及线缆 To provide background music (double up as emergency voice communication) and to reserve space for speaker and cabling.
16	轿厢内多媒体显示系统 Car Multimedia Display System	预留视像及音频信息系统线缆 To reserve space for AV system cabling
17	监控系统 CCTV System	配置，主机设置在消控中心，轿厢顶预留监控摄像头位置和电缆 To be provided. The main station to be located at the fire command center. To reserve space for CCTV camera and cabling at the top of the car.
18	轿厢内轿厢位置及运行方向组合显示器 Integrated Monitor for Car Location and Direction	COP 上设置 15 英寸彩色 LCD 显示屏，左右各一块。楼层和运行方向指示信息在 LCD 屏上叠加显示 15 inch color LCD display on both sides of the COP. Car location and direction to be overlapping displayed in the LCD screen.
19	应急照明 Emergency Lighting	至少一盏灯具有应急功能，并保证1.5小时的使用时间 Minimum one (1) emergency lighting with 1.5 hour duration of operation

序号 S/N	功能配置 Function Configuration	要求 Requirements
20	轿厢顶应急逃生口 Car Top Emergency Exit	装修时严禁封死 The emergency exit shall not be blocked during construction.
21	电梯厅和轿厢装饰 Elevator Lobby and Car Interior Finishes	轿厢按钮和电梯厅按钮、到站灯及轿厢内部装饰由室内设计确定；如装修要求轿厢地板采用大理石，需考虑底板与门槛的高差≥2cm，所有设计应由希尔顿全球技术服务部审阅。 Car button, hall button, arrival lantern and car interior finishes shall be selected by the interior designer. If marble is used for car floor, minimum 2cm height difference shall be allowed between the floor and doorsill. All the design shall be submitted to Hilton Worldwide Technical Service Department for review and approval.
22	多台电梯群控 Multi-elevator Group Control	控制系统将 2-8 台邻近的电梯统一管理，根据建筑物中的交通状况和相应的服务要求，提高运输效率。 The control system shall manage 2-8 numbers of elevators in the same zone and improve the transportation efficiency according to the building traffic condition and the service requirements.
23	电梯远程管理系统 Elevator Remote Control System	保安监控室必须要有电梯运行状态显示装置 Elevator status monitoring device shall be provided in the security room.
24	应急功能 Emergency Operation	需配置，如消防迫降、停电自动平层等 To provide, e.g. automatic homing during fire, automatic leveling during power failure, etc.
25	供电要求 Power Supply Requirement	双电源末端切换+发电机供电 Dual power supply with terminal change-over and generator power supply

B. 控制柜、门机、曳引机、安全钳、限速器、钢丝绳/带六大部件需原厂进口（进口部件须为欧美或日本生产），其余部件（轿厢板、轿厢外壳、电梯操作盘、缓冲器、称重装置、导轨等）需至少采用原厂部件，不允许采用第三方公司部件，招标过程中不满足要求时须提交希尔顿全球审核批准。

The six (6) main components, namely control cabinet, door operator, traction machine, safety gear, governor, and steel wire rope, shall be of original import. (The imported components shall be from Europe, United States or Japan.) The rest of components (car enclosure panel, car external panel, elevator supervisory panel, buffer, weighting device, guide rail, etc.) shall be of original import as the minimum requirement and products from a third party company shall not be used. Any deviation or incompliance during the tender stage shall be submitted to Hilton Worldwide for review and approval.

C. 典型客梯的轿厢功能示意如图 2-2 所示，图 2-3 为无障碍电梯的功能要求示意。
Please refer to Figure 2-2 for the diagram of typical guest elevator car function requirements and Figure 2-3 for the diagram of barrier-free elevator function requirements.

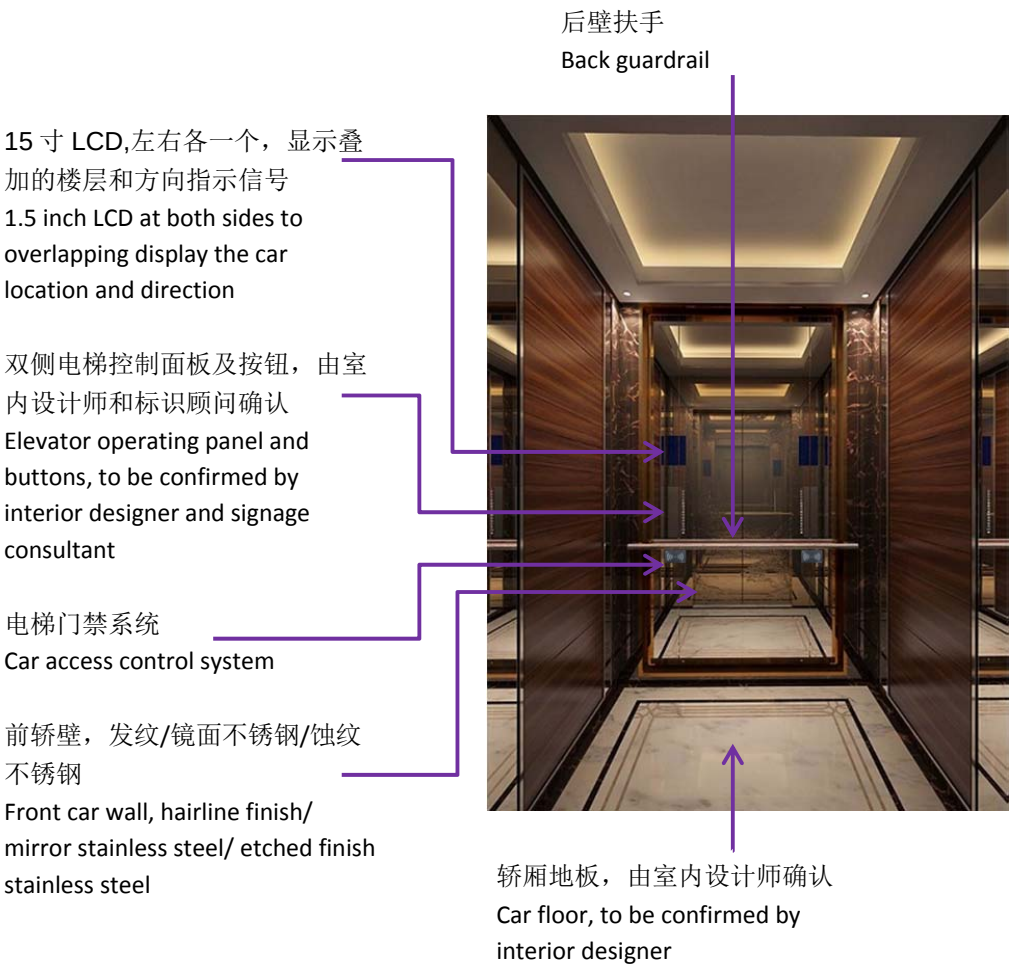


图 2-2 普通客梯轿厢功能要求示意
Figure 2-2 Diagram of typical guest elevator car function requirements



图 2-3 无障碍客梯轿厢的功能要求示意

Figure 2-3 Diagram of barrier-free elevator function requirements

D. 裙房客梯应在按钮上标识各楼层功能区的名称。图 2.4-2.5 为标准裙房和客房客梯的控制面板按钮示意，供参考。面板及按钮的样式应由室内设计师和标识顾问确定，希尔顿全球审核批准。

The name of function areas in every floor shall be indicated on the buttons of the podium elevator. Please refer to figure 2-4 to 2-5 for typical operating panel button layout for podium and guest elevators, for reference only. The type of panel and button shall be confirmed by the interior designer and signage consultant and submitted to Hilton Worldwide for review and approval.



图 2-4 裙房客梯面板按钮示意

Figure 2-4 Typical operating panel button layout for podium elevator

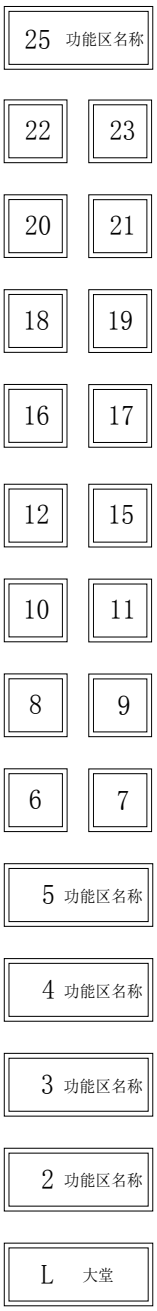


图 2-5 客房客梯面板按钮示意

Figure 2-5 Typical operating panel button layout for guest elevator

2.4. 服务梯
SERVICE ELEVATOR

A. 通常服务梯（货梯）用于客房服务、餐饮服务、物业维修等，应和酒店客梯独立，避免服务时使用酒店客梯。

Service (Freight) elevators are usually used for room service, housekeeping, F&B service,

facility maintenance etc. and shall be separated from the guest elevators. The guest elevator shall be avoided to be used as service/ freight elevator.

B. 所有服务梯（货梯）轿厢必须具有“火灾情况下禁止使用电梯，请使用疏散楼梯”的标识。
All Service (Freight) elevator cabs must have signs that read “In fire emergency do not use elevator – please use exit stairs.”

2.4.1. 客房服务梯
Room Service Elevator

A. 客房数量在 250 间内需设置 2 部成组服务电梯，超过 250 间客房后每 125 间客房增设一部电梯。客房服务梯首选载重量 1800kg，在建筑条件限制时可选择 1600kg；仅在服务客房数量不超过 150 间且建筑结构无法更改时最小不低于 1350kg，且必须获得希尔顿全球的事先批准。客房服务梯宜采用深轿厢电梯，客房区且至少有一部电梯满足运输医用担架的要求。
Minimum one pair of elevators (2 numbers) shall be provided if there are not more than 250 hotel rooms. If more than 250 rooms, one elevator shall be provided for every additional 125 rooms. The capacity of the guest elevator is preferred to be 1800kg. Capacity of 1600kg can be selected if there is constrain of construction condition. If there are less than 150 guest rooms and no change is allowed to the building structure, the elevator can be provided with capacity of not less than 1350kg but subject to Hilton World wide’s approval. Deeper car depth is preferred and minimum one (1) elevator shall be provided to meet requirements of medical stretcher transportation.

B. 若酒店高区设置有餐饮厨房，应至少设置一部由粗加工厨房至高区厨房的专用电梯。
If there is kitchen located at the hotel high zone, there shall be at least one (1) number of dedicated elevator to serve between the production kitchen and the high zone kitchen.

C. 服务电梯的净高不低于 2800mm，开门尺寸建议为 1200~1400mm x 2300~2400mm（WxD）。有大型家具运输需求，或为空中大堂式高区服务梯宜采用中分四扇门或侧开门，门宽至少为 1300mm。
The car clear height of the service elevator shall not be less than 2800mm. The minimum door size shall be 1200~1400mmX2300~2400mm (WXD). If there is requirement of large furniture transportation or service elevator serving sky lobby at high zone, car door is recommended to be center opening type with four (4) door panels or side opening type with minimum car door width of 1300mm.

D. 若酒店设置在高区，且在高区设置设备层。需要设置至少一部载重量不小于 2000kg 的服务梯，净高不低于 3200mm。设计时需考虑井道尺寸满足设备层设备的运输需求。
If the hotel and its equipment are located at high zone, at least one (1) number service elevator with minimum capacity of 2000kg and minimum car clear height of 3200mm shall be provided. Considerations shall be given to the design of hoist way that the size of the proposed hoist way can meet the requirements of large equipment transportation.

2.4.2. 裙房服务梯/货梯
Podium Service/ Freight elevator

A. 酒店应至少设置 2 台裙房专用服务梯/货梯，其中至少一部载重量不低于 1800kg。
There shall be minimum two (2) numbers of dedicated service/ freight elevators serving the podium. At least one of the elevators shall be of minimum 1800kg capacity.

B. 裙房服务梯载重量应根据具体使用功能确定，净高不低于 2800mm，采用侧开门或中分门的开门方式。
The capacity of the podium service elevator shall be decided according to the specification and operation requirements. The car clear height shall not be less than 2800mm. The car door shall be side or center opening type.

C. 酒店至少为宴会厅/中餐厅厨房等设置两部 1350kg 厨房专用服务梯。垃圾梯与食物梯必须分开，动线应靠近卸货平台和各层厨房。
There shall be minimum two (2) numbers of dedicated kitchen service elevators for ballroom or Chinese restaurant kitchen, each with capacity of 1350kg. Elevators serving foods and transporting garbage shall be separated and located in the proximity of the loading/ unloading bay and kitchens at each level.

D. 当酒店厨房和餐厅/包房不在同一楼层时，必须设置传菜电梯。由厨房顾问提出明确要求，希尔顿全球批准确认。
A dedicated elevator for serving the food shall be provided if the kitchen and the restaurant/ private dining rooms are not located at the same floor. The detailed requirements shall be given by the kitchen specialist and submitted to Hilton Worldwide for review and approval.

E. 兼做货梯的服务梯载重量应不低于 1800kg，净高不低于 2900mm，采用侧开门或中分四扇门的开门方式。货梯的宽度至少应满足运输物品的宽度+600mm，动线应靠近宴会厅家具储藏间和卸货平台。
The service dumb waiter, which doubles as freight elevator, shall be of minimum capacity of 1800kg and minimum car clear height of 2900mm. The car door shall be side opening type or center opening type with four (4) door panels. The width of the freight elevator shall be at least 600mm in addition to the required goods width. The freight elevators shall be located in the proximity of the ballroom furniture storeroom and the loading/ unloading bay.

F. 服务梯/货梯开门尺寸建议为 1200~1400mm x 2300~2400mm(W x D)。
The recommended car door size for service/ freight elevator is 1200~2500mm x 2300~2400 mm (WXD).

G. 大于 1400 m2 的宴会厅/展厅需设置一部汽车梯，汽车梯的载重量不低于 4500kg，净高不低于 2900mm。
Vehicles elevator with minimum capacity of 4500kg shall be provided for ballroom of more than 1400m2. The minimum car clear height shall be 2900mm.

H. 汽车梯可兼做裙房区的货梯，货梯必须由司机操作，平时严禁载人。
Vehicles elevator can be used as freight elevator for podium area. The elevators shall be operated by trained personnel and shall not be allowed to carry passengers during normal operation.

2.4.3. 系统配置要求
System Configuration Requirements

A. 需要在项目的设计、建造、交付阶段提供电梯停层表、电梯土建参数表、电梯功能表等相关信息供希尔顿全球知悉确认。货梯/服务梯主要配置要求参考表 2-6。
The elevator stop level chart, civil engineering parameter table, function table and other relevant information for the elevator shall be provided to Hilton Worldwide for review and approval at the design, construction and handover stage of the project. Refer to table 2.6 for the general system configuration requirements of the goods/ service elevator.

表 2-6 服务梯主要配置要求表

Table 2-6 Service elevator system configuration requirements

序号 S/N	功能配置 Function Configuration	要求 Requirements
1	轿厢型式 Car Type	宜采用深轿厢 Recommended to use deep car
2	驱动机构 Drive Mechanism	变压变频调速 VVVF
3	对重保护装置 Counterweight Safety Gear	当底坑下方有人能够到达，必须设置对重安全钳或将对重缓冲器安装于一直延伸到最底层坚固地面的实心墩。 If the space under the elevator pit is accessible, counterweight safety gear shall be provided or counterweight buffer shall be installed with extension to the solid pier of the ground floor at the lowest level.
4	电梯门安全保护装置 Car Door Safety Device	红外光幕感应 Infra-red screen sensor
5	消防开关 Fireman Switch	首层电梯厅设置消防开关，可进行手动迫降 Fireman switch shall be provided in the 1st storey elevator lobby which can be used for manual homing of the elevators.
6	操作面板 Operating Panel	设置一块操作面板，包括所有必要的按纽，采用防破坏设计，材质为不锈钢 One (1) operating panel to be provided, including all necessary buttons with anti-vandal design. Material to be stainless steel.
7	内壁 Car Wall	采用厚不锈钢面板，壁厚不低于2.0mm；在两侧及后壁上安装防撞保护条 To use thick stainless steel panel with thickness of not less than 2.0mm. To provide anti-collision protection plates at both side walls and the rear wall.
8	到站钟 Arrival Gong (Chinese and English)	到站鸣钟提示乘客轿厢已经到达目的层站（安装在轿厢顶部和底部） On arrival, an arrival audible signal shall be sounded and heard to announce the arrival of the elevator car to the serviced floor (located at the top and bottom of the car).

序号 S/N	功能配置 Function Configuration	要求 Requirements
9	轿内错误指令人工消除 Manual Cancelation of False Command in the Car	误按了轿内指令按钮，连按两次该按钮，可取消该指令。 Press the car button twice to cancel false command
10	五方/（六方）通话系统 Five-way/ (Six-way) Intercom System	轿厢、电梯基坑、轿顶、电梯机房(仅有机房电梯)、消防控制中心、（电话总机房）可实现五/六方通话 Five-way/ (six-way) intercom shall be provided among elevator car, elevator pit, car top, machine room (if the elevator is of machine room type) and fire command center (and telephone exchange center).
11	应急广播 Emergency Voice Communication	在轿顶配置应急广播 To be provided at the car top
12	监控系统 CCTV System	配置，主机设置在消控中心，轿厢顶预留监控摄像头位置和电缆 To be provided. The main station to be located at the fire command center. To reserve space for CCTV camera and cabling at the top of the car.
13	照明 Lighting	采用嵌入式带罩日光灯具 To use fluorescent lighting, recessed type with cover
14	应急照明 Emergency Lighting	至少一盏灯具有应急功能，并保证1.5小时的使用时间 Minimum one (1) emergency lighting with 1.5 hour duration of operation
15	轿厢顶应急逃生口 Car Top Emergency Exit	轿厢顶须有应急逃生口 The emergency exit shall be provided at the car top.
16	电梯远程管理系统 Elevator Remote Control System	保安监控室必须要有电梯运行状态显示装置 Elevator status monitoring device shall be provided in the security room.
17	应急功能 Emergency Operation	需配置如消防迫降、消防运行（兼做消防电梯的服务电梯）等 To provide, e.g. automatic homing during fire, fire-fighters service operation (if the service elevator doubles as fire elevator), etc.
18	供电要求 Power Supply Requirement	双电源末端切换+发电机供电 Dual power supply end change-over and generator power supply

B. 2.5m/s 及以上速度服务梯控制柜、门机、曳引机、安全钳、限速器、钢丝绳/带六大部件需原厂进口（进口部件须为欧美或日本生产），其余部件（轿厢板、轿厢外壳、电梯操作盘、缓冲器、称重装置、导轨等）需至少采用原厂部件，不允许采用第三方公司部件，招标过程中不满足要求时须提交希尔顿全球审核批准。

For service elevators with speed of 2.5m/s or above, the six (6) main components, namely

control cabinet, door operator, traction machine, safety gear, governor, and steel wire rope, shall be of original import. (The imported components shall be from Europe, United States or Japan.) The rest of components (car enclosure panel, car external panel, elevator supervisory panel, buffer, weighting device, guide rail, etc.) shall be of original import as the minimum requirement and products from a third party company shall not be used. Any deviation or incompliance during the tender stage shall be submitted to Hilton Worldwide for review and approval.

2.5. 消防电梯
FIREFIGHTING ELEVATOR

A. 高度超过 24m 的酒店应归为一类高层建筑，需要设置消防电梯。消防电梯的设置应满足 GB50045 和其他相关规范的要求。
Hotel with the height of more than 24 meters is classified as Class 1 high-rise building and fireman elevator shall be provided. The design and installation of the fireman elevator shall comply with the latest revision of GB50045 and other prevailing codes and standards.

B. 消防电梯的数量和速度应满足：
The quantity and speed of the fireman elevator shall comply with the following requirements:-

- 单层建筑面积不大于 1500 m2 时，应设 1 台；
  One (1) elevator shall be provided if the floor area is less than 1500 m2;
- 当面积大于 1500 m2，但是不大于 4500 m2 时，应设 2 台；
  Two (2) elevators shall be provided if the floor area is more than 1500 m2 but less than 4500 m2;
- 当面积大于 4500 m2 时，应设 3 台；
  Three (3) elevators shall be provided if the floor area is more than 4500 m2.
- 消防电梯的载重量不应小于 800kg 注①，行驶速度从首层至顶层的运行时间不应超过 60s。
  The minimum capacity of the fireman elevator shall be 800kg. The fireman elevator shall reach the topmost floor from the designated floor within 60 seconds.

注①：消防电梯通常兼做服务电梯，载重量通常需满足服务梯的要求。兼做消防电梯的服务梯需要设置消防切换开关。
Note①: As fireman elevator is usually used as service elevator, the capacity of the fireman elevator shall meet the requirements of the service elevator. If the service elevator is used as fireman elevator, fireman switch shall be provided.

2.6. 自动扶梯
ESCALATOR

2.6.1. 扶梯标准和要求
Escalator Standard and Requirement

C. 如果主要的宴会厅和会议室与街道/大堂不在同一楼层，则必须提供自动扶梯。
Escalators shall be provided if the main ballroom and conference room are located on a different level from the street or main lobby.

D. 自动扶梯的梯级宽度至少为 1.0m。水平梯级采用 2 梯级，当提升高度大于 6m 时应至少采用 3 梯级。
The minimum width of the escalator shall be minimum 1.0 meter. Two (2) numbers of horizontal steps shall be provided. If the rise is more than 6 meter, there shall be at least three (3) numbers of horizontal steps.

E. 自动扶梯的最高速度不超过 0.5m/s。
The maximum speed of the escalator shall be 0.5m/s.

F. 自动扶梯的最大倾角为 30°。
Maximum inclination of escalators is 30 °.

G. 自动扶梯的处理能力应满足：最多在 20 分钟内，将所有宴会厅所有人员运输到主要出入口处。若设置有专用裙房电梯时，疏散比例可按表 2.1 进行考虑；若设置有客用楼梯时，可安排 50%的人流由此进行疏散。自动扶梯最大运输能力按 6000 人/小时进行计算。
The design of the escalator shall be able to cater for the demand of transporting all the guests from a fully occupied ballroom to the main ingress/ egress within 20 minutes. If there is dedicated podium elevator, Table 2.1 can be used for reference for the ratio of passenger evacuation. If there is guest staircase, 50% of guests can be evacuated via the staircase. The maximum transportation capacity of the escalator shall base on 6000 persons/hour.

H. 如果自动扶梯是独立式的，则须提供玻璃栏杆。
Glass balustrade shall be provided if the escalator is standalone.

I. 驱动装置必须装于上部踏板平台下方空间内，齿轮类型须采用斜齿轮。
Transmission drive shall be located in the space under the upper landing. The gear shall be of helical gear type.

J. 梯级链销轴比压不应大于 23N/mm2。梯级滚轮最小直径为 75mm，并应采用橡胶或聚氨酯滚轮。
Cascade chain pin specific pressure shall not be more than 23N/mm2. The minimum diameter of the cascade roller shall be 75mm, and rubber or polyurethane roller shall be used.

K. 自动扶梯配电必须从上部踏板平台下方空间引入。
The power supply to the escalator shall be provided to the space under the upper landing.

L. 操作按钮必须安装在扶手栏的内侧盖板靠近扶手带的入口位置。必须包括一个紧急停止按钮和一个启动钥匙开关。
Operating buttons shall be installed at the inner deck of the balustrade near the inlet of the handrail, which shall consist of an emergency stop button and a start key switch.

M. 在上下踏板平台扶手栏的端部必须安装启动钥匙开关。
Start key switches shall be provided at the bottom of the balustrade at both upper and lower landings.

2.6.2. 系统配置要求
System Configuration Requirement

A. 需要在项目的设计、建造、交付阶段提供自动扶梯土建参数表、功能表等相关信息供希尔顿全球知悉确认。自动扶梯主要配置要求参考表 2-7。
The civil engineering parameter table, function table and other relevant information for the escalator shall be provided to Hilton Worldwide for review and approval at the design, construction and handover stage of the project. Please refer to Table 2-7 for the general system configuration requirements of the escalator.

表 2-7 自动扶梯主要配置要求表
Table 2-7 Escalator system configuration requirements

序号 S/N	功能配置 Function Configuration	要求 Requirement
1	驱动机构 Drive Mechanism	交流变频变压牵引电动机 Variable voltage variable frequency AC traction motor
2	人员感应 Motion Sensor	配置 To be provided.
3	紧急停止按钮 Emergency Stop Button	配置，按钮动作时应在 24 小时值班站内发出报警 To be provided. Alarm shall be sent to the 24 hour on duty station once the emergency stop button is pressed.
4	安全刷防夹装置 Deflector Brush	配置 To be provided.
5	附加制动器 Auxiliary Brake	配置 To be provided.
6	自动扶梯踏板照明和梳齿板照明 Step Lighting and Comb Lighting	配置 To be provided.
7	桁架设置喷淋 Sprinkler at Truss	视当地要求 To comply with local requirements
8	扶手带颜色 Handrail Colour	黑色 Black colour
9	扶手带照明 Handrail Lighting	配置 To be provided.
10	梯级链断链保护 Broken Step Chain Safety Device	配置 To be provided.
11	自动扶梯梯级踏板 Escalator Step Board	应采用整体铝合金铸造 To use integral aluminum alloy casting
12	其他要求 Other Requirements	各个踏板的三个边缘，前、左和右边应当使用 250 mm 宽的黄色区划线标记 Three (3) edges of each step (front, left and right) shall be provided with 250mm wide yellow demarcation line.

序号 S/N	功能配置 Function Configuration	要求 Requirement
13	其他要求 Other Requirements	扶手带外缘与各种障碍物间距小于400mm时，在与楼板交叉处以及各交叉设置的自动扶梯或自动人行道之间，应在扶手带上方设置一个固定的无锐利边缘的垂直防护挡板，其高度不应小于0.3m，且至少延伸至扶手带下缘25 mm处 If the distance between the outer edge of the handrail and any obstacles is less than 400mm, a fixed vertical protection board without sharp edges shall be provided at the cross junction of floors, escalators or automatic passenger conveyors. The height of the board shall not be less than 0.3m and it shall extend at least 25mm from the bottom of the handrail.

B. 自动扶梯驱动系统、控制柜、扶手梯构架、梯级、扶手带、栏杆、床板、安全装置等主要部件需至少采用原厂部件，不允许采用第三方公司部件，招标过程中不满足要求时须提交希尔顿全球审核批准。
Driving system, control cabinet, escalator frame, step, handrail, railing, bed plate, safety device and any other main components of the escalators shall be of original import as the minimum requirement and products from a third party company shall not be used. Any deviation or incompliance during the tender stage shall be submitted to Hilton Worldwide for review and approval.

2.7. 隔声和减震要求
NOISE ISOLATION AND ANTI-VIBRATION REQUIREMENT

A. 电梯前期设计的声学与减震应满足以下要求：
The following acoustic and anti-vibration requirements shall be provided at the early stage of the elevator design:

- 电梯井道不应与客房、会议室、餐厅、酒吧、办公室等对噪声敏感区域相邻隔墙。
The elevator hoistway shall not be located adjacent to the guest room, conference room, restaurant, bar, office or others acoustically-sensitive rooms.

- 电梯井道尺寸应符合电梯厂家的标称井道尺寸与轿厢间距要求，不得因井道尺寸缩减和空气阻力增加造成电梯噪声增加。
The elevator shaft size shall comply with the elevator factory nominal shaft size and car spacing requirements. The elevator noise shall not be increased due to shaft dimension reduction or air resistance increase.

B. 电梯的电气设备应与建筑结构隔离，以确保当按照GB/T13441.2“机械振动与冲击-人体暴露于全身振动的评定 - 第2部分：建筑物内的振动（1赫兹至80赫兹）”进行测量和评价时，在任何占用房间的地板振动在任何方向上（纵向或横向）控制在不超过0.05m/s^{2}的水平。
The elevator electrical equipment shall be isolated from the building structure and ensure

compliance with the latest revision of GB/T13441.2 “Mechanical vibration and shock - Evaluation of human exposure to whole-body vibration - Part 2: Vibration in buildings (1 Hz to 80 Hz)”. During the measurement and evaluation, the floor vibration of any occupied room in any direction (vertical or horizontal) shall not exceed 0.05m/s^2.

C. 详细的电梯隔声和减震设计应由专业的声学顾问完成。
The detailed design for the elevator noise isolation and anti-vibration shall be carried out by the professional acoustic consultant.

2.8. 节能和环保
ENERGY CONSERVATION AND ENVIRONMENTAL PROTECTION

A. 为了节约能源，在设计电梯时，需要考虑电梯系统的节能措施。主要包括：
Energy saving shall be taken into consideration in the design of the elevator system, which generally includes the followings:

1. 在方案阶段合理布局平面，合理设计交通系统；
Proper planning and design of the layout and the transportation system at the design stage.

2. 驱动主机建议使用无齿轮传动的永磁同步电动机，有齿轮传动的驱动电机应选择效率较高的传动形式；
The machine is recommended using gearless permanent magnet synchronous motor. If geared motor is used, the machine shall be selected with higher transmission efficiency.

3. 采用变频变压调速方式（VVVF）；
VVVF type of drive.

4. 提升高度超过 35m 或者额定运行速度超过 1.75m/s 电梯，建议使用能量反馈系统；
If the travelling distance is more than 35 meters or the rated speed is more than 1.75 m/s, energy recovery system is recommended for the elevator system.

5. 采用群控或其它先进的梯控方式。
The control system shall be group-control or other advanced elevator control method.

B. 自动扶梯必须考虑的节能措施主要包括：
The necessary energy saving methods for the escalator generally include the followings:-

1. 变频变压调速（VVVF）方式作为调速方式；
VVVF type of drive

2. 无乘客使用时自动停止运行或减速运行的控制方式。
The escalator shall automatically stop running or running at a lower speed when it detects no passenger for a set period of time.

2.9. 调试和验收
TESTING AND COMMISSIONING

2.9.1. 电梯的调试和验收
Testing and Commissioning for Elevator

A. 为了保证电梯正常工作，需要进行系列的测试，以确保电梯的安装满足规范、技术规格书和当地标准、法规的要求。测试需满足 GB10060 等标准和规范要求，主要包括：
A series of tests shall be carried out to ensure the elevator's compliance with the standards, technical specifications and local authorities' requirements. The testing shall comply with the latest revision of GB10060 and other standards which generally include:

表 2-8 电梯验收和调试项目分类表

Table 2-8 Schedule of testing and inspection items for elevator

序号 S/N	项类 Catagery	检验或试验项目 Inspection or Testing Item	备注 Remark
1	机器设备区间和滑轮间 Machine Room and Pulley Room	a.通道 Access	
2		b.安全空间和维修空间 Safety Space and Maintenance Space	☆
3		c.主开关、照明及其开关 Master Switch, Lighting and Lighting Switch	☆
4		d.断、错项防护和电动机电源切断检查 Break, Fault Protection and Motor Power Shut Off Inspection	☆
5		e.电气布线及安装 Electrical Wiring and Installation	
6		f.接触器和接触器式继电器 Contactor and Contactor Relay	
7		g.设备安装 Equipment Installation	
8		h.驱动主机 Drive Motor	
9		i.旋转部件的防护 Protection for Rotating Components	
10		j.电动机和其他电气设备的保护 Protection for Motor and Other Electrical Devices	
11		k.电动机运转时间限制器 Motor Running Time Limiter	☆
12		l.紧急操作 Emergency Operation	☆
13	井道 Hoistway	a.井道壁 Hoistway Wall	
14		b.检修门、井道安全门和检修活板门 Inspection Door, Hoistway Safety Door and Inspection Trap	
15		c.安全空间和安全间距 Safety Space and Safety Spacing	☆
16		d.井道照明 Hoistway Lighting	
17		e.导轨 Guide Rails	
18		f.对重和平衡重	

序号 S/N	项类 Catagery	检验或试验项目 Inspection or Testing Item	备注 Remark
		Counterweight and Balance Weight	
19		g.随行电缆 Trailing Cable	
20		h.限速器系统 Governor System	☆
21		i.缓冲器 Buffer	☆
22		j.底坑 Pit	
23	机器设备在井道时的工作区域 Working Areas for Machine in Hoistway	a.工作区域在轿厢内或轿顶上 Working Area in the Car or on Top of the Car	☆
24		b.工作区域在底坑内 Working Area in the Pit	☆
25		c.工作区域在平台上 Working Area in the Platform	☆
26		d.工作区域在井道外 Working Area outside the Hoistway	
27		e.门和检修活板门 Door and Inspection Trap	
28	轿厢 Car	a.轿厢总体 Overall Car	
29		b.轿门护脚板 Toe Guard	☆
30		c.轿门 Car Door	☆
31		d.轿厢玻璃 Car Glass	
32		e.轿顶 Car Top	
33		f.轿厢安全窗和轿厢安全门 Car Safety Window and Car Safety Door	☆
34		g.紧急照明 Emergency Lighting	
35		h.安全钳 Safety Gear	☆
36		i.轿厢上行超速保护装置 Car Top Overspeed Governor Device	☆
37		j.通风机照明 Fan Lighting	
38	悬挂和补偿装置 Suspension and Compensating Device	a.悬挂装置 Suspension Device	
39		b.补偿绳 Compensating Rope	
40	层门和层站 Landing Door and Landing	a.层站指示和操作装置 Landing Indicating and Operating Device	
41		b.层站处运行间隙和安装尺寸 Landing Running Clerance and Installation Size	

序号 S/N	项类 Catagery	检验或试验项目 Inspection or Testing Item	备注 Remark
42		c.层门防护 Landing Door Protection	☆
43		d.紧急和试验操作装置 Emergency and Inspection Operation Device	☆
44		e.层门玻璃 Landing Door Glass	
45		f.层门耐火 Landing Door Fire Resistance	
46	电气安全装置 Electrical Safety Device	a.电气开关的安装检查 Installation and Inspection of Electrical Switches	☆
47		b.电气安全装置的作用方式 Mode of Operation for Electrical Safety Device	☆
48		c.电气安全装置 Electrical Safety Device	☆
49		d.安全触点 Safety Contact	☆
50	紧急报警装置 Emergency Alarm Device	a.电梯管理机构的应急响应 Emergency Response of the Elevator Management	☆
51		b.轿厢内报警装置 Car Alarm Device	☆
52		c.紧急操作处对讲装置 Emergency Two-way Intercom	☆
53		d.井道内报警装置 Hoistway Alarm Device	☆
54		e.报警装置电源 Power Supply to Alarm Device	☆
55		f.报警装置通话要求 Alarm Device Communication Requirements	☆
56	电磁运行控制 Electromagnetic Operation Control	a.门开着情况下的平层和再平层控制 Leveling and Re-leveling Control with Car Door Open	☆
57		b.检修运行控制 Inspection Operation Control	☆
58		c.紧急电动运行控制 Emergency Electrical Operation Control	☆
59		d.对接操作运行控制 Docking Operation Control	☆
60	验收试验项目与试验要求 Acceptance Test Items and Testing Requirements	a.速度 Speed	
61		b.平衡系数 Balance Coefficient	
62		c.启动加速度、制动减速度和A95加速度、A95减速度 Start Acceleration, Braking Deceleration	

序号 S/N	项类 Catagery	检验或试验项目 Inspection or Testing Item	备注 Remark
		and A95 Acceleration, A95 Deceleration	
63		d.振动 Vibration	
64		e.开关门时间 Door Opening and Closing Time	
65		f.平层准确度和平层保持精度 Landing Accuracy and Leveling Accuracy	
66		g.运行噪声 Operation Noise	
67		h.超载保护 Overload Protection	
68		i.制动系统 Braking System	☆
69		j.曳引条件 Traction Condition	☆
70		k.限速器与安全钳 Speed Governer and Safety Gear	☆
71		l.轿厢上行超速保护装置 Car Top Overspeed Governor Device	☆
72		m.缓冲器 Buffer	☆
73		n.层门与轿门联锁 Landing Door and Car Door Interlock	☆
74		o.极限开关 Limit Switch	☆
75		p.运行 Operation	
注：表中备注栏内标有“☆”的为重要项目，其余为一般项目 Note: Items with "☆" in the remark column are important items. The rest are general items.			

B. 电梯应按照 GB10060 规定的安装验收标准进行验收。交付的电梯需满足所有验收项目均为合格并提供验收记录表。
The acceptance inspection of the elevator shall comply with the installation and inspection requirements as per GB10060. All the inspection items shall be qualified before the handover of the elevator and the acceptance form shall also be provided.

C. 酒店项目在投入运营前 2 个月，应完成所有电梯的调试和验收、并取得当地部门颁发的批文和证书。
Two months before the hotel is completed and put into operation, the elevators shall be tested, inspected and approved by the local authorities with issuance of relevant approval document and certification.

D. 电梯厂商需提供以下书面文件供酒店管理公司知悉、备存。
The elevator manufacturer shall provide the followings for the hotel management’s reference and record:-

1. 调试验收记录
Testing and inspection records

2. 相关部门的电梯验收合格报告（参考 TSG T7001 附录 B）
   Elevator acceptance reports from relevant authorities (refer to TSG T7001 Appendix B)

3. 电梯定期检验报告（酒店运营阶段，参考 TSG T7001 附录 C）
   Elevator regular inspection reports (for hotel operation period, refer to TSG T7001 Appendix C)

2.9.2. 自动扶梯的调试和验收
Testing and Commissioning for Escalator

A. 在电梯投入使用前，必须完成以下一系列的调试和验收工作。验收检查和测试需满足 GB16899 等标准和规范要求，主要包括：
Tests and inspections shall be carried out before the intended use of the elevator. Acceptance inspection and testing shall comply with the latest revision of GB16899 and other codes and standards which generally include the followings:-

1. 整体外观检查
   Overall visual inspection

2. 功能测试
   Functional test

3. 电气安全装置动作的有效性试验
   Electrical safety device test during operation

4. 对空载自动扶梯或自动人行道进行制动试验，以确定是否符合所规定的制动距离
   Brake test for no load escalator or automatic passenger conveyor to ensure compliance with the required braking distance as per standards.

5. 测量不同回路导线与地之间的绝缘电阻
   Measurement of the insulation resistance between different circuit conductors and the earth.

6. 应进行自动扶梯或人行道驱动站处的接地端子与其他容易于意外带电零部件之间连接的电气连续性试验。
   Electrical continuity test for the connection between the earthing terminals located at the motor of the escalator or passenger conveyor and other components which may likely become live in accidental situations

B. 酒店项目在投入运营前 2 个月，应完成所有自动扶梯的调试和验收、并取得当地部门颁发的批文和证书。
The escalators shall be tested, inspected and approved by the local authorities two months before the hotel is completed and put into operation.

C. 电梯厂商需提供以下书面文件供希尔顿全球知悉、备存。
The elevator manufacturer shall provide the followings for Hilton Worldwide's reference and record:-

1. 调试记录
   Test results

2. 电梯验收合格报告（参考 TSG T7005）
   Elevator acceptance reports (refer to TSG T7005)

第3章. 消防与生命安全系统
SECTION 3: FIRE PROTECTION AND LIFE SAFETY SYSTEM

3.1. 概述
GENERAL

A. 本标准详细说明了全球希尔顿品牌旗下所有新建酒店、改牌酒店和改造酒店在设计及施工过程所需满足的消防生命安全要求。这些要求适用于希尔顿全球范围内所有酒店，包括自有、委托管理和特许经营的酒店。
This standard stipulates in detail the Fire protection and life safety requirement for the design and construction of new properties, conversion of existing properties (brand-changed) and retrofitting of existing properties under the Hilton Worldwide Portfolio of brand. These requirements are applicable to all properties within the Hilton Worldwide system including those that are owned, managed and franchised.

B. 这些功能性的要求旨在保护希尔顿全球旗下酒店的客人和员工的生命安全。
These requirements are performance based with the goal of safeguarding the life safety of guests and employees from fire threats or hazards within all Hilton Worldwide properties.

C. 需参照以下规范的最新版执行。
Latest version of the following codes of practice shall be used in the design and construction of the fire protection systems:

1. GB50016 建筑设计防火规范
   GB50016 Code of Design on Building Fire Protection and Prevention
2. GB50045 高层民用建筑设计防火规范
   GB50045 Code for Fire Protection Design of Tall Buildings
3. GB50084 自动喷水灭火系统设计规范
   GB50084 Code of Design for Sprinkler System
4. GB50219 水喷雾灭火系统设计规范
   GB50219 Code of Design for Water Spray Extinguishing System
5. GB50370 气体灭火设计规范
   GB50370 Code for Design of Inert Gas Fire Extinguishing Systems
6. GB50140 建筑灭火器配置设计规范
   GB50140 Code for Design of Extinguisher Distribution in Building
7. CECS 263 大空间智能型主动喷水灭火系统技术规程
   CECS 263 Technical Specification for Large-Space Intelligent Active Control Sprinkler System
8. CECS 233 厨房设备灭火装置技术规程
   Technical Specification for Fire Extinguishing Equipment of Cooking Appliance – CECS233
9. GB50116 火灾自动报警设计规范
   Code for Design of Automatic Fire Alarm System – GB50116
10. JGJ16 民用建筑电气设计规范
    JGJ16 Code for electrical Design of Civil Buildings

11. GB50028 城镇燃气设计规范
    GB50028 Code for Design of City Gas Engineering

D. 当地方、区域或国家主管部门（即具有法律管辖权的部门）的要求与希尔顿全球标准的要求不同时，应当严格遵守较严格的要求。上述标准冲突之处，应提交希尔顿全球建筑及建造部门进行审核及解决。如果当地主管部门无法行使管辖权，希尔顿全球保留为本项目或酒店补充额外的消防与生命安全标准的权利。
Where the requirements of local, regional and/or national authorities (i.e the Authority having Jurisdiction hereafter) exceed those prescribed by Hilton Worldwide, the more stringent standard must be followed. Conflicts between applicable standards must be referred to Hilton Worldwide Architecture and Construction Group for review and resolution. When applicable standards from the Authority having jurisdiction are not available, Hilton Worldwide reserves the rights to specify additional fire and life safety standards to a project or property.

E. 在某些特殊条件情况下，可能需要考虑替代的设计方法。本标准并不限制采用具有等效或更高品质、强度、防火性能，有效性、耐用性和安全性的系统、方法和设备。
In the event of unusual circumstances, alternative design approach may be considered. This standard does not limit the application of system, method or devices of equivalent or superior in quality, strength, fire resistance, effectiveness, durability and safety.

F. 消防系统需要经过酒店认可的消防顾问检测合格后方可移交给酒店管理方。
Fire protection system shall be tested and certified by fire consultant recognized or acknowledged by Hilton Hotel before handed over to the Hotel Management Team.

3.2. 建筑结构防火
BUILDING STRUCTURE FIRE PROTECTION

A. 建筑构件的最低耐火等级必须遵循希尔顿建筑章节的相关规定。当希尔顿标准中引用的建筑构件规范不是现行规范且与本章节不一致时，希尔顿全球保留使用替代或者补充建筑结构规范的权利。同时需满足下列最低标准。
The minimum fire resistance rating of building structure shall comply with the construction codes stipulated in Hilton Worldwide Architectural Standards. When the building structure construction codes stipulated in Hilton Worldwide Architectural standards differ from the latest prevailing codes and regulations, Hilton Worldwide reserves the right to stipulate the use of alternative or supplementary construction codes. In addition, the following minimum standards apply:

B. 除独立的附属建筑物外，屋面必须采用 UL(美国安全检测实验室)认证“A,B 或 C 级”或国家认可的同等级别材料。
Materials used for roof systems, except for ancillary detached building, must be UL “Class A, B or C” certified or equivalent material approved by local authorities.

C. 下列区域需采用防火构造。以下区域结构支撑系统必须采用不低于下表耐火极限的建筑构件。
The following areas and elements of structures shall be constructed of non-combustible materials and to have fire resistance for not less than the relevant period specified herewith in the table:

表 3-1 建筑结构耐火时间要求

Table 3-1 Building Structure fire resistance period requirement

区域 **Area**	**1小时** **One-Hour**	**2小时** **Two-Hour**
所有楼板、承重墙、柱和梁 All floors, load-bearing walls, columns, and beams	X	
客房隔墙* Guestrooms separation wall	X	
走廊和客房间隔墙* Corridor and guestroom separation wall	X	
设有燃气设备的房间 Room containing gas fired equipment	X	
洗衣房周边 Laundry area perimeter	X	
楼梯间和电梯井 Stairs and elevator shafts	小于四层 < Four Floors	大于等于四层 ≧Four Floors
烟囱井 Flue Exhaust Shaft	小于四层 < Four Floors	大于等于四层 ≧Four Floors
布草井 Linen chute	小于四层 < Four Floors	大于等于四层 ≧Four Floors
垃圾房* Refuse Storage Chamber		X
可回收物储存间* Recycle storage room		X

*在设有自动喷水灭火系统的情况下，若当地消防审批部门同意可按本表 50%的耐火等级数量。

*For building provided with automatic fire sprinkler system, the fire resistance rating stated in the above table could be reduced by half, but shall be subjected to the final approval by Local Fire Bureau.

D. 当地主管部门允许时，防火分区的分隔门应采用满足以下耐火极限的常闭式防火门。
Doors used at the fire compartment or fire separation zones shall be normally closed with the following fire resistance rating, subject to the approval of the Local Authorities:

表 3-2 防火门耐火时间

Table 3-2 Fire rated door resistant period

	With Sprinkler **有喷淋**	**Without Sprinkler** **无喷淋**
One-Hour Fire-Rated Wall 一小时耐火极限的防火墙	20 minutes 20分钟	30 minutes 30分钟
Two-Hour Fire-Rated Wall 两小时耐火极限的防火墙	60 minutes 60分钟	90 minutes 90分钟
Guestroom Entry Door 客房门	20 minutes 20分钟	30 minutes 30分钟

E. 综合体建筑必须在酒店和相邻区域之间设置 2 小时耐火极限的防火分隔。当整个建筑全面采用自动喷淋系统进行保护时，此防火分隔的耐火极限的要求降低为 1 小时。如果附属功能区域（例如零售区）建筑面积占比小于 10%时，则无需考虑防火分隔要求。停车

库不能作为一个独立功能区域考虑防火分隔。
Mixed-use building must have a 2 hours fire resistance separation between the property and adjacent occupancy. The fire resistance rating could be reduced to 1 hour when the entire building is protected by automatic fire sprinkler system. When affiliated functional areas, such as retail spaces, are less than 10% of the building area, no fire resistance separation is required. Car park shall not be used as an independent functional area for fire resistance separation consideration.

F. 防火门及门框必须有当地国家消防机构认可的耐火等级认证。防火门及门框边缘须贴有金属的封条或标签标明其耐火等级。
Fire rated doors and frame with fire resistance certification issued by Local Fire Safety Bureau shall be used. A proprietary metal seal or label must be attached to the edge of the door and frame indicating its fire resistance rating.

G. 当管道穿越 2 小时耐火极限的防火分隔时必需安装 90 分钟耐火极限的防火阀。
Fire damper with 90 minutes fire resistance rating must be provided for duct works penetrating through a 2 hours fire resistance separation wall.

H. 低于 24m 的建筑设置自然排烟；高于 24m 的建筑应设机械排烟或电动开启的排烟窗。
Natural ventilated smoke vent system shall be provided for building lower than 24 m. Mechanical smoke extract or motorized smoke exhaust ventilator system shall be provided for building higher than 24 m.

I. 所有安装在穿越防火分隔位置的耐火保护材料必须通过 UL(美国安全检测实验室)或等同认证。
All fire rated material installed for penetration through fire separation shall be approved by UL (America Underwriter Laboratories Inc.) or equivalent.

3.3. 灭火系统
FIRE FIGHTING SYSTEM

3.3.1. 概述
General

A. 本章节所包含的内容仅适用于制定希尔顿全球酒店内基本的灭火系统标准，建筑防火设计尚应符合当地现行有关标准的规定，如果地方规范高于希尔顿标准，则按照高的标准执行。
The content of this section is applicable in establishing the basic design requirement for fire suppression system to be used in Hilton Worldwide properties. The building fire protection design shall also comply with local codes and regulations; and when these local codes and regulations exceed Hilton World wide's Standards, the more stringent requirement shall take precedent.

B. 灭火系统的设计，应密切结合保护对象的功能和火灾特点，积极采用新技术、新设备、新材料，做到安全可靠、技术先进、经济合理。
The design of the fire suppression system shall include holistic considerations on the functionality of the protected areas, the fire characteristics, the use of new techniques, equipment and material, to achieve the objective of safety, reliability, advanced techniques and economic viability of the system.

C. 具体应用此标准时，必须针对个别酒店进行设计分析。如设计单位所提供方案中任何与本章标准中不符之处，设计单位必须以书面形式提交希尔顿审核，取得希尔顿同意后方可进行深化设计。
During the application of this standard, design analysis peculiar to each individual hotel should be carried out. This is to ensure that any discrepancies between the concept design done by the consultant and the standards of this section could be identified. These discrepancies must be referred to Hilton Worldwide in writing for their review, verification and concurrence before proceeding into detail design.

3.3.2. 供水水源及消防储水
Supply Water Source and Fire Water Storage

A. 市政消防供水管道应可靠，进水管不宜少于两条。
Municipal water supply main must be reliable with at least two incoming feeds provided for the development.

B. 供水水源的基本要求是可靠、可实施和有足够的供水能力。
Basic requirements for firewater supply include reliability, applicability and sufficiency.

C. 酒店消防灭火系统应设置消防水池，消防水池的总容量超过 500m³ 时，应分成两格。
Firewater tank must be provided for the hotel fire protection system. Firewater tank shall be separated into two compartments when its total effective capacity exceeds 500 m^3.

D. 消防水池储水量需按国家标准进行计算，并满足当地规范的规定。
Firewater tank capacity shall be calculated based on National Standards and to comply with local codes and regulation..

E. 供水系统要考虑的三个方面是：
Three aspects shall be considered for the firewater supply system:

1. 系统设计流量-L/s
System design flow rate –L/s

2. 系统设计压力-Bar
System design pressure-bar

3. 系统设计容积-m^3
System design capacity - m^3

F. 酒店内消防水源需通过消火栓泵及喷淋泵分别供至酒店消火栓系统及喷淋系统。消火栓泵及喷淋泵需分别设置 2 台，1 用 1 备。
Supply of firewater to the hotel's firefighting facilities such as the fire hydrant and automatic fire sprinkler systems shall be via the use of fire pumps. Each system shall be provided with 2 numbers of dedicated fire pumps, namely, 1 duty and 1 standby.

G. 消火栓给水系统室内外消防用水量见下表，喷淋系统用水量见 3.3.3.1 章节。
The firewater supply requirement for internal and external fire hydrant system shall be provided as per the design flow rate prescribed in the table below; firewater supply requirement for sprinkler system is illustrated in Section 3.3.3.1.

表 3-3 消火栓给水系统用水量

Table 3-3 Fire hydrant water supply requirement

建筑类别 Building Category	建筑高度h (m)、层数或体积 V (m^3) Building Height h (m), no of floors or capacity V (m^3)	消火栓用水量 (L/s) Fire hydrant water consumption (L/s)		火灾延续时间 (h) Fire duration (h)
		室外 Outdoor	室内 Indoor	
高级宾馆 High standard hotels	h≦50 h > 50	30 30	30 40	3

注：当项目生活用水量达到最大时，市政进水管不能满足项目室内外消防用水量时，消防水池的有效容积应包含火灾延续时间内室内外消防用水量总和。

Note: When domestic water consumption reaches its maximum at any one time and the municipal water supply is unable to meet the internal and external firewater demand in the property, storage capacity of the firewater tank must be sized to meet the total firewater demand, for both internal and external fire protection systems, according to the fire duration stipulated in the code.

3.3.3. 喷淋系统
Sprinkler System

A. 设计标准
Design Standard

1. 设计要求
Design Requirement

a. 自动喷水灭火系统必须由希尔顿全球认可的经验丰富并持有注册资质的专业人员进行水力设计。系统设计必须满足以下标准：
The automatic fire sprinkler system shall be hydraulically designed by competent and qualified professional acknowledged by Hilton Worldwide. The system design shall comply with the standards listed below:

b. 设计作用面积按下表取值。
Design area of operation shall base on the table below:

表 3-4 系统设计基本参数

Table 3-4 System Basic Design Parameters

火灾危险等级 Fire Hazard Category		净空高度(m) Clear Height (m)	作用面积(m^2) Operation Area (m^2)	喷水强度 ($L/min.m^2$) Water Spraying Intensity ($L/min.m^2$)
轻危险级 Extra Light Hazard		≦8	160	4
中危险级 Ordinary Hazard	I 级 Group I			6
	II 级 Group II			8
严重危险级 Extra High Hazard	III 级 Group I		260	12
	II 级 Group II			16
中庭 Atrium		8~12	260	6
会展中心 Exhibition Center		8~12	300	12

c. 酒店喷淋系统设计按中危险级 1 级的要求；车库喷淋系统设计按中危险级Ⅱ级的要求。
The property's sprinkler system design shall comply with Ordinary Hazard Group I requirement; sprinkler system design for car park shall comply with Ordinary Hazard Group II requirement.

d. 对于净空高度在 12m-16.8m 的空间需设置喷淋系统，如果当地消防部门要求设置水炮或大空间智能灭火系统，应同时设置喷淋系统。对于净空高度大于 16.8m 的空间可不设置喷淋系统。

e. Sprinkler system is required for those spaces with clear hight between 12m-16.8m. If local authority requires installing water monitor extinguishing system or large-space intelligence firefighting system, sprinker system is also required. Sprinkler system is not required for those spaces with clear hight above 16.8m.

f. 柴油发电机房、燃油/燃气锅炉房采用水喷雾灭火系统。可与自动喷淋灭火系统共用水泵，单独设置雨淋阀组、管网及喷头。
Water mist spray system shall be used for diesel generator room and oil/gas boiler room. The system shall share the same firewater pump but must be provided with separate deluge valve, pipe works and nozzles.

g. 各餐饮场所，其烹饪操作间的排油烟罩及烹饪部位设置湿式化学灭火系统，并且需同时具备 CCC 认证和 UL 或 FM 认证。
Wet type chemical fire suppression system shall be provided for kitchen fume extract hoods and cooking area in all food & beverage areas. System used shall be provided with CCC and FM certification.

h. 电梯机房需设自动灭火系统。可采用湿式系统保护；在寒冷地区，当电梯机房不在采暖区内，湿式系统工作环境温度低于 4 摄氏度时，应采用简易预作用系统或干式系统保护电梯机房。
Automatic fire suppression system shall be installed for lift motor room and wet pipe system is acceptable in this case. However, in cold weather localities, where no heating is provided for the lift motor room and wet-pipe system is operating in an environment with temperature lower than 4°C, simplified pre-action or dry-pipe system shall be used to protect the space instead.

i. IT 机房、程控交换机房及变配电机房应采用气体灭火系统，机房值班室或办公室应设置普通喷淋系统。
Inert gas fire extinguishing system shall be provided for electrical switch room, IT room and telephone exchange room. Employee duty room or office in M&E plant room shall be protected by automatic fire sprinkler system.

j. 自动喷水灭火系统的设计和安装须保证对自然灾害的抵御，包括地震，洪水和龙卷风。
Design and installation of automatic fire sprinkler system shall be capable of resisting the threats arising from natural disasters such as earthquake, flood and tornado.

2. 设计范围
Scopes of Design

a. 酒店内所有区域除不宜用水灭火的部位均需提供自动喷淋保护，下列区域需特别考虑：
Automatic fire sprinkler protection shall be provided for all areas except those that are not suitable to be protected by a wet system. Special considerations shall be provided for the following areas:

1. 所有的内部场所如客房、大于 2.2m^2 步入式衣橱、超出 5m^2 的和/或具有较多可燃固定设备的客房浴室、走廊、门廊、大厅、可燃的封闭场所都应安装自动喷淋头。
Automatic fire sprinkler shall be provided for all internal areas such as guestroom, walk-in wardrobe larger than 2.2m^2, and bathroom larger than 5m 2 and/or consists of huge amount of combustible materials, corridor, lobby, main hall; enclosed areas with combustible material shall be protected by automatic fire sprinklers.

b. 酒店内楼梯间及污衣槽等需按以下要求安装喷淋头。
Provision of sprinklers for internal staircases and linen chute shall comply with the following requirement:

1. 所有疏散楼梯间的顶部和底部需安装喷淋系统，并且地上和地下部分应分开设置。
Sprinklers shall be provided at highest and lowest floors of the escape staircase and must be via separate sub-systems.

2. 污衣槽喷淋头应采用平板隐藏式防挂喷头，需要布置在顶部、底部和隔层布置。槽门需带熔丝弹簧，熔丝为 60°C 熔断后槽盖将自动关闭槽门。污衣槽自动喷淋系统需要设置独立的垂直立管，以及相应的控制阀和水流指示器。试水阀和泄水阀设置在水流指示器后。污衣槽高度超过 50 米，可分段设置

立管和水流指示器。
Sprinkler head with guard and shield shall be installed at the top, bottom and alternate floors of the linen chute. The linen chute door shall be spring-return type with fusible link which will close door when the temperature exceed 60°C. This is to prevent fire spread through the linen chute. Dedicated vertical pipe riser, control valve and flow switch shall be provided for the linen chute. Test and drain valves shall be installed after the flow switch. Sectional installation of vertical pipe riser and flow switch is permissible when linen chute height is higher than 50 m.

c. 机械设备机房、室内游泳池休息区上方需安装喷淋头，室内游泳池水池上方宜设置喷头。
Sprinklers shall be provided for mechanical plant room, at ceilings of rest areas and directly above the pool in indoor swimming pool.

d. 吊顶夹层高度≥800mm，内应设喷淋；厨房、宴会厅、餐饮区吊顶高度大于 800mm 时，需安装喷淋。喷头流量系数为 80。
Sprinklers protection shall be provided within ceiling space for suspended ceiling height ≥800mm, such as kitchen, banquet hall and dining areas. Sprinkler head K factor shall be 80.

e. 特别需要考虑设置喷淋的区域还包括：
Sprinkler provision is also required for the following special areas:

1. 面积大于 2.2m2 的衣橱需设置喷淋系统。
Sprinkler system shall be provided for closet larger than 2.2 m2.

2. 所有步入式冷库应设置干式喷头。
Dry pipe system shall be provided for all walk-in cold rooms.

3. 所有大于 5m2 的客房浴室及公共卫生间应安装喷淋系统。
Sprinkler system shall be provided for guest bathrooms and common toilets with area larger than 5 m2.

4. 设备夹层和管道转换层应安装喷淋系统。
Sprinkler system shall be provided at equipment mezzanine floor and pipe services transfer floor.

5. 大型吊灯附近应选用动作温度 79°C 的喷头。吊灯内侧采用动作温度 93°C 的喷头。
Sprinklers with temperature rating of 79°C shall be provided at areas around large suspended lighting such as chandelier. Sprinklers with temperature rating of 93°C shall be provided for installation within the chandelier.

6. 室内游泳池和干蒸房采用带防腐涂层(镀铬)的快速响应喷头，其中干蒸房的喷头动作温度为 141°C 。
Quick response sprinkler with anti-corrosion coating (chrome-plated) shall be provided for indoor swimming pool and sauna room. Sprinkler head with temperature rating of 141°C shall be provided for sauna room.

B. 系统形式
System Types

1. 喷淋系统应优先考虑湿式系统，当冬季室外平均温度低于 4° C 时，采暖区采用湿式系统，非采暖区禁止采用湿式系统加电伴热的系统，设计应考虑干式系统或预作用系统。考虑到防冻需要，所有室外明露管道应考虑保温措施。
Wet pipe system shall be considered in the design of the automatic fire sprinkler system. However, when the external ambient temperature is lower than 4°C, wet pipe system shall only be installed in areas where heating is provided; and areas where heating is not provided shall be installed with dry pipe or pre-action system. Electric heating of wet pipe system in non-heated areas is not allowed. All external exposed sprinkler pipes shall be provided with adequate insulation to prevent freezing.

C. 主要部件
Major Components

1. 按照消防规范要求设喷淋头，下表列出特殊应用：
The type of sprinkler heads to be used at various areas shall meet the code requirement and special requirement stipulated herewith in the table below:

表 3-5 喷淋头基本选型

Table 3-5 Sprinkler head selection

位置/区域 Location/Area	喷头类型 Sprinkler Type	喷头温度等级 Sprinkler Temperature Category	喷头流量系数K Sprinkler Head K Factor
客房卧室 Guest Bedroom	快速反应扩展覆盖边墙型喷头 Quick Response Extended Coverage Sidewall Sprinkler	68°C	115
客房其他区域 Guestroom and other areas	快速反应隐蔽型喷头 Quick Response Concealed Type Sprinkler Head	68°C	80
公共区域 Common Area	快速反应型隐蔽式喷头 Quick Response Concealed Type Sprinkler Head	68°C	80
后勤区（有吊顶） Logistics area (with suspended ceiling)	快速半隐蔽式喷头 Quick Response Recessed Pendant Sprinkler Head	68°C	80
后勤区（无吊顶） Logistics area (with suspended ceiling)	快速直立型喷头 Quick Response Upright Sprinkler Head	68°C	80
停车库 Car park	快速直立型喷头 Quick Response Upright Sprinkler Head	68°C	80

位置/区域 Location/Area	喷头类型 Sprinkler Type	喷头温度等级 Sprinkler Temperature Category	喷头流量系数K Sprinkler Head K Factor
桑拿/干蒸房 Sauna/Steam Room	快速反应型防腐材质喷头 Quick Response Sprinkler with Anti-corrosion Coating	141°C	80
步入式冷库 Walk-in Cold Storage	下垂型干式喷头 Dry Type Pendent sprinkler head	68°C	80
污衣槽 Linen Chute	快速直立型喷头 Quick Response Upright sprinkler head	68°C	80
厨房、洗衣房 Kitchen, Laundry	快速反应隐蔽型喷头 Quick Response Concealed Sprinkler Head	93°C	80

注：客房卧室区的喷头形式需要结合装饰造型要求确认。

Note: Sprinkler head selected for guestroom shall be coordinated with the interior finishes.

2. 所有区域自动喷水灭火系统须全面设置快速响应喷头（客房卧室采用流量系数为 115 的喷头,其余区域采用流量系数 80 的喷头），并遵循制造商提出的安装标准。改牌酒店可以使用现有建筑已有的标准响应喷头，直至对自动喷水灭火系统进行重大改造时再进行更新。
   Quick response sprinkler shall be provided for the automatic fire sprinkler system at all areas (K factor for sprinkler head in the guestroom shall be 115 while all other areas shall be 80) and installation shall be carried out in accordance with the manufacture's guidelines. Existing hotel undergoing change of brand may retain the already installed standard resposne sprinklers. However, they shall be replaced to meet the requirement of this standard when the hotel undergoes a major retrofit.

3. 后勤辅助区域，包括洗衣房及储藏室吊顶高度低于 2.2m，且喷头明装时，应采用防撞罩对喷头进行保护。
   Exposed sprinkler head installed at back-of-house including laundry and stores with suspended ceiling height lower than 2.2m shall be protected with sprinkler guard.

4. 喷淋系统内报警阀后每个控制阀门均应为带电子监控功能的信号阀。每个分区及每个横支管均应设置水流指示器。每个水流指示器后需考虑设置不小于 50mm 的泄水阀，并设有专用排水，管网末端设置 DN25mm 测试阀。
   The control valve after the alarm valve in the automatic fire sprinkler system shall be monitored by the fire alarm system on its Open/Close status. Every control valves zonings and their horizontal distribution pipes at each floor shall be provided with a flow switch. Each flow switch shall also be provided with emergency discharge valve not smaller than 50mm and dedicated discharge stack. The most remote sprinkler of each control valve zone shall be provided with a DN25mm test valve.

5. 寒冷结冰地区（包括无采暖空间和冷藏设备）、存在腐蚀性空气的区域（泳池区，桑拿浴室和洗衣房）和暴露于含盐空气的区域内，自动喷水灭火系统在设计和元件选型上应考虑上述环境影响。

The design of the automatic sprinkler system shall take into consideration the impact of the environment in which it is being installed, such as locations or areas with extremely cold environment where freezing of water is expected (including unheated interior space and cold room equipment), corrosive environment (such as swimming pool, sauna and laundry) and saline environment.

6. 必须采取可靠措施保持湿式系统的管网和设备温度维持在 4°C（40°F）以上。喷淋系统报警阀前管网应环状供水，报警阀后管网可布置成环状或枝状。自喷系统的水平管道宜有坡度，充水管道大于 2‰；准工作状态不充水管道大于 4‰；干式系统管道大于 4‰。系统立管顶部设置自动排气阀。
Reliable measures shall be exercised to ensure that the wet pipe system is maintained to operate in an environment with ambient temperature above 4°C. Ring main circuit at the pipe works before the control valve is required. Pipe work after the control valve could either be ring or radial type. Horizontal distribution pipes for the automatic sprinkler system shall be provided with gradient greater than 2% for wet pipe system and 4% for dry pipe system. Automatic air release valve shall be provided at the highest point of the vertical pipe stack.

7. 需在喷淋泵的出口报警阀组前管段上设置电接点压力表，用于压力开关失效时启动喷淋泵。消防喷淋泵主管道上安装 1 个压力开关，直接强电硬线连接至水泵控制柜，系统压力下跌至正常值的 80%时启动主泵。若主泵出现故障，备用泵将自动启动。
Pressure switch shall be provided for fire sprinkler pump at the main pipes and shall be linked directly to pump control panel via hard wires interlock. The main pump shall be activated when the system pressure dropped beyond 80% of the required system pressure. In the event of main pump failure, the spare pump must be activated automatically. An additional pressure gauge with electric contact shall also be provided at a location between the sprinkler pump outlet and alarm valve inlet, which serve as a backup to activate the sprinkler pump when the pressure switch fail.

8. 喷淋和消火栓泵出水管应设测试排水管并接至消防水池排放，测试排水管上安装电磁式直读数字式流量计，并保持流量计前后分别有 1.0m 的水平直管，流量计安装高度不超过 2m。
A discharge pipe with diameter shall be provided for the fire sprinkler and fire hydrant pumps to be connected back to the firewater storage tank. Magnetic flow meter shall be provided on the discharge pipe to measure the water flow rate of the fire pumps. A straight pipe length of 1m must be provided before and after the flow meter to facilitate more accurate reading. The flow meter shall also be installed at a height not higher than 2m for ease of reading.

9. 管材建议详见 3.3.8 章节。
Refer to Section 3.3.8 for automatic fire sprinkler system pipe material.

3.3.4. 消火栓系统
Fire Hydrant System

A. 设计标准
Design Standard

1. 消火栓灭火系统必须由希尔顿集团认可的经验丰富并持有注册资质的的专业人员进行水力设计。系统设计必须满足以下标准：

The fire hydrant system shall be hydraulically designed by competent and qualified professional acknowledged by Hilton Worldwide. The system design shall comply with the standards listed below:

a. 消火栓系统设计用水量及火灾延续时间应满足国家相关规范要求。
The design water consumption and fire duration for fire hydrant system shall comply with National codes requirement.

b. 室内消火栓箱采用带自救卷盘。自救卷盘用水量不计入消防用水总量。
Internal fire hydrant shall be provided with hose reel. Water supply for the hose reel is taken from the internal fire hydrant through a pressure reducing valve and the amount of water required need not be computed in sizing of firewater tank

c. 室内消火栓采用带自救卷盘的消火栓。自救卷盘用水量不计入消防用水总量。
Internal fire hydrant shall be provided with hose reel. Water supply for the hose reel is taken from the internal fire hydrant through a pressure reducing valve and the amount of water required need not be computed in sizing of firewater tank.

d. 消火栓栓口出水压高于 0.5MPa 时应采取减压措施。
Appropriate measures shall be taken to reduce the water pressure of the internal hydrant when it exceeds 0.5MPa.

e. 酒店室内消火栓的设置间距应根据计算得出，确保任意一点有两股充实水柱保护, 且不应大于 30m；室外消火栓布置间距不应大于 120m。
The distance between internal hydrants must be calculated to ensure that there is two internal fire hydrants protect any one point in the property, and their distance must not exceed 30m. The distance between external hydrants must not exceed 120m.

B. 系统形式
System Types

1. 系统设计流量及火灾持续时间应同时满足国家及当地消防规范要求。
System design flow rate and fire duration shall comply with national and local fire codes.

2. 消火栓系统须为完整的系统（包括管道，水带、水枪和栓头）。消火栓系统应采用湿式系统；对于暴露于非采暖区的消火栓管道，当冬季室外平均温度低于 4° C 时应考虑防冻保温措施。
Fire hydrant system shall be wet pipe system consisting of associated pipe works, hose reel, hose and nozzles. Anti-freezing measures shall be considered for exposed fire hydrant pipes in areas without heating when the outdoor temperature is lower than 4°C during winter.

3. 室内消火栓泵出水管上引出两根消防管并在建筑物内各分区水平成环，竖向成环布置,当最不利点消火栓处静压大于 1.0MPa 时应竖向分区供水。
Fire ring main shall be designed for the internal fire hydrant system at both the horizontal main distribution pipe and the vertical riser to ensure reliability of water supply to the system. When the static pressure of the most unfavorable point exceeds 1.0 MPa, vertical water distribution approach shall be applied.

C. 主要部件
Main Components

1. 室外消火栓、阀门等设置地点应有永久性的固定标识。
   Permanent signage shall be provided at the locations of external fire hydrant and associated valves.

2. 尽量将消火栓布置在公共区域，由于美观的原因，要凹进墙体里面。一般靠近公共区域走廊处设消火栓，室内消火栓布置必须靠近入口、疏散口和便于取用的地方，并且严格满足规范规定的间距要求。
   Internal fire hydrants located in public areas must be provided with housing or cabinets that are recessed into the walls due to aesthetics requirement. Internal fire hydrants shall be located at public area corridors near entrance and emergency exits. Distance between internal fire hydrants must be strictly complied as per codes requirement.

3. 室内消火栓应采用 SN65/SN50 消火栓，并配置长度不超过 25m 的水龙带。室内消火栓箱内应设置消防卷盘，当系统采用临时高压时消火栓箱内还应设置起泵按钮。
   Internal fire hydrant shall be SN65/SN50 Type complete with hose not longer than 25m. Fire hose reel shall also be provided in the internal fire hydrant cabinet. A push-start start button to activate the fire pump shall also be provided when the system is design with only pressure stabilizing tank at the highest point of the property without jockey pump set.

4. 消火栓箱设置在有装饰要求的区域时，可考虑由装饰安装与装饰完成面一致材料的消火栓门，但必需有消火栓文字标注，且开启角度不小于 160 度。
   When internal fire hydrants are located in the front of house with decorative interior finish, the doors and frames of the cabinets or housings used shall be constructed with material similar to the interior finishes. The door of the hydrant housing must be provided with adequate text label with door opening angle not less than 160 °.

5. 高位水箱的设置需满足以下要求：临时高压消火栓系统的高位消防水箱的设计容积应满足火灾初期 10 分钟的用水量要求。对于高层建筑高位消防水箱的设置高度应满足最不利点消火栓处的静压不小于 7m，超高层建筑不小于 15m。水枪的充实水柱多层建筑不应小于 7m，高层建筑不应小于 10m，超高层建筑(大于 100 米)不应小于 13m。
   Effective capacity for the high-level firewater pressure-stabilizing tank shall comply with the firewater demand during first 10 minutes of a fire outbreak. For tall building, the high-level firewater tank shall be located at a height so as to provide a minimum static pressure of 7m head for the most hydraulically unfavorable hydrant in the property. The water throw of each internal fire hydrant for multi-floor and tall buildings shall not be less than 7m and 10m respective. For tall building exceeding 100m, the water throw of each internal fire hydrant shall not be less than 13m.

6. 泵结合器的设置位置应方便消防车取水，水泵结合器的设置数量应根据计算确定，单个水泵结合器的流量应按 10~15L/s 选择，水泵结合器宜采用挂墙式或地上式，当采用地下式时应有明显的标记。
   Breeching inlet for firewater pumps must be located at a location accessible by fire engine. The quantity of breeching inlet is determined by calculation based on 10 – 15 L/s per inlet. Breeching inlet used shall either be wall mounted or floor standing type. When underground type breeching inlet is used, adequate label or signage must be provided to clearly mark its position.

7. 消火栓系统的管材建议详见 3.3.8 章节。
   Refer to Section 3.3.8 for fire hydrant pipe material.

3.3.5. 厨房排油烟罩和排油烟风管保护
Protection of Kitchen Hood and Duct

A. 当采用厨房排油烟罩系统用于控制油烟时，必须遵循以下火灾保护系统和风罩/风管建造标准：
Where the kitchen hood exhaust system is used to control grease-laden fumes, the following fire protection systems and hood/duct construction criteria must be complied:

1. 应采用厨房排油烟罩专用灭火系统保护厨房设备和厨房排油烟罩系统。厨房灭火系统应能对厨房烹饪设备、厨房排油烟罩、厨房排油烟风管连接的通风系统提供保护。
   A fire supression system designed for installation in a kitchen exhaust hood to protect kitchen appliances and the kitchen hood exhaust system shall be provided. The suppression system must provide protection to the kitchen cooking appliances, the kitchen exhaust hood, and the exhaust plenum portion of the hood connecting to the exhaust duct in the event of fire outbreak in the kitchen.

2. 发生火灾或确认燃气泄漏时应联动关断燃气进气阀门，向消控中心发出报警信号，关断补风风机，排风机继续保持动作。
   In the event of fire alarm or gas leakage, the gas solenoid valve which is interlocked with the fire alarm panel and gas detection control panel must be shut-off, sending alarm signal to the fire command center, shut off make-up air fan and keep the exhaust fan operating.

3. 厨房排油烟罩和风管必须专用于排放厨房油烟，并且应与其他通风系统分开。
   The kitchen exhaust hood and the exhaust duct shall be solely didcated to the extract of greased-laden fumes and must be separated from all other exhaust and ventilation systems.

4. 厨房排油烟罩和排油烟风管不能采用易于腐蚀或遇热退化的材料。不能采用镀锌铁皮材料，应采用不锈钢材质。
   The kitchen exhaust hood and exhaust duct must not be constructed of material that could be easily corroded or degraded due to heating. Stainless steel sheet metal shall be used instead of galvanized steel sheet.

5. 厨房排油烟风管安装和施工必须保证不会出现油脂聚集或从任何结合部位溢出。
   The kitchen exhaust hood and duct must be constructed and installed such that grease will not accummulate or leak from any joints in any portions of the exhaust system.

6. 必须提供排油烟风管废油清洁与检修面板以便对排油烟风管系统进行检查和清洁。检修口之间间距不能大于 6m。
   Grease duct cleanout access panels must be provided to allow inspection and cleaning of all sections of the duct system/ Access hatches must be spaced at more than 6m apart.

7. 排油烟风管从穿越天花板、墙体或楼板至室外的风管段必须有 2 小时的耐火等级。
   All sections of the exhaust duct from the point of duct penetration through ceiling, wall or floor to the external must be provided with 2 hours fire resistance rating

8. 厨房排油烟管道可燃物的安全距离不能小于 400mm 或者与非可燃物的安全距离不能小于 150mm。
   Clearance of the kitchen exhaust duct to the interior surface of combustible material must not be less than 400mm, or from non-combustible material must not be less than 150mm.

9. 排油烟水平主风管内应设置 260°C 动作温度的快速响应喷头，水平段每隔 3m 一只，垂直段顶部一只。
   Quick response sprinkler with temperature rating of 260°C shall be provided in the main horizontal kitchen exhaust duct, with one sprinkler installed for every 3m in horizontal duct and one sprinkler installed at the top of the vertical duct.

10. 关于厨房集烟罩的详细信息，应参照希尔顿全球适用的品牌标准。
    Refer to Hilton Worldwide brand standards for detail requirement and information of the kitchen exhaust hood.

11. 厨房区域的疏散路径上应设置可手动关闭和复位的燃气切断阀。
    A manual shut off and reset valve for the gas supply must be provided along the path of egress from the cooking area.

3.3.6. 灭火器
Fire Extinguishers

A. 整个酒店范围必须提供灭火器，手提灭火器单个不宜超过 5kg。公共区域的灭火器尽量与消火栓箱的设置结合起来，放置在嵌墙式的组合式消防柜内。消火栓和灭火器在有装饰材料位置处不必订购外门，采用与装饰完成面一致的门，门上需加消火栓文字标识。
Fire extinguisher shall be provided for the entire hotel and capacity of each of them shall not exceed 5kg. The fire extinguisher in public area shall be housed together with the internal fire hydrant and located in a recessed cabinet or housing, where possible. Separate external door is not required if the fire hydrant and fire extinguisher are located in a place with interior finishes; and the door used shall be of interior finishes matching those in the surrounding. Text label of the internal fire hydrant must be provided on the door.

B. 除公共区域需结合消火栓箱设置的灭火器外，所以的机电设备机房、强弱电间、厨房、洗衣房、停车库、储藏间、办公区、员工更衣区应根据规范及当地消防管理部门的要求，提供灭火器。
With the exception of fire extinguishers located in public area, which must be placed together with the internal fire hydrant, all other areas such as M&E plant room, electrical switch room and ELV room, kitchen, laundry, car park, stores, office, changing room shall be provided with fire extinguisher based on the requirements and standards of local fire safety bureau.

C. 每个厨房区域应配置不少于一个厨房专用油脂类灭火器。
Each kitchen area shall be provided with at least one (1) no. of fire extinguisher which is specified for suppression of kitchen grease-type fire.

D. 灭火器的类别选择需根据设置场所的火灾类型选取，如公共区、餐饮区、走道、存放固体的储藏间一般为 A 类火灾，厨房、地下车库、液体可燃物的房间、油漆间一般为 B 类火灾，而高低压配电室及强弱电间则多为电气火灾，可根据潜在火灾类型选择单一类型灭火器或可同时扑灭几种类型火灾的复合灭火器。
The type of fire extinguishers used shall be in accordance to the fire classes in the locations. Public area, dining area, corridors, solid storage room shall be classified under Class A fire.

Kitchen, underground garage, flammable liquid room, paint room shall be classified under Class B fire. The high and low voltage substation, electrical and ELV room shall be classified under Class C fire or fire due to electrical fuel/heat source. Based on the type of potential fire hazard, single type fire extinguisher or multi-type composite fire extinguishers shall be selected.

E. 灭火器的危险等级需按具体区域区分，如厨房、餐厅、会议室、宴会厅、SPA 及其它公共活动用房应按严重危险等级配置灭火器；如客房、车库则可按中危险等级配置灭火器。
Provision of fire extinguisher must be selected based on the fire hazard of the specific area. Provision of fire extinguishers for Kitchen, restaurant, conference room, ballroom, SPA and other public activities areas shall be based extra high hazard. For guest room and garage, it shall be based on ordinary hazard.

3.3.7. 气体灭火
Inert Gas Suppression System

A. 酒店的高低压配电室需设置 FM200/IG541 灭火系统，如采用其它气体灭火系统需经希尔顿确认后方可实施。
Inert gas suppression system shall be provided for the property high-tension and low-tension electrical substation; and FM200 is recommended. If other inert gas suppression system is proposed, prior approval must be obtained from Hilton Worldwide.

B. 整个系统除气体灭火装置外还应包括火灾探测器、事故排风等部分组成。
The inert gas Fire suppression System should include the provision of fire detection and emergency ventilation fans systems to operate as an integrated system.

C. 气体灭火系统的控制方式应包括电气自动、电气手动、机械应急手动三种控制方式。
The inert gas fire suppression system shall be capable of manually and automatically activated via electric actuation. Emergency manual activation of the system shall also make possible via mechanical actuation.

D. 气体灭火控制器上应有控制方式选择锁，当将其置于“自动”位置时，灭火控制器处于自动控制状态。当只有一种探测器发出火灾信号时，控制器即发出火警声光信号，通知有异常情况发生，而不启动灭火装置释放灭火剂。如确需启动灭火装置灭火时，可按下“紧急启动按钮”，即可启动灭火装置释放灭火剂，实施灭火。当两种探测器同时发出火灾信号时，控制器发出火灾声、光信号，通知有火灾发生，有关人员应撤离现场，并发出联动指令，关闭风机、防火阀等联动设备，经过一段时间延时后，即发出灭火指令，打开电磁阀，启动气体打开容器阀，释放灭火剂，实施灭火；如在报警过程中发现不需要启动灭火装置，可按下保护区外的或控制操作面板上的“紧急停止按扭”，即可终止控制灭火指令的发生，不启动灭火装置。
A selector switch shall be provided to select the mode of control, either manual or automatic. When in “Auto” mode, activation of the system shall be automatic. When one of the detectors in the protected room is activated, first stage alarm shall be initiated with the activation of audible/visible alarm within the protected room, alarm buzzer at the control panel shall be sounded and sound continuously, announcement of possible fire hazard but no discharge of the inert gas. When necessary, the inert gas agent could be released manually by activating the emergency button.When another detector within the same room is activated, the siren and general alarm shall sound. The “Evacuation” sign(s) at all exits within the protected area and warning beacon light(s) provided outside the entrance shall illuminate and flash. Alarm signal shall be sent to the main alarm panel and this signal shall also be transmitted to close all

motorized control dampers, shut down all associated fans and equipment serving the protected room. After a pre-set delay, a signal shall be transmitted from the inert gas control panel to the solenoid valve to release the inert gas from the required number of cylinders to the protected room. The “Gas Discharged” sign(s) of the inert gas extinguishing system in protected room shall flash upon receipt of signal from the inert gas control panel. An abort switch shall also be provided to de-activate the system if it is confirm that it is a false alarm.

E. 当气体灭火控制盘控制方式选择锁置于“手动”位置时，灭火控制器处于手动控制状态。这时，当火灾探测器发出火警信号时，控制器即发出火灾声、光报警信号，而不启动灭火装置，需经人员观察，确认火灾已发生时，可按下保护区外或控制器操作面板上的“紧急启动按钮”，即可启动灭火装置，释放灭火剂，实施灭火。但报警信号仍存在。
When in manual mode, the inert gas suppression system shall be activated manually. When one of the detectors in the protected room is activated, first stage alarm shall be initiated with the activation of audible/visible alarm within the protected room, alarm buzzer at the control panel shall be sounded and sound continuously, but no discharge of the inert gas agent. Duty personnel shall investigate the cause of the alarm and upon confirmation of a genuine fire hazard, shall activate the second stage alarm sequence to release the inert gas agent via a manual push button located at the exit outside the protected room.

F. 当用于控制器失效时，可使用机械应急手动控制方式，当职守人员判断为火灾时，应立即通知现场所有人员撤离现场，在确定所有人员撤离现场后，方可按以下步骤实施应急机械启动实施灭火。
When the controller of the Inert gas suppression system is faulty, emergency activation of the system is made possible via mechanical actuation Duty personnel shall investigate cause of the alarm and upon confirmation of a genuine fire hazard shall evacuate all personnel in the area before activating the system manually.

G. 设计浓度及钢瓶的选择应根据气体灭火设计规范的具体要求设计，所有气体灭火的设计及施工都要经过希尔顿认可的消防顾问的审核确认。
Design density and selection of gas cylinder capacity shall be based on the code requirements for inert gas suppression system. All inert gas suppression system design and installation shall be reviewed and approved by the fire consultant appointed by Hilton Worldwide.

3.3.8. 灭火系统管材
Plumbing Pipe Materials

A. 灭火系统管材选择要求如下：
Fire suppression pipe material requirement as follows:

表 3-6 灭火系统管材选择要求

Table3-6 Fire suppression pipe material requirement

序号 No	管道应用 Pipe application	管材要求 Material requirement	连接方式 Connection method
1	室外消火栓管道 Outdoor fire hydrant pipe	离心球墨铸铁管 Ductile Cast Iron Pipe	柔性接口、T 型接口 Flxible connection, T-type connection

2	室内喷淋管道 Inddor sprinkler pipe 室内消火栓管道 Indoor fire hydrant pipe	≤DN80 热镀锌焊接钢管 Hot-dipped welding steel pipe ≥DN100 热镀锌无缝钢管 Hot-dipped seamless steel pipe	螺纹连接 Screw thread connection 卡箍或法兰连接 Clamp or flange connection
3	气体灭火系统 Gas fire suppression system	高压热镀锌无缝钢管 High pressure hot-dipped seamless steel pipe	≤DN80 螺纹连接 Screw thread connection ≥DN100 卡箍或法兰连接 Clamp or flange connection

3.4. 火灾探测、通信和报警系统
FIRE DETECTION, COMMUNICATION AND ALARM SYSTEMS

3.4.1. 概述
General

A. 所有建筑必须提供可靠火灾探测能力的报警系统，将火灾事故告知酒店员工并启动适当的疏散方案。
All buildings shall be provided with reliable fire detection system, providing duty personnel prompt fire alarm and reporting of fire incidents for the initiation of appropriate evacuation procedures for the occupants in the building.

B. 火灾自动报警系统必须由希尔顿认可的有资质的资深专业消防工程师设计
The fire alarm and detection system shall be designed by competent and qualified professional acknowledged by Hilton Worldwide.

C. 所有新建和改造系统必须使用可寻址技术，分布式处理技术，分布式扩展技术，为每个独立的设备提供独立的“地址”。
All new and retrofit systems shall utilize the application of digital addressable system with distributed processing and distributed amplification technology providing discrete "address" for each individual device.

D. 新建项目火灾探测报警系统的设计、安装和调试必须能提供一个全自动的火灾探测报警系统，以满足本节所述的所有区域安装要求，可操作性和性能标准。
The design, installation and commissioning of the fire alarm and detection system for new properties must be capable of providing a fully automatic fire alarm detection to satisfy the operation and performance requirements of all areas in the building.

E. 所有设备包括布线必须获得下列任一测试机构的认证：
All equipment, cabling and trunking shall be approved and certified by any one of the following accredited testing laboratories:

1. UL Underwriters Laboratories, USA, www.ul.com
2. Vds Verband der Sachvershicherer, Germany, www.vds.de
3. BS British Standards, www.bsigroup.com
4. CEN European Committee for Standardization, www.cen.eu
5. 3C 中国强制性产品认证，国家认证认可监督管理委员会，www.cnca.gov.cn 或 www.ccc - cn.org
   3C China Compulsory Certification by the “Certification and Accreditation Administration of the PRC”, www.cnca.gov.cn or www.ccc‐cn.org

F. 火灾报警系统的主机、模块及探测器应同时获得 UL/FM 认证和 CCC 认证。
The main fire alarm panel, control modules and detectors for the entire fire alarm and detection system shall be UL/FM and CCC certified.

3.4.2. 基本设计原则
Basic Design Principles

A. 所有新建和改建系统的联动、控制和报警信号设备回路必须预留至少 10%的系统扩展余量。
The system interlocks, controls and devices alarms circuits for all new and retrofit systems must be provided with 10% spare capacity for future expansion.

1. 控制柜、电源和功放容量须与设备总容量相匹配。
   Control panels, power supplies and amplifier capacities shall be sized and matched accordingly.
2. 备用控制柜和备用电源须均匀分布在整个系统中。
   Spare control panels and backup power supply shall be evenly distributed throughout the system.

B. 在当地法规允许的情况下，所有新建和改建系统需具有报警确认功能，即当总线型感烟探测器报警时，需在系统控制盘上进行报警确认。对于手报按钮和水流指示器报警时不需进行报警确认。
Where permitted by local code, all new and retrofit systems shall incorporate an alarm verification function in the main alarm panel for the smoke detection devices. Alarm verification is not required for manual call points or switches.

C. 如满足以下条件，允许预报警功能在启动全面报警之前提供一定的时间对报警的探测设备进行现场确认：
Pre‐alarm, triggered by the detection device, shall be permitted before activation of a full scale fire alarm to facilitate on site verification of the fire hazard within a prescribed time. This is allowed only when the following conditions are met:

1. 当地消防部门允许这一功能。
   Such provision is permitted by local fire safety bureau.

2. 感温探测器或喷淋系统启动，则立即启动疏散。
   Immediate evacuation is initiated when fire alarm is caused by heat detectors and automatic fire sprinkler system.

3. 同一分区中后续探测器动作则立即启动疏散。
   Immediate evacuation is initiated when subsequent detection devices in the same zone are activated.

4. 全面疏散程序启动前用于现场确认火情的时间小于 3 分钟。
   The time allowed for duty personnel to investigate and verify cause of a fire alarm shall be less than 3 minutes before initiating full scale evacuation procedure.

5. 酒店应保证有足够的值班人员确认火情。
   The hotel management shall ensure that there are sufficient duty personnel to conduct on site investigation and verification on the cause of a fire alarm.

D. 对于无法保证可靠的商业供电或应急电源的地区，以及可能遭受严重雷击的地区，必须配置一个 UPS 不间断电源以保护火灾警报中央控制设备，打印机和终端设备，以防断电或电压不稳定。发生电力故障时，不间断电源必须向上述设备及相关设备供电。
   At locations where reliable power supply from the grid or provision of emergency power supply is not available, and there is severe potential threat from lightning, uninterruptible power supply must be provided to protect the fire alarm central control equipment, printers and terminal devices from power failure or unstable voltage that may breach fire safety of the building. Upon power failure, the UPS shall immediately be activated and provide the necessary power require to all connected loads for the continuous operation of the system.

   1. 火灾报警控制面板应安装功率调节/稳压器（PC/ VR）。
      At a minimum, Power Conditioner/Voltage Regulator (PC/VR) must be provided for the fire alarm panel.

   2. PC/VR 的输出功率必须能够支持消防报警设备。
      The PC/VR power output shall be capable of supporting the fire alarm equipment.

   3. 当输入电压在额定输入电压的-25%~15%范围内浮动时，PC/VR 必须能够自动调节电压，使输出电压在其额定电压上下 5%的范围内。
      The PC/VR must be provided with automatic voltage regulation capable of maintaining output voltage to within 5% of its nominal voltage rating with an input voltage fluctuation of +15 percent to －25 percent.

E. 进出火灾报警控制盘及分控盘所在的建筑的火灾报警系统相连的回路均应提供浪涌保护器。
   Transient surge arrestor shall be provided for each circuits connected to the fire alarm system that enters and exits main the building housing the fire alarm control panel and/or sub panels.

F. 当设备被置于非空调区域时，必须由生产商决定其是否可以适应这种环境，并提供适当的保护措施以避免遭受天气和腐蚀的破坏。
   Where devices are located in non-air-conditioned space, the manufacturer shall determine whether such area is suitable and provide protection against damaged due to weather and corrosion.

G. 位于综合体建筑内的酒店必须设置独立的火灾探测系统，通讯系统及火灾报警系统，并且应能与整个建筑的火灾报警信号联动。承担酒店与其它区域火灾报警联动的装置必须接入应急电源。
Hotels located within a mixed‐use development must be provided with a dedicated fire detection, communication and alarm system capable of interfacing with the fire alarm signals from the entire development. Fire alarm interfaced equipment must be provided with an emergency power source.

H. 防报警总线须采用 Class A 环形。
Fire alarm wiring system shall of Class A ring type.

3.4.3. 火灾探测系统
Fire Detection System

A. 对于采用监控灭火系统保护的建筑，须在以下位置提供可寻址感烟探测器：
For buildings protected throughout by fire suppression systems and monitored by the fire alarm system, addressable smoke detectors system shall also be provided within each of the following areas:

1. 客房（须带蜂鸣器）
Guestroom (complete with buzzer alarm)
2. 客房内部走廊
Guestrooms internal corridors
3. 电梯前室
Elevator lobbies
4. 机电和电力用房
Mechanical and electrical plant rooms
5. 计算机/电话/程控交换机房
Computer/telecom/PBX rooms
6. 储藏室
Storage rooms

B. 应尽量减少感烟探测器的使用。除非当地消防规范要求增加额外的单元或禁止拆去已有感烟探测器。
The use of smoke detectors shall be minimized, unless local codes require the provisions of additional units or prohibit the removal of existing smoke detectors.

C. 对于不使用监视灭火系统保护的建筑，需要在整个建筑提供可寻址的火灾探测器。
In buildings that are not protected throughout by monitored fire suppression systems, full addressable fire detection shall be provided in all spaces.

D. 任何在地面无法触及的探测设备，均需提供远程测试开关和指示灯。
Any detection device not accessible from the floor level shall be provided with a remote test switch and indicator light.

E. 前台附近位置需设置手动报警按钮。
A manual fire alarm (manual call point) station shall be located in close proximity to the front desk.

F. 每个楼层安全出口和通向室外的出口处需设置手动报警按钮。如当地规范允许，在有喷淋保护的客房层可不设置手动火灾报警按钮。
Manual fire alarm stations shall be provided at each floor entrance and exit to the external. If permitted by local code, manual fire alarm stations may be omitted on guest floors in sprinkler‐protected buildings.

G. 火灾报警系统应监视特种灭火系统及厨房集烟罩灭火系统的动作。厨房集烟罩灭火系统的动作必须关闭厨房内的送风及排风系统。
All special fire suppression systems including kitchen hood fire suppression systems shall be monitored by the fire alarm system. Activation of the kitchen hood fire suppression system shall de‐energize and shut-off the kitchen air supply and extraction system.

H. 火灾报警系统需监视消防水泵，应急发电机，自动喷水灭火系统和消火栓系统的报警及监视设备的动作。
The alarm and operation status of fire pumps, emergency generator, sprinkler and internal fire hydrant shall be monitored by the fire alarm system.

I. 中庭须使用光束型感烟探测器。若非当地消防部门要求，点型感烟探测器不应在中庭中使用。
Optical smoke detectors shall be used at atriums. Individual, spot‐type detectors shall not be provided within atriums, unless otherwise required by the Local Fire Safety Bureau.

1. 根据选用的光束型感烟探测器设计参考，中庭内每三层布置一组光束型感烟探测器。
Optical smoke detectors shall be installed at every three floors in accordance with the design parameters and specification of the selected device.

2. 对于形状不规则的中庭，每层可能需安装多组光束型感烟探测器，或安装空气采样探测系统以达到探测面积的覆盖要求。
For irregular shaped atriums, more than one optical smoke detector may be needed on each floor, or an aspirating system may be necessary to provide the required coverage.

3. 需采用火灾模拟来确定探测器的覆盖类型，覆盖位置和覆盖形式，以证明烟气层能够保持在有人员疏散的最高楼层楼板以上 6’-0”(1.83m)的高度及中庭未受保护的开向周边区域的开口以上。
Fire modeling and simulation shall be used to determine type, location and style of coverage and to demonstrate that a smoke layer is maintained at 6’‐0”/1.83m above the highest floor level of exit access, or unprotected opening to adjoining spaces.

3.4.4. 火灾报警及广播装置
Fire Alarm and Broadcast System

A. 以下设备至少应配置相应的火灾警报装置：
At a minimum, the following accessories devices shall be provided to the fire alarm system:

1. 火灾报警主控制器和打印机
Main fire alarm control panel and printer

2. 位于话务员室的远程重复显示屏
   Remote repeater panel at the PBX operator room

3. 彩色图像终端显示设备（超过 1000 间客房数的酒店及/或综合体建筑应设置此功能）
   Color display terminal(s) with graphic capability (required at properties greater than 1,000 guestrooms and/or multi‐building facilities)

B. 警报装置安装、布置和接线应满足输出声压级满足环境噪音下整个建筑区域可以清晰听到警报声音。
   All audible devices shall be installed, layout and wired so as to produce an alarm sound output on that is clearly audible above the ambient noise level throughout the building.

1. 房间内的声音报警信号任何情况下应高于环境噪音 15 分贝，或公共区域任何情况下应高于最大环境噪音 5 分贝，声音报警信号声响应在 65~110 分贝之间（最大 110 分贝，最小 65 分贝）。
   In no case shall the audible alarm be less than 15 dB above the ambient room noise level or less than 5 dB above the maximum ambient noise level in public and common areas, with a minimum of 65 dB, and a maximum of 110 dB.

2. 所有安装在客房内的声音报警应保证在客房门关闭的情况下，枕边位置接受到的报警声响不应低于 75 分贝。
   In no case shall the audible alarm be less than 75 dB at the pillow level in all guestrooms when the doors are closed during the alarm.

C. 系统要求
   System Requirement

1. 每个客房和用作睡眠功能区域必须安装报警扬声器或喇叭。
   A speaker/horn shall be provided in each guestroom and areas used for sleeping purpose.

2. 扬声器必须配备瓦数调节装置。
   Speakers shall be equipped with variable watt input taps.

3. 系统须有自动监测每个消防广播区（酒店按楼层划分广播区；每个疏散楼梯间为独立广播区）线路短路、开路装置，在消防中心显示每个线路状态, 并在短路时可自动切断该线路。
   The system shall be able to monitor short and open circuit devices for each fire broadcast zone (The broadcasting zone for guestroom floors shall be divided according to each floor, and escape staircase shall also be allocated as an independent zone); the status of each circuit shall be monitored displayed in fire command center; In the event of short circuit, the circuit shall be automatically cut off.

4. 报警设备的电路设置应保证单点电路出现故障时不应影响整个线路正常工作。
   Alarm notification devices circuits shall be arranged in a manner so that fault occurring at any single point circuit will not result in affecting the operation of the other circuits.

5. 希尔顿全球管理范围内所有前场和后场区均需设置完善的火灾应急广播系统。
   All FOH and BOH area which is managed by Hilton Worldwide should install complte An emergency broadcast system.

6. 消防广播应有预先录制好的当地语言和英文的声音信息，能作自动信息广播。消防广播方案是一遍录音, 一遍报警声, 不断重复循环。
   Pre-recorded local language and English voice messages with auto-repeat function shall be provided during a fire broadcast. The fire broadcast shall be auto-repeat with continuous sounding of alarm and recording of voice messages.

7. 须提供内存语音信息芯片,最少 4 个可选频道（预警、疏散、测试、回复正常）的多语言录音芯片，可以手动对指定楼层或区域广播。
   4 channels (Warning, evacuation, test and normal) multi-languages video memory chip shall be provided with manual control for broadcasting to selected floor or area.

8. 设有本地音响的区域，例如宴会厅、多功能厅、会议室、餐厅、酒吧、KTV、SPA 等，须在火灾时切断本地音响的电源，切换至消防广播状态。
   In the event of fire, power supply to local areas with audio equipment such as banquet, multi-function room, meeting room, canteen, bar, KTV and SPA, etc. shall be cut off and switched over to fire broadcast signal.

9. 除楼梯间应按竖向单独分区外，其余扬声器应按照楼层进行分区。地下及裙楼部分按防火分区划分广播区，地上部分按楼层划分广播区。
   All broadcast zone should be divided according to the floors while that for staircase shall be zoned according to the vertical stairway. Broadcast zone for basement and podium shall be divided according to the building fire zoning. Upper floor broadcast zone shall be divided according to the floors.

10. 消防广播与背景音乐系统是独立分开设置，背景音乐不允许接应急电源，消防状态时切掉背景音乐系统。
    Fire broadcast and background music system shall be separately installed. The background music system shall not be linked to emergency power supply and shall be automatically for cut-off during a fire alarm.

11. 功放配置总功率应大于全楼广播扬声器功率总和的 1.1-1.2 倍，同时应配置至少一台备用功放。
    Total power for amplifier shall be 1.1 to 1.2 times of total power for building broadcast speakers. At least one spear amplifier shall be provided.

12. 在中控室有一键启动全楼消防广播功能。
    Master switch shall be provided in the fire command center to activate fire the broadcast system in the building.

13. 无障碍/听力受损客房内的感烟探测器动作时必须联动本房间内安装的声光报警装置以及当地规范要求的其它装置动作。
    Activation of smoke detector in the barrier free/hearing impaired guestroom shall cause activation of visible alarm device in that room, and other devices as required by local codes.

14. 当走廊警报装置动作时，必须能联动本楼层内无障碍/听力受损客房内的声光报警装置以及当地规范要求的其它装置动作。
    Activation of alarm devices in the corridor shall be interlocked and cause activation of

visible alarm device in the handicapped/hearing impaired room on that floor, and other devices as required by local codes.

15. 话筒、前级、扩音设备、广播区选择、及音乐节目的录、播放等中央设备均集中装置于消防控制中心。消防广播的功放器必须具备足够功率供全大楼所有消防广播一起广播，最少设置 1 台备用功放器。备用电池或 UPS 应能支持系统作最少 2 小时全楼广播操作。
Central equipment including microphone, pre-stage, amplifier, zones selection and music record/play equipment shall be installed in fire command center. Fire broadcast amplifier shall have sufficient power for all speakers in the building to be broadcast at the same time; Minimum 1 spare amplifier shall be provided. Backup battery or UPS shall be able to support the system for at least 2 hours.

16. 扬声器线路电线不应有三通接口（即从一个扬声器至另一个扬声器以手拉手方式配线），否则会导致线路失去监测功能及多故障；喇叭线路电线设置为环线广播以确保线路在断线时部分喇叭失去功能。每个喇叭须有金属（或不燃材料）面板和底箱作保护。地下及裙楼部分按防火分区划分广播区，地上部分按楼层划分广播区。
Speaker circuit shall not be tee joint type (Note: speaker in-between circuit shall be hand-in-hand type) to avoid monitoring function loss or fault; Ring circuit shall be provided to ensure no interruption in the event of cable disconnection. Metal (or fire-rated) panel and enclosure shall be provided to protect each speaker. Broadcast zone for underground and podium shall be separated by area; Upper floor broadcast zone shall be separated by floor.

D. 以下位置应提供消防广播：
Speakers shall be provided at the following areas:

1. 每间客房和客厅
Each guestroom and parlor

2. 大堂及大堂吧
Lobby and lobby bar

3. 餐饮区大厅及包间
Restaurant lobby and private room

4. 商务中心
Business center

5. 酒吧/娱乐区/健身
Bar/Entertainment area/Fitness area

6. SPA 区和包间
SPA area and compartment

7. 所有功能厅、宴会厅、会议室
All function rooms, banquets and meeting rooms

8. 所有厨房
All kitchens

9. 公共卫生间及部分后勤区
   Comment toilet and part of backup area
10. 走廊及电梯厅
    Corridors and elevator lobbies
11. 楼梯间内每两层
    Every two floors in interior exit stairs
12. 有疏散楼梯通向的屋顶区域
    Roof areas accessible by exit stairs
13. 更衣室
    Changing room
14. 主要机房
    Main server room
15. 洗衣房
    Laundry
16. 主要室外公共平台
    Outdoor main public area
17. 酒店办公室（小办公室如能听到走廊广播可减省，办公区内另有套间则须设消防喇叭在主要区）
    Hotel office (speaker for small office which is covered by broadcast signal from the corridor can be omitted. Speakers for rooms in office shall be located at the main area)
18. 电话值班室（须有音量调节）
    Telephone duty office (With volume control)

E. 以下区域应当设置包括闪光灯的声光报警装置，并且必须在建筑内任何区域发生报警时自动动作，包括且不限于:
   Visible alarm device such as clear lens strobe units shall be installed in the following areas, which shall be activated automatically upon any alarm within the building, including but not limited to:

1. 客房走廊
   Guestroom Corridors
2. 无障碍客房卧室
   Bedroom of Barrier Free Guestrooms
3. 公共残疾人卫生间
   Public Handicapped Toilets
4. 会议室
   Meeting rooms

5. 餐厅
   Dining rooms

6. 宴会厅
   Ballrooms

7. 公共区域走廊
   Common area corridors

8. 游泳池
   Swimming Pool

9. 大堂出口处
   Egress of Grand Lobby

10. Back-of-house areas having high ambient noise conditions, including:
    高环境噪声的后场区域，包括：

    a. 所有厨房
       All Kitchenes

    b. 洗衣房
       Laundry

    c. 锅炉房
       Boiler room

    d. 制冷机房
       Chiller room

    e. 发电机房等
       Generator room, etc

F. 与其他设备之间接口
   Interlocks and Other Devices

1. 火灾报警信号必须和楼宇管理系统，机电设备系统和安保系统相互协调匹配。
   Fire alarm signals shall be linked and monitored by the building management systems. Fire alarm signals shall also be linked and interfaced with the mechanical, electrical and security systems in the design of the fire alarm system to facilitate activation/deactivation of certain equipment during a fire alarm.

2. 为了日常运营所需要的常开防火门需安装电磁闭门器以确保其自闭功能要求。
   Magnetic door holders shall be provided for self-closing fire doors that are required to be in the open position for business operations.

3. 背景音乐及其他影响报警通知系统的娱乐设施必须设置可以关闭其功能的控制装置。
   Control devices shall be provided to shut off music and other entertainment devices that would interfere with the operation of fire alarm and broadcasting systems.

4. 在发生火警情况下，电控门锁系统应能断电开启。
   Door locking systems shall be de‐energized during a fire alarm.

5. 电梯厅的感烟探测器动作时应联动所有该电梯厅影响区域电梯降至首层或其他制定楼层。
   Activation of smoke detectors in the Elevator lobby will cause all elevator cars to home to the first floor or designated floor.

6. 使用燃料燃烧设备的房间或区域，包括壁炉区域，应设置 CO 探测器。可设置烟气/二氧化碳气体复合探测器，且应参照当地法规和条例的补充要求。
   Carbon monoxide detectors shall be provided in fireplace, all rooms or areas where equipment-requiring combustion of fuel is housed. Integrated smoke/carbon dioxide detectors are permissible, subject to compliance with local codes and ordinances on additional requirements for the usage of such detector.

7. 下表为一个联动控制关系的系统的操作表格，详细说明火灾报警系统的联动动作关系。此表只作为示例。具体项目的系统表格必须在设计阶段经希尔顿全球建筑工程部批准。
   The following tables provide the operational cause and effect relationship between the fire alarm and detection system with other equipment related to the fire and life safety of the property. The cause and effect matrix provided in this standard is meant to be a guideline only and shall be worked out in detail during design stage to meet the individual building requirement and subject to the approval of Hilton Worldwide Architectural and Construction Department.

表 3-7 消防联动关系表

Table 3-7 Fire equipment effection relationship

输出 / 输入	消防控制中心报警/打印/反馈	声光报警与消防广播[2]	非消防电源强切(火警防火分区)	应急照明自动投入(火警防火分区)	防火卷帘下降、常开防火门释放（火警防火分区）	门禁释放（全楼）	电梯迫降（全楼）	排烟系统（火警防烟分区）	前室正压送风系统(本层及上下层送风口开启)[3]	楼梯间正压送风系统[3]	雨淋阀/预作用阀	喷淋泵	消火栓泵	气体/气溶胶灭火	通风系统应急模式	切断燃气供应	柴油发电机自动启动
非残疾人客房内烟感报警	★[1]	☆1烟感蜂鸣器立即响起	☆	☆	☆	☆	☆	☆	☆	☆							
残疾人客房内烟感报警	★	☆房内声光报警和蜂鸣器立即响起	☆	☆	☆	☆	☆	☆	☆	☆							
其它区域烟感报警	★	☆	☆	☆	☆	☆	☆	☆	☆	☆							
温感报警	★	★	★	★	★	★	★	★	★	★							
按下手动火灾报警按钮	★	★	★	★	★	★	★	★	★	★							
同一防火分区内任意两点火灾探测点位同时动作	★	★	★	★	★	★	★	★	★	★							
信号阀、水流指示器等监视信号动作	★																
湿式报警阀压力开关或超低压启喷淋泵电接点压力表动作	★											★					
湿式报警阀压力开关或超低压启喷淋泵电接点压力表动作+水流指示器动作（定位火灾防火分区）	★	★	★	★	★	★	★	★	★	★		★					
气体/气溶胶灭火：任意一个火灾探测器动作	★	★仅本保护区															
气体/气溶胶灭火：一个烟感+一个温感或两个温感同时动作或手动释放按钮动作	★	★	★	★	★	★	★	★	★	★				★30s 延时释放计时开始	★停止通风、关闭风口		

输出 / 输入	消防控制中心报警/打印/反馈	声光报警与消防广播[2]	非消防电源强切(火警防火分区)	应急照明自动投入(火警防火分区)	防火卷帘下降、常开防火门释放（火警防火分区）	门禁释放（全楼）	电梯迫降（全楼）	排烟系统（火警防烟分区）	前室正压送风系统(本层及上下层送风口开启)[3]	楼梯间正压送风系统[3]	雨淋阀/预作用阀	喷淋泵	消火栓泵	气体/气溶胶灭火	通风系统应急模式	切断燃气供应	柴油发电机自动启动
预作用系统：两个及以上烟感同时动作	★	★	★	★	★	★	★	★	★	★	★ 预作用阀	★					
水喷雾系统：一个烟感+一个温感或两个温感同时动作	★	★	★	★	★	★	★	★	★	★	★ 雨淋阀	★					
按下消火栓远程启泵按钮	★												★				
厨房安素灭火系统释放反馈输入	★	★ 厨房声光报警	★	★												★	
可燃气体探测器报警	★	★ 厨房声光报警													★ 事故排风	★	
高低压配电室低压侧全部失电																	★

1、☆表示火警 180s 延时确认（180s 以内确认为误报可以复位、确认为火警可通过主机上的火灾紧急确认按钮进行联动；若 180s 以后未复位则自动进入火警联动程序。故酒店应保证有合理的消防应急程序和良好的管理水平）；★表示不需要延时。

2、声光报警和消防广播动作区域：

地下层发生火灾，通知所有地下层及首层；首层发生火灾，通知所有地下层、首层及二层；二层及二层以上发生火灾，通知着火层及着火层上下相邻层。

任何位置火警确认后，所有楼梯间消防广播同时动作；若声光报警与消防广播相互严重干扰，两者应交替动作；消防广播功放功率应能负担全楼消防广播，且消防广播区域选择盘应有全楼广播快捷按钮（All Call）

3、启动与火警所在防火分区关联的前室和楼梯间正压送风

Input \ Output	Fire Control Centre Alarm/ Print/ Feedback	Audio Visual Alarm and Fire Broadcasting 2	Non-fire Power Shut Down (Fire Alarm Zone)	Emergency Lighting Auto Turn-on (Fire Alarm Zone)	Fire Roller Shutters Drop, Normally-open Fire Doors Release (Fire Alarm Zone)	Access Control Release (Whole Building)	Elevator Homing (Whole Building)	Smoke Extraction System (Fire Alarm Smoke Zone)	Antechamber Positive Pressure Air Supply System (Open this floor and adjacent floors supply air outlets) 3	Staircase Positive Pressure Air Supply System 3	Deluge Valve/ Pre-action Valve	Sprinkler Pump	Hosereel Pump	Gas/ Aerosol Fire Suppression	Ventilation System Emergency Mode	Gas Supply Cur-off	Diesel Generator Auto Activation
Non-handicapped guest room smoke detector alarm	★1	☆1 Smoke detector buzzer sounds immediately	☆	☆	☆	☆	☆	☆	☆	☆							
Handicapped guest room smoke detector alarm	★	☆ Audio visual alarm and the buzzer inside the room sound immediately	☆	☆	☆	☆	☆	☆	☆	☆							
Other areas smoke detector alarm	★	☆	☆	☆	☆	☆	☆	☆	☆	☆							
Temperature detector alarm	★	★	★	★	★	★	★	★	★	★							
Press manual call point	★	★	★	★	★	★	★	★	★	★							
Any two fire detectors within the same fire zone activate at the same time	★	★	★	★	★	★	★	★	★	★							
Signal valve, water flow indicator and other monitoring signal activate	★																
Hydraulic alarm valve pressure switch or ultra-low pressure starting sprinkler pump manometer activate	★											★					

Hydraulic alarm valve pressure switch or ultra-low pressure starting sprinkler pump manometer activation + water flow indicator activation (fixed fire zone)	★	★	★	★	★	★	★	★	★	★		★					
Gas/ aerosol fire suppression: any fire detector activates	★	★ For this fire zone only															
Gas/ aerosol fire suppression: one smoke detector + one temperature detector or two temperature detectors activate at the same time or manual release button activates	★	★	★	★	★	★	★	★	★	★				★ 30s for delay release begins	★ Stop ventilation, close air outlets		
Pre-action system: two or more smoke detectors activate at the same time	★	★	★	★	★	★	★	★	★	★	★ Pre-action Valve	★					
Water spraying system: one smoke detector + one temperature detector or two temperature detectors activate at the same time	★	★	★	★	★	★	★	★	★	★	★ Deluge Valve	★					
Press hosereel pump remote activation button	★												★				
Kitchen ANSUL fire suppression system activation feedback	★	★ Kitchen audio visual alarm	★	★												★	
Flammable gas detector alarm	★	★ Kitchen audio visual alarm													★ Emergency Ventilation	★	
HT and LT electrical substation LT side power outage																	★

1. ☆ indicates fire alarm 180s delay for confirmation (False alarm which is confirmed within 180s can be reset. Confirmed fire alarm can use the fire emergency confirmation button at the main equipment to activate the integrated control. If no reset after 180s, the fire integrated control program shall be activated automatically. Therefore, the hotel shall have reasonable fire emergency procedures and good management standard.). ★ indicates no delay required.

2. Audio visual alarm and fire broadcasting areas:

If basement on fire, all basement levels and first storey shall be notified. If first storey on fire, all basement levels, first storey and second storey shall be notified. If second storey and above on fire, the storey on fire and its adjacent storey shall be notified.

After fire is confirmed at any location, all the staircase fire broadcasting shall be activated at the same time. If there is severe interference between the audio visual alarm and the fire broadcasting, they shall be activated alternatively. Fire broadcasting power amplifier shall be able to cater the demand of the whole building, and the fire broadcasting area selection panel shall have a shortcut button for broadcasting for the whole building (All Call).

3. When there is a fire alarm, activate the antechamber and staircase positive pressure air supply in the related fire zone.

3.5. 安全疏散
SAFETY EVACUATION

3.5.1. 概述
General

A. 消防/紧急出口应设置如下：
Fire/emergency exits shall be provided as follows:

1. 每层至少有两个疏散出口，两个出口的间距至少大于此层对角线长度的 1/3。
A minimum of two exits shall be provided for each floor, separated by a minimum distance of one third of the diagonal distance of the floor.

2. 对于超过 50 人的单独房间应至少设置两个疏散门。两个疏散门间的距离至少大于此房间对角线长度的 1/3。
A minimum of two exits shall be provided for an individual room where room occupant load exceeds 50 persons. Exits shall be separated by a minimum distance of one third of the diagonal distance of the room.

3. 当一个楼层或房间内超过 500 人，此楼层或房间须至少设置三个疏散出口。
Where occupant load exceeds 500 persons on a floor or within a room, a minimum of three exits shall be provided.

4. 当一个楼层或房间内超过 1000 人，此楼层或房间须至少设置四个疏散出口。
When occupant load exceeds 1000 persons on a floor or within a room, a minimum of four exits shall be provided.

B. 人员荷载计算如下：
Occupant load shall be calculated using the following:

表 3-8 人员荷载计算
Table 3-8 Occupancy load calculation

序号 NO.	建筑功能 Building Function Areas	ft² /人 ft² / person	m² /人 m² / person
1	人员密集区域-没有固定座位，密集（仅有座椅） Assembly – no fixed seats, concentrated (chairs only)	7	0.65
2	人员密集区域-没有固定座位，不太密集（有桌椅，如餐厅） Assembly – No fixed seats, less concentrated (with tables and chairs – such as restaurants)	15	1.4
3	人员密集区域-等待区域 Assembly – Pre-function area	5	0.47
4	厨房 Kitchens	100	9.3
5	游泳池 Swimming Pools	50	4.6

序号 NO.	建筑功能 Building Function Areas	ft² /人 ft² / person	m² /人 m² / person
6	游泳池岸边区域 Swimming Pool Deck Areas	30	2.8
7	酒店客房区 Hotel Guest Room Areas	200	18.6
8	储藏室/机电用房 Storage/ Electrical & Mechanical Plant Rooms	500	46.5
9	零售区 Retail	30	2.8
10	健身中心 Fitness Center with Equipment	50	4.6

C. 人员密集区域，人员荷载应取等待区或人员密集区两者中较高的数值。
Occupant load calculations in assembly areas shall be based on the higher of either the pre‐function or assembly area loads.

D. 总疏散宽度应基于下列折算系数（inches 或 mm/人）：
Total exit or escape width provided shall be calculated based on capacity factors as follows (inches or mm/person):

1. 楼梯:7.6 mm
Stairways ‐ 7.6 mm.

2. 疏散门和水平疏散通道: 5 mm
Exit door and horizontal escape corridor: 5 mm

E. 疏散距离必须符合以下要求：
Travel distances shall comply with the following:

表 3-8 疏散距离要求
Table 3-8 Travel distance requirement

序号 NO.	功能区 Function Area	有喷淋保护 Sprinkle protected	无喷淋保护 Non-Sprinkle protected
1	客房至安全出口的疏散距离 Travel distance from a guest room door to an exit	200 ft/ 61 m	150 ft / 46 m
2	其他所有区域至安全出口的疏散距离 Travel distance to an exit for all other areas	250 ft / 76 m	200 ft/ 61 m
3	房间（区域内）疏散至可具备两个疏散出口之前疏散距离 Travel distance from a room or area to a location with provision of two exits	100 ft / 30 m	75 ft / 23 m

序号 NO.	功能区 Function Area	有喷淋保护 Sprinkle protected	无喷淋保护 Non-Sprinkle protected
4	最大袋形走道疏散距离 Maximum travel distance of dead end corridors	50 ft / 15 m	35 ft / 10 m

F. 疏散走道最小净宽度不应小于 1.12 m。
Egress or escape corridors shall be a minimum of 44”/1.12 m clear width.

G. 疏散走道净高不应小于（可等于）2.03m。
Headroom clearance in all egress or escape paths shall be a minimum of 80”/2.03 m.

H. 当满足下列条件时，可借用相邻房间或区域进行疏散：
Exit paths through an intervening room or space is allowed when all of the following conditions are met:

1. 借用的房间或区域没有相对更大的火灾风险。
Hazard or risk of the intervening room or area is relative small.

2. 穿越相邻房间或区域的疏散路径，疏散线路清晰，无任何阻挡物。
There shall be a clear and unobstructed path to an exit.

3. 所借用的房间或区域不应超过 1 个。
There shall be not more than one intervening room or space to pass through.

3.5.2. 楼梯
Stairs

A. 每层至少有两部疏散楼梯通往上下楼层。
A minimum of two exits or escape stairs shall serve each floor leading to its adjacent floors.

B. 楼梯最小净宽度不应小于 1.12 m。
Stairs shall have a minimum clear width of 44”/1.12 m。

C. 楼梯踏步宽度要求：
Width of the step shall be:

1. 新建筑楼梯踏步最小宽度为 279mm。
New stairs – a minimum of 11”/279 mm.

2. 改建建筑楼梯踏步最小宽度为 229mm。
Existing stairs – a minimum of 9”/229 mm.

D. 楼梯踏步高度要求：
Riser height shall be:

1. 新建筑楼梯踏步最大高度为 179 mm。
New stairs – a maximum of 7”/179 mm.

2. 改建建筑楼梯踏步最大高度为 203 mm。
Existing Stairs – a maximum of 8”/203 mm.

E. 高度超过 25 m 以上的疏散楼梯应采用以下方式使其满足防烟的要求：
Egress or escape stairs serving occupied floors above 82’-0”/ 25 m to the level of exit discharge must be smoke free using one of the following methods:

1. 机械通风
Mechanical Ventilation

2. 自然排风
Natural Ventilation

3. 正压送风
Staircase Pressurization Ventilation

F. 当安全疏散距离仅有一层高度时允许采用开放式疏散楼梯，并且设计应防止在室外楼梯出现积水。除了在寒冷区域楼梯必须完全封闭以防冻外，其它区域允许采用安全疏散距离超过一层高度的开放式室外疏散楼梯。
Except in cold climate region, when the safe escape distance is only one floor high from the exit point, exposed egress or escape staircase is allowed. However, adequate drainage shall be provided to prevent water ponding or accumulation of water in the stairway. In cold climate region, egress and escape staircase must be enclosed even when the safe escape distance is only single floor high from the exit point.

G. 在当地规范允许时可采用剪刀楼梯，并且楼梯之间不应有穿越，同时楼梯之间应根据其他节的要求设置防火隔墙。
Scissor stairs may be utilized, where allowed by local code, provided no penetrations exist between the stairs and each stair shall be separated by fire compartment as required in other sections of this standard.

H. 所有疏散楼梯，需直通室外。
All stairs must discharge to the exterior.

1. 在当地规范允许时，建筑已采用自动灭火系统进行保护时，允许有 50%的人员经过首层大堂疏散至安全出口，该大堂应具有清晰的直通室外的疏散路径且直通室外。
Where local code allows, and the building is protected by automatic suppression system, 50 percent of occupant load may discharge to a lobby with a clear path to the exit when the lobby is at the level of exit discharge.

I. 封闭式疏散楼梯间不得用于其他用途。
Enclosed egress or escape stairs shall not be used for any other use.

疏散楼梯间禁止用于储物。
Storage is prohibited in the egress or escape stairs.

J. 对于通常无人场所如机电机房或储藏室，不能直接开向疏散楼梯间。
Normally unoccupied spaces, such as mechanical or storage rooms, shall not open directly to egress or escape stairs.

K. 除直接服务于疏散楼梯间外，线槽桥架或风管不允许布置在楼梯间内。
No wiring or ductwork is permitted within the exit or escape staircase except for those which are necessary to serve it directly.

L. 所有安全出口必须通往室外可认作为公共道路的开放式区域，或者通过一条没有障碍物的路径通往公共道路。
All exits shall discharge to an open area considered as a public way, or lead to a public way via an unobstructed path.

M. 对于非全覆盖喷淋保护的建筑中，每层每个楼梯必须设置一个避难区，面积按每 200 人容纳一部轮椅考虑。
Buildings that are not fully sprinklered shall have an area of refuge within each stair that accommodates one wheelchair per 200 persons for each floor.

3.5.3. 门
Doors

A. 疏散路径上，包括客房门在内的所有疏散门的最小净宽为 900 mm。
Minimum door width for all doors (including guestroom doors) in the escape ways shall be 900 mm.

B. 酒店内疏散用的防火门，禁止使用子母门，且门上不允许设锁，可设把手和弹簧舌。
Fire door used for escape or evacuation in the hotel shall not use unequal double doors and lock is not allowed. Handrail and spring can be provided.

C. 50 人及以上房间的疏散门应朝疏散方向开启。
All egress doors shall swing in the direction of egress when serving 50 or more persons.

D. 所有疏散楼梯间的门和疏散楼梯出口的门必须朝疏散方向开启。
All egress doors serving an escape staircase and the exit discharge shall swing in the direction of egress.

E. 门闩应带有明显的、单手开启的装置。
Door latches shall have lever hardware, requiring an obvious one‐hand method of operation.

F. 对于服务大于等于 100 人的带有门闩的房间门和开向室外的疏散门均应设置推杆锁。
Panic push rod lock shall be provided for all doors with latching hardware and serving 100 or more persons and at all exit doors open to the exterior.

G. 疏散路径上设置的电子门禁控制的门必须满足以下要求:
Electronically access‐controlled doors in an egress path shall meet all of the following requirements:

1. 火灾探测与报警系统动作时应联动开门。
Open upon activation of the fire detection and alarm system

2. 在离地 1.52m 高度安装手动释放装置
Provided with a manual releasing device within 5’-0”/1.52 m height

3. 断电自动释放
Unlock upon loss of power to the device

H. 疏散路径上安装的门的开门力不能超过:
Opening force for any door in an egress path shall not exceed the following:

1. 释放门闩 67N
   67N to release latch

2. 开启门 130N
   130N to set in motion

3. 完全打开门 67N
   67N to fully open

I. 门锁应无需使用钥匙、工具、特殊技能或操作即能在疏散侧打开。
Locks, if provided, shall not require the use of key, tool, or special knowledge or effort to operate it from the egress side.

3.5.4. 扶手和栏杆
Handrails and Guards

A. 楼梯和坡道两侧都需要设有扶手。超过 1.2m 的疏散楼梯间，应设双侧扶手。
Handrails shall be provided on both sides of the stairs and ramps. Double side handrail shall be provided for egress or escape stairs more than 1.2m wide.

B. 楼梯转弯处的内扶手必须连续。
Inside handrails at turns of stairs shall be continuous.

C. 扶手高度应介于踏步地面以上 34“(864 mm)至 38”(965 mm)之间。
Handrails shall be located between 34”/864 mm and 38”/965 mm above the surface of the tread.

D. 扶手和墙之间的最小净距为 57 mm。
A minimum clearance of 2.25”/57 mm shall be provided between the handrail and the wall.

E. 高于或低于地面 762 mm 的行走地面应提供安全护栏。
Guards shall be provided where the walking surface is located more than 30”/762 mm above the floor or grade below.

F. 护栏高度应不低于 1.07 m。
Guards shall be not less than 42”/1.07 m high.

G. 开放式护栏应设置中间格栏或其他装饰图案，并应保证直径为 4”(102 mm) 的球体无法通过其中的空洞缝隙。
Open guards shall have intermediate rails or ornamental pattern such that a 4”/102 mm diameter sphere is not able to pass through.

H. 护栏装饰图案的形状设计应限制攀爬的可能。
Ornamental patterns shall be designed to minimize the ability to climb handrails.

3.5.5. 疏散标志
Egress Signage

A. 安全疏散出口和疏散通道应设有易于识别的疏散指示标志。
Exits and exit access shall be marked with exit signs that are readily visible in the path of egress.

B. 疏散指示标志在任何时间应自发光或带外部照明。
Exit signs shall be internally or externally illuminated at all times.

C. 断电时，应急电源应可为疏散指示标志连续供电时间不应少于 90 分钟。
In the event of power failure, emergency power shall be supplied to the exit signage for a minimum of 90 minutes.

3.5.6. 应急照明
Egress Lighting

A. 除机房照明可采用自带蓄电池的方式外，应急照明设计应采用集中式蓄电池（EPS）组对所有区域分支回路进行供电。当整栋建筑停电的时，必须通过发电机对应急照明设备进行供电。
Emergency lighting for equipment room shall be provided with dedicated battery pack. Emergency lighting for all other areas shall be served by centralized battery bank and emergency power supply (EPS). In the event of power failure, generator shall operate to provide power supply for these emergency lightings. The central battery bank shall be activated when there is a total power failure.

B. 疏散通道，通向公共通道的路径以及公共通道在建筑或空间有人使用时应保持全天照明。
The means of egress, paths leading to a public way, and the public way shall be illuminated at all times if the building or space is occupied.

C. 以下区域的最低地面照度需达到 10.8 lux：楼梯、楼梯平台、楼层转换区、方向转换区、交叉区、应急楼梯间门(走道侧)、着火风险区域比如厨房和公共聚集区以及后场区(设备机房、给排水/喷淋机房、变配电/变压器房等)的安全疏散出口门。
Mandatory lighting shall achieve a minimum illumination of 1 ft‐candle/10.8 lux at the floor level for the following locations, namely, staircases, staircase landings, change of levels, change of direction, intersections, at emergency stairwell doors (corridor side), at emergency exit doors from areas of risk such as kitchens and public assembly spaces and at emergency exit doors from back of house spaces (plant rooms, plumbing/ sprinkler rooms, switchgear/ transformer rooms, etc.)

D. 整栋建筑内的消防设备/设施、消防控制盘和手动报警按钮等操作面的最低地面照度需达到 5.4 lux。
Mandatory lighting shall achieve a minimum illumination of 0.5 ft‐candle/5.4 lux at the floor level directly in front of all firefighting equipment/appliances, fire control panels and manual call points, throughout the entire property.

E. 公共区域沿疏散路径的平均地面照度需达到 5.4lux，并且在任何一点均不低于 1.1lux。
Infill lighting between mandatory lighting along the means of egress, shall achieve an average minimum illumination level of 0.5 ft‐candle/5.4 lux at the floor and, not less than 0.1 ft‐candle/1.1 lux at any point, along the entire means of egress at floor level and at the public way.

F. 断电时，应急备用电源应可为应急照明连续供电时间不应少于 90 分钟。
In the event of power failure, emergency power shall be supplied to emergency lighting for a minimum period of 90 minutes.

3.6. 应急电源
Emergency Power Supply

3.6.1. 概述
General

A. 所有酒店均需提供可靠的应急电源。当正常供电中断时，应急电源应向关系客人及员工生命安全/安防要求的建筑设备进行供电。对于酒店运营的关键系统要求应参见其他小节。
All hotels shall be provided with reliable emergency electrical power supply. In the event of loss of normal power supply, the emergency power supply shall be provided for the building services critical to the safety/security of the guests and employees. Requirements for critical systems for hotel operation are specified in other sections of this standard.

B. 在正常电源失效时，关键电力系统应能自动接入应急电源系统(EPS)。可接受的应急电源包括:
Failure of normal electrical power shall result in the automatic transfer of critical electrical loads to an Emergency Power Supply (EPS). Acceptable sources of emergency power include:

1. 专用应急发电机组
Dedicated emergency generators

2. 蓄电池
Batteries

3. 独立于正常电源系统以外其他电力系统提供的可靠电源。
Power feed from a reliable electrical supply verified to be independent of the property's primary electrical feed.

C. 关键电力负荷应永久和可靠的接入应急电源系统。
Critical loads shall be permanently and reliably connected to the EPS.

D. 应急备用电源部件包括发电机、油箱、控制设备、自动转换开关等技术要求，设计和安装和调试均应符合设备制造商和相关管理部门所认可的执行标准。
The technical requirements, design and installation, testing and commissioning for EPS components, including generators, fuel tanks, controllers and automatic transfer switches, etc. shall comply with the standards as specified by the equipment manufacturers and accepted by the relevant authorities.

E. 应急供电系统（EPS）的发电机应具有不受天气影响的围护保护构造，同时考虑以下因素：
Generator(s) provided for EPS shall be in a weatherproof enclosure, and considered the followings:

1. 与相邻设备和建筑间保持一定的距离;
Separation between adjacent equipment and building;

2. 通风要求;
Ventilation requirements;

3. 燃油系统的安全;
Fuel system safety;

4. 振动、噪音和废气排放;
   Vibration, noise and exhaust emission;

5. 可能的地震活动，风力，飓风和龙卷风等环境因素。
   Possible seismic activity, wind, hurricane/cyclone, tornado and other environmental factors.

F. 在正常供电出现故障的情况下，应急备用电源应至少提供：
In the event of loss of normal electrical power supply, at a minimum, EPS shall be provided to:

1. 保证建筑内的宾客和员工生命安全直至恢复正常供电。
   Ensure the life safety of the guests and employees within the building until restoration of the normal power supply.

2. 保证建筑内人员安全疏散，包括下述内容：
   Ensure the safe evacuation of the building including:

   a. 疏散通道和控制调度区域（前台，保安监控室，消防控制室）的最低照明度。
      The provision of minimum lighting levels through designated means of egress and at control points (front desk, security room, fire command center)

   b. 应急疏散标志
      Emergency evacuation or exit signage

   c. 电梯应急控制供电
      Power for emergency operations of elevators

   d. 通信供电包括建筑火灾报警系统和电话通讯设备
      Power for communications including the building fire alarm system and telephone equipment

G. 维持与生命安全和安防要求相关的系统正常运行，包括：
Maintain systems critical to fire and life safety and security in operational readiness, including:

1. 消防水泵
   Fire pump(s)

2. 烟气控制系统和楼梯间加压设备
   Smoke control and stairwell pressurization equipment

3. 所有与安防相关的设备及设施，包括保安室，远程传感探测器和摄录像设施
   All security related equipment and devices including security office(s), remote sensors/detectors and cameras

4. 所有电控启闭锁设施
   All electrically controlled locking/unlocking mechanisms

H. 与生命安全，防火保护和安全保卫相关的电力负荷必须优先于其他电力负荷。
Electrical loads related to life safety, fire protection and security shall take precedence over all other electrical loads.

I. 对于可能遭受自然灾害，如飓风/旋风，地震，洪水/潮汐，龙卷风，暴风雪，山林火灾或正常供电不稳定的酒店设施，必须考虑应急备用电源的额外负荷。应根据可能的自然灾害及燃料再补给情况设计应急电源的供电时间。燃料的存储应至少保证在酒店补给中断的情况下设计负荷两天的使用消耗。
For properties subject to natural events including hurricanes/cyclones, earthquakes, flooding/tidal waves, tornadoes, significant winter storms, wildfires and/or located in an area with unreliable power supply, consideration shall be given to the provision of additional EPS capability. Duration of the EPS shall be based on likely exposure to the identified hazard(s) and available fuel to resupply the property. No less than two days' supply of fuel shall be provided based on the calculated loads where fuel resupply may be interrupted.

3.7. 消防防排烟系统
FIRE PROTECTION SMOKE CONTROL SYSTEM

A. 建筑防排烟系统应符合国家规范及项目所在地消防规范的有关规定。防排烟量的计算应严格按照国家规范及当地消防规范的要求确定。
Smoke control system and its smoke volume calculations shall strictly comply with the national codes and the local fire codes requirement and regulations.

3.7.1. 防烟系统
Smoke Control System

A. 防烟楼梯间优先采用机械加压送风方式防烟。机械加压送风系统的加压风量应根据规范相关要求计算确定。
Mechanical pressurization system is preferred to be used for smoke stop staircase. The pressurized air volume of the mechanical pressurization system shall be calculated and determined based on requirements from relevant standards.

B. 机械加压送风系统要求如下：
The requirements of the mechanical pressurization system are as follows:-

1. 地上、地下部分在同一位置的防烟楼梯间设置机械加压送风时，加压送风系统宜分开设置；如建筑条件受限无法分开设置时，加压送风量应叠加，并应满足地上、地下加压送风要求；
If mechanical pressurization system is provided for the same smoke stop staircase at aboveground and basement, the pressurization system is recommended to be separated. If the system is not possible to be separated due to construction constrains, the total air volume shall added up by the aboveground and basement pressurized air supply requirements.

2. 采用机械加压送风的场所不可设置百叶窗及开启窗；如设置可开启窗，则火灾发生时，可开启窗须自动关闭；
Louver or retractable window shall not be provided for areas with mechanical pressurization supply air. If there is retractable window, the window shall be automatically closed during fire alarm.

3. 加压送风风道应采用镀锌钢板风道，不可直接采用土建风道；
Pressurization air duct shall be of galvanized steel type. Brick or concrete duct shall not be used directly.

4. 加压风机可采用离心风机或轴流风机；

5. Pressurization fan shall be centrifugal or axial type.

6. 加压风机应设置在加压机房、设备层或裙楼/塔楼屋面，不可吊装于楼梯间或其他区域吊顶；
   Pressurization fan shall be located in pressurization system plant room, equipment floor or podium/tower roof top, but shall not be installed in the staircase or ceiling space.

7. 前室加压送风口宜为常闭型，并设置与消控中心及加压风机联动装置，并应设置现场手动开启装置；如采用常开型加压送风口时，前室应采用带启闭信号的常闭防火门，并在送风机的出风管加装防回流装置或电动调节阀；
   Antechamber pressurization system supply air inlet shall be normally closed and interlocked with the fire control center and pressurization fan; and it shall be able to be manually opened on site. If the pressurization system supply air inlet is of normally open type, the antechamber shall be provided with normally closed fire door, which will open during fire alarm mode; and non-return damper or motorized damper shall be provided at the supply duct of the pressurization fan.

8. 机械加压送风口不应设在被门挡住的部位；
   Mechanical pressurization system supply air inlet shall not be blocked or obstructed by the door.

9. 防烟楼梯间的加压送风口宜每隔 2~3 层设置一个；合用一个风道的剪刀楼梯应每层设置一个；
   The pressurization supply air inlet for smoke stop lobby shall be provided at every 2~3 floors. The pressurization supply air inlet for scissors staircase sharing one air duct shall be provided for every floor.

10. 前室或合用前室每层设置一个加压送风口；
    Antechamber or shared antechamber shall be provided with one pressurization supply air inlet at each floor.

11. 加压风口的速度不大于 7m/s。
    Pressurization system outlet air velocity shall not exceed 7m/s.

3.7.2. 排烟系统
Smoke Extraction System

A. 采用自然排烟的区域，其自然排烟口除可手动开启外，还须与消控中心联动，火灾时可电动开启自然排烟口。
   For area using natural smoke extraction system, the natural smoke extraction outlet shall not only be able to be manually opened, but shall also be opened by electric actuator through fire alarm signal received from the main fire alarm panel located at the fire command center.

B. 火灾确认后，同一排烟系统中着火的防烟分区的排烟口应呈开启状态，其他防烟分区的排烟口应呈关闭状态。
   Upon verification of the fire hazard, all exhaust outlets in the same smoke separation zone and smoke extraction system shall be opened. The smoke extraction outlets of other smoke separation zones shall continue to be closed.

C. 在地下建筑及地上密闭场所中设置机械排烟系统时，应同时设置补风系统，补风量不低于排烟量的 50%。补风系统应与排烟系统联动启停；补风口应远离排烟口，并保证水平距离不小于 5m。
For mechanical smoke extraction system in basement and enclosed aboveground areas, make-up air system shall be provided. The make-up air volume shall not be less than 50% of the smoke volume. Make-up air system shall be interlocked with the smoke extraction system. Make-up air inlet shall be located away from the smoke extraction outlet and the horizontal distance shall not be less than 5m.

D. 除地下车库外，排烟系统应与通风系统分开设置。
The smoke extraction system shall be separated from ventilation system unless it is in basement car park.

E. 机械排烟系统排烟风道应采用镀锌钢板风道，不可直接采用土建风道。
Mechanical smoke extraction system duct shall be of galvanized steel type. Brick or concrete duct shall not be directly used.

F. 排烟风机可采用离心风机或排烟专用轴流风机，排烟风机应满足以下要求：
Smoke extraction fan can use centrifugal or axial flow fan and shall meet the following requirements:

1. 排烟风机排烟量须考虑至少 10%的漏风量，其全压应满足排烟系统最不利环路的要求
The smoke volume of the smoke extraction fan shall consider at least a surplus of 10% to compensate for leakages in the system. The total pressure shall meet the requirements of the most unfavorable loop in the smoke extraction system.

2. 排烟风机应保证在 280℃时可连续工作 30min。排烟风机入口处总管应设置超过 280°C 能自动关闭的排烟防火阀，并连锁关闭排烟风机；
Smoke extraction fan shall ensure continuous working for 30min at a temperature of 280°C. Smoke fire damper which can be automatically closed at temperature above 280°C shall be provided for the main duct at the smoke extraction fan outlet, and shall be interlocked with the smoke extraction fan.

3. 排烟风机宜设置在排烟系统的上部，烟气出口宜朝上，并应高于加压送风机的进风口，两者垂直距离不应小于 3m 或水平距离不应小于 10m；排烟系统能够中任一排烟口或排烟阀开启时，排烟风机应能自动启动；
Smoke extraction fan shall be located at the upper portion of the smoke extraction system. The smoke exhaust outlets shall be facing up and higher than the pressurization fan supply air inlets. The vertical distance between the two shall not be less than 3m and horizontal distance shall not be less than 10m. When any of smoke extraction outlet or smoke damper in the system opens, the extraction fan shall be able to start automatically.

4. 排烟风机应设置于专用房内或室外屋面，不可吊装于室内吊顶内。
Smoke extraction fan shall be located in a dedicated room or at outdoor roof, but shall not be installed in the ceiling space.

G. 机械排烟系统中排烟口、排烟阀和排烟防火阀的设置须满足以下要求：
The smoke exhaust outlet, smoke damper and fire damper for the mechanical smoke extraction system shall meet the following requirements:

1. 排烟口设置应尽量使气流方向与人员疏散方向相反，排烟口位置与附近安全出口的最小距离不应小于 1.5m，且应尽量远离逃生出口；
Smoke extraction outlet shall be designed to allow the airflow direction to be opposite to the evacuation route where possible. The minimum distance between the smoke extraction outlet and nearest the safety exit shall not be less than 1.5m, and shall be located as far as possible from the exit.

2. 设置在顶棚的排烟口，距可燃构件或可燃物的距离不应小于 1.0m；
For smoke extraction outlet located at roof, the distance between the outlet and combustible components or materials shall not be less than 1.0m.

3. 设置于酒店功能区及前勤的排烟口须采用排烟阀+不燃排风口的形式；
Smoke exhaust outlet for hotel function area and reception area shall be of type integrating the smoke damper and non-combustible exhaust outlet.

4. 防烟分区的排烟口距最远点得水平距离不应超过 30m；
The distance between the smoke exhaust outlet of the smoke zone and the furthest point shall not be more than 30m.

5. 排烟风口的速度不大于 10m/s。
Smoke exhaust outlet air velocity shall not exceed 10m/s.

3.8. 调试和验收
TESTING AND COMMISSIONING

3.8.1. 灭火系统调试
Commissioning of Fire Suppression System

3.8.2. 火灾自动报警系统调试
Test of Fire Alarm System

1. 所有系统必须在按照本章的相关要求在酒店正式营业之前进行正式且成功通过测试。调试必须由有资质的独立第三方监督。
All systems shall be tested and verified officially according to the requirements of this specification, prior to the official opening and operation of the hotel. The testing and commissioning of the system shall be witnessed and certified by an independent qualified third‐party.

2. 测试须按照本章标准进行测试记录。项目文件，包括测试说明，测试文档及施工图纸应呈交给酒店管理人员。
Testing shall be conducted with all test results recorded in accordance with the specifications stated herewith. Project documentation, including testing specifications, test documentation and as‐built drawings shall be provided upon handing over to the hotel operation personnel.

3. 系统软件，包括存储信息的安全保障和重置系统的功能要求应呈交给酒店运营管理人员。
   System software, including security of stored information and functional requirements of system re-configuration shall be provided upon handing over to the hotel operation personnel.

4. 如有要求，测试结果书面文件必须呈交给当地消防管理监督机构。
   If required, the written document of the test results shall be submitted to the local fire management and supervision authority.

5. 测试和调试必须验证各个系统之间相互动作关系的正确性，包括自动喷淋，暖气和空调，电梯，防排烟及应急发电机。
   Testing and commissioning shall verify the correct operation of all interfaces between systems, including automatic fire sprinkler sprinklers, heating and air conditioning, elevators, smoke control and emergency generators.

6. 向酒店相关设备管理人员演示和指导已安装的设备。
   Demonstration and trainings on operation of installed equipment shall be provided for relevant hotel equipment management and operation personnel.

7. 根据本章节规定，用以下标准表格填写测试记录。
   The standard form below shall be used for recording of test records specified herewith.

表 3-9 消防联动测试表

Table 3-9 Fire Protection Automatic Control System Test

测试项目 Test Item		**测试内容 Test Description**	**检查结果 Test Result**	**备注 Remark**
消防水系统 Fire Fighting Water System	**消火栓系统 Fire Hydrant System**	1.消火栓泵现场手动启泵 On site manual start-up of the fire hydrant pump		
		2.消防控制中心远程启泵及启泵反馈 Fire command center remote pump start-up and status feedback		
		3.主备泵故障切换启泵 Transfer and switching between the duty and standby pumps during failure of either set of pump		
		4.消火栓手报按钮远程启泵及启泵反馈 Fire hydrant manual start button remote pump start-up and feedback		
		5.屋顶试验消火栓水枪试射 Roof fire hydrant testing		
		6.稳压泵压力正确，启动正常 Jockey pump pressure is correct and start-up is normal		

测试项目 Test Item		测试内容 Test Description	检查结果 Test Result	备注 Remark
	喷淋系统 Sprinkler System	1.泵房现场手动启泵 On site manual start-up of the pumps		
		2.消防控制中心远程启泵及启泵反馈 Fire command center remote pump start-up and status feedback		
		3.主备泵故障切换启泵 Transfer and switching between the duty and standby pumps during failure of either set of pump		
		4.末端放水自动启泵及启泵反馈 Automatic pump start-up and status feedback due to water proving test at the terminal test valve		
		5.湿式报警阀放水自动启泵及启泵反馈 Automatic pump start-up and status feedback due to water proving test at the control valve		
		6.泵房内电接点压力表自动启泵及启泵反馈 Automatic pump start-up and status feedback by pressure sensors in the pump room		
		7.稳压泵压力正确，启动正常 Jockey pump pressure is correct and start-up is normal		
	湿式报警阀 Hydraulic Valve	1.湿式报警阀放水，水力警铃连续报警，压力开关信号反馈消防中控室报警，并联动喷淋泵启动及启泵反馈 Control valve water proving, continuous sounding of alarm gong, pressure switch alarm feedback to fire command center and sprinkler pump start-up and status feedback		
		2.报警阀处压力开关直接联接泵房喷淋泵控制柜启泵 Alarm valve pressure switch directly linked to sprinkler pump control panel in the pump room to start up the pump.		
		3.报警阀处压力开关反馈消防中控室联动启泵 Alarm valve pressure switch feedbacks to fire command center to start up the pump.		

测试项目 Test Item		测试内容 Test Description	检查结果 Test Result	备注 Remark
	预作用阀/雨淋阀 Pre-action Valve/ Deluge Valve	关闭报警阀后的阀门，报警联动电磁阀打开，水力警铃连续报警，压力开关在消防中控室报警，泵自动启动及启泵反馈 Close the valve after the alarm valve, open the alarm control solenoid valve, continuous warning from the water powered alarm, alarm to fire control center by pressure switch, automatic pump start-up and feedback		
其它 Others	**气体灭火系统 Gas Suppression System**	1.系统安装的完整性 System installation is complete		
		2.外观无变形、缺陷；手动操作装置有铅封 No visual deformation and defects. Manual operation device has a lead seal.		
	安素灭火系统 ANSUL Fire Suppression System	1.系统安装的完整性 System installation is complete		
		2.厨房 ANSUL 灭火系统动作后自动关闭燃气切断阀 The gas shut off valve shall be closed automatically when the kitchen ANSUL fire suppression system activates.		
	厨房燃气探测系统 Kitchen Gas Detection System	1.系统安装的完整性 System installation is complete		
		2.燃气探测器报警时启动事故排风 Emergency exhaust fan shall be activated if the gas detection alarm activates.		
		3.燃气探测器报警时关闭燃气切断阀 The gas shut off valve shall be closed if the gas detection alarm activates.		
	消防通讯 Fire Intercom	1.控制室与设备间的通话功能正常，语音清楚 The intercom between the control room and plant room shall be clear and operates normally.		
		2.手动报警按钮处插孔通话，功能正常，语音清晰 The intercom at the manual call point is clear and operates normally.		

测试项目 Test Item		测试内容 Test Description	检查结果 Test Result	备注 Remark
		3.消防控制室应设置向当地消防部门直接报警的外线电话 Direct telephone line connected too local fire department is provided in the fire command center		
	安全疏散 Safety Evacuation	1.疏散指示灯方向正确 Correct installation of directional exit sign		
		2.安全出口标识设置正确 Correct installation of exit sign		
		3.安全疏散通道通畅 Unobstructed safety escape corridor		
	防火门 Fire Door	1.闭门器、顺位器安装正确 Correct installation of door closer and door selector		
		2.防火门锁芯安装方向正确 Correct direction and installation of fire door lock core		
		3.开启方向正确 Correct door opening direction		
	防火卷帘 Fire Roller Shutter	1.疏散通道上防火卷帘两步降（旁边设置通道门的可以一步降），防火分隔的防火卷帘一步降 Fire roller shutter for escape corridor shall be of two stage closing type (side door can be of one stage closing type). Fire roller shutter for fire compartment shall be of one stage closing type.		
	门禁 Access Control	1.消防报警联动打开所有门禁 All access controlled areas shall be released upon fire alarm.		
	首层通往室外安全出口的门 Door leading to External Safety Exit at First Floor	1.使用推杆锁 Push bar lock is used.		
	应急照明 Emergency Lighting	1.消防联动切非消防电后所有可能有人区域有应急照明 Emergency lighting is provided for all occupied areas after power supply to non-fire services is cut off during fire alarm.		

测试项目 Test Item		测试内容 Test Description	检查结果 Test Result	备注 Remark
		2.配电室、消防中控室、消防泵房、应急发电机室等机房设置应急照明 Emergency lighting shall be provided for electrical substation, fire command center, fire pump room, emergency generator room and other plant rooms.		
	末端电源互投 Power Supply Sources Changeover	1.应急电源末端互投切换正常 Normal operation of emergency power supply source changeover		
	柴油发电机 Diesel Generator	1.现场手动启动发电机 On site manual start-up of the generator		
		2.双路市电断电后是否在 10S 内自动启动柴油发电机 Diesel generator shall start up within 10 seconds after failure of the dual supply feeds from power grid.		
		3.双路市电断电后启动柴油发电机，并运行 20 分钟 Diesel generator shall start up after failure of the dual supply feeds from power grid and run for 20min.		
		4.自动状态时，供发电机使用的送排风机在发电机启动时由发电机自动供电并自动启动 In automatic mode, the supply and exhaust fan serving the generator shall be automatically turned on via supply from the generator.		

3.8.3. 消防广播的调试验收
Testing and Commissioning for Fire Broadcast System

A. 检查所有扬声器安装位置是否合理，检查线路的连接。
Inspect all speakers' locations and circuits connection.

B. 以手动方式在消防控制室对所有广播分区进行选区广播，对所有公用扬声器进行强行切换；应急广播应以最大功率输出。
Manually activate all broadcast zones from the fire command center and broadcasting of each zone in turn. Emergency broadcast shall operate at maximum power output with forced switch-over of public address system.

C. 对扩音机和备用扩音机进行全负荷试验，应急广播的语音应清晰。
Full load test for operational and spare amplifiers; emergency broadcast must be clear.

D. 对接入联动系统的消防应急广播设备系统，使其处于自动工作状态，然后按设计的逻辑关系，检查应急广播的工作情况，系统应按设计的逻辑广播。
When fire emergency broadcast is interfaced with other system, it must operate automatically, check against its designed program logic and working conditions, and broadcast according to its designed program logic.

E. 使任意一个喇叭离线，其它喇叭的工作状态不受影响。
In the event of any speaker is off-lined, the other speakers shall not be affected.

3.8.4. 应急电源
Emergency Power Supply

A. 应急备用电源必须经过规范的测试，并成功的完成自动转换操作。
The EPS shall be tested as per specification to ensure successful automatic transfer operation.

B. 对酒店相关人员提供设备安装操作示范和指示说明。
Demonstration and training on the equipment installation and operation shall be provided for the hotel operation personnel.

第4章. 给排水系统
SECTION 4: PLUMBING SYSTEM

4.1. 概述
GENERAL

本章节所包含的设计内容仅适用于制定希尔顿全球基本的给排水系统标准，如果地方规范高于希尔顿全球标准，则按照高的标准执行。

The content of this section is applicable in establishing the basic design requirement for the Plumbing and Drainage System to be used in Hilton Worldwide properties. The building Plumbing and Drainage System shall also comply with local codes and regulations. When these codes and regulations exceed Hilton Worldwide's standards or vice versa, the more stringent requirement will take precedent.

4.2. 设计标准和要求
DESIGN CRITERIA AND REQUIREMENT

A. 给排水系统的设计及安装必须依据下列标准的最新版本进行设计、安装和测试：
Design and installation of the Plumbing and Drainage Systems shall comply with the latest version of the standards as listed below for design, installation and testing:

1. GB50015 建筑给水排水设计规范
GB50015 Code for Design of Building Water Supply and Drainage
2. GB 5749 生活饮用水卫生标准
GB 5749 Standards for drinking water quality
3. GB50336 建筑中水设计规范
GB50336 Code of Design for Building Reclaimed Water System
4. GB50013 室外给水设计规范
GB50013 Code for Design of Outdoor Water Supply Engineering
5. GB50014 室外排水设计规范-
GB50014 Code for Design of Outdoor Waste Water Engineering
6. CECS14 游泳池及水上游乐池设计规程
CECS14 Specification for Design of Swimming and Amusement Pools
7. CJJ122 游泳池给水排水工程技术规范-
CJJ122 Technical Specification for Water Supply and Drainage Engineering of Swimming Pool
8. GB50242 建筑给水排水及采暖工程施工质量验收规范
GB50242 Code for acceptance of construction quality of water supply drainage and heating works
9. GB50268 给水排水管道工程施工及验收规范-
GB50268 Code for Construction and Acceptance of Water and Sewerage Pipeline Works

4.3. 给水分配系统
HOT AND COLD WATER DISTRIBUTION SYSTEMS

4.3.1. 水源及用水量标准
Water Source and water Consumption Standard

A. 如项目所在地具备条件，开发商应为酒店申请两路市政进水，市政引入管进入项目红线后宜按照水用途分开，以便单独计量。如：项目生活用水与消防用水分开室外供水管网，分别设水表计量，室外园林用水预留水表；如当地职能部门推荐合用室外供水管网，可在环网以后区别水用途处分别设计量装置。
The developer is required to apply for two municipal water-incoming feeds from the Water Utility Company when available. Municipal incoming water main shall be distributed according to the water usage to facilitate respective individual metering within the project boundary. Domestic water and firewater shall be provided under separated external reticulation network with dedicated water meters. Provision of space for installation of water meter in the future shall be provided for landscape irrigation. When local authority permits the use of common external water reticulation network, water meters shall be provided and installed separately after the ring main..

B. 所有项目均需提供项目当地水质检测报告，水质检测报告应在项目所在地现场取水并送当地主管部门进行水质检验，不能仅采用自来水厂出厂水质报告。
Water quality test report of local municipal water supply shall be submitted for all projects. Water sample for the water quality test shall be obtained on site and tested by competent local authority. Water quality test report produced from water plant is not acceptable.

C. 用水量将根据现行国家规范及参照有关标准。按不同用水性质建议采用以下参数
Water consumption data for different water usage areas shall follow latest national regulation and standard with details as listed below

表 4 -1 生活冷水用水量

Table 4-1 Cold water consumption for domestic hot water system

用水项目 Water consumption content	单位 Unit	建议用水定额(最高日)(L) Recommended water consumption rate (Maximum per day)(L)	小时变化系数 Variation per hour	使用时间(h) Usage Time (h)	备注 Comment
酒店客人 Hotel guest	每人每日 Per person per day	400	2.5~2.0	24	城市酒店人数按每客房1.5人计算 度假酒店人数按每客房2人计算 Number of people for city hotel shall be 1.5 persons per guest room. Number of people for resort hotel shall be 2 persons per guest room
酒店员工 Hotel Staff	每人每日 Per person per day	150	2.5~2.0	24	人数按客房数量计算 Number of people shall be determined by quantity of guest rooms

用水项目 **Water consumption content**	单位 **Unit**	建议用水定额(最高日)(L) **Recommended water consumption rate (Maximum per day)(L)**	小时变化系数 **Variation per hour**	使用时间(h) **Usage Time (h)**	备注 **Comment**
西餐厅 Western Restaurant	每人每日 Per person per day	25	1.5~1.2	10~12	每日2~4人次（按座位数计算或按餐厅面积估算1.0~1.5m^2/人）。 2 to 4 persons per day (calculated by seats Or 1.0 to 1.5 m^2/person)
中餐厅 Chinese Restaurant	每人每日 Per person per day	50	1.5~1.2	10~12	每日2~4人次（按座位数计算；或按餐厅面积估算1.0~2.0m^2/人）。 2 to 4 persons per day (calculated by seats Or 1.0 to 2.0 m^2/person)
大堂吧 Lobby Bar	每人每日 Per person per day	15	1.5~1.2	8~18	每日3~5人次（按座位数计算 或按1.0~1.5m^2/人估算）。 3 to 5 persons per day (calculated by seats Or 1.0 to 1.5m^2/person)
健身中心 Fitness Center	每人每日 Per person per day	60	1.5~1.2	8~12	每日2~3人次；按10 m^2/人估算 2 to 3 persons per day; 10 m^2/person
SPA	每人 Per person	200	2.0~1.5	12	每日2~3人次；按20 m^2/人估算 2 to 3 persons per day; 20 m^2/person
游泳池补水 Compensating water for swimming pool					每日占水池容积5% (室内)，10%(室外) 5% of swimming pool volume for indoor type and 10% for outdoor type
洗衣房 Laundry	每kg每日 Per kg per day	40~80	1.5~1.2	8	按5.5kg/房.天计 5.5kg per room per day
绿化、景观 Greening and landscape	每m^2每日 Per m^2 per day	2			按绿化面积计算 Calculated by green area
空调系统补水 Compensating water for Air conditioning system					补水量约为冷却水流量的1.5% Compensation water shall be 1.5% of the cooling water

用水项目 Water consumption content	单位 Unit	建议用水定额(最高日)(L) Recommended water consumption rate (Maximum per day)(L)	小时变化系数 Variation per hour	使用时间(h) Usage Time (h)	备注 Comment
未预见用水量 Unforeseen water consumption					总日用量的10%(消防用水量除外) 10% of daily total water consumption(Excluding Firefighting water)

注：酒店总用水量需按 1.2~1.6m^3/房.天的标准进行校核，入住率按 100%考虑。

Note: Total water consumption for hotel shall be adjusted by 1.2 to 1.6 m^3 per room at 100% occupancy rate.

A. 用水量将根据现行国家规范及参照有关标准。按不同用水性质建议采用以下参数:
Water consumption data for different water usage areas shall follow latest national regulation and standard with details as listed below:

表 4-2 生活热水用水量

Hot water consumption for domestic hot water system

用水项目 Water consumption content	单位 Unit	建议用水定额(最高日) (L) Recommended water consumption rate (Maximum per day)(L)	使用时间(h) Usage Time (h)	备注 Comment
酒店客人 Hotel Guest	每人每日 Per person per day	160	24	城市酒店人数按每客房1.5 人计算 度假酒店人数按每客房2 人计算 Number of people for city hotel shall be 1.5 persons per guest room. Number of people for resort hotel shall be 2 persons per guest room
酒店员工 Hotel Staff	每人每日 Per person per day	50	24	人数按客房数量计算 Number of people shall be determined by quantity of guest rooms
餐厅 Restaurant	每人每次 Per person per time	15	10~12	每日2~4人次（按座位数计算或按餐厅面积估算1.0~2.0m^2/人） 2 to 4 persons per day (calculated by seats or 1.0 to 2.0m^2/person)
大堂吧 Lobby Bar	每人每日 Per person per day	8	8~18	每日3~5人次（按座位数计算或按1.0~1.5m^2/人估算） 3 to 5 persons per day (calculated by seats or 1.0 to 1.5m^2/person)

用水项目 Water consumption content	单位 Unit	建议用水定额(最高日) (L) Recommended water consumption rate (Maximum per day)(L)	使用时间(h) Usage Time (h)	备注 Comment
健身中心 Fitness Center	每人每日 Per person per day	50	8~12	每日2~3人次；按10m^2/人估算 2 to 3 persons per day; 10 m^2/person
SPA	每人 Per person	100	12	每日2~3人次；按20m^2/人估算 2 to 3 persons per day; 20 m^2/person

注：

Note:

1. 对于酒店，150≤床位数≤1200，热水时变化系数取 3.33~2.60。
   For hotel with beds range between 150≤Beds Number≤1200, the hot water consumption variation factor shall range between 3.33 to 2.60
2. 度假型别墅的用水定额均须满足 1 立方米浴缸的冷热水用水量。
   Water consumption rate for resort hotel shall comply with the hot and cold water requirement for bathtub.
3. 表中热水温度按 60°C 计算。
   The hot water temperature shall be 60°C

4.3.2. 水质标准
Water Quality Standard

A. 供水系统应是可靠的，并应符合且不低于世界卫生组织的标准，且应符合现行行业标准《生活饮用水卫生标准》-GB5749 的要求。
Water supply system shall be reliable and comply with the World Health Organization, latest industry standards and GB5749 “Codes for Standards for Drinking Water Quality”.

B. 为酒店供应的生活水水质应满足表 4-3 要求；
Domestic water quality of hotel shall comply with the requirements as stated in Table 4-3:

C. 需在项目现场每个出水点检测水质指标，达到表 4-3 标准要求。
Water quality of all water outlets at site shall be tested and comply with the standard requirement as stated in Table 4-3.

D. 表 4-3 中的物理和化学性能的限定和最大允许浓度是按百万分之一计。
The physical and chemical performance limit and maximum allowable concentration of the water quality shall be as stipulated in Table 4.2.2-1 in ppm.

表 4-3 水质标准要求

Table 4-3 Water quality requirement

参数 Parameter	WHO 标准 WHO Standard	中国国标 GB 5749 China Standard GB 5749	希尔顿全球标准 Hilton Worldwide Standard
温度（°C） Temperature(°C)		10-15	10-15
酸碱度 PH Value	6.5-9.2	6.5-8.5	6.5-8.5
氯化物（mg/l） Chloride(mg/l)	250	<50	<50
硫酸盐（mg/l） Sulfate(mg/l)	200	<250	<200
硬度(以 CaCO3 计) Hardness(CaCO3)		<450	<150
钠（mg/l） Sodium(mg/l)	250	<200	<200
铝（mg/l）		<0.2	<0.2
总溶解固体（TDS） Total Dissolved Solid(TDS)	1,000	<1000	<1000
硝酸盐（mg/l） Nitrate(mg/l)	45	<10，地下水源限制时<20 <10, When underground water source limitation <20	<10
苯酚（mg/l） Phenol(mg/l)	0.001	0.002	≤0.001
杀虫剂（mg/l） Pesticide(mg/l)		0.001	≤0.001
铁（mg/l） Ferrum(mg/l)	0.3	0.3	≤0.3
锰（mg/l） Manganese(mg/l)	0.05	0.1	≤0.1
铜（mg/l） Copper(mg/l)	0.05	1.0	≤0.05
锌（mg/l） Zinc(mg/l)	5.0	1.0	≤1.0
铅（mg/l） Lead(mg/l)	0.5	0.01	≤0.01
镉（mg/l） Cadmium(mg/l)	0.01	0.005	≤0.005
铬（mg/l） Chrome(mg/l)		0.05	≤0.05
汞（mg/l） Mercury(mg/l)	0.001	0.001	≤0.001
砷（mg/l） Arsenic(mg/l)	0.01	0.01	≤0.01
氰化物（mg/l） Cyanide(mg/l)	0.01	0.05	≤0.01

参数 Parameter	WHO 标准 WHO Standard	中国国标 GB 5749 China Standard GB 5749	希尔顿全球标准 Hilton Worldwide Standard
镍（mg/l） Nickel(mg/l)		0.02	≤0.02
氟化物（mg/l） Fluoride(mg/l)	1.5	1.0	≤1.0
银（mg/l） Silver(mg/l)		0.05	≤0.05

注：锅炉房、洗衣房及厨房的用水水质要求详见 4.1.4.3 章节。

Note: Refer to Section 4.1.4.3 for water quality of Boiler, Laundry and Kitchen.

4.3.3. 系统和主要部件
System and Major Equipment

A. 给水方式及系统分区
Method of Water Supply

1. 酒店裙房宜采用储水箱+变频水泵的供水形式，不能采用市政管道直供，塔楼部分的供水方式可根据具体建筑情况确定采用重力或变频供水。
Water supply to hotel podium shall be via water storage tank + Variable frequency booster pump feed (up-feed system). No direct feed from municipal is permitted. Water supply to tower block shall be via gravity feed or variable-frequency booster pumps feed (up-feed system) depending on the building architectural and condition.

2. 酒店内供水压力分区应满足：酒店客房区供水压力分区应满足酒店卫生器具用水水压的基本需求，宜按 0.2~0.45MPa 进行分区，各分区楼层数可根据具体项目情况确定。如需要减压时，客房区供水应尽量避免使用支管减压装置，尽可能通过竖向分区设置减压阀将水压控制在规定范围内。裙房区域的最小供水压力应不小于 0.15MPa,最大水压应不大于 0.55MPa。
Supply water pressure for hotel shall comply with following requirements: Water pressure of sanitary wares and fittings water outlet in hotel guestroom must be sufficient, regulated and zoned within the range of 0.2 to 0.45MPa. The number of floors per zone shall be allocated to control the water pressure within the stipulated range. In addition, water supply system shall be zoned at the vertical water riser, and be divided according to the building height and water pressure required at the outlet. Where water pressure is required to be reduced, pressure reducing valve shall be installed in the vertical riser. Pressure reducing valve installed at horizontal branched pipe from the riser should be avoided. Supply water pressure for podium area shall be no less than 0.15MPa and no more than 0.55MPa.

3. 酒店内供水宜根据功能区域分区供水： 客房区与裙房分开供水，洗衣房独立供水。
Water supply within hotel shall be distributed according to the functions of the areas. The water distribution system for guestroom floors, podium and laundry shall separate, with each area provided with an independent water distribution network comprising of necessary pipe works and pump sets.

4. 给水主管道布置时宜采用上行下给的方式，具体可根据建筑情况确定。
Main water supply pipeline generally shall be via delivering the supply water upwards and

down feed to the water usage outlets, but shall also be subjected to the building architectural and condition.

B. 水的储存
Water Storage

1. 需提供可靠的两路供水，酒店储水量不低于 12 小时酒店正常用水要求， 当市政供水不能达到二路供水时，酒店设计储水量需经过希尔顿全球审核批准。
Reliable water supplies with two independent incoming feeds are required. Water storage capacity for hotel shall not be less than 12 hours of normal water consumption. When two independent incoming feeds is not available, the designed water storage capacity proposed shall be reviewed and approved by Hilton Worldwide.

2. 蓄水量还应根据城镇供水制度，供水可靠程度及区域对供水的保证要求确定。
Water storage capacity shall also be determined by urban water supply policy, the degree of water supply reliablity and warenty provided by regional or local water supply authority

3. 生活储水应与消防储水应分开设置。
Domestic water storage and firewater storage shall be independent and separated.

4. 水箱材质应优先考虑采用食品级不锈钢 SUS444，水箱应分为两格。
Food grade stainless steel SUS444 shall be considered for the water storage tank material selection. The water tank shall be provided with two compartments.

5. 考虑到市政水质中含有一定的余氯，宜优先考虑以市政原水水质形态进行储存，处理过的净化水储水量不宜超过总储水量的三分之一。
Incoming municipal water shall be stored in the raw water storage tank in due consideration on the presence of residual chlorine. Treated raw water shall be stored in the purfied water storage tank and its capacity shall not exceed one third of the total water storage capacity.

6. 消防用水与生活用水水价不同的地区，冷却塔的补水不得与消防用水合并储存。
In locations where the water tariff for domestic water and firewater are not the same, makeup water storage for cooling tower should not be combined or shared with firewater storage tank and prefer to be taken from the domestic water side.

C. 水的处理
Water Treatment

1. 应根据当地水质检验报告确定水处理方式及流程。一般系统包括石英砂、树脂、活性炭。考虑到市政供水也存在水质恶化的情况，无论水质检测结果如何，酒店用水必须经过过滤、紫外线消毒，或其它能保证水质效果的净化消毒措施。以下为一般水处理工艺流程示意图。
Water treatment method and process shall be determined based on local water quality report. Generally, the water treatment plant should include granule, resin and activated carbon filters. Water supplied to the hotel must be filtered and disinfected by ultraviolet light or other effective disinfection method regardless of the raw water test result with due consideration on the possibility of degradation of municipal water quality. Typical water treatment process is illustrated by the schematic below:

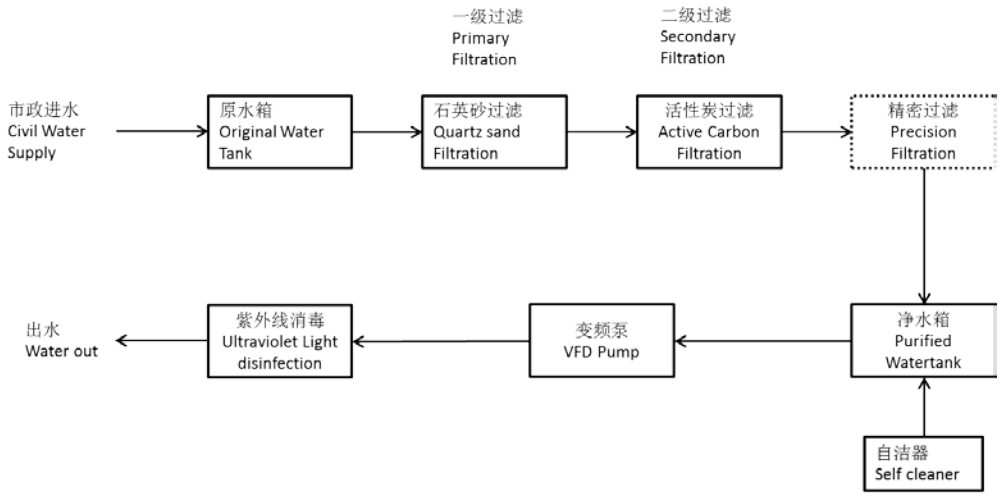


图 4-1 水处理工艺流程示意图

Figure 4-1 Water treatment flow chart

注：①如市政供水条件满足要求，且水箱设置受条件限无法实现时，可与希尔顿全球确认不设原水箱；②为避免活性炭过滤器出故障时炭粒不会进入净水箱，建议设置精密过滤器③净水箱后不一定都是变频泵，具体可根据系统形式确定。④此工艺流程为最基本的水处理工艺，机电顾问或者设计方可提供其他新技术处理工艺供希尔顿全球进行审批。

Note: ① Raw water tank can be omitted subject to the approval by Hilton Worldwide when the municipal water supply comply with the design requirement and installation of raw water tank is not possible due to site constrains; ② Precision filtration tank is recommended to prevent precitation of carbon particles in the water supply when the activated filter breaks down; ③ It is not compulsory that variable frequency pump after the purified water tank must be provided as it is dependent on the type of system adopted; ④ This filtration process is meant to be the basic water treatment requirement. Other new method or technology where applicable shall be proposed by M&E Consultant or designer and shall be submitted to Hilton Worldwide for review and approval.

2. 需为物业、行政区域包括更衣间、洗脸盆、淋浴、卫生间（冲厕水除外 ）、开水间提供满足希尔顿全球饮用水标准的冷、热水。
   Potable hot and cold water meeting Hilton Worldwide standards shall be provided for the facility management and administration areas such as changing room, wash basin, shower, toilets (excluding WC flushing water) and hot water dispenser room.

3. 对酒店内需要用软水的区域，以下是应达到的水质硬度指标：
   Water hardness requirement for areas requiring soft water area in the hotel is as follows:

   a. 锅炉：不超过 30ppm。
      Boiler: No more than 30ppm

   b. 厨房：0ppm （用于制冰机，咖啡机及洗碗机）
      Kitchen: 0ppm (for Ice maker, coffee machine and dish-washing machine)

c. 其它：不超过 50ppm
Other Equipment: Less than 50ppm

d. 洗衣房：不超过 50ppm（硬水可以在洗衣房内洗涤设备的最后两道冲洗工序中使用）
Laundry: No more than 50ppm (Hard water can be used for last two washing processes of the washing equipment)

e. 客房：不超过 150ppm
Guestroom : No more than 150ppm

f. 冷却塔：不超过 150ppm
Cooling tower: no more than 150ppm

4. 酒店所在地如有可利用的天然水源需根据水质报告来确定处理及工艺用途。
Where there is natural water resources that can be utilized in the vicinity, the filtration process must be determined based on water quality report.

D. 生活热水系统
Domestic hot Water System

1. 客房区热水分区应与冷水分区相同，并采用同源设计，来自同一变频压力泵或减压阀，防止混合水温水压频繁波动。
Hot water distribution and zoning shall be similar to that of the cold water distribution. The makeup water source for the hot water system shall be taken from the same water feed as the cold water supply through variable frequency booster pump or pressure reducing valve or gravity feed to avoid pressure fluctuation of the mixed water.

2. 酒店客房区热水系统需采用支管循环的循环方式，以确保出水龙头可以在 5 秒内出热水。
Hot water return pipe is provided at the hot water supply branch pipe near the water fittings in the guestroom to improve hot water circulation in the network to ensure that hot water is maintained in the system with minimal cold water leg and that it could be delivered within 5 seconds at the water taps.

3. 热水循环管路应采用同程；热水供水方式应采用上行下给式；每个循环系统控制立管数量不宜大于 15 根。
Reverse return system shall be adopted for the hot water circulation system. The hot water shall be supplied upwards and down feed to the hot water usage outlets and number of vertical risers for each system shall not exceed 15.

4. 客房淋浴间的热水应考虑安装恒温控制装置。
Constant temperature devices shall be installed for hot water supply to guestroom shower.

5. 客房的分支竖管回程管应配有截止阀，分区热水供水主立管顶部应设置自动排气阀。
Stop valve shall be provided at the branch off from the return vertical riser for isolation purpose. Auto air vent shall be provided at the highest pipe of the hot water supply main.

6. 生活热水系统的管道设计，减压阀，冷热水混合器的选择必须考虑最大限度减小对混合后水温及水压的波动。如采用减压阀分区供水，建议优先采用可调式减压阀。
The design of the hot water system pipe works, use of pressure reducing valve and

selection of hot-cold water mixer must take into consideration to minimize the effect on mixed water temperature and pressure fluctuation. When pressure reducing valve for the water distribution system is required, it is recommended that the adjustable type is used.

7. 生活热水系统宜采用容积式热交换器，贮水量不宜小于 60 分钟耗热量。每个分区至少设 2 台换热设备，互为备用。要求热水循环泵有备用。
   Hot water storage heat exchanger or hot water storage calorifier shall be provided for the domestic hot water system with storage capacity no less than 60 minutes of the total heat consumption. At least 2 numbers of heat exchangers (1 duty and 1 standby) shall be provided for each zone. 2 numbers of hot water circulating pumps (1 duty and 1 standby) shall be provided for each zone to circulate the hot water in the system.

8. 酒店裙房的生活热水的供应应与酒店客房热水分开供应。由于水质原因洗衣房热水应独立供应。
   Domestic hot water supply for hotel podium and hotel guestrooms shall be independent and separated. Hot water supply for laundry shall be independent and separated from the other areas due to consideration of water quality.

E. 计量
   Metering

1. 在冷热水系统中均应考虑分区域设水表，计量用水量主要是基于以下考虑：
   Water meters shall be provided to measure water consumption of different areas for hot and cold water system with considerations as below:

   a. 对水资源的使用进行管理
      Water resource usage management

   b. 记录及跟踪水的用量
      Record and tracability of water consumption

   c. 对大客户进行鉴别，经济合理的规划水资源的使用。
      Identify major consumers to optimize water usage cost efficiently

   d. 对出租的区域进行单独计量
      Separate metering for leased areas

2. 除进入酒店的总引入管上设置水表外，酒店内部下列区域（见下表）需设置水表计量，内部水表需采用直读式远传水表。
   Meters shall be installed at main incoming feeds as well at internal areas as listed in the table below. The meters must also be able to be read remotely.

表 4.-4 酒店计量水表设置

Table 4-4 Hotel Water Sub-metering

位置 Location	冷水 Cold Water	热水 Hot water
客房区 Guest room Area	√	√
SPA	√	√
游泳池补水 Compensation water for swimming pool	√	
美容美发 Hairdressing & Beauty	√	√
健体中心 Fitness Center	√	√
大堂吧 Lobby Bar	√	
冷却塔补水 Cooling tower compensation water	√	
空调系统补水 Compensation water for air conditioning system	√	
餐饮厨房 Kitchen	√	√
洗衣房 Laundry	√	√
公共区域 Common Area		
后台区域 Back of house area		
员工更衣室 Staff changing room	√	√
停车场 Carpark	√	
绿化、景观 Greening and landscape	√	
锅炉房补水 Boiler compensation water	√	

4.3.4. 技术说明及应用指导
Specifications and Application Guides

A. 水泵

Water Pump

1. 酒店生活供水系统如采用变频泵组，变频器与变频泵应一一对应。变频泵组服务客房区时应不少于两用一备，服务裙房时宜按不少于三用一备配置，具体可根据实际情况自由组合最优化搭配。在供水分区的最远供水点加装压力传感器。小流量用水时段，自动切换至小水泵或小气压罐运行。

   The hotel water supply system shall be provided with variable frequency drive booster

pump sets consisting of one variable frequency drives and to each pump. Each variable frequency drive booster pump set serving the hotel guestroom floors shall consist of at least 2 duty and 1 standby pumps.Those serving the hotel podium shall be provided with 3 duty and 1 standby pumps. Actual provision shall be based on the optimized configuration of the system depending on the circumstances. Water pressure sensor shall be provided at the hydraulically most unfavorable location of the water supply distribution system to control the start/stop of the pump set. During period of low water consumption, the system shall automatically switch to the operation of the smallest pump or pressure vessel to maintain the system water pressure

2. 水泵应有隔震措施，按照水泵运行重量，设置减震器或隔震垫。
Vibration isolation such as spring isolators with deflection sized in accordance to the operation pumps weight shall be provided for the domestic hot and cold water pumps.

B. 阀门
Valve

1. 阀门应配合各系统的工作压力，闸阀应适合于受压力情况下进行维修工作。不论安装于任何系统，阀门之额定工作压力不能小于系统工作压力并满足试验压力的要求。其它更高要求按系统需要而定。
Valves selected must match and withstand the system operation pressure and be able to operate and work normally. Regardless of where the valve is installed, its rated operating pressure shall not be less than the system pressure and shall comply with the hydraulic pressure test of the system. Higher standard requirement shall be determined based on the system requirement.

表 4-5 阀门工作压力与额定等级

Table4-5 Valve operation pressure and rating

系统 **System**	**最大系统工作压力(kPa)** **Maximum system operation pressure(kPa)**	**阀门系统额定级别 BS5150 至 BS5160** **Rated range for valve system BS5150 to BS5160**
生活给水、压力排水 Domestic plumbing and pressure drainage water system	600	PN10
	1000	PN16
	1200	PN16
	1600	PN20
	2000	PN25

2. 阀门接驳：
Valve connection:

a. 按管道接口的要求提供阀门，直径须与管径相同。
Valve shall in accordance to the pipe joint of similar size.

b. 管径 50mm 及以下为丝扣接口。
Joint shall be thread type for 50mm and below.

c. 管径 65mm 及以上为符合国家标准的法兰接口。
Joint shall be flange type for 65mm and above.

3. 给水系统阀门选用
Selection of valve for water supply distribution system valve

a. 低位生活水箱进水管的市政进水管段上应设置防污隔断阀，高位生活水箱进水管上应设止回阀。
Antifouling cut off valve shall be provided at municipal incoming water pipe for low level domestic water tank; Check valve shall be provided for high level domestic water tank.

b. 给水加压泵吸水管及出水管上不得采用蝶阀，应设置闸阀。
No butterfly valve is allowed for booster pump inlet and outlet pipes and gate valve should be provided instead.

c. 给水加压泵出口止回阀采用缓闭消声止回阀。
Low noise check valve, which closes slowly, shall be provided for booster pump outlet pipes.

d. 酒店垃圾房冲洗给水管上应设防污隔断阀。其他有可能导致生活给水系统污染的管路也将应设置防污隔断阀。
Antifouling cut off valves shall be provided for water supply to bin center. This shall also be provided along pipelines at locations where contamination of water supply is anticipated.

C. 配管尺寸
Pipe Sizing

1. 给水管应能提供足够的流量，连接管的管径应符合下表的要求。数量应根据当地的设计规范（如国际管道法规）的要求考虑同时使用的情况的计算值。最大设计流速：卫生器具的配水支管一般采用 0.6-1.0m/s，横向配水管，管径超过 25mm，宜采用 0.8-1.2m/s。
Plumbing water pipes shall provide sufficient flow rate with the pipe size as listed in the table below. The rate shall follow the local design regulation (e.g. International pipeline regulation). Maximum designed flow rate: 0.6 to 1.0 m/s for sanitary water pipes.0.8 to 1.2 m/s and 25 dia mm for horizontal water distribution pipes.

表 4-6-给水管道接管尺寸：
Table4-6 Plumbing water pipe size:

卫生设备类型 Sanitary ware type	最小连接管的尺寸 Connection pipe minimum size	
	冷水 Cold water	热水 Hot water
浴缸 Bath tub	20mm 20 mm	20mm 20 mm
自动饮水器 Water dispenser	15mm 15 mm	-
厨房洗涤池 Kitchen wash basin	15mm 15 mm	15mm 15 mm
抽水马桶（冲洗水箱浮球阀）	15mm	-

卫生设备类型 Sanitary ware type	最小连接管的尺寸 Connection pipe minimum size	
	冷水 Cold water	热水 Hot water
Water closet(Flush floating ball valve)	15 mm	
抽水马桶（延时自闭冲洗阀） Water closet(Time delay flush valve)	25mm 25 mm	-
洗衣池（1 格或 2 格） Laundry basin(1 container or 2 containers)	15mm 15 mm	15mm 15 mm
淋浴，单阀 Shower, single valve	20mm 20 mm	20mm 20 mm
洗涤池，清洗用 Wash basin, for cleaning	15mm 15 mm	15mm 15 mm
立式小便器 Pedestal Urinal	15mm 15 mm	-
挂式小便器 Wall Urinal	15mm 15 mm	-
洗涤盆，圆型或方型（单阀水嘴） Wash basin, round or square(Single valve)	15mm 15 mm	15mm 15 mm
延时自闭冲洗阀 Time delay flush valve 冲水水箱浮球阀 Flush floating ball valve	25mm 25 mm 15mm 15 mm	

注：

Note:

1. 对于可能影响连续供水的出水口，应单独计算连续供水的水量，并将结果加到卫生设备配件的总用量中。
   Separate calculation for water consumption shall be applied for outlet which may affect the continuous water supply and shall be included in total sanitary water consumption.

2. 对于没有列出的卫生器具配件，可以对照列出的这些卫生器具配件的流量和流速。
   For sanitary wares not listed above, reference could be made from the above table for the water flow rate and velocity.

3. 在那些对冷水、热水供应有特殊要求的场所，单独供应的最大供应量，应能达到总水量的 75%。
   For hot and cold water provision for areas with special requirement. Dedicated water supply shall be at least 75% of the maximum water consumption required.

4. 浴盆上面的淋浴用水量包含于浴缸用水里面。
   Water consumption for shower attached to the bathtub shall be included in its total water consumption.

D. 给水系统管材
   Water supply system

1. 给水系统管材选择参见 4.9 小节。
   Refer to section 4.9 for water supply pipe material selection

4.4. 排水系统
SANITARY DRAINAGE SYSTEMS

4.4.1. 系统设计要求
Design Criteria and Requirement

A. 排水系统应包括所有卫生器具、厨房和洗衣房设备的排水，最终排至市政管网或污水处理厂。
Sanitary discharge system shall include the discharge of soil and waste water from all sanitary wares, kitchen and laundry equipment which shall be ultimately discharged to the municipal sewer line or waste water treatment plant.

B. 排水系统排水量宜按酒店相应的生活给水系统用水量的 85%~95%计算。
Sanitary drainage system discharge water capacity shall base on 85% to 95% that of domestic water consumption capacity.

C. 需根据当地的市政排放要求，确定是否可以直接排放或需要设置化粪池等处理。
Whether the discharge of waste/soil water direct to or to be pre-treated by a septic tank before discharging to the municipal sewer line shall be determined by local municipal waste/soil water discharge requirement.

D. 建筑内污废水应分流，厨卫应分流，设专用通气立管系统。
Separate discharge stacks complete with a dedicated vent stack shall be provided for soil and wastewater discharge within the building. Similar provision shall also be provided for the discharge of kitchen wastewater with dedicated discharge and vent stack.

E. 客房卫生间的地面排水应有防止水封干枯的措施，可通过先将洗手盆排水排至地漏存水弯前接入，同时为避免双水封洗脸盆下方可不设存水弯。应考虑适当的措施消除排水时可能造成的噪音。示意图如下：
The floor drains (complete with U or P trap) provided in guestroom toilet must be provided with a mechanism to prevent drying up of water seal in the trap. This is achieved by connecting the discharge pipe from the wash basin to the vertical pipe of the floor drain above the water seal level below the floor slab as illustrated in the diagram below. To avoid the provision of double water seal in the system, the bottle trap below the wash basin shall be removed. Adequate measures and provision shall be considered to eliminate noise generated due to flowing of water to the trap.

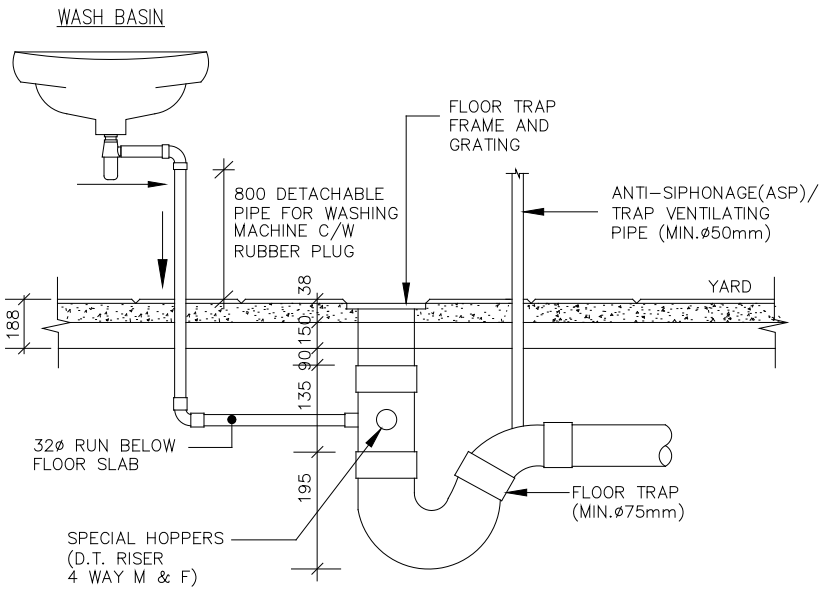


图 4-2 客房卫生间地漏连接

Figure4-2 Guest bathroom floor drain connection

注：①卫生设备大于等于 DN75 的排水管应在楼板下接至排水立管；②洗脸盆下方不应重复设置水封；③卫生器具供应商应参考建筑专业图纸确认地板砂浆底层的厚度。

Note: ①Sanitary wares discharge pipes sized at DN75 and above shall be connected to sanitary vertical discharge pipes under floor slab; ② No additional water seal under wash basin; ③ Sanitary wares supplier shall refer to construciton drawings to confirm floor sreed depth.

F. 在客房楼层每个客房管道井中需设置一个排水地漏，该地漏可考虑与客房风机盘管冷凝水共用排水立管，立管底端采用间接排水形式接入排水主系统。
Floor drain shall be provided in each pipe shaft in the guestroom. The floor drain can also be used for the discharge of air conditioning condensate by sharing the vertical discharge stack. The condensate discharge from the fan coil units shall not be connected directly to the vertical discharge stack and there shall be an air gap between outlet of the condensate discharge and the floor drain.

G. 厨房区域排水在排入市政管道之前，需考虑二级隔油，隔油装置宜按不少于两套考虑。
2-stage grease separation shall be provided for the kitchen wastewater discharged using at least two grease interceptors before discharging to municipal sewer lines.

H. 应在停车库提供排水点，方便车库保洁。
Floor drains shall be provided for car park for ease of car wash.

I. 垃圾房排水应单独排出，方便保洁。
Wastewater discharge from bin center shall be discharged independently for ease of cleaning.

J. 除电气设备机房外，所有的大型设备机房内应设排水点，以便保洁。
Floor drains shall be provided for all main plant rooms (excluding electrical plant room) for ease of cleaning.

K. 消防电梯的井底应设排水设施，其附设的专用排水井有效容积不应小于 2.0m3，排水泵排水量不应小于 10L/s。
Drainage equipment shall be provided for fireman elevator pit. Effective sump pit capacity shall not be less than 2.0m3 and the sump pump flow rate shall not be less than 10 L/s.

L. 地下室集水坑内污废水不能自流排出时采用潜水排污泵提升排出。所有排污泵一用一备，配自耦装置。集水坑内需设置水位启停装置，当高水位时需能同时启用 2 台泵，并接入楼宇自控系统。
Where direct gravity discharge is not available, basement wastewater shall be first discharged to sump pit and subsequently pumped and discharged to the external drainage system via sump pumps. Two self-couple type sump pumps shall be provided (One duty and one standby) and connected to the building management system. Water level control electrodes shall be provided to start/stop the sump pump automatically. When water level in the sump pit is extremely high, two sump pumps shall be operated concurrently to prevent flooding.

4.4.2. 技术说明及应用指南
Specifications And Application Guides

A. 管道
Piping

1. 卫生器具排水管道尺寸如下：
Sanitary wares discharge pipe sizes as follows:

表 4-7 卫生器具排水管道尺寸
Table4-7 Sanitary wares discharge pipe size

卫生设备 Sanitary wares	排水管尺寸 Discharge pipe size
洗手盆 Wash basin	50mm 50 mm
浴缸 Bath tub	50mm 50 mm
淋浴 Shower	75mm 75 mm
冲水马桶 Water closet	100mm 100 mm
小便器 Urinal	50mm 50 mm

2. 污/废水管不应布置在给水泵房及餐饮等上方。污/废水管道及配件的安装需满足国家施工验收规范的要求。
Soil/waste water pipes shall not be located above domestic water pump room or restaurant. Soil/waste water pipes and all necessary accessories installations shall comply with the national construction acceptance regulation requirement.

3. 大便器排水管最小管径不得小于 100mm；建筑物内排出管最小管径不得小于 50mm；小便槽或链接 3 个及 3 个以上的小便器，其污水支管管径不宜小于 75mm。
Water closet discharge pipe size shall not be less than 100mm; Discharge pipe size for building shall not be less than 50mm; Pipe size for sewerage pipes connected to 3 nos. or more urinals shall be not less than 75mm.

4. 客房淋浴间地漏规格不小于 DN75 或者设置 2 个 DN50，员工淋浴区如采用地漏排水时需考虑毛发过滤器。
   Floor drain size for guestroom shower shall not be smaller than DN or provision of 2 nos. of DN50. Hair filter shall be provided for floor drain of showers at staff changing rooms.

5. 餐饮区域排水可采用地沟或地漏，地沟的排出管需要设置水封，排水管的管径不小于 DN150mm,地漏不小于 DN100mm，具体也可参照厨房顾问要求执行。
   Surface drain complete with perforated stainless steel cover or cover with matching floor finishes or floor drain shall be used for restaurant area. The discharge pipe connected to the surface drain shall be provided with water seal via trap with pipe diameter not less than DN150mm. Pipe size of each floor drain complete with trap shall not be less than DN100mm. All the above provision shall be based on the requirement from kitchen consultant.

6. 垃圾房地漏规格建议不小于 DN100;
   Floor drainage size for refuse chamber shall not be less than DN100;

7. 管井内地漏不小于 DN50mm。
   Floor drain in pipe shaft shall not be less than DN50mm.

8. 排水管管材
   Drainage water pipe material

   a. 管材选择参见 4.9 小节。
      Refer to section 4.9 for pipe material selection

B. 通气系统
   Venting System

1. 污废水立管应设置专用通气立管，支管的通气设置应遵守当地的规范要求。在污水立管上至少每隔 10m 应设置和专用通气管的连接。通气立管和支管的尺寸应根据当地的相关法规考虑。
   Ventilation stack must be provided for all soil and waste water pipe for ventilation of foul air in the system and shall comply with local standard requirement. Connection between the soil/waste and ventilation stacks shall be provided at every 10 meters. The pipe size of ventilation pipes and its branch pipes shall comply with local regulation.

2. 公共卫生间，连接超过 4 个卫生器具且长度超过 12 米的排水横支管，或者连接超过 6 个大便器的排水横支管应设置环形通气管。
   Vent pipes provided for more than 4 nos. of sanitation wares or length of horizontal discharge pipe is longer than 12 meters or provided for the horizontal discharge pipe serving more than 6 nos. of water closets, shall be installed in the form of a loop.

3. 厨房排水管及隔油装置的通气管单独设置，不能与卫生间的通气管连接。
   Ventilation pipes for kitchen discharge water pipe and grease trap shall be separately installed and shall not be connected or shared with any guestroom ventilation pipes.

4. 通气管原则上都应伸至屋面，高出屋面的高度不少于 450mm。
   All ventilation pipes shall be extended by at least 450mm above the roof top and shall avoid location such as roof garden or area where there is human occupancy or activities.

5. 通气管管材
Ventilation pipe material

a. 管材选择参见 4.9 小节。
Refer to section 4.9 for pipe material selection

C. 检修口与清扫口
Access Panel and Cleaning Eye

1. 需根据规范要求在管道上设置清扫及检修口，检修口、清扫口应设置在较易接近的位置。
Cleaning eye and access panel shall be provided for all soil/waste horizontal discharge pipes and vertical stacks for ease accessibility and maintenance. The location of the cleaning eye shall be as per the requirement of local codes.

2. 考虑到维护检修需要，需在设计及实施阶段要求建筑师或内装单位为管道井及集水坑、隔油器等排水设备提供检修孔。包括吊顶上方有阀门或清扫口区域需要设置检修孔。
During the design and construction stage, access panels shall be considered for cleaning eyes and valves in the ceiling space, pipe shafts, sump pits, grease traps and other drainage system equipment for maintenance access. Efforts are required to coordinate these requirements with the architect or interior designer to ensure provision is adequate and aesthetically acceptable.

4.5. 中水系统
GREY WATER SYSTEM

4.5.1. 设计原则
Design Principle

A. 当项目符合以下条件时，宜考虑设计中水系统：
If the project fulfills the following requirements, the reclaimed water system can be considered:-

1. 饮用水资源匮乏。
When potable water resources are scarce.

2. 当市政条件可以提供中水时。
When the municipal conditions permits the provision of grey water system.

3. 当项目有评定绿色建筑要求时。
When there is green building assessment for the project.

4. 自来水和排水费用较高。
When there are high domestic water and soil/waste water discharge tariffs.

5. 可从当地政府获得补贴或在税收方面得到优惠，或者当地政府强制要求时。
When there are tax rebates or subsidies obtainable from local authority or it is a mandatory requirement.

B. 各种污、废水资源，应根据当地的水资源情况和经济发展水平充分利用。
All wastewater resources shall be fully utilized accordingly to the local water resources conditions and the degree of economic development.

C. 建筑中水设计应采取合理、有效、成熟的处理工艺和设备，确保中水系统功能和效益。
Reasonable, effective and mature water treatment technology and equipment shall be adopted for the building grey water system design to ensure that the performance and benefits of the system are achieved. Overseas mature and advanced technology could also be considered and adopted.

D. 中水回用系统，可从洗手盆、浴缸、桑拿池、洗衣房等收集废水。可用在景观水池补水和浇灌等用途，具体使用区域需经过希尔顿全球确认。
Recycle wastewater to be treated could be obtained from wash basin, bathtub, sauna pool, laundry, and etc. The treated grey water shall be used for irrigation and makeup water for water features. Other areas of application shall be subjected to Hilton World wide's review and approval.

4.5.2. 设计要求
Design Requirement

A. 中水用作城市杂用水，其水质应符合国家标准《城市污水再生利用 城市杂用水水质》GB/T 18920 的规定。
If grey water is used as urban miscellaneous water, its water quality shall comply with the national standard GB/T 18920 The Reuse of Urban Recycling Water - Water Quality Standard for Urban Miscellaneous Water Consumption.

B. 中水用作景观环境用水，其水质应符合国家标准《城市污水再生利用 景观环境用水水质》GB/T 18921 的规定。
If grey water is used for landscape or scenic environment, its water quality shall comply with the national standard GB/T 18921 The Reuse of Urban Recycling Water - Water Quality Standard for Scenic Environment Use.

C. 当中水同时满足多种用途时，其水质应按最高水质标准确定。
If grey water is concurrent used for different purposes, its water quality shall comply with the water quality requirements of the most stringent application.

4.5.3. 技术说明及应用指南
Design Requirement

A. 当需要设置中水时，排水系统应为污废分流系统，粪便污水不应作为中水水源。
If grey water system is required, the drainage system shall be provided in a manner in which the soil and wastewater discharge stacks are separated. Soil discharge shall not be recycled for production of grey water.

B. 中水系统的设计，应根据项目的实际情况、原水和中水用量的平衡和稳定、系统的技术经济合理性等因素综合考虑确定。
The type of grey water system selected shall account for overall consideration on factors such as the project actual site conditions and circumstances, water balance and stability between raw and grey water usage and system technical and economical viability.

C. 中水处理工艺的选择依据如下：
The grey water treatment process shall be based on the followings:

1. 原水的水质、水量和中水的水质、水量
Water quality and amount of water required for both raw water and grey water.

2. 使用要求和项目实际情况
User requirements and project actual conditions and circumstances.

3. 技术经济比较结果
Result of technical and economic feasibility analysis.

D. 当采用雨水作为中水水源或水源补充时，应有可靠的调储设施，并具有初期雨水剔除和超量溢流功能。
If rainwater is used as recycle and makeup water for the grey water system, appropriate reliable control and storage facilities shall be provided. The system shall also possess features that could discard rainwater collected at early stage of rainfall and due to over-flow.

E. 当采用新型的中水处理工艺流程时，必须经过试验或实践检验，并能提供相应的评审、鉴定、验收意见和该工艺处理效果、效率、水质检验报告资料。并得到希尔顿全球的认可。
If new grey water treatment process or technology is adopted, it must be tested and proven in actual application and installation. Relevant documents and reports on the appraisal, evaluation and commissioning results of the new system must be furnished to verify and testify on its effectiveness, efficiency and water quality of the treatment process. All information regarding the new technology collated shall be submitted to Hilton Worldwide for review and approval.

F. 中水用于水景补水等其他用途时，如采用的处理工艺达不到相应的水质标准，应增加深度处理设施。
If the grey water is used for water features makeup water or other applications and the proposed treatment process is not able to meet the required water quality, adequate enhancement to the process and addition of facilities must be implemented to improve the treatment.

G. 中水处理必须设有过滤和消毒设施。
The grey water treatment shall be equipped with filtration and disinfection facilities.

H. 酒店内的中水处理间宜设置在建筑物的最底层并应与其它机房分开独立设置，中水处理间宜单独设置药剂贮存间。
The grey water treatment plant for hotel is preferably located at the basement of the building and to be standalone. A separate chemical dosage storage room shall be provided adjacent to the grey water treatment plant room.

I. 对中水处理中产生的臭气应采取有效的除臭措施与排风措施。
Effective deodorant and ventilation measures shall be adopted to remove odor generated by the water treatment process.

J. 中水处理间应具备污泥、渣等的存放和外运条件。
The grey water treatment room shall be provided with the necessary conditions and

infrastructures in the building for the storage and transportation of sludge, slag and other wastes.

K. 中水处理的处理系统和供水系统应接入楼宇自控系统，并应同时设置手动控制。
The grey water treatment system and its associated grey water supply system shall be connected the building automation system for monitoring/control. Manual control shall also be provided for the system.

L. 中水处理系统应对使用对象要求的主要水质指标定期检测，对常用控制指标（水量、主要水位、PH 值、浊度、余氯等）实现现场监测。中水水质应按现行国家有关水质检验法进行定期检测。
Regular testing must be conducted on the water quality of the grey water treatment system to ensure that the treated water quality meets the user requirement. On-site monitoring of commonly used control index and parameters (such as water capacity, main water level, PH value, turbidity, residual chlorine, etc.) shall be carried out. Grey water quality shall also be regularly tested for compliance with current national standards for water quality inspection.

M. 中水处理系统应对自耗用水、用电进行单独计量。
Water and electricity consumption by the grey water treatment system must be metered accordingly.

4.6. 污水处理系统
SEWERAGE TREATMENT SYSTEM

4.6.1. 设计要求
Design Requirement

A. 当项目所在地没有市政污水排水条件时，应考虑污水处理系统，以便对建筑物内的污水进行处理，处理后的水排放到当地政府允许的排放口。
When the project is located at a site where municipal sewer drainage system is not available, a complete sewerage treatment plant must be provided to fully treat the soil and wastewater to a prescribed water quality before discharging into the point of discharge allocated by the local authority.

B. 污水处理的目标应符合当地的卫生要求，如果当地的卫生标准不适用，污水处理水质要求可以参考以下标准：
The sewage treatment shall comply with local hygiene requirements. If the local hygiene requirements are not applicable, the following standards can be referred for the water quality of the sewage treatment:-

1. GB 8978-污水综合排放标准
   GB 8978-Integrated wastewater discharge Standard

2. GB18918-城镇污水处理厂污染物排放标准
   GB18918-Discharge standard of pollutants for municipal wastewater treatment plant

4.6.2. 技术说明及应用指南
Specifications and Application Guides

A. 污水量指标建议参照下表取值
Recommended soil water discharge quantity index as per table below:

表 4-8 污水量排放指标
Table 4-8 Soil water discharge quantity index

污水源 **Sewage Source**	**污水流量/每人** **Sewage Water Flow Rate/ Person**	**有机物含量** **Organic Content** **5日生化需氧量** **5-day Biochemical Oxygen Demand**
客人 Guest	230升/每天 230L/Day	0.060 千克 0.0060kg
员工 Employee	50升/每天 50L/Day	0.010 千克 0.010kg
餐饮 Restaurant	35升/每次 35L/Day	0.045 千克/人次 0.045kg/Person
洗衣房 Laundry Room 无循环利用 No Recycling 有循环利用 Recycling	25升/每千克 25L/kg 15升/千克 15L/kg 假设7.5千克织品/每间 Assume 7.5kg Cloth/Room	0.005 千克/千克 0.005kg/kg

B. 一般情况下，酒店总的排水量可按照每个客人每天 400-600 升估算。
In general, the total water discharge can be estimated based on 400-600L per guest per day.

C. 所有的工艺流程的设备都应考虑两个，或考虑两套处理设施，每套处理设施的负荷按照总负荷的 50%考虑，以便进行维修。
Two sets of treatment process plants, each with 50% capacity, shall be considered. This is to facilitate ease of maintenance so that at least one set of sewerage treatment plant could continue to operate even when the other one is shut down.

D. 污水处理站应设置在开发区域地势较低的地方，应靠近道路或硬地面或离道路的距离最远不超过 30m。不论是在内部还是外面从处理站到道路的通道应不被占用。
Sewage treatment plant shall be located at low-lying area of the development and near the roads or hardscape or within 30m from the main road. The internal and external passageway from the sewerage treatment plant to the main road shall not be occupied and free from obstruction

4.7. 雨水系统
RAIN WATER SYSTEM

4.7.1. 设计要求
Design Requirement

A. 除非有其他法规规定，所设计的最大暴雨排水量应根据该地区，在 25 年间，发生的 10 次雨水记录计算。
Unless otherwise specified by other codes or regulations, the design of the heaviest storm water discharge shall base on records of ten (10) incident of heaviest rainfall in the region within 25 years.

B. 室外的雨水设计重现期宜按照 3 年一遇考虑。
The design of outdoors rainwater system shall base on the assumption of recurrence period of 3 years.

C. 屋面雨水设计重现期：重现期宜按 10 年一遇考虑，溢流口按 50 年校核。
The design of roof rainwater system shall base on the assumption of recurrence period of 10 years and occurrence period of outlet overflow of 50 years.

D. 下沉式广场雨水重现期宜按 50 年一遇。
Sunken type plaza rainwater system shall base on the assumption of recurrence period of 50 years.

E. 屋面雨水与阳台、露台雨水应分开排放。普通屋面按重力排水设计，裙房大屋面宜按虹吸设计。
Rainwater from the roof and balcony/terrace shall be collected by separate rainwater discharge system. Generally, rainwater discharge from all normal roofs shall be via gravity. Podium with large area of roof shall be provided with siphonic rainwater drainage system.

F. 雨水管管材：管材选择参见 4.9 小节。
Refer to section 4.9 for rainwater downpipe material.

4.7.2. 技术说明及应用指南
Specifications and Application Guides

A. 地面排水
Surface Drainage System

1. 包括停车场、人行道等在内的所有地区，需设计缓和的坡度，引导雨水进入雨水口或排水沟。在地方法规要求的地方，还要提供车库沉砂隔油装置。
The surface drain shall be provided for all areas including car park and pavement. Moderate slope design with gradient to direct rainwater into the rainwater outlets or drains shall be provided. For areas governed by the local authority, garage grease trap and grit chamber shall also be provided.

B. 排水沟
Gutter

1. 雨水排水沟需用混凝土构建，内壁采用水泥砂浆抹面。雨水沟上宜采用铸铁格栅盖板或其它景观盖板，在过车区，如地下车库坡道集水沟，盖板需采用重型铸铁格栅盖板。
Rain gutter shall be made of concrete block and the internal surface to be provided with cement mortar plaster. On top of the rain gutter, it is recommended to have cast iron grille plate or other landscape cover plate. For vehicle access areas, the cover plate shall be of heavy duty cast iron grille type.

C. 屋顶和阳台排水
Drainage From Roof and Terrace

1. 平屋顶区域应建有 1:200 的最小落差。排出口应在屋面边缘。对具有山墙的屋脊，除了考虑屋脊出水口之外，还应该考虑溢流设施。
Flat roof shall be built with minimum gradient of 1:200. Discharge outlets shall be located on the edge of the roof. For gable roof, overflow facility shall be considered in addition to the provision of roof discharge outlets.

2. 阳台雨水应单独排放。
Rainwater from terrace shall be discharged separately.

3. 当冬季积雪日超过冬季总天数的 5%时，户外露台及阳台应考虑电热融雪系统。
When the period for accumulation of snow during winter exceeds 5% of the total winter day, the external balcony and terrace shall be provided with electric heating snow-melting system.

D. 斜屋顶排水
Drainage from Pitch Roof

1. 斜屋顶区排水的传统方法是靠雨水边沟排水。雨水边沟的材料很多，但主要是不锈钢或铝合金。
Rainwater drainage for traditional pitch roof drainage shall be via rain gutter. Rain gutter can be made from several materials, but mainly stainless steel or aluminum alloy is preferred.

2. 铸铁排水沟和落水管需采用底漆，在建筑完成后，再协调上漆。
Cast iron gutters and rainwater downpipes shall be provided with primer coating and painted with final coating upon completion of the building.

3. 铝制排水沟和落水管颜色，通常涂色由建筑师协商指定。
The paint color of the aluminum gutters and rainwater downpipes shall be specified by the Architect.

4. 上述类型排水沟的截面形状可以是圆形或方形的。
The cross section of the above-mentioned gutter can be round or square in shape.

5. 在多雪地区，宜在排水沟槽前面加上挡雪板。
For areas where heavy snow is expected, it is recommended that snow plate is provided in front of the gutter.

6. 在落水管出口的地方应配有滤网，以防止大型物体、碎片或鸟类进入落水管。在弯曲处、在超过 45 度的支线和在落水管与排水沟连接的最低点处，应安装检修口。
A filter screen shall be provided at the rainwater downpipe discharge outlet to prevent large objects, debris or birds from getting into the pipe. Access panels shall be provided at bends, pipe lines slanted at 45° and lowest point of the connection between the downpipe and gutter.

4.8. 游泳池系统
SWIMMING POOL SYSTEM

4.8.1. 设计要求
Design Requirement

A. 应在泳池区配套设置不少于两个淋浴，在泳池区域入口进处设置浸脚池，淋浴及浸脚池应提供冷热水供应，排水应接入生活污废水系统，不能接入泳池循环系统。
There shall not be less than two (2) showers in the pool area. Footbath shall be provided at the entrance to the swimming pool area. Shower and footbath shall be provided with both hot and cold water supply. Wastewater from the shower and footbath must be discharged to the sanitary drainage system and must not be discharged to the swimming pool circulation system.

B. 游泳池给水应通过机房循环系统反复利用。室内游泳池供水系统需具备循环加热功能，游泳池需经常保持规定的温度，在非常炎热的气候条件下，需采取降温措施。
The supply water to the swimming pool shall be recycled via a water filtration and circulation system. Indoor swimming pool water supply system shall be provided with heating to maintain a constant required water temperature. In very hot climate, cooling system shall be provided instead.

C. 游泳池水质（详细标准参照国际游泳协会（FINA）的具体要求）
Swimming pool water quality (For detailed standards, please refer to International Swimming Federation (FINA) requirements.)

表 4-9 游泳池水质标准

Table4-9 Swimming pool water quality standard

参数 **Parameter**	**可接受的范围** **Acceptable Range**
PH 值 PH Value	7.2 到 7.6 7.2 to 7.6
浑浊度 Turbidity Value	0.10FTU 0.10FTU
大肠埃希氏杆菌 Escherichia Coli	100ml 池水内不得检出 Not to be detected in 100ml pool water
绿脓杆菌 Pseudomonas Aeruginosa	100ml 池水内不得检出 Not to be detected in 100ml pool water
总溶解固体 Total Dissolved Solids	小于 3000ppm Less than 3000ppm
余氯 Residual Chlorine	游离余氯 0.4~0.6mg/l Free Residual Chlorine 0.4~0.6mg/l

D. 游泳池水温如下:
Pool water temperature as follows:

表 4-10 游泳池水温标准

Table4-10 Swimming pool water temperature standard

泳池类型 **Swimming Pool Type**	温度范围 **Temperature Range**
游泳池 Swimming Pool	26°C 至 28°C 26°C to 28°C
按摩池 Massage Pool	37°C 至 39°C 37°C to 39°C

E. 详细标准参照国际游泳协会（FINA）的具体要求。
For detailed standards, refer to International Swimming Federation (FINA) requirements.

4.8.2. 泳池循环系统
Pool Filtration and Circulation System

A. 泳池循环方式和管道系统
Swimming pool circulation and piping system

1. 泳池水循环方式需采用逆流式或混合式循环，成人池循环周期不超过 6 小时，按摩池不超过 0.5 小时。
The swimming pool water circulation shall be of counter flow or mixed flow type. The turnover period for adult pool shall not be more than six (6) hours and not more than 0.5 hour for massage pool.

2. 游泳机房应设在泳池下方附近，考虑足够的检修空间。泳池循环泵应不少于 2 台，且有备用泵。按摩池的循环系统应与泳池分开设计。
The swimming pool plant room shall be located below the swimming pool with sufficient maintenance space. The swimming pool circulation pumps shall not be less than two (2) numbers and standby unit shall be provided. The circulation system for massage pool shall be separated from the swimming pool.

3. 游泳池设备应能自动调节，包括自动监视 pH 值、化学品浓度，并使温度维持在规定的范围之内。
System with automatic adjustments shall be provided for swimming pool, including auto monitoring on PH value, chemical concentration and maintaining temperature within specified range.

B. 过滤和排放系统
Filtration and discharge system

1. 池水循环系统内的过滤器需不少于 2 台。
There shall not be less than two (2) filers for pool circulation system.

2. 所选的过滤手段应使池水的清晰度能清晰看到池底，能清楚地看到池底的各个部分。
There shall not be less than two (2) filers provided for the pool filtration and circulation system.

3. 过滤器宜采用中速过滤器。可用玻璃纤维砂过滤器，如采用低碳钢高压砂过滤器，内部应有涂层保护，防止腐蚀。
Medium speed filter is recommended. Fiberglass sand filter can be used. If low carbon steel high pressure sand filter is used, internal protection shall be provided to prevent corrosion.

4. 压力开关应该安装在过滤器的前面，以满足反洗/冲洗之需要。管道宜选用聚氯乙烯（UPVC）材料或其它耐腐蚀材料。
   Pressure switch shall be installed in front of the filter for ease of wash/ rinse. Pipe shall be of polyvinyl chloride (UPVC) material, or other corrosion resistant material.

5. 在单靠过滤装置不能达到透明要求时，应采用絮凝剂，如硫酸铝，可通过自动定量给料泵将它们注入到泳池中。
   If the filter device is not able to meet the transparent requirement, flocculating substance, such as aluminums sulphate, shall be used and it can be fed into the pool by automatic quantitative feeding pumps.

C. 消毒装置
   Disinfection device

1. 消灭池水中细菌感染可采用以下几种方式：
   The following methods can be used for disinfection of the pool water:-

   a. 采用加氯消毒。处理后，池水中的余氯，须能维持水的消毒特性。氯可通过次氯酸钠或次氯酸钙添加剂得到，或在现场用电解方法产生。
      Chlorine additive can be used. After treatment process, the residual chlorine in the water can maintain the water disinfectant. Chloride can be obtained from sodium hypochlorite, calcium hypochlorite additives, or generated by electrolysis on the spot.

   b. 采用臭氧消毒。可通过臭氧发生器制备臭氧，同时需设置尾气吸收装置。在酒店视泳池的规模可选用全流量臭氧系统或分流量系统，采用臭氧装置需考虑必要的散热要求。
      Ozone disinfection can be used. It has strong disinfection capability and there is no side effect for the oxide impurities. Ozone can be generated by ozone generator and at the same time, a tail gas absorption device shall be provided. Full flow or split flow ozone system can be selected based on the size of the hotel swimming pool. Necessary cooling requirements for the ozone devices shall be considered.

   c. 多谱段紫外线灯管，紫外线波长范围 200—400nm，为确保紫外线杀菌效果，紫外线设备必须配备在线紫外线绝对强度传感器，实时显示紫外线照射剂量及灯管发光强度，并具备可靠的安装报警装置。
      Ultraviolet disinfection can be used. The ultraviolet disinfection device can be installed after the circulation and filtration device. For ultraviolet generating device, medium voltage multispectral ultraviolet lamp with 200-400nm wavelength can be selected. In order to ensure effective ultraviolet radiation sterilization, online UV absolute intensity sensor shall be provided for real-time display of ultraviolet irradiation dose and the lamp luminous intensity. Reliable alarm device shall be provided.

2. 如果对添加剂不仔细进行控制的话，所有的化学添加剂都会对游泳者产生或大或小的副作用。必须严格遵守安全预防规定添加消毒剂。
   If the additives are not carefully controlled, all chemical additives would have big or small side effects to the swimmers. Disinfectant shall be added in accordance with the safety regulations.

3. 设置水质自动监控仪，对水质进行即时监控。通过定量给料泵等自动监视和维持。
   Water quality automatic monitoring device shall be provided for real-time monitoring of the water quality. Automatic monitoring and maintaining shall be carried out by quantitative feeding pumps, etc.

D. 泳池补水
   Swimming pool make-up water

1. 泳池补水量应按泳池容积的 5%~10%计，补水管上应设置计量表。
   Make-up water shall base on 5%~10% of the total capacity of the swimming pool. Water meter shall be provided at the make-up water pipe.

2. 在游泳池进水采用饮用水的地方，可在加热之前，接入饮用水。
   If potable water is used as swimming pool water supply, the potable water can be connected before heat-up.

3. 在非采用饮用水的地方，应该在过滤和消毒工艺之前接入系统。
   If non-potable water is used, filtration and disinfection shall be done before connection to the system.

E. 池水加热
   Swimming pool heating

1. 游泳池的热媒水的置备，可采用以下几种方式：
   There are a few methods for swimming pool heating:-

2. 太阳能集热器。将太阳能转换成可使用的热，但需要考虑辅助加热措施。
   Solar collector, which converts solar energy into usable heat, shall be considered in providing the heating source to heat up the swimming pool. However, auxiliary backup heating measures must also be considered to cater days of overcast sky or raining days when solar energy is not available.

3. 热回收，回收利用制冷装置产生的废热转换到池水中，作为日常恒温。
   Heat pump, which uses the waste heat from refrigeration device and transfers it into the pool water to maintain a constant temperature

4. 热泵。将游泳池水表面蒸发的热损失回收利用，转移到池水和空气中，以满足池水和空气保温所需的热量。
   Swimming Pool heat pump system basically recovers the heat loss due to evaporation of water from the surface of the swimming pool and then uses it to heat the swimming pool and indoor space instead.

5. 锅炉或市政蒸汽（可作为初次加热及日常恒温）
   Boiler or municipal steam (can be used as the initial heating and maintaining constant temperature)

6. 上述热源与泳池换热，宜通过板换换热的方式为泳池间接加热。
   Heat plate heat exchange shall be provided to heat up the swimming pool via heat exchange between the above heat source and the swimming pool water.

F. 系统监控
System monitoring

1. 泳池循环系统应接入楼宇 BA 系统，对循环泵等运行情况进行监视。
The swimming pool filtration and circulation system shall be connected to the building BA system in order to monitor the operation of system such as operation of the circulation pumps and other equipment.

G. 泳池区地面冲洗
Floor flushing in swimming pool areas

1. 应考虑泳池区的地面冲洗用水接驳口，冲洗水应能有组织排放，不应流向池内。
Floor flushing points in the swimming pool area shall be considered. Rinsed water discharge shall be controlled and shall not flow into the pool.

4.9. 给排水管材
Plumbing Pipe Materials

H. 给排水管材选择要求如下：
Plumbing pipe material requirement as follows:

表 4-11 给排水管材选择要求
Table4-11 Plumbing pipe material requirement

序号 No	管道应用 Pipe application	管材要求 Material requirement	连接方式 Connection method
1	生活冷热水管道 Domestic cold/hot water pipe	铜管/不锈钢管 Copper/ Stainless steal	不锈钢管： Stainless steal pipe: <DN50mm 采用双卡压 Connect with double compression >DN65-DN200mm 采用法兰、沟槽、氩弧焊连接，不允许采用承插焊接和对接焊接 Connection with flange, groove and argon arc welding, socket welding and butt welding are not allowed. 铜管： Copper pipe: 钎焊，埋墙时应采用覆塑铜管 Connect with braze welding. When it is buried in walls, copper pipe plastic plated should be used.

2	中水管道(若有) Grey water pipe(If applicable)	钢塑复合管 Copper-plastic complex pipe	DN＜100mm 采用螺纹连接 Connection with screw thread DN≥100mm 或工作压力大于 1MPa 采用法兰/沟槽连接 Connection with flange/groove when pipe size greater than100mm or operation pressure greater than 1MPa
3	预埋中水支管 Pre-buried grey water branch pipe	聚丁烯 PB	热熔连接 Hot melting connection
4	污水/废水重力管道/通气管 Seweage/ waste water gravity pipe/Vent pipe	柔性铸铁管 Flexible joint cast iron pipe for drainage	不锈钢卡箍连接 Connection with stainless steel clamp
5	污水/废水同层排水管道 Seweage/ waste water wall drainage pipe/Vent pipe	HDPE(PE80)	电焊管箍连接 Welding clamp connection
6	室内重力雨水管道 Indoor gravicty rain water pipe	热镀锌焊接钢管 Hot-dipped welded pipe	卡箍连接 Clamp connection
7	室内虹吸雨水管道 Indoorsiphon rain water pipe	HDPE(PE100)	电焊管箍连接 Welding clamp connection
8	室外埋地雨水管道 Outdoor buried rain water pipe	双壁波纹管 PVC-U	承插连接 Socket connection
9	泳池和景观管道 Pool and landscape pipe	PVC-U	粘接 Socket plastic connection

注：在沿海地区或其它空气含有盐分的地区，希尔顿全球可根据情况要求采用更高标准的给排水管材。

Note: For those hotels located in coastal or weather containing salt, Hilton worldwide may require plumbing pipe with stricter standard.

4.10. 节能和环保
ENERGY CONSERVATION AND ENVIRONMENTAL PROTECTION

4.10.1. 给水系统节能措施
Water Distribution System Energy-saving Measures

A. 考虑在设备的进水管上安装阀门以控制流量和压力。
Flow and pressure control valves can be considered to be installed on the equipment supply water pipe

B. 在那些市政供水压力水量及水质可以保证的建筑物，低层功能区域或公共区域可以直接利用市政管网供水。
In the buildings with reliable municipal water pressure and supply, lower function areas or public areas can be directly supplied from municipal water supply network.

C. 员工更衣室、公共卫生间、服务区和客房的卫生器具的流量可限制在：洗手盆 6 升/分钟。大便器：选用两档低档 3 升/每次，高档 6 升/每次。小便器手动冲洗每次 4 升。
The water flow rates for the sanitary ware in staff changing rooms, public toilets, service areas and guest rooms can be low flow rate type as follows: wash basin at 6 litres/min, dual flush water closet at 3 litres/time for low flush and 6 litres/time for high flush, manual flushed valve urinals at 4 litres/time

D. 主厨房操作，在功能厅或餐厅尽可能利用主厨房集中供餐，避免不同厨房各自排放。
Operate a main kitchen for food supply to all function rooms or restaurants, where possible, and avoid food supply from different kitchens.

E. 对于同一区域有不同水质要求时，仅对对水质有特殊要求的地方设置末端水处理措施，如厨房提供冲洗盘子和玻璃器皿的水。
For an area with unique water quality requirements, such as water for dishes and glassware washing in the kitchen, terminal water treatment equipment dedicated only for that area could be provided.

F. 水处理：过滤反冲应采用自动冲洗，宜对反冲洗水进行回收。这些废水可采用过滤器和消毒处理设施进行处理，然后回收利用。
Water treatment: Backwash of filters could be initiated automatically and wastewater produced as a result of the washing could be recycled and treated via the existing filtration and disinfection system.

G. 绿化浇灌系统应采用自动控制。根据土壤的湿度和不同植物的需求，最好在晚上进行，避免采用开放式喷洒时大量水分被蒸发。
Automatic irrigation system is recommended. To conserve water, it is advisable to irrigate the plants during the night to avoid large amount of evaporation during the day, but subject to the need of different type of plants and the humidity level in the soil.

4.10.2. 排水系统节能措施
Drainage System Energy-saving Measures

A. 可以重力排出的卫生排水应全部通过重力流的形式排出，尽量避免采用污水提升装置或潜污泵。
All sanitary drainage shall be discharged by gravity and avoid using wastewater lifting device or submersible sewage pump, where possible.

B. 中水回用，从洗手盆、浴缸、桑拿池、洗衣房等收集废水。可用景观水池水和浇灌等非饮用水系统使用。

Recycle reclaimed water and collect wastewater from sink, tub, sauna pool, laundry, etc. which can be used for toilet flushing, cooling tower make-up water and other non-potable water system.

C. 中水系统应进行计量。
Reclaimed water system shall be metered.

D. 厨房、车库、卸货区的含油废水在排放前应通过隔油装置处理。
The oily wastewater from kitchen, garage and unloading areas shall be treated by the grease trap before discharge.

4.10.3. 雨水系统节能措施
Rainwater Drainage System Energy-saving Measures

A. 建筑物雨水排水应尽量通过重力流排放。
Building rainwater shall be discharged by gravity where possible.

B. 因地制宜考虑雨水回收利用，将雨水收集至雨水蓄水池中，适当处理后供给冲厕、浇灌等非饮用水系统使用。

C. Rainwater shall be recycled based on local conditions. Rainwater can be collected in the rainwater collection tank and used for toilet flushing, irrigation and other non-potable water usage.

D. 雨水回用系统应进行计量。
Usage of recycle rainwater shall be metered.

4.10.4. 游泳池系统节能措施
Swimming Pool System Energy-saving Measures

A. 户外游泳池宜采用保温外罩盖起来。在阳光不充足时，这不仅由于减少了热的损耗和防止水的蒸发而节省能源。在有条件的地方，来自过滤器反洗的“废水”，宜进行回收并适当处理后，供冲厕、浇灌等非饮用水系统使用。
Outdoor swimming pool is recommended to be covered by insulating cover. If there is no sufficient sunlight, it will reduce heat loss and prevent the evaporation of the water so as to save energy. In areas where applicable, ‘waste water’ from the filter backwashing can be recycled and used for flushing.

B. 对排出的含有化学添加剂的污水，应进行适当处理，使之地方供水系统、地方水道、湖泊、小溪等不会产生污染。排水坑或过滤坑应设在离水体较远的地方，防止水体污染。
Wastewater containing chemical additives shall be treated before discharge so as to prevent pollution to local water supply system, local waterways, lakes, streams, etc. Drainage pit or filtering pit shall be located away from the well to prevent water pollution.

C. 游泳池均衡水箱及循环管道宜有保温措施，减少热量损失。
Provision of thermal insulation to swimming pool balance water tank and circulation pipe is recommended to reduce heat loss from the system.

4.11. 调试和验收
TESTING AND COMMISSIONING

A. 所有系统在正式移交前，应进行完整的测试并做好相关记录。提供主要设备合格证书。并对员工进行系统操作培训和提供使用手册。
All systems shall be completely tested with proper records before handing over. Major equipment test certificates, staff training and Operation & Maintenance (O&M) manual shall be provided.

B. 给排水各系统调试的主要事项见下表，详细的调试检验方法可参见表后内容：
The main items for water supply and drainage system testing and inspection are shown in the table below. For detailed commissioning and testing methods, please refer to the content after the table.

表 4-12 给水系统调试内容

Table 4-12 Test item of water supply and drainage system

序号 S/N	系统 System	测试项目 Testing Item
1	生活冷水系统 Domestic Cold water system	
1.1		管道及阀门的水压试验 Hydraulic pressure test for pipelines and valves
1.2		所有给水泵试运转 Supply water pump commissioning (all pumps)
1.3		敞口水箱的满水试验及密闭水箱的水压试验 Open water tank full capacity test and sealed water tank water pressure test
1.4		给水水质指标检验 Supply water quality index inspection
1.5		系统冲洗及消毒 System flushing and disinfection
2	生活热水系统 Domestic Hot water system	
2.1		管道及阀门的水压试验 Hydraulic pressure test for pipelines and valves
2.2		卫生器具出水时间、水温以及浴缸充水时间 Sanitary ware water supply time, water temperature and bath water filling time
2.3		热交换器测试 Heat exchanger testing
2.4		热水循环泵的试运转 Hot water circulation pump commissioning
2.5		系统冲洗 System flushing
3	卫生排水系统 Sanitary Drainage system	
3.1		管道及卫生器具的灌水试验 Pipeline and sanitary ware watering test
3.2		排水主立管及水平干管的通球试验 Ball test for main drainage riser and main horizontal pipeline
3.3		排水管及通气管的密封性试验 Drainage and vent pipe leakage test
3.4		所有排水泵的试运行 Drainage pump commissioning (all pumps)
3.5		主系统的排水测试 Main system drainage test
4	中水系统 Reclaimed Water System	
4.1		系统试运行 System commissioning
4.2		检测出水水质指标 Reclaimed water quality index inspection
5	污水处理系统 Wastewater Treatment System	
5.1		处理系统试运行 Treatment system commissioning

5.2		检测出水水质指标 Treated water quality index inspection
6	雨水排水系统 Rainwater Drainage System	
6.1		管道系统的灌水试验 Piping system watering test
6.2		管道系统的连接检测 Piping system connection test
7	游泳池系统 Swimming Pool System	
7.1		阀门的壳体压力和密封试验 Valve casing pressure and seal test
7.2		游泳池附件及循环管道系统的防腐 Anti-corrosion for swimming pool accessories and circulation piping system
7.3		检测池水水质指标 Pool water quality index inspection

注：项目移交时，需提供上述项目的检测记录，表格形式参见附表。

Note: The test results for the above-mentioned items shall be provided during project handing over. Please refer to appendix 3 for the table format.

C. 生活给水分配系统
Domestic Water Distribution System

1. 除非规范或权威部门已经明确，应对管道系统进行如下的检测：
Unless specified by regulation or authority, the testing for piping system shall be as follows:-

2. 测试所有的室内配水系统的水压，充水压力按照不低于正常运行或市政水压的 1.5 倍。在两小时的测试时间内应没有压力损失。
The water pressure for all indoor water supply system shall be tested. Water filling pressure shall not be under normal operation pressure or 1.5 times municipal water pressure. There shall be no pressure loss in two (2) hours testing time.

3. 热水系统需测试卫生器具的热水出水时间、水温，以及浴缸的充水时间。
For hot water system, the hot water supply time, water temperature and bath water filling time for sanitary ware shall be tested.

4. 根据法规要求或设计师的要求对水管系统进行消毒。
Water piping system shall be disinfected in accordance with regulations or designer's requirements.

5. 需在项目所在地现场取水并送当地质监部门出具水质报告。
Water shall be collected on the spot from the area where the project locates and sent to local supervision department for water quality report.

D. 卫生排水系统
Sanitary Drainage System

1. 除非规范或相关部门已经明确，排水管道都应进行以下测试：
   Unless specified by regulation or authority, the testing for pipeline system shall be as follows:-

2. 检测建筑物内的污水、废水、通气管。测试范围应包括整个系统从系统总最低排水点到伸出屋面的最高处。通气的测试适应于全部或部分的排水系统。整个系统测试完成以后，在那些被证明已经满足要求的地方，不需要再对部分进行测试，除非主管部门认为有必要。
   Building sewage, wastewater and ventilation pipeline shall be inspected. Testing shall include the entire system from the lowest drainage outlet to the highest point at the roof. Ventilation test shall be applicable to all or part of the drainage system. After completion of the testing for the entire system, those areas which have already met the requirements do not require to retest, unless the relevant person in charge think it is necessary.

3. 排水管和通气管在初次安装的时候应进行气密性测试，管道连接处应保证严密，不应有漏水现象发生。
   Tightness test shall be conducted during the initial installation of drainage and vent pipes. Pipe connection joints shall ensure tightness and no leakage.

4. 当卫生器具已经安装好后且配件已经充满水，可以对连接管进行测试，通过堵塞伸顶通气管和排出管来检测系统是否漏气和漏水。在不注入新的空气的情况下，这个压力应该在整个检测期间保持不变。
   After sanitary ware is installed and accessories are filled with water, testing can be conducted for the connection pipes. Plug the roof ventilation pipes and discharge pipes to detect leakage. The pressure shall remain the same during the testing if no fresh air is injected.

5. 隐蔽或埋地污废水管在隐蔽前必须做灌水试验，其灌水高度不低于底层卫生器具的上边缘或地面高度，满水 15 分钟水面下降后，再灌水 5 分钟液面不降，管道及接口无渗漏合格。
   Water fill test shall be conducted for concealed or buried rainwater pipe before it is being backfilled or closed up. The water level of the test shall not be lower than the upper edge of the sanitary ware at the lowest floor or its floor level height. The rainwater pipe shall be fully filled with water for 15 minutes and if the water level drops, top up with water again for another 5 minutes. If the water level does not drop, it could be determined that no leakage is detected for the pipeline and joints.

E. 中水系统
   Reclaimed Water System

1. 应对系统进行试运行，以观察其性能。对中水处理设备的出水进行水质指标检验，至少应满足相应的回用水水质标准。中水高位水箱与生活高位水箱净距应大于 2m，中水给水管道不得设取水水嘴，便器冲洗宜采用密闭型设备和器具。绿化、浇洒、汽车冲洗宜采用壁式或地下式给水栓。中水供水管道系统应涂抹管道标示及明显标记，严禁与生活饮用水管道连接。系统管材及配件应采用耐腐蚀的管材及配件。
   Conduct the system commissioning to check its performance. Water quality index for the reclaimed water generated by the treatment equipment shall be inspected to ensure compliance with the reclaimed water quality standards. There shall be minimum two (2) meters between the reclaimed water high level water tank and the domestic water high

level tank. Water tap shall not be provided for reclaimed water supply pipe. Enclosed type of equipment and accessories shall be used for toilet flushing. Wall or underground type of hydrant shall be used for landscape, irrigation and car washing. Reclaimed water system pipeline shall be provided with clear pipe marking and shall not be connected to domestic potable water pipeline. Corrosion resistant pipes and accessories shall be used.

F. 污水处理系统
Wastewater Treatment System

1. 应对系统进行试运行，以观察其性能。在超过 12 小时的周期内，每隔 1 小时对原水和最后经过处理的水分别进行取样，并将每个样品都冷冻起来。取样应是在处理工序的流量接近设计要求的时间段下获取的。将样品互相混合，按 5 天的生物需氧量进行反应，得出的结果必须能反映处理工艺的能力，即至少应减少 20ppm。设备的性能必须在运行一年后达到规定的指标，设备性能的试运行至少在 50%的负荷条件下进行。
Conduct the system commissioning to check its performance. In a period of more than 12 hours, sample shall be hourly collected from raw water and treated water respectively and each sample shall be frozen. Sample can be collected when the process flow is close to the design requirements. Mix the samples and conduct reaction based on five days biological oxygen demand. The results shall be able to reflect the treatment process capability, i.e. at least 20ppm shall be reduced. The equipment performance shall meet the required target within one year after the operation. Commissioning for the equipment performance shall be conducted with minimum 50% loading.

G. 雨水排水系统
Rainwater Drainage System

1. 除了法规和当局指令外，雨水管道系统的条适应包括如下内容：
Unless specified by regulation or authority, the testing for pipeline system shall be as follows:-

2. 调试大楼内雨水管道系统。调试应该包括从最低点到在屋脊上最高出口的整个系统。在整个系统完工之后，那些已经发现可以满足要求的地方，不需要重测，除非有关主管认为有此必要。
Building rainwater piping system shall be inspected. Inspection shall include the entire system, from the lowest point to the highest outlet on the roof. After completion of the entire system, those areas which have already met the requirements do not require to retest, unless the relevant person in charge think it is necessary.

3. 用水对隐蔽型排水管和检修孔进行检测，这种检测需在管沟回填和将系统低段堵住之前进行。特殊的排水段应进行分段测量。
Use water to inspect the hidden water drainage pipe and manholes. The test shall be conducted before the trench backfilling and blocking of the lower section of the system. Special drainage portion shall be measured by segment.

4. 隐蔽或埋地雨水管在隐蔽前必须做灌水试验，其灌水高度不低于底层卫生器具的上边缘或地面高度，满水 15 分钟水面下降后，再灌水 5 分钟液面不降，管道及接口无渗漏合格。
Hidden or buried rainwater pipes shall have watering test before hidden. The water level

shall not be lower than the upper edge of the sanitary ware at the lowest floor or ground floor level. Fully filled with water for 15 minutes and after the water level drops, fill up water again for 5 minutes, if the water level does not drop, no leakage is qualified for pipeline or connection.

H. 游泳池系统
Swimming Pool System

1. 游泳池池水净化系统所采用的设备及配套设施、附件、仪表和管材进场施工安装时，均应按现行国家标准《压缩机、风机、泵安装工程施工及验收规范》GB50275 和《机械设备安装工程施工及验收通用规范》GB50231 的规定对品种、规格及外观进行开箱检查验收、应包装完好、表面无划痕及外力冲击破损，并应经监理工程师确认。
The equipment, supporting facilities, accessories, instruments and pipes for swimming pool water purification system shall be installed in accordance with the current national standard GB50275 Code for Construction and Acceptance of Compressor, Fan and Pump Installation Engineering and GB50231 General Code for Construction and Acceptance of Mechanical Equipment Installation Engineering. Open-package inspection shall be conducted for varieties, specifications and appearance which shall be well packed, no surface scratches or damage by external force, and approved by the supervision engineer.

2. 管道系统中的阀门安装前，应进行壳体压力和密封试验，试验数量和要求应符合现行国家标准《建筑给水排水及采暖工程施工质量验收规范》GB50242 的规定。安全阀应按设计文件规定的压力进行调试、调试时压力应稳定，每个安全阀启闭试验不得少于 3 次。
Before the pipeline valves in the system are installed, casing pressure and sealing test shall be carried out. Testing quantity and requirements shall be in accordance with the current national standard GB50242 Code for Acceptance of Construction Quality of Water Supply Drainage and Heating Works. Relief valve shall be tested in accordance with the design requirements and the pressure during testing shall be stable. The testing for each relief valve opening and closing shall not be less than three (3) times.

3. 所有与游泳池池水接触的设备、附件和材料，均应符合现行国家标准《生活饮用水输配水设备及防护材料的安全性评价标准》GB/T17219 的要求。
All equipment, accessories and materials having contact with the swimming pool water shall comply with the current national standard GB/T 17219 Standard for Safety Evaluation of Equipment and Protective Materials in Drinking Water System.

4.11.1. 调试验收样表
T&C sample table

表 4-13 室内给水管道水压试验记录 Table 4-13 Indoor Water Pipe Water Pressure Test Record							
管道品牌 Pipe Brand			管道材质 Pipe Material		连接方式 Connection Type		
试压泵生产厂 Pressure Test Pump Manufacturer			规格型号 Specification Model		试验介质 Test Medium		
仪表检验证号 Instrumentation Test Certification No.			仪表编号及精度 Instrumentation Series No. and Accuracy		有效日期 Expire Date		
试验内容 Test Content		强度试验 Strength Test			严密性试验 Leakage Test		
管段编号 Pipe Series No.	工作压力（MPa） Operation Pressure (MPa)	试验压力（MPa） Test Pressure (Mpa)	试验持续时间 Test Duration Time		压力降（MPa） Pressure Drop (MPa)	工作压力（MPa） Operation Pressure (MPa)	试验情况 Test Result
			起始时间 Start Time	终止时间 Finish Time			
试运行说明： T&C Brief:							
见证人 Witness	施工承包单位 Contractor		监理公司 Management Company		业主/顾问公司 Client/Consulting Company		
姓名 Name							
公司 Company							
职位 Designation							
签名 Signature							
日期 Date							

表 4-14 阀门水压试验记录
Table 4-14 Valve Water Pressure Test Record

试压泵生产厂 Pressure Test Pump Manufacturer			规格型号 Specification Model			试验介质 Test Medium	
仪表检验证号 Instrumentation Test Certification No.			仪表编号及精度 Instrumentation Series No. and Accuracy			有效日期 Expire Date	
阀门名称 Valve Name	型号/规格 Type/Model	安装位置 Install Location	公称压力（MPa） Nominal Pressure (MPa)	压力试验 Pressure Test			试验情况 Test Result
				介质 Medium	压力（MPa） Pressure (MPa)	时间（s） Time (s)	
试运行说明： T&C Brief:							
见证人 Witness	施工承包单位 Contractor		监理公司 Management Company			业主/顾问公司 Client/Consulting Company	
姓名 Name							
公司 Company							
职位 Designation							
签名 Signature							
日期 Date							

表 4-15 水泵试运转记录 Table 4-15 Water Pump Commissioning Test Record					
设备资料描述 Equipment Specification Description					
系统名称 System Description		设备名称 Equipment Name		安装位置 Install Location	
生产日期 Production Date		设备品牌 Equipment Brand		设备型号 Equipment Model	
水泵流量 Pump Flow Rate		进水管尺寸 Inlet Pipe Size		出水管尺寸 Outlet Pipe Size	
电动机型号 Motor Type		水泵转速 Water Pump Speed		马达转数 Motor Speed	
供电方式 Power Supply Mode		电动机功率 Motor Power		启动方式 Start Mode	
压力测试记录 Pressure Test Record					
项目内容 Item Description	设计进水压力（MPa） Designed Inlet Water Pressure (MPa)	实际进水压力（MPa） Actual Inlet Water Pressure (MPa)	设计出水压力（MPa） Designed Outlet Water Pressure (MPa)	实际出水压力（MPa） Actual Outlet Water Pressure (MPa)	备注 Remark

表 4-15 水泵试运转记录 Table 4-15 Water Pump Commissioning Test Record			
性能测试记录 Function Test Record			
项目内容 Item Description	状况 Status	项目内容 Item Description	状况 Status
水泵转动是否正常 Water Pump Operation		管道及设备上压力表是否正常 Gauge Indication for Pipe and Equipment	
水泵是否有不正常震动 Water Pump Abnormal Vibration		水泵运行信号 Water Pump Operation Signal	
水泵运行时减震是否正常 Water Pump Anti-Vibration Function		水泵启动控制 Water Pump Start Control	
过载保护自动停机功能 Over Load Protection Self Stop Function		水泵故障状态 Water Pump Fault	
管道及设备上的阀门是否灵活 Convenient Operation of Valve for Pipe and Equipment		手/自动状态 Manual/Auto Status	
试运行说明： T&C Brief:			

见证人 Witness	施工承包单位 Contractor	监理公司 Management Company	业主/顾问公司 Client/Consulting Company
姓名 Name			
公司 Company			
职位 Designation			
签名 Signature			
日期 Date			

表 4-16 敞口（密闭）水箱满水（水压）试验记录 Table 4-16 Open-Type (Close-Type) Water Tank Full Water(Water Pressure) Test Record					
设备名称 Equipment Description	满水试验（h） Full Water Test(h)	水压试验 Water Pressure Test			试验结果 Test Result
		工作压力（MPa） Operation Pressure (MPa)	试验压力（MPa） Test Pressure (MPa)	持续时间（min） Duration Time (min)	
试运行说明： T&C Brief:					

见证人 Witness	施工承包单位 Contractor	监理公司 Management Company	业主/顾问公司 Client/Consulting Company
姓名 Name			
公司 Company			
职位 Designation			
签名 Signature			
日期 Date			

表 4-17 管道系统清洗、消毒试验记录 Table 4-17 Pipe System Cleaning and Disinfection Test Record			
系统名称 System Description		管道材质 Pipe Material	
规格（mm） Dimension (mm)		数量（m） Quantity (m)	
清洗消毒标准规定 Cleaning and Disinfection Standard Specification			
清洗方法 Cleaning Method		清洗介质 Cleaning Medium	
清洗标准 Cleaning Standard		流速 Flow Rate	
清洗、消毒结果 Cleaning and Disinfection Result			
标准依据 Standard Specification			
清洗、消毒说明及问题处理： Cleaning and Disinfection Description and Problem Treatment:			

见证人 Witness	施工承包单位 Contractor	监理公司 Management Company	业主/顾问公司 Client/Consulting Company
姓名 Name			
公司 Company			
职位 Designation			
签名 Signature			
日期 Date			

表 4-18 给水水质指标检验记录 Table 4-18 Supply Water Quality Index Test Record				
系统名称 System Description		水样名称 Water Sample Description		
检验方 Surveyor				
序号 Series No.	检验项目名称 Test Item Description	单位 Unit	检测值 Test Value	限值 Limit
试运行说明： T&C Brief:				
见证人 Witness	施工承包单位 Contractor	监理公司 Management Company		业主/顾问公司 Client/Consulting Company
姓名 Name				
公司 Company				
职位 Designation				
签名 Signature				
日期 Date				

表 4-19 卫生器具试验记录 Table 4-19 Sanitary Ware Test Record						
系统名称 System Description			水样名称 Water Sample Description			
检验方 Surveyor						
卫生器具名称 Sanitary Ware Description	检测位置 Test Location	出水时间（s） Outflow Time (s)	充水时间（s） Water Charging Time (s)	出水温度（℃） Outflow Water Temperature (℃)	检测结果 Test Result	
淋浴器 Shower						
洗脸盆 Wash Basin						
浴缸 Bath Tub						
卫生器具满水试验 Sanitary Ware Full Water Test						
卫生器具名称 Sanitary Ware Test Record	检测位置 Test Location	出水时间（s） Outflow Time (s)	满水高度（cm） Full Water Level (cm)	各连接件接口检查 Connection Check	通水试验 Flushing Test	
淋浴器 Shower						
洗脸盆 Wash Basin						
浴缸 Bath Tub						
大便器 Water Closet						
小便器 Urinal						
试运行说明： T&C Brief:						

表 4-19 卫生器具试验记录 Table 4-19 Sanitary Ware Test Record							
见证人 Witness	施工承包单位 Contractor		监理公司 Management Company			业主/顾问公司 Client/Consulting Company	
姓名 Name							
公司 Company							
职位 Designation							
签名 Signature							
日期 Date							

表 4-20 热交换器测试记录
Table 4-20 Heat Exchanger Test Record

设备资料描述 **Equipment Specification Description**			安装位置 **Installation Location**			
检验方 **Surveyor**			热媒类型 **Heat Medium Type**			
水温、压力测试 **Water Temperature and Pressure Test**						
设备名称 **Equipment Description**	测试位置 **Test Location**	出水温度（℃） **Outflow Temperature (℃)**	出水压力（MPa） **Outflow Pressure (MPa)**	热媒供热温度（℃） **Heat Medium Heating Temperature（℃）**	热媒回水温度（℃） **Heat Medium Return Water Temperature（℃）**	测试结果 **Test Result**
试运行说明： **T&C Brief:**						

见证人 **Witness**	施工承包单位 **Contractor**	监理公司 **Management Company**	业主/顾问公司 **Client/Consulting Company**
姓名 **Name**			
公司 **Company**			
职位 **Designation**			
签名 **Signature**			
日期 **Date**			

表 4-21 排水管道灌水试验记录 Table 4-21 Drainage Pipe Water Filling Test Record					
系统名称 System Description			管道材质 Pipe Material		
检验方 Surveyor					
排水管段编号 Drainage Pipe Series No.	规格 Dimension	管道灌水高度 Pipe Infill Water Level	灌水持续时间(s) Water Infill Duration Time	管内液面情况 Internal Water Level	外观检查 Visual Inspection

试运行说明：
T&C Brief:

见证人 Witness	施工承包单位 Contractor	监理公司 Management Company	业主/顾问公司 Client/Consulting Company
姓名 Name			
公司 Company			
职位 Designation			
签名 Signature			
日期 Date			

表 4-22 排水管道通球试验记录 Table 4-22 Drainage Pipe Ball-Passing Test Record						
系统名称 System Description			管道材质 Pipe Material			
检验方 Surveyor						
排水管段编号 Drainage Pipe Series No.	试验管段 Test Section			通球直径（mm） Ball Diameter (mm)	投入口部位/ 投出口部位 Inlet Location/ Outlet Location	试验结果（通过/受阻） Test Result (Pass/Blocked)
	所处层（区）段范围 Location	材质 Material	规格（管径）（mm） Dimension (Pipe Size) (mm)			
试运行说明： T&C Brief:						

见证人 Witness	施工承包单位 Contractor	监理公司 Management Company	业主/顾问公司 Client/Consulting Company
姓名 Name			
公司 Company			
职位 Designation			
签名 Signature			
日期 Date			

表 4-23 排水管/通气管严密性试验记录
Table 4-23 Drainage Pipe/Ventilation Pipe Leakage Test Record

系统名称 System Description				管道系统材质 Pipe Material					
检验方 Surveyor									
管段编号 Pipe Series No.	试验管段 Test Section			强度试验 Strength Test			严密性试验 Leakage Test		
	所处层(区)段范围 Location	规格(mm) Dimension	工作压力 (MPa) Operation Pressure	试验压力 (MPa) Test Pressure	稳压时间(min) Standup Pressure Duration	压力降 (MPa) Pressure Drop	试验压力 (MPa) Test Pressure	稳压时间(h) Standup pressure Duration	外观检查 Visual Inspection
试运行说明： T&C Brief:									

见证人 Witness	施工承包单位 Contractor	监理公司 Management Company	业主/顾问公司 Client/Consulting Company
姓名 Name			
公司 Company			
职位 Designation			
签名 Signature			
日期 Date			

表 4-24 主排水系统测试记录 Table 4-24 Main Drainage System Test Record			
系统名称 System Description		管道系统材质 Pipe Material	
检验方 Surveyor			
管段编号 Pipe Series No.	测试管段区段范围 Location	测试结果 Test Result	
试运行说明： T&C Brief:			

见证人 Witness	施工承包单位 Contractor	监理公司 Management Company	业主/顾问公司 Client/Consulting Company
姓名 Name			
公司 Company			
职位 Designation			
签名 Signature			
日期 Date			

表 4-25 中水系统试运行记录 Table 4-25 Recycled Water System Commissioning Test Record				
检验方 Surveyor				
序号 Series No.	运行时间段 Operation Time	系统运行状况 System Operation Condition	出水水质指标 Outflow Water Quality Index	试验结果 Test Result
试运行说明： T&C Brief:				

见证人 Witness	施工承包单位 Contractor		监理公司 Management Company	业主/顾问公司 Client/Consulting Company
姓名 Name				
公司 Company				
职位 Designation				
签名 Signature				
日期 Date				

表 4-26 污水处理系统试运行记录 Table 4-26 Waste Water Treatment System Commissioning Test Record				
检验方 Surveyor				
序号 Series No.	运行时间段 Operation Time	系统运行状况 System Operation Condition	出水水质指标 Outflow Water Quality Index	试验结果 Test Result
试运行说明： T&C Brief:				

见证人 Witness	施工承包单位 Contractor	监理公司 Management Company	业主/顾问公司 Client/Consulting Company
姓名 Name			
公司 Company			
职位 Designation			
签名 Signature			
日期 Date			

表 4-27 雨水管道灌水试验记录 Table 4-27 Rain Water Pipe Filling Test Record					
系统名称 System Description			管道材质 Pipe Material		
检验方 Surveyor					
排水管段编号 Pipe Series No.	规格（mm） Dimension (mm)	管道灌水高度 Pipe Infill Water Level	灌水持续时间（s） Infill Water Duration Time (s)	管内液面情况 Internal Water Level Condition	外观检查 Visual Inspection
试运行说明： T&C Brief:					

见证人 Witness	施工承包单位 Contractor	监理公司 Management Company	业主/顾问公司 Client/Consulting Company
姓名 Name			
公司 Company			
职位 Designation			
签名 Signature			
日期 Date			

表 4-28 泳池池体及管道盛水试验记录 Table 4-28 Swimming Pool and Pipe Full Water Test Record				
检验方 Surveyor				
序号 Series No.	时间段 Duration Time	池体液面高度 Water Level	管道及阀门检测（渗漏/严密） Pipe and Valve Test (Leak/Tight)	水箱检测（渗漏/严密） Water Tank Test (Leak/Tight)
试运行说明： T&C Brief:				
见证人 Witness	施工承包单位 Contractor	监理公司 Management Company		业主/顾问公司 Client/Consulting Company
姓名 Name				
公司 Company				
职位 Designation				
签名 Signature				
日期 Date				

表 4-29 泳池池水水质指标检验记录 Table 4-29 Swimming pool Water Quality Test Record			
检验单位 Surveyor			
序号 Series No.	检验事项名称 Test Item Description	检测值 Test Value	限值 Limit
1	PH 值 PH Value		7.2~7.6
2	浑浊度 FTU Turbidity		0.10FTU
3	大肠埃希氏杆菌 Coli bacillus		不得检出 Not Allowed
4	绿脓杆菌 Pseudomonas Aeruginosa		不得检出 Not Allowed
5	总溶解固体 ppm Total Dissolved Solids (TDS)		＜3000ppm
6	余氯浓度 mg/L Residual Chloride Concentration		0.4~0.6mg/L
7	温度 ℃ Temperature		26℃~28℃
试运行说明： T&C Brief:			
见证人 Witness	施工承包单位 Contractor	监理公司 Management Company	业主/顾问公司 Client/Consulting Company
姓名 Name			
公司 Company			
职位 Designation			
签名 Signature			
日期 Date			

第5章. 暖通空调系统
SECTION 5 HEATING VENTILATION AND AIR CONDITIONING

5.1. 概要
GENARAL

A. 本章标准所包含的内容仅用于制定最基本的希尔顿空调采暖通风标准，而非提供一个工程项目的完整设计方案。如果地方规范高于希尔顿的标准，则按照高的标准执行。
All contents of this seciton is applicable in establishing the basic design requirement for the heating, ventilation and air conditioning system for Hilton Worldwide properties and it is not meant to be a complete design solution for any specific projects. Whenever the Local Standard is higher than Hilton Worldwide standard, the local standard shall take precedent and followed.

B. 各类设计标准之间的差异性\冲突性问题由希尔顿全球确定解决方案。
Differences and conflicts among different design standards shall be submitted to Hilton Worldwide for resolutions.

C. 如设计单位所提供设计方案中任何与本章标准中不符之处，设计单位必须以书面形式事先提交希尔顿全球进行审批，取得同意后方可进行深化设计。
Any deviation of the design proposal by the design consultant from this standard shall be submitted in writting to Hilton Worldwide for approval before further detailed design can be carried out.

D. 空调系统是酒店机电设计系统中的一个重要组成部分。高品质室内空气对于客人的舒适性至关重要，因此为酒店客人及酒店工作人员提供舒适的室内环境是空调系统设计的主要目的。
Heating, ventilation and Air conditioning system is the key component of the mechanical and electrical systems design in a hotel. High indoor air quality is crucial for the guest's comfort. Therefore, achieving a comfortable indoor environment for hotel guests and its employees is the main objective of the air conditioning system design.

E. 空调系统的设计应满足本标准中提及的国家标准、国际标准、地方标准及其他规范的要求，且必须以经济效益、能源效率以及安静的环境为原则，系统设计应为全自动化且易于维护。设计师应针对不同项目考虑多种因素，并应对整个空调系统的全生命周期的成本进行分析后确定最优的系统。
Air conditioning design shall comply with National Standards, International Standards, Local Standards as well as other standards as stated in this section. The key design principle shall also include consideration on econmical benefits, energy efficiency and noise control of the proposed system. The design shall also ensure that the system proposed is fully autmated and faciliate ease of maintenance. Life cycle cost analysis must be carried out with consideration of various factors affecting different projects in order to determine the most optimum system to be applied.

5.2. 设计标准
DESIGN STANDARD AND SYSTEM REQUIREMENT

5.2.1. 设计标准
Design Standard

1. GB50736 民用建筑供暖通风与空气调节设计规范
   GB50736 Code for design of heating ventilation and air conditioning

2. GB 50019 采暖通风与空气调节设计规范
   GB 50019 Code for design of heating ventilation and air conditioning

3. GB50041 锅炉房设计规范
   GB50041 Code for Design of Boiler Plant

4. GB50176 民用建筑热工设计规范
   GB50176 Thermal design code for civil building

5. GB50336 地源热泵系统工程技术规范
   GB50336 Technical code for ground-source heat pump system (2009 Version)

6. GB50364 民用建筑太阳能热水系统应用技术规范
   GB50364 Technical code for solar water heating system of civil buildings

7. JGJ142 地面辐射供暖技术规程
   JGJ142 Technical specification for floor radiant heating

8. JGJ158 蓄冷空调工程技术规程
   JGJ158 Technical specification for cool storage air-conditioning system

9. GB50072 冷库设计规范
   GB50072 Specifications for the design of cold storage warehouse

10. GB3095 环境空气质量标准
    GB3095 Ambient Air Quality Standard

11. GB3096 声环境质量标准
    GB3096 Environmental quality standards for noise

12. GB50243 通风与空调工程施工质量验收规范
    GB50243 Code of acceptance for construction quality of ventilation and air conditioning works

其它当地政府部门颁发适用于供热通风空调系统的技术要求

Other codes for heating ventilation and air conditioning system by local authorities

注：以上标准均以最新版本为准。

Note: All the above-mentioned standards shall be the latest version.

5.2.2. 设计参数
Design Parameter

A. 室外参数设计标准
   Outdoor Design Parameters

1. 空调室外设计条件应以项目所在地夏、冬季节空调室外计算温湿度为依据。
   Outdoor design parameters such as the summer and winter outdoor temperature and relative humidity must be based on the climate of the location in which the project is situated.

B. 室内参数设计标准
Indoor Design Parameters

1. 室内参数设计标准见下表：
Indoor design parameters shall comply with those indicated in the table below:

表 5-1 客房区

Table 5-1 Guest floor

区域 Area	夏季 Summer		冬季 Winter		压力关系 Pressure relation	人员密度 Occupant Density m^2/p	新风量 $m^3/h·p$ Fresh Air Quantity $m^3/h·p$	排风量 $m^3/h·p$ Exhaust Air Quantity $m^3/h·p$	噪声 dBA Noise Level dBA
	干球温度℃ Dry Bulb Temperature ℃	相对湿度 % Relative Humidity %	干球温度℃ Dry Bulb Temperature ℃	相对湿度 % Relative Humidity %	类型 Type				
客房 Guest Room	23	55	22	30	正压 Positive Pressure	2 人/房 2 Persons/Room	50	--	35
客房卫生间 Guest room Toilet	23	55	22	30	负压 Negative Pressure	--	--	90 m^3/room	40
套房 Suit Room	23	55	22	30	正压 Positive Pressure	--	$2m^3/h.m^2$	--	35
客房走廊 Guestroom Corridor	26	60	20	--	正压 Positive Pressure	--	$2m^3/h.m^2$	--	45
行政楼层客房 Executive floor guestroom	23	55	22	30	正压 Positive Pressure	2 人/房 2 Persons/Room	60	--	35
行政酒廊 Executive Lounge	23	55	22	30	负压 Negative Pressure	5	30	+(5%~10%)	40
楼层服务间/布草间 Floor Service Room/Store Room	24	--	21	--	负压 Negative Pressure	--	-(5%~10%)	4ACPH	40

表 5-2 酒店大堂接待区

Table 5-2 Hotel Lobby Reception

区域 Area	夏季 Summer		冬季 Winter		压力关系 Pressure Relation	人员密度 m^2/p Occupancy Density m^2/p	新风量 $m^3/h·p$ Fresh Air Quantity $m^3/h·p$	排风量 $m^3/h·p$ Exhaust Air Quantity $m^3/h·p$	噪声 dBA Noise Level dBA
	干球温度℃ Dry Bulb Temperature℃	相对湿度% Relative Humidity %	干球温度℃ Dry Bulb Temperature ℃	相对湿度% Relative Humidity %	类型 Type				
大堂前厅 Lobby Front Hall	23	55	22	30	正压 Positive Pressure	7	30	-(5%~10%)	45
中庭 Atrium	23	55	22	30	正压 Positive Pressure	7	25	-(5%~10%)	45
大堂 Lobby	23	55	22	30	正压 Positive Pressure	7	25	-(5%~10%)	45
前台 Front Desk	23	55	22	30	平衡 Balance	5	25	100%	45
大堂吧 Lobby Bar	23	55	22	30	负压 Negative Pressure	5	30	+(5%~10%)	40
公共休息区 Public Leisure Space	23	55	22	30	负压 Negative Pressure	7	30	+(5%~10%)	45

表5-3 酒店商务区

Table 5-3 Hotel Commercial District

区域 Area	夏季 Summer		冬季 Winter		压力关系 Pressure Relation	人员密度 m^2/p Occupancy Density m^2/p	新风量 $m^3/h·p$ Fresh Air Quantity $m^3/h·p$	排风量 $m^3/h·p$ Exhaust Air Quantity $m^3/h·p$	噪声 dBA Noise Level dBA
	干球温度℃ Dry Bulb Temperature℃	相对湿度% Relative Humidity %	干球温度℃ Dry Bulb Temperature ℃	相对湿度% Relative Humidity %	类型 Type				
会议室 Conference Room	23	55	22	30	平衡 Balance	2	40	100%	35
会议前厅 Conference Lobby	23	55	22	30	正压 Positive Pressure	2	40	-(5%~10%)	35
商务中心 Business Center	23	55	22	30	平衡 Balance	6	40	100%	45
家具储藏 Furniture Storage	26	60	20	--	负压 Negative Pressure	1.5	-(5%~10%)	2 ACPH	40
宴会厅 Banquet Hall	23	55	22	30	平衡 Balance	1.5	30	100%	35
宴会前厅 Banquet Lobby	23	55	22	30	平衡 Balance	3	25	100%	35
宴会厅服务走廊 Banquet Service Corridor	26	60	20	-	负压 Negative Pressure	--	3 $m^3/h.m^2$	+(5%~10%)	45
衣帽间 Cloak Room	23	55	22	30	负压 Negative Pressure	--	2$m^3/h.m^2$	+(5%~10%)	40

表 5-4 酒店公共区

Table 5-4 Hotel Common Area

区域 Area	夏季 Summer		冬季 Winter		压力关系 Pressure Relation	人员密度 m^2/p Occupancy Density m^2/p	新风量 $m^3/h·p$ Fresh Air Quantity $m^3/h·p$	排风量 $m^3/h·p$ Exhaust Air Quantity $m^3/h·p$	噪声 dBA Noise Level dBA
	干球温度℃ Dry Bulb Temperature℃	相对湿度% Relative Humidity %	干球温度℃ Dry Bulb Temperature ℃	相对湿度% Relative Humidity %	类型 Type				
中餐厅 Chinese Restaurant	23	55	22	30	负压 Negative Pressure	2.5	30	+(5%~10%)	40
西餐厅、特色餐厅 Western Restaurant, Specialty Restaurant	23	55	22	30	负压 Negative Pressure	3	30	+(5%~10%)	40
酒吧 Bar	23	55	22	30	负压 Negative Pressure	2	30	+(5%~10%)	40
全日/自助餐厅 All day dinning/Buffet	23	55	22	30	负压 Negative Pressure	2	30	+(5%~10%)	40
咖啡吧 Café	23	55	22	30	负压 Negative Pressure	2	30	+(5%~10%)	40
礼品商店 Gift Store	23	55	22	30	平衡 Balance	5	30	100%	45
餐厅包间 Restaurant Private Room	23	55	22	30	负压 Negative Pressure	2.5	30	+(5%~10%)	40
公共卫生间 Public Toilet	26	--	20	--	负压 Negative Pressure	--	--	12 ACPH	45

表 5-5 康体中心

Table 5-5 Health and Fitness Center

区域 Area	夏季 Summer		冬季 Winter		压力关系 Pressure Relation	人员密度 m^2/p Occupancy Density m^2/p	新风量 $m^3/h·p$ Fresh Air Quantity $m^3/h·p$	排风量 $m^3/h·p$ Exhaust Air Quantity $m^3/h·p$	噪声 dBA Noise Level dBA
	干球温度℃ Dry Bulb Temperature℃	相对湿度% Relative Humidity %	干球温度℃ Dry Bulb Temperature ℃	相对湿度% Relative Humidity %	类型 Type				
接待室 Reception Office	23	55	22	---	正压 Positive	8	30	-(5%~10%)	45
游泳池 Swimming Pool	29	60	29	60	负压 Negative	6	$9m^3/h.m^2$	$10m^3/h.m^2$	45
更衣室 Changing Room	26	--	20	--	负压 Negative	--	-(10%~20%)	8 ACPH	45
卫生间 Toilet	26	--	20	--	负压 Negative	--	--	10 ACPH	45
健身中心 Fitness Center	22	55	20	--	负压 Negative	10	40	+(5%~10%)	45
Spa 洗浴 ③ Spa Bath ③	25	--	25	--	负压 Negative	10	-(10%~20%)	10 ACPH	45
Spa/理疗室③ Spa Treatment Room ③	25	55	25	30	负压 Negative	2 人/房 2P/Room	60	+(5%~10%)	35
Spa 休息 ③ Spa Rest ③	25	55	25	30	平衡 Balance	5	30	100%	40
美容美发 Hairdressing and Beauty	23	55	22	30	负压 Negative	10	30	+(5%~10%)	40

表 5-6 酒店后勤区

Table 5-6 Hotel Back of House Area

区域 Area	夏季 Summer		冬季 Winter		压力关系 Pressure Relation	人员密度 m^2/p Occupancy Density m^2/p	新风量 $m^3/h·p$ Fresh Air Quantity $m^3/h·p$	排风量 $m^3/h·p$ Exhaust Air Quantity $m^3/h·p$	噪声 dBA Noise Level dBA
	干球温度℃ Dry Bulb Temperature℃	相对湿度% Relative Humidity %	干球温度℃ Dry Bulb Temperature ℃	相对湿度% Relative Humidity %	类型 Type				
办公室 Office	23	55	22	30	平衡 Balance	8	30	100%	40
员工餐厅/休息室 Staff Canteen/Lounge	23	55	22	--	负压 Negative	5	30	+(5%~10%)	45
员工淋浴间 Staff Shower Room	26	60	20	--	负压 Negative	--	-(10%~20%)	10 ACPH	50
员工更衣室 Staff Changing Room	26	60	20	--	负压 Negative	--	-(10%~20%)	8 ACPH	50
员工卫生间 Staff Toilet	26	60	20	--	负压 Negative	--	--	12 ACPH	50
员工培训 Staff Training Room	23	55	22	30	平衡 Balance	5	30	100%	40
员工娱乐室 Staff Entertainment Room	23	55	22	30	平衡 Balance	5	30	100%	45
制服间 Uniform Room	25	55	21	--	负压 Negative	--	-(5%~10%)	4 ACPH	45

区域 Area	夏季 Summer		冬季 Winter		压力关系 Pressure Relation	人员密度 m^2/p Occupancy Density m^2/p	新风量 $m^3/h·p$ Fresh Air Quantity $m^3/h·p$	排风量 $m^3/h·p$ Exhaust Air Quantity $m^3/h·p$	噪声 dBA Noise Level dBA
	干球温度℃ Dry Bulb Temperature℃	相对湿度% Relative Humidity %	干球温度℃ Dry Bulb Temperature ℃	相对湿度% Relative Humidity %	类型 Type				
工程部/维修间 Engineering Department/ Maintenance Room	27	60	20	--	负压 Negative	--	25	+(5%~10%)	45
备餐间 Food Preparation Room	23	55	22	--	负压 Negative		--	2 ACPH	50
储藏间 Store	27	60	20	--	负压 Negative		--	4 ACPH	45
总仓库 Total Warehouse	27	60	20	--	负压 Negative		--	4 ACPH	45
化学品仓库 Chemical Store	27	60	20	--	负压 Negative		--	6 ACPH;	45
化学品仓库 Chemical Store	27	60	20	--	负压 Negative		--	6 ACPH; 事故通风 Emergency Ventilation 12 ACPH	45
危险品仓库 Hazardous Store	27	60	20	--	负压 Negative		--	12 ACPH	45

表 5-7 洗衣房区域

Table 5-7Laundry Area

区域 Area	夏季 Summer		冬季 Winter		人员密度 m^2/p Occupancy Density	新风量$m^3/h·p$ Fresh Air Quantity	排风量$m^3/h·p$ Exhaust Air Quantity	噪声dBA Noise Level
	干球温度℃ Dry Bulb Temperature	相对湿度% Dry Bulb Temperature	干球温度℃ Dry Bulb Temperature	相对湿度% Relative Humidity %				
洗衣房 Laundry Room	27	60	20	-	--	-(10%~20%) ⑤	15~20 ACPH	50

表 5-8 酒店粗加工区

Table 5-8 Hotel Rough Preparation Area

区域 Area	夏季 Summer		冬季 Winter		补风量 Compensate Air Volume	全面排风量（次/h） Full Exhaust Quantity (Air-change per hour)	局部排风量（排油烟） Local Exhaust Air Quantity (Smoke Exhaust)	噪声dBA Noise Level
	干球温度℃ Dry Bulb Temperature ℃	相对湿度% Dry Bulb Temperature ℃	干球温度℃ Dry Bulb Temperature ℃	相对湿度% Relative Humidity %				
食品准备间 Food Preparation Room	27	60	20	--	-(10%~20%)	4	--	45
烧腊间 BBQ Room	27	--	18	--	-(10%~20%)	6	由厨房顾问提资	50
食物、饮料储藏室 Food and drink Storage	26	60	20	--	-(10%~20%)	4	--	50
凉菜间 ⑧ Cold Dish Room	22	--	18	--	-(10%~20%)	2	--	50
糕点裱花间 ⑧ Cake Decoration Room	22	--	18	--	+(10%~20%)	2	--	50
巧克力间 ⑧ Chocolate Room	22	--	18	--	+(10%~20%)	2	--	50
面包房 Bakehouse	24	--	18	--	-(10%~20%)	--	由厨房顾问提资 To be provided by Kitchen Consultant	50

区域 Area	夏季 Summer		冬季 Winter		补风量 Compensate Air Volume	全面排风量（次/h） Full Exhaust Quantity (Air-change per hour)	局部排风量（排油烟） Local Exhaust Air Quantity (Smoke Exhaust)	噪声dBA Noise Level
	干球温度℃ Dry Bulb Temperature ℃	相对湿度% Dry Bulb Temperature ℃	干球温度℃ Dry Bulb Temperature ℃	相对湿度% Relative Humidity %				
果汁加工间 Fruit Juice Processing Room	18	--	16	--	+(10%~20%)	2	--	50
蔬菜粗加工间 Vegetable Rough Preparation Room	24	--	18	--	-(10%~20%)	3	--	50
肉类/鱼类粗加工间 Meat/Fish Preparation Room	24	--	18	--	-(10%~20%)	6	--	50
烧腊间 BBQ Room	27	--	18	--	-(10%~20%)	6	由厨房顾问提资	50
花房 Flower Room	24	--	18	--	--	2	--	50
垃圾处理间 Refuse Disposal Room	24	--	12	--	--	20	--	50
垃圾冷库 Refuse Cold Storage	13	--	13	--	--	--	--	50

表 5-9 酒店厨房区

Table 5-9 Hotel Kitchen Area

区域 Area	夏季 Summer		冬季 Winter		补风量 Make-up Air Volume	全面排风量（次/h） Full Exhaust Quantity (Air-change per hour)	局部排风量（排油烟） Local Exhaust Air Quantity (Smoke Exhaust)	噪声dBA Noise Level dBA
	干球温度℃ Dry Bulb Temperature ℃	相对湿度% Dry Bulb Temperature ℃	干球温度℃ Dry Bulb Temperature ℃	相对湿度% Relative Humidity %				
热厨/烹饪间 Hot Kitchen/Cooking Room	27	60	20	--	-20% ④	6	60~80ACPH④	50
洗碗间/洗锅间 Dish/Pot Washing Room	26	60	20	--	-(10%~20%)	--	2000m^3/h ④	50

表 5-10 酒店机电用房

Table 5-10 Hotel Mechanical and Electrical Room

区域 Area	夏季 Summer	冬季 Winter	平时补风/事故补风 Normal Compensation Air/Emergency Compensation Air	平时排风/事故通风（次/h） Normal Exhaust Air/Emergency Exhaust Air (Air-change per hour)	噪声dBA Noise Level dBA	备注 Comment
	干球温度℃ Dry Bulb Temperature ℃	干球温度℃ Dry Bulb Temperature ℃				
变配电室 Switchroom	≤35	≥5	-10%/-10%	5/--	60	提供专用空调 Supply Separate Air Conditioner
制冷站 Chiller Plant Room	≤35	≥5	-10%/-10%	6/12	60	需根据不同制冷剂类型设置相应制冷剂泄漏探测装置（除R134A制冷剂外），及不小于12 ACPH事故通风 Refrigerant leak detector shall be provided and determined by different type of refrigerant(Except for Refrigerant 134A), including minimum 12ACPH emergency ventilation
锅炉房 Boiler Room	≤35	≥5	+10%（平时排风量+燃烧空气量）/ -10%事故通风量 +10% (Normal Exhuast Air Volume + Combution Air Volume)/ -10% Emergency Ventilation Air Volume	6/12	--	设备工作时，应保证机房正压；事故通风时，机房可为负压 Positive pressure for common ventination; Negative pressure for emergency ventination
热交换机房 Heat Exchanger Room	≤35	≥5	+10%/--	6/--	--	--

区域 Area	夏季 Summer	冬季 Winter	平时补风/事故补风 Normal Compensation Air/Emergency Compensation Air	平时排风/事故通风（次/h） Normal Exhaust Air/Emergency Exhaust Air (Air-change per hour)	噪声dBA Noise Level dBA	备注 Comment
	干球温度℃ Dry Bulb Temperature ℃	干球温度℃ Dry Bulb Temperature ℃				
通风机房 Ventilation Room	≤35	≥5	--	--	--	--
发电机房 Generator Room	≤35	≥5	-10%/--	3/--	--	设备工作时排风量及新风量按设备自身需求量确定 Fresh air and exhaust air generator's shall be determined by its requirement;
储油间 Diesel storage	≤35	≥5	-10%/-10%	6/12	--	
空调机房 Air Handling Unit Room	≤35	≥5	--	--	--	
电梯机房 Lift Motor Room	≤35	≥5	--	1~2/--	--	
水泵房 Pump Room	≤35	≥5	-10%/--	6/--	--	
污水处理机房 Waste Water Treatment Room	≤35	≥5	-20%/--	12/--	--	
中水机房 Reclaimed water plant room	≤35	≥5	-20%/--	12/--	--	
中水机房 Reclaimed water plant room	≤35	≥5	-20%/--	12/--	--	

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区域 Area	夏季 Summer	冬季 Winter	平时补风/事故补风 Normal Compensation Air/Emergency Compensation Air	平时排风/事故通风（次/h） Normal Exhaust Air/Emergency Exhaust Air (Air-change per hour)	噪声dBA Noise Level dBA	备注 Comment
	干球温度℃ Dry Bulb Temperature ℃	干球温度℃ Dry Bulb Temperature ℃				
电信间 MDF Room	27	20	--	3/--	--	
IT机房 IT Server Room	22	20	-10%/--	3/--	55	设置机房专用空调，一用一备 Separate air conditioner, one duty one standby
AV控制间 AV Control Room	22	22	-20%/--	1~2/--	--	
有线电视机房 TV Room	22	22	-10%/--	3	--	提供分体空调 To provide split air conditioning system
通讯/IT值班室 Communication/IT Duty Office	23	22	--	3	--	提供分体空调 To provide split air conditioning system
设备机房值班室 Utility Duty Office	23	22	--	--	--	提供分体空调 To provide split air conditioning system
消防/保安监控室 Fire Command /Security Monitor & Control Center	23	22	--	1~2/--	--	提供分体空调 To provide split air conditioning system
地下车库 Underground Carpark	--	≥5	5	6	55	设置CO探测器以控制送排风机的运行 To provide CO sensor to control fresh/exhaust Air Fan

注：

Note:

①室内参数设计要求满足+/-1℃的温差及+/-5%的湿度差。

Indoor design parameter indicated shall only permit differential of +/-1℃ and +/-5% for temperature and relative humidity respectively.

②压力关系的确定是由临近的区域决定的。对于暖湿气候地区的建筑来说，所有建筑的压力必须和外界压力保持 5-10Pa 的正压。对于冷气候地区的建筑来说，考虑到通过围护结构水转化成蒸汽的损失，所有建筑的压力必须和室外压力保持相等。对于混合气候（夏天热湿，冬天冷的气候）的建筑来说，所有建筑在夏季与室外保持正压，在冬季与室外保持相等。

Pressure relationship with the outdoor shall be determined based on the climate of the region in which the project is situated. For projects located at warm humid climate region, the building pressure shall be 5 -10 Pa higher compared to the outdoor pressure. Building pressure for buildings in cold climate region shall be the similar to the outdoor pressure to minimuize vapor losses through the building envelop. Building pressure for mixed climate (humid temperate climate in summer and cold climate in winter) shall be postive in summer and in equilibrium with the outdoor pressure in winter.

③SPA 房间室内参数须最终满足 spa 管理设计标准。

Indoor parameters for spa room shall comply with design standard provided by the Spa Management Consultant.

④厨房排风系统应独立设置。酒店厨房排风主要包括局部排油烟、厨房全面排风和洗碗间排风。厨房排油烟量及洗碗间排风量应由厨房顾问提资，在设计初始阶段，如果没有厨房顾问的提资时，厨房排油烟量可按 60~80 次/h 来预留管井，洗碗间/洗锅间按 2000m3/h 风量预留管井，但深化设计阶段须参考厨房顾问的提资。

Kitchen exhaust system shall be installed independently. Hotel kitchen exhaust mainly includes kitchem hood exhaust, kitchen exhaust and exhaust for dish washing room. Information for kitchen hood exhaust and dish washing room exhaust shall be provided by Kitchen Consultant. When priliminary deisgn input is not available from Kitchen Consultant, shaft sizes could be estimated based on assumptions of 60 to 80 ACPH for kitchen hood exhaust and 2000 m^3/h for dish washing room. The final detailed design shall be provided by the Kitchen Consultant.

厨房通风应采用直流式系统。为保证厨房负压，厨房补风量应为厨房总排风量的 80%~90%。补风采用两路系统供给，一路直接向灶台（油烟罩）补充，另一路经新风机组（变频）处理后补充至厨房岗位空调。油烟罩补风夏季不做处理，冬季要预热至大于 18℃后补入排烟罩。

100% outdoor air once through system shall be applied for the kitchen ventilation system. Make-up air volume for kitchen shall be 80% to 90% of total exhaust air to maintain negative pressure in the space. Kitchen make-up air shall be supplied via two separate systems, one that is supplied directly to the kitchen exhaust hood, and the other supplying make-up air via a pre-air-handling unit (with variable frequency drive) which treat and distribute the outdoor air to various parts of the kitchens to provide spot cooling or heating. The kitchen exhaust hood make-up air is not required to be pre-treated during summer but must be pre-heated to 18°C during winter.

整个厨房风量平衡及运行策略应符合以下要求：

The air balancing and operation strategy for the entire kitchen shall comply with the requirements as listed below:

1. 忙时：排油烟风机（变频）运行，全面换气排风机关闭/低速运行，补风由油烟罩补风、全面换气补风及邻室（餐厅）渗漏补风承担。
   Peak Hour: Kitchen hood exhaust fan (provided with variable Frequency drive) in operation, kitchen ventilation exhaust air fan shall be off or at low speed operation, outdoor air make-up shall be provided for kitchen exhaust hoob, make-up air for kitchen ventilation shall be via infiltration from adjacent room (or canteen).

2. 闲时：全面换气排风机运行，排油烟风机关闭，补风由邻室（餐厅）渗漏补风承担。
   Off-Peak Hour: Kitchen ventilation exhaust air fan in operation, kitchen hood exhaust fan off, make up air shall be provided by infiltration from ajacent room (cateen).

⑤洗衣房通风用于排出洗衣房内设备散热及满足设备局部排风的要求。上表中的洗衣房换气次数仅作为方案阶段的估算依据，且洗衣房排风应按 2 个排风系统预留：60%排风预留给烘干机，40%预留给其他区域及设备排风。深化设计阶段，洗衣房的排风量应由洗衣房顾问提供。洗衣房补风应由新风机组处理后补充至岗位送风。

Luandry room ventilation shall be designed to dissipate heat generated by equipment and provide partial local exhaust for equipment. Laundry air exchange rate indicated in the table mentioned above shall only be used as design reference in estimating the air flow rate during conceptual design stage. The laundry room must be provided with 2 sets of ventilation systems. One for the dryer which shall be sized to 60% of the total exhaust volume and one for other equipment which shall be sized to 40%. Actual ventilation rate requirement shall be provided by the Laundry Consultant during detail design stage.

⑥为所有的燃烧装置（锅炉房、柴发机房）提供助燃空气，助燃空气符合当地所有的法律法规。为防止机电用房空气渗透至其他区域，不需燃烧空气的设备机房为负压；

Outdoor air shall be provided for fuel combustion devices (such as boiler and diesel generator room) and the provision shall comly with Local Laws and Regulations. MEP plant rooms that do not require to house fuel combustion equipment shall be negatively pressurized to prevent exfiltration of air to other areas.

⑦地下车库消防补风量不小于排烟量的 50%。

Basement capark outdoor air make up volume shall not be less than 50% of the exhaust air volume.

⑧凉菜间、糕点裱花间、巧克力间应设置分体空调。

Split air conditioners shall be provided for cold dish room, dessert preparation room, chocolate room.

⑨ACPH 指的是每小时换气次数。

ACPH stands for Air Change rate Per Hour

5.3. 系统要求
System Selection

A. 系统选择应以建筑冷热负荷作为依据，负荷计算以应按现行国家设计手册要求及本标准规定的室内、室外设计标准为依据。
System selection must be based on the building's cooling and heating load. Heating and cooling load shall be calculated base on outdoor and indoor design standard as stipulated in this standard and National Design Handbook.

B. 系统主要包括空调冷冻水系统、空调冷却水系统、热水系统、空调通风系统。
The system proposed shall be central refrigeration plant consists mainly of chillers, chilled water distribution system, heating hot water distributiion system and air distribution system.

5.3.1. 冷水系统
Cold Water system

1. 空调冷冻水系统由空调冷源、空调冷冻水泵及末端空调设备等组成。
The chilled water distribution system shall comprise of chiller, chilled water pump and terminal units.

2. 空调冷却水系统包括冷却塔、冷却水泵及水处理装置等。
The condenser water system shall comprise of cooling towers, condenser water pumps and water treatment system.

3. 负荷计算
Load Calculation

   a. 建筑供冷负荷应按现行国家设计手册要求及本标准规定的室内、室外设计标准为依据进行计算。
   Building's cooling load shall be calculated based on latest National Design Handbook and the indoor and outdoor design conditions as stipulated in this standard.

4. 冷源选择
Cold Source Selection

   a. 酒店冷源的选择应以项目地的气候特点及项目实际情况为依据。应优先采用水冷冷水机组，经技术经济分析后确认其他节能型冷源类型更具优势，且需事先提交希尔顿全球进行审批，同意后方可采用其他形式冷源（包括风冷热泵机组、水源热泵机组等）。
   Chiller selection shall be determined based on local climate characteristics and microenvironment of the project where it is situated. Water-cooled chiller unit is preferred due to the higher efficiency of such refrigeration plant. Other energy efficient refrigeration plants and technologies could also be considered but must be submitted and approved by Hilton Worldwide supported with adequate feasibility studies on its technical and economics viability.

   b. 风冷热泵机组需妥善考虑冬季制热效率下降和减噪问题，允许在南方别墅型酒店中采用、但其应远离建筑居住区域，需声学顾问提供相关可行性报告进行审批；对于靠近江河湖海并且年径流量保持恒定的区域可考虑采用水源热泵机组，并应提供相关水文资料进行审批。
   Air-cooled heat pump is permitted for villa type hotel in Southern part of China. However, adequate measures must be exercised to control the equipment noise

and ensure sufficient heating hot water is generated when its efficiency is reduced during winter. Feasibility study report must be submitted by Acoustic Consultant to ensure suitable measures are taken to treat the noise generated by the equipment and will not cause discomfort or nuisance to the guests.For hotels located at areas where natural water resource such as river, lake or sea is available, water source heat pump system could be considered substantiated with all necessary documents such as geographical and hydrological data and feasibility study report.

c. 酒店冷机的配置需留有一定的冗余量，且须满足当任意一台冷机故障或检修时，其他冷机至少可以承担酒店总负荷的 75%。
The chiller's capacity and configuration must be selected in a manner to have redundancy to support at least 75% of the building air-conditioning load when any one of the chillers fails or under maintenance.

d. 考虑到计量与日后运行管理问题，酒店制冷机组及制冷机房不与其他非酒店区域共用；如共用，则须需事先提交希尔顿全球进行审批，并应分区域安装能量计量装置。
In a mixed development, in due consideration of ease of operation management and metering of usage, the hotel must be provided with dedicated chiller plant and associated plant room and no sharing of the equipment with other non-hotel areas or applications is permitted. If there is necessity to share the chiller plant with other non-hotel functional areas due to site or operational constraints, adequate BTU meters must be provided for each area and approval must be obtained from Hilton Worldwide before implementation.

e. 制冷剂的冷媒选择应遵守蒙特利尔协定书关于制冷剂的法规，采用环保冷媒，宜优先采用 R-134A。
Refrigerant selection shall comply with Montreal Protocol Regulation and be environmental friendly type. R-134A is preferred.

f. 当冷冻水系统采用一次泵变流量时，冷冻机组蒸发器允许的冷冻水最低流量必须小于或等于额定流量的 30%；机组蒸发器所允许的冷冻水流量变化率必须不小于每分钟 30%。
When variable primary flow system is used for chilled water system, the minimum chilled water flow rate through the evaporator of the chiller unit must not be less than 30% of the rated flow rate. Flow rate variation shall not be less than 30% per minutes.

g. 当单台冷冻机组的制冷量大于 400RT 时，应采用离心式冷冻机组。
Centrifugal type chiller unit shall be used for chiller capacity greater than 400RT.

h. 离心式冷冻机组压缩机应为多级或双级离心型，可在冷冻水进水温度恒定及其它可能的条件下自动调节制冷量，调节范围为额定工况负荷的 20%~100%。
Multi-stage or minimum two stage centrifugal chiller compressor shall be used to allow regulation of the cooling load between the range of 20% to 100% of the rated capacity under various possible operating conditions and constant chilled water temperature.

i. 螺杆式冷冻机组的压缩机应采用全封闭或半封闭式。
Hermetic or semi-hermetic compressor shall be provided for helical rotary screw chiller.

j. 根据项目实际情况以及采暖、生活热水的需求，考虑采用冷凝器热回收技术。
Heat recovery from the chiller condenser shall also be considered where applicable for use in the heating of domestic hot water system.

k. 冷水机组效率应遵守国家和地方节能标准，并应满足以下要求：
Chiller efficiency shall comply with National and Local Energy Efficient Standards and those stipulated hereafter:

l. 冷水机组满负荷运行工况下，离心式冷冻机组 COP 应大于 5.1，螺杆式冷水机组 COP 应大于 4.9，并应提供冷水机组部分负荷工况下的 IPLV 值。
COP of chiller selected shall be at least 5.1 and 4.9 for centrifugal and screw chiller respectively at full load condition. The IPLV of the chiller selected shall also be submitted for review and shall comply with the requirement stipulated in ARI and ASHRAE.

5. 冷却塔选择
Cooling tower selection

a. 冷却塔数量应与冷水机组匹配。冷却塔选型应留有 10%-20%的冗余量，以满足夏季极端天气散热量的需求。
The numbers and capacity of cooling towers provided shall match with that of the chillers. The cooling tower shall be sized with a redundancy of 10% to 20% for heat dissipation during extreme weather in summer; and this is in addition to the excess capacity required for heat dissipation of the chiller compressor.

b. 对于存在较大腐蚀性空气的地区，宜采用密闭式冷却塔或冷却塔选用防腐蚀的材料。
Closed type cooling tower or cooling tower with corrosion resistant material shall be used in areas where the environment is corrosive.

c. 冷却塔风机宜变频，以便于根据负荷情况进行风速控制和优化控制。
Cooling tower fan shall be provided with variable frequency drive to allow variable speed control in response to varying loads condition and optimization control.

d. 冷却塔在最高设计湿球温度下，且制冷机及水泵在设计工况运行时，冷却塔的冷却量应不少于系统最大散热量的 110%，同时在室外气温较低时(10℃或当地极端最低温度，两者中较低温者)，冷却塔仍保持操作，利用被冷却的循环水经热交换器以产生较低温的冷冻水，为酒店提供免费制冷。
When the chiller and chilled water pump are operating under their design conditions and that the cooling tower is at its highest designed wet bulb temperature, the cooling capacity of the cooling tower shall not be less than 110% of the heat dissipation requirement. When outdoor temperature is low (10°C or extreme low temperature at the site, which ever is lower), the cooling tower shall remain operational to generate chilled water via heat exchanger for free cooling in the hotel during winter.

e. 如冷却塔需冬季运行，且室外温度低于 0℃，应对冷却塔集水盘和冷却水管均配置电加热器或伴热电缆等防冻措施。
Anti-freezing measures shall be taken at cooling tower collection basin to prevent freezing of cooling water by using electric heater or electric heating cable when cooling tower need to operate during winter where outdoor ambient temperature is lower than 0℃.

f. 冷却塔的设置应考虑噪音及设备振动对客房或其他区域的影响，并由声学顾问提供解决方案。另外，应由建筑、景观顾问配合考虑对冷却塔进行遮挡处理，避免客人直接看到。
Design of cooling tower shall take into consideration the effect of noise and equipment vibration transmissions to guestrooms or other noise sensitive areas. This shall be coordinated with the Acoustic Consultant for appropriate solutions and measures. Provision of cooling towers in the property shall also be coordinated with the Architect and Landscape Consultant due to aesthetic consideration and shall be concealed to avoid visual contact by hotel guests and visitors.

g. 冷却塔应采用方形横流超静音冷却塔。
Cooling tower shall be cross-flow super low noise type and rectangular in shape.

h. 冷却塔风机宜变频，利用自动化控制系统控制冷却塔风扇的风速和台数，以达到冷却水温度的控制，从而实现调节能的目的。
Cooling tower fan shall be provided with variable frequency drive to facilitate variable speed control by the Building Automation System controller in order to control the cooling water temperature and reduce energy consumption by the system.

i. 冷却塔的所有金属部件均应为不锈钢材料或热浸镀锌钢制成，沿海城市不可采用热镀浸锌钢材质。冷却塔塔身应为不锈钢或玻璃钢材质。
All metal part of the cooling tower shall be of stainless steel or hot dipped galvanized steel construction. Nevertheless, hot dipped galvanized steel construction is not permitted when cooling towers are installed in properties located at coastal cities. Cooling tower body shall be constructed of stainless steel or reinforced fiberglass when installed at coastal cities.

j. 冷却塔应尽量放置于裙楼屋面或远离客房的室外区域。如果放置于客房塔楼屋面，必须在方案阶段提交相关的声学分析报告由希尔顿全球进行审批。
Cooling towers shall be located on podium roof or outdoor area where they are far away from the guestrooms. Acoustic feasibility study report shall be submitted and approved by Hilton Worldwide if the cooling towers are proposed to be located at the tower roof.

6. 冷冻水系统
Chilled Water Distribution System

a. 空调水系统应采用四管制，满足过渡季节同时供冷、供热的需求。
Four pipes system must be adopted to satisfy the simultaneous needs for cooling and heating during the transition of seasons.

b. 冷冻水系统应根据项目气候特点及实际需求采用一次泵变流量系统、二次泵变流量，从而达到节能运行的要求。具体要求如下：
Variable primary flow (p-only) or primary-secondary pumping (p-s) system shall be adopted based on the climate characteristics of the project and actual operational requirement so as to achieve energy efficient operation by the system. The distribution pumps (primary pumps for p-only system and secondary pump for p-s system) are fitted with variable frequency drives. Specific requirement on the choice of systems shall be as follows:

c. 冷水水温和供回水温差要求一致且各区域管路压力损失相差不大的中小型工程，宜采用一次泵变流量系统；冷冻水泵泵组中单台水泵功率相差较大

时，经技术经济分析，确保设备的适应性、控制方案和运行管理可靠的前提下，可采用冷水机组变流量方式；
Variable primary flow system shall be adopted for medium and small size projects when the chilled water supply temperature and temperature differential between the supply/return chilled water is the same throughout; and that differences in the pressure losses at various areas are not significant. When the differences in power rating between individual pumps are significant, variable speed chiller can be adopted after adequate feasibility study is conducted to justify its viability in terms of economical gain, adaptability, control strategies and operation management of the system.

d. 系统作用半径较大，设计水流阻力较高的大型工程，宜采用二次泵变流量系统。当各环路的设计水温一致且设计水流阻力接近时，二次泵宜集中设置；当环路的设计水流阻力相差较大或各系统水温或温差要求不同时，宜按区域或系统分别设置二次泵。
Primary-secondary variable flow system shall be used for projects with large floor plate and when pressure loss in the system is also large. Centralized secondary pumps shall be provided when the chilled water temperature is the same and pressure loss is similar for each circuit of terminal loads. When the difference in pressure loss for each circuit of terminal loads is significant or chilled water temperature and temperature differential of the supply/return chilled water temperatures for each area is significantly dissimilar, dedicated secondary pumps shall be provided according to the zoning.

e. 冷冻水供回水温度宜为 7/12℃，可根据项目实际情况进行经济可行性分析后适当增大供回水温差，减少运行能耗。
Chilled water supply and return water temperatures shall be 7/12°C. With the support of adequate feasibility study, high temperature differential system could be adopted to reduce water flow rate and pumping energy. The feasibility study must prove that the application of high temperature differential system must not have significant impact on the chiller and overall system efficiency and performance.

f. 冷冻水系统应设置自动水处理装置。
Automatic water treatment devices shall be provided for the chilled water distribution system.

g. 冷冻水系统定压补水方式应优先选用高位膨胀水箱，当受建筑、天气等因素限制时，可采用气压罐式定压补水装置。
High-level expansion tank is preferred for pressure stabilization of the chilled water distribution system. When the provision of a high-level expansion tank is constrained by the building design and climate, pressure vessel type expansion tank could be used instead.

7. 冷却水系统
Condenser Water System

a. 冷却水系统宜采用变流量系统，节能运行。
Variable flow system shall be adopted to reduce pumping energy for condenser water system.

b. 冷却水系统应设置自动水处理装置（包括军团菌处理）。
Automatic water treatment devices (Including treatment for legionaries bacteria) shall be provided for the condenser water system.

c. 冷却水系统冬季应考虑防冻措施。提供带有自动三通阀的旁通，控制冬季冷却水水温；严寒地区、寒冷地区可采用集水盘加电加热或其它防冻措施防止集水盘冻结。
Anti-freezing measures shall be taken to prevent freezing of water in the condenser water system in winter by providing a by-pass regulated by an automatic three way valve to control the condenser water temperature. In areas with extremely cold climate, water collection basin of cooling towers shall be provided with heating devices or other anti-freezing measures.

8. 冷冻水泵、冷却水泵
Chilled Water and Condenser Water Pumps

a. 水泵的选择应合理，扬程应根据计算得出；
Water pumps shall be appropriately selected based on the calculated system pressure loss.

b. 水泵效率不低于 75%，并且应在最高效率点附近运行；水泵需允许在超过设计流量 25%的情况下运行时仍不超过破坏点。
Water pump efficiency shall not be less than 75%. The pump shall operate around the maximum efficiency point on its pump-curves and shall not surge or reach the breaking point when exceeding 25% of the design flow rate.

c. 水泵应该有足够的承压能力，且最低限度必须能承担 1.0Mpa。
Water pump selected must be able to withstand a working pressure of not lower than 1.0 MPa.

d. 水泵的转速应小于 1500rpm。
Water pump speed shall be less than 1500 rpm.

e. 冷冻水泵、冷却水泵均应为离心式，且应根据流量的不同进行选择，具体如下：
Centrifugal pumps shall be used for the Chilled water and condenser water systems. The types of centrifugal pumps selected shall base on the design water flow rate of the system as follows:

f. 单台水泵流量大于等于 250m3/h,应采用卧式双吸泵；
Horizontal or vertical split case pump shall be used for water flow rate 250m3/h and above.

g. 单台水泵流量流量小于 250m3/h, 可采用卧式端吸泵；
End suction pump shall be used for flow rate lower than 250m3/h.

h. 单台水泵流量小于 75m^3/h 可采用立式多级离心泵。
High-pressure multi-stage centrifugal pump shall be used for flow rate less than 75m3/h.

i. 水泵耗功率应满足国家和地方节能标准的要求。
Water pump power consumption shall comply with National and Local Energy Efficient Standards.

9. 免费制冷系统
Free Cooling System

a. 应为酒店冷冻水侧提供冷却塔免费制冷系统。
Heat exchanger shall be provided for heat exchange between the condenser

water side and chilled water side to facilitate free cooling via the operation of the cooling tower during cold climate.

10. 厨房水冷冷库冷却塔
Cooling Tower for Kitchen Water-Cooled Cold Room Refrigeration System

a. 为满足厨房冷库、制冰间设备的散热需求，应设计独立的厨房冷却水系统。冷却水由独立闭式冷却塔系统承担，不得与空调冷却塔系统合用，且应设置备用冷却塔，并将冷却塔及厨房冷却水系统其他设备接入备用电源。
In order to meet the heat dissipation requirement of the kitchen water-cooled cold room refrigeration system, dedicated cooling tower and condenser water system shall be provided. Closed loop cooling tower and condenser water system shall be used and shall not be shared with the air-conditioning refrigeration plant. Back-up cooling tower must also be provided to ensure continuous operation of the system during maintenance or breakdown of one of the equipment. Emergency power supply must also be connected to the power distribution system of the cooling tower and condenser water system to ensure continuous power supply during power failure.

b. 严寒地区厨房冷库应采用风冷方式。
Air cooled cold room refrigeration system shall be used in extreme cold climate regions.

5.3.2. 热水系统
Hot water system

A. 供暖系统由热源、热水泵、热水环路及末端供暖设备组成。供暖系统的设计直接影响到冬季室内舒适度。
The air-conditioning heating system shall consist of the heat source, hot water circulation pump, hot water distribution network and terminal devices. The design of the system is critical in determining indoor comfort of the property and therefore must be exercised with due diligence to meet the requirement stipluated in this section.

B. 负荷计算
Heating Load Calculation

1. 酒店总热负荷应包括以下各项：
Total heat load for hotel shall include the items listed below:

a. 空调、采暖热负荷；
Air-conditioning and heating load of the building.

b. 通风热负荷；
Heat load due to heating of ventilation outdoor air.

c. 空调加湿负荷；
Heat load due to Humidification.

d. 生活热水热负荷；
Heat load due to Domestic Hot Water Heating.

e. 泳池池水加热负荷；
Heat load due to swimming pool water heating

f. 洗衣房蒸汽负荷；
Heat load due to generation of steam for laundry.

2. 酒店热源应满足酒店所有热负荷的要求，并应考虑备用。上述热负荷的峰值并不会在同一时刻出现，酒店热负荷应根据项目的实际负荷需求考虑适当的同时使用系数。
The heating source provided for the hotel shall be able to meet all heating requirement stated above with consideration of adequate back up. The peak demand for the above provisions does not occur simultaneously and therefore appropriate diversity factor must be considered when sizing the plant.

C. 热源选择
Heat Source Selection

1. 供暖热源可选用锅炉、市政热水、市政蒸汽。经技术经济分析后，且经希尔顿全球同意后方可采用其他形式热源，如热泵、太阳能等，不宜采用溴化锂直燃机组。
Boiler, municipal hot water and municipal steam can be considered as the heat source for the heating system. Other heat sources such as heat pump and solar thermal energy could also be considered but must be submitted with adequate feasibility study report to Hilton Worldwide for approval. No absorption chiller is permitted when direct fuel supply to drive the equipment is required.

2. 有市政热源时：
Where municipal heat source is available:

a. 当采用市政热源时，应对市政热源的稳定性进行评估，并设置燃气锅炉作为备用热源。备用热源应至少满足 75%的供暖热负荷、70%生活热水负荷 70%洗衣房蒸汽热负荷的总量。
When municipal heat source is available, reliability and stability of the system must be evaluated. When municipal heat source is adopted, back up gas-fired boiler must still be provided. The backup boiler must be able to provide up to 75% of the space heating load, 70% of the domestic hot water heating load and 70% of the steam heating load for laundry.

b. 当市政热源为蒸汽时，宜采用蒸汽锅炉作为项目备用热源；
When municipal steam supply is available, back up steam boiler shall be provided.

c. 当市政热源为热水时，宜采用热水锅炉作为项目备用热源。
When municipal hot water heat supply is available, back up hot water boiler shall be provided.

3. 无市政热源时：
Where no municipal heat source is available:

a. 采用锅炉为热源，应选用燃气/燃油两用锅炉。供暖、生活热水锅炉应优先选用热水锅炉，容量应能同时满足冬季峰值热负荷及所生活热水负荷的需求，锅炉台数不少于两台，并能保证当一台锅炉故障检修时，其余锅炉可承 75%的供暖热负荷、及 100%生活热水负荷及 100%洗衣房蒸汽热负荷的总量。
Gas/oil fired dual fuel boiler shall be used as the heat source for the heating required by the hotel. Hot water boiler shall be considered with priority for use in providing the necessary heating. The boilers shall be sized to meet the peak

demand for space heating and domestic hot water heating. At least two numbers of boilers shall be provided to ensure continuous operation of at least one boiler in the event when one of them breakdowns or under maintenance, to support 75% of the space heating load, 100% of the domestic hot water heating and 100% steam heating load for laundry.

4. 当洗衣房蒸汽、加湿蒸汽需求量占洗衣房蒸汽、加湿蒸汽及供暖、生活热水用热等蒸汽需求总量的百分比大于 70%，且供暖、生活热水负荷值小于等于 1.4MW 时，可考虑采用蒸汽锅炉。
When the quantity of steam required for laundry and humidification is more than 70% of the total steam required for laundry, humidification, space heating and domestic water heating, and that the space heating load and domestic water heating load is less than 1.4 MW, steam boiler can be considered and applied for the property.

5. 洗衣房蒸汽、蒸汽加湿系统由蒸汽锅炉供给。
Steam required for laundry and humidification shall be supplied directly by the steam boiler.

6. 对于无市政热源和市政燃气的地区，可考虑采用水源热泵或地源热泵系统、别墅型酒店可考虑采用风冷热泵系统，并应向希尔顿全球技术服务部提交相关的径流水文资料、地下水位资料、减噪措施、冬季制冷效率及备用热源措施、水温稳定措施等资料进行审核。
Water source or ground source heat pump system can be considered for areas where no municipal heat source or gas is available. Air-cooled heat pump system can be used for villa type hotel. All related documents regarding the use of ground/water source and air-cooled heat pump such as feasibility study report, hydrological data, ground water level, noise reduction measures, refrigeration efficiency of equipment in winter, backup heat source and water temperature stabilizing measures, and etc, must be submitted to Hilton Worldwide for verification and approval before application.

D. 热水锅炉
Hot Water Boiler

1. 热水锅炉优先采用承压热水锅炉。
Pressurized hot water boiler system is preferred.

2. 承压热水锅炉应为卧式、三或四回程、湿背式、机械强制通风、水平火管式设计。适合燃烧用于柴油、煤气及天然气三种燃料。
Pressurized hot water boiler shall be horizontally mounted, designed with at least three or four pass, wet-back and forced draft. Fuels such as diesel, town gas and natural gas shall be applicable for the boiler.

3. 热水锅炉在 30%至 100%满载操作时，应保证维持最少 90%的燃烧效率。
Combustion efficiency of the hot water boiler shall be at least 90% when the load is 30% to 100%.

4. 当锅炉房位置受限时或对锅炉房安全性要求较高可考虑采用常压锅炉，但须需事先提交希尔顿全球进行审批。
Normal pressure boiler shall only be used when there is constraint in its location or

requirement for high safety standards. The proposal to use normal pressure boiler must be submitted to Hilton Worldwide for review and final approval.

E. 蒸汽锅炉
Steam Boiler

1. 蒸汽锅炉宜为卧式、三或四回程、湿背式、机械强制通风、水平火管式设计。适合燃烧用于柴油、煤气及天然气三种燃料。应保证维持最少 90%的燃烧效率。
Steam boiler shall be horizontally mounted and designed with at least three or four pass, wet-back, forced draft and horizontal fuel-fired. Fuels such as diesel, town gas and natural gas shall be applicable for the boiler. Combustion efficiency of the steam boiler shall be at least 90%.

2. 蒸汽锅炉供洗衣房蒸汽、空调系统蒸汽加湿使用。(注：厨房用蒸汽由厨房蒸汽发生器提供，不采用锅炉蒸汽。)
Steam boiler shall be used to generate steam for laundry and humidification in air-conditioning.(Note: Steam for kitchen application shall be generated by kitchen steam generator and not by the steam boiler)

3. 蒸汽锅炉供汽压力应满足酒店蒸汽需求的最大压力值。
Steam pressure of the boiler must be selected to meet the highest pressure required among the various applications in the hotel.

4. 每台蒸汽锅炉应各自设置两台给水泵，一用一备。蒸汽锅炉水泵不可共用。
Two numbers of water make up pumps for each steam boiler (one duty and one standby) shall be provided. No sharing of the water make up pumps is allowed for the steam boilers.

5. 蒸汽凝结水须回收。
Steam condensates shall be collected and recycled.

F. 锅炉系统附属设备
Boiler System Accessories

1. 热力除氧器
Thermal De-aerator

a. 当单台锅炉容量大于 2.1MW 或 3t/h 时，应设置锅炉热力除氧器。
Thermal de-aerator shall be provided for boiler capacity larger than 2.1MW or 3t/h.

b. 除氧器须能于 3％至 100％中任何负荷正常地运行，并保证能提供含氧量不超于 0.005c.c/升及完全不带二氧化碳之锅炉供给水。
De-aerator shall be able to operate under load conditions between 3% to 100% of its rated capacity and shall provide no more than 0.005 c.c/l of oxygen content and shall not contain any CO_2 content in the supply water.

c. 外壳须以不少于 5mm 之精钢焊接以成。所有与未经除氧之水接触的部分须以不锈钢制成。
The external shell of the boiler shall be constructed of welded steel not less than 5mm thick. All parts in contact with non-aerated water shall be constructed of stainless steel.

d. 除氧器之储存容量须不小于 3000 升且满足 10 分钟储存容量。
De-aerator storage capacity shall not be less than 3000 liter and shall meet the 10 minutes storage capacity requirement.

2. 除氧水箱
De-aerator Water Tank

a. 除氧水箱须由 SUS304 不锈钢制成，其板材厚度须符合或不低于国家现行的规范和标准及尺寸，但不少于 3mm。
De-aerator water tank shall be constructed using SUS304 stainless steel. Thickness of the steel plate used to construct the tank shell shall comply with the minimum requirement stipulated in the latest National Code and must not be less than 3mm.

b. 水箱须固定在热镀锌轨制工字钢（RSJ）架子上并附有必要的热镀锌角钢及支撑件。箱体与支撑之间应有铅板补垫。
The de-aerator water tank shall be reinforced with hot-dipped galvanized I-beam rolled steel joist (RSJ) complete with hot dipped galvanized angle support and other necessary accessories. Lead gasket shall be provided in-between the tank and the supports.

3. 除氧水泵、锅炉给水泵及凝结水水泵
De-aerator Water, Boiler Feed and Condensate Water pumps

a. 水泵的工作压力及工作温度应满足使用工况的要求。
Water pump working pressure and temperature shall comply with the operating conditions requirements.

b. 锅炉给水泵须为不锈钢立式多级离心水泵。循环水泵须为不锈钢立式单级离心水泵。
Vertical multi-stage centrifugal pump of stainless steel construction shall be used for the boiler make up water supply system. Circulate water pump shall be vertical single stage centrifugal stainless steel water pump.

c. 泵和法兰接头设计工作压力最少为 1.0MPa, 但应匹配所选型的锅炉的工作压力。
Design working pressure for pump and flange joints shall be at least 1.0MPa and shall match with working pressure of the selected boiler.

G. 燃料选择
Fuel Selection

1. 锅炉燃料应以燃气（人工煤气或天然气，具体采用何种燃料应根据项目所在地的燃气供气供应确定）为主要燃料，燃油（0 号柴油）仅作为锅炉的备用燃料。
Gas shall be the main source of fuel for boiler (The usage of town gas or natural gas shall subject to the availability of gas supply at the location of the project). The use of oil (No. 0 diesel) shall be used as backup fuel for the boiler.

2. 但当项目所在地无市政燃气供时，可将燃油作为锅炉的主要燃料，但考虑市政燃气的未来供应，锅炉仍需油气两用型，并预留燃气调压间等机房。
Where municipal gas supply is not available, oil could be used as the main source of fuel, but the boiler provided shall still be dual fuel (oil/gas) fired type. Pressure regulating station shall also be provided for future connection when municipal gas supply is available.

H. 燃料储存
Fuel Storage

1. 当以燃气作为主燃料时，燃油储油罐的容量应不低于酒店锅炉运行 48h 的锅炉燃油总量，并应满足国家和地方相关规范要求；
When gas is used as the main source of fuel, fuel tank capacity for storage of oil or diesel shall not be less than 48 hours of fuel consumption by the boiler and all provisions and installations shall comply with National and Local Authority Codes requirement.

2. 当以燃油作为锅炉主燃料时，燃油储油罐的容量应不低于酒店锅炉运行 24h 的锅炉燃油总量，并应满足国家和地方相关规范要求；
When oil or diesel is used as the main source fuel, fuel tank capacity for storage of oil or diesel shall not be less than 24 hours of fuel consumption by the boiler and all provisions and installations shall comply with National and Local Authority Codes requirement.

3. 当项目所在地有可靠及时的燃油来源时，燃油量可根据实际情况适当的降低储油时间，但必须经过希尔顿全球的同意。
When fuel supply at the location of the property is reliable and prompt, the fuel storage capacity could be reduced but shall subject to the review and final approval by Hilton Worldwide.

I. 锅炉烟道
Boiler Flue

1. 锅炉烟道应采用预制双层不锈钢烟囱 (亦适用于发电机烟囱)。
The boiler chimney shall be of pre-fabricated stainless steel double wall type (this specification is also applicable to the generator chimney).

2. 整个水平及垂直的排烟管道须加以隔热和保温材料，排烟管须采用厚度不小于 50mm 的玻璃纤维棉或矿岩棉作保温， 外加金属网和用铝带固定，再以铝片作外壳保护。
The entire horizontal and vertical flue exhaust ductwork shall be provided with adequate fiberglass or rock wool thermal insulation with thickness not less than 50mm. The thermal insulation shall be constructed complete with steel netting secured using aluminum strap and protected by a layer aluminum sheet.

3. 钢制排烟管在进行保温前，须先彻底清除表面的锈渍和油污，然后涂上两层耐高温（600℃）的防锈银灰光漆。
Steel constructed exhaust flue pipe shall be thoroughly cleaned and degreased to ensure that its surface is free from oil and dirt, and subsequently painted with two coating of high temperature resistant (600°C) anti-rust paint before thermal insulation is applied.

4. 排烟管道所采用的保温材料，须适合在高温下使用，而保温材料的密度须为不小于 48 kg/m3，导热系数在 280℃ 时为 8.07 x 10-2 W/m° K。
Thermal insulation used shall be suitable for use in high temperature environment with density not less than 48 kg/m³ and thermal conductivity of 0.0807 W/m°K at 280°C.

5. 设计单位应对烟囱抽力进行计算，当烟囱抽力不足时，应由锅炉厂家提高燃烧机组和炉膛的燃烧正压，满足排放要求。
The Local Design Institute shall calculate the chimney buoyancy draft based on the design to make sure the fume could be discharged effectively. When buoyancy effect of the boiler

selected is inadequate to discharge the fume, the boiler manufactured shall takes measures to enhance the furnace pressure to achieve the discharge requirement.

J. 供暖末端的设置
Heating Terminal units

1. 酒店应设置采暖系统，采暖末端系统一般由风机盘管、新风机组和空调机组组成。
Space heating system, consisting of fan coil units, outdoor air handling unit and air handling unit, shall be provided for the hotel.

2. 设置采暖的酒店泳池区、泳池更衣室应设置低温热水地板辐射采暖。
Radiant heating via the use of low temperature hot water floor heating system shall be provided for hotel swimming pool areas and changing room.

3. 寒冷、严寒地区除设置四管制空调末端外，仍需满足以下要求：
For locations experiencing cold climate, 4 pipes system shall be provided for all terminal units and shall meet the following requirement:

4. 客房及有外窗的卫生间应设置散热器采暖或设置低温热水地板辐射采暖；
Radiant heating via the use of radiator or low temperature hot water floor heating system shall be provided for guestroom and toilets with external windows.

5. 全日餐厅、大堂区、入口门厅等靠外窗、外门墙区应设局部低温热水地板辐射采暖，保证客人舒适性；
Low temperature hot water floor heating shall be also be provided at All Day Dinning, hotel lobby, entrance lobby and areas near to external windows and entrances to ensure guests' comfort.

6. 疏散楼梯间冬季应保证不低于 5℃；客房及后勤楼梯间不应低于 15℃；车库出入口应设置热风幕系统或采取其他措施，防止车库内消防管道发生冻裂。
Escape staircases during winter shall maintain at a temperature of not lower than 5°C; while guestroom and back-of-house staircases shall maintain at a temperature not lower than 15°C. Car-park entrances/exits shall be fitted with hot air curtain or other measures to prevent damage of firewater pipes in the car-park due to freezing.

K. 热水管路系统
Hot Water Pipeline System

1. 空调、采暖热水系统应根据经济可行性分析确定采用定流量或变流量系统。变流量系统中水泵应设变频器。
Feasibility study must be carried out when determining the application of constant flow or variable flow system for the air-conditioning and space heating hot water distribution system.

2. 热水泵的其他要求与冷冻水泵、冷却水泵相同，详见：5.1.2.4；
The provision and requirement of hot water pump is similar to the chilled water and condenser water pumps. Refer to section 5.1.2.4 for detail.

3. 空调热水的供水温度一般应设计为 60℃，不应低于 50℃；供回水温差一般为 10-15℃；

The supply/return hot water temperature for air-conditioning system shall generally be 60°C/50°C. When other hot water temperature is proposed, it shall not be lower than 50°C and temperature difference between the supply and return water shall range from 10 to 15°C.

4. 散热器热水系统供水温度一般为 80℃，供回水温差为 20-25℃；
   The supply hot water temperature for radiator heating shall generally be 80°C and temperature difference between the supply and return water shall range from 20 to 25°C.

5. 非客房区低温热水地板辐射采暖的供水温度不超过 60℃；客房区地面辐射采暖的供水温度宜不超过 50℃；
   The hot water temperature for low temperature how water (LTHW) floor heating system shall not exceed 60°C and 50°C for non-guestroom and guestroom areas respectively.

6. 锅炉水系统应设置中央软水机组；供暖热水系统应设置自动水处理装置。
   Central water softener must be provided for the boiler make up water system. Automatic water treatment system shall also be provided for the heating hot water distribution system.

L. 蒸汽管路系统
   Steam Pipeline System

1. 蒸汽压力
   Steam Pressure

   a. 酒店蒸汽系统均属于高压蒸汽系统蒸汽锅炉提供蒸汽压力应满足其服务的各系统最大压力需求。
      Steam pressure of the boiler selected must meet the highest steam pressure required among the various applications in the hotel.

   b. 各系统设备所需蒸汽压力详见下表：
      The steam pressures required by the various applications in the hotel are illustrated in the table below:

表 5-11 蒸汽管路压力

Table 5-11 Steam Pipeline Pressure o

设备类型 **Equipment Type**	**蒸汽压力要求** **Steam Pressure Requirement**
板式换热器、容积式换热器 Plate Heat Exchanger / Calorifier	0.2~0.4 MPa
干蒸汽加湿器 Dry Steam Humidifier	0.2~0.3 MPa
洗衣房平烫机 Ironer or Ironing Machine in Laundry Room	0.8 MPa
洗衣脱水机、烘干机 Hydro Extractor and Dryer in Laundry Room	0.4~0.6 MPa
洗衣房其它设备（万能夹机、去渍台、熨烫台、人像机、干洗机等） Other Equipment in Laundry Room	0.4~0.6 MPa

(Universal Ironers, Scouring Station, Ironing Station, Finish-Ironing Machine and Dry Washing Machine, etc)	

注：

Note:

① 洗衣房设备的蒸汽压力要求应以最终选定的洗衣设备要求为准；
Steam pressure for laundry equipment shall be determined based on final selection.

② 为保证厨房蒸汽的洁净度，厨房用蒸汽由厨房蒸汽发生器提供，不采用锅炉蒸汽。
Steam generator shall be used for generation of steam for kitchen usage in order to maintain cleanness of the steam supplied. Steam generated and supplied by boiler is not allowed for use in Kitchen.

2. 蒸汽管路附属设备
Steam Pipeline Accessories

a. 蒸汽系统中的关断用阀门应采用波纹管密封截止阀；凝结水系统中的关断用阀门采用截止阀。
The type of valve to be used in the steam system for the purpose of on/off control shall be bellows sealed stop valve. Stop valve shall also be used for on/off control of the condensate water system.

b. 每个蒸汽设备的供蒸汽管上均应设计安装破真空器，可以有效保护设备在蒸汽冷凝时不会处于真空状态。破真空器的阀座和阀体均应为不锈钢。
The supply pipeline of all steam equipment must be provided with vacuum breaker, to protect the system or equipment against vacuum when condensation of steam occurs. The vacuum breaker valve seat and body shall be of stainless steel construction.

3. 疏水阀及疏水阀组
Steam Trap & Associated Valve Assembly

a. 蒸汽系统采用热力式排气阀，用以排除系统中的空气和不凝性气体。蒸汽管路中疏水阀及疏水器阀组应满足以下要求：
Air vents & air eliminators shall be provided in the steam system to allow venting of air and non-condensable gases in the system. Steam trap assemblies provided in the steam pipelines shall meet the following requirements:

b. 所有蒸汽系统分汽缸、立管底部、管道最低点、每隔 30~40m 的蒸汽横管、用汽设备及汽水分离器等须设水疏阀组。疏水阀进口须设过滤器，出口设观视镜。疏水阀组分类及选择如下：
All distribution headers of the steam system, lowest point of vertical pipe stack and pipelines, every 30 to 40m intervals of horizontal steam pipes, steam usage equipment, steam-water separators and etc, must be provided steam traps. Inlet and outlet of all steam traps must be provided with strainers and sight glass respective. The type of steam trap to be used at different applications shall be as follows:

1. 疏水阀分为：浮球式疏水阀（FT）和 热动力型疏水阀（TD）；
Steam trap can be categorized as ball float stream type (FT) and thermodynamic steam trap (TD).

2. 浮球式疏水阀（FT）：内置热静力型排气阀。阀体为球墨铸铁，阀芯、自动排气装置及浮球均为不锈钢；
   The ball float steam trap shall be provided with internal thermostatic air vent for prompt removal of large condensate loads from steam systems. The ball float (FT) steam trap is constructed of ductile iron body with stainless steel working internals including spool valve, ball float and automatic air venting facility.

3. 热动力型疏水阀（TD）：阀体、阀片、阀座和阀帽均为不锈钢；
   The body and cap of the thermodynamic steam trap (TD) shall be of stainless steel construction.

4. 对于不同用汽设备，疏水阀的选择：
   Steam trap selection for different application shall be as follows:

表 5-12 蒸汽管道：

Table 5-12 Steam Pipeline:

分汽缸 Distribution Header	汽水分离器 Steam-water Separator	水平管道 Horizontal Pipes	蒸汽立管 Steam vertical Pipe	蒸汽管最低处 Lowest Point of Steam pipe works	管道末端 Pipe Terminals
FT	FT	TD	TD	TD	TD+热静力型排气阀 TD+Thermostatic air vent

表 5-13 加热/换热器

Table 5-13 Heater and Heat exchanger

汽/水换热器 Steam/Water Heat Exchanger	单元式加热器 Cell Type Heater	蒸汽盘管 Steam Coil
FT	FT	FT

表 5-14 洗衣房设备

Table 5-14 Laundry Equipment:

烫衣机 Finish-Irone machine	烫平机 Ironed machine	滚筒式烘干机 Drum Type Dryer	干洗机 Dry Washing Machine	修整台 Preparation Station
FT	TD	FT	FT	FT

4. 干蒸汽加湿器：
   Dry Steam Humidifier:

   a. 为干蒸汽加湿器提供浮球式疏水阀（FT）。
      Dry steam humidifier shall be provided with ball float steam trap (FT).

   b. 疏水器阀组：包含截止阀→过滤器（20 目）→疏水阀→观视镜→止回阀→截止阀及旁通管等其他附件。

Steam trap assembly shall consist of stop valve→ strainer (20 pores) → Steam Trap → sight glass → check valve → stop valve, bypass pipes and other necessary accessories.

c. 止回阀：50mm 及以下口径采用黄铜阀体，丝扣连接；50mm 以上口径采用铸铁阀体，法兰连接。
Body material of check valve with diameter 50mm and smaller shall be constructed of brass with screwed connection. Body material for those with diameter above 50mm shall be constructed of cast iron with flanged connection.

d. 观视镜：本体为炮铜，可抵受不少于 3.5MPa 的压力，镜面玻璃可配换。25mm 或以下为单窗式，32mm 以上为双窗式。
Body material of sight glass shall be constructed of gun brass and must be able to withstand working pressure up to 3.5 MPa. The mirror glass provided shall be replaceable. Sight glass of size 25mm and smaller shall be provided with single layer of glass while those above 32mm shall be provided with double layer of glass.

e. 疏水阀的选型：根据排水量、阀后余压选择疏水阀规格。疏水阀的排水能力应该不小于用汽设备排水量的 3 倍。
Steam trap selection shall also base on the quantity of condensate to be discharged and its residual pressure. The discharge capacity of the steam trap shall not be less than 3 times that of the equipment water discharge capacity.

5. 减压阀及减压阀组：
Pressure Reducing Valve & Pressure reducing Station:

a. 减压阀的选型：不可以由上下游的管径来决定其口径，而必须依据上下游压力，和最大流量来选择口径；
Size of pressure reducing valve shall be determined by the upstream and downstream pressure of the pipeline and also by its maximum flow rate instead of being determined merely by the pipe diameter.

b. 蒸汽系统中的减压阀：采用导阀型隔膜减压阀。球墨铸铁阀体，不锈钢阀座及阀芯。阀身辅助控制阀设有接驳口供接驳压力感应管，下游压力通过压力感应管反馈至辅助控制阀，并控制主阀的开度以调节下游侧的压力。在无负载的情况下，减压阀可做到完全关闭。
Pilot operated diaphragm pressure reducing valve shall be used in the steam system. The body material shall be constructed of ductile iron. The vale seats and spool shall be constructed of stainless steel. The control valve in the main valve body shall be provided with a union for installation of pressure sensing pipe. Downstream pressure is sensed by the pressure sensing pipe and the fluctuation in the pressure is feedback to the control valve which in turn controls the opening of the main valve and regulates the pressure at the downstream. At no load condition, the pressure-reducing valve shall be fully closed.

c. 供应生活热水系统和空调热水系统的减压阀需要“大小搭配，并联运行”，小号减压阀需要满足系统的最小流量要求。
Pressure reducing valve for domestic hot water and air-conditioning hot water systems shall be provided with two pressure-reducing valves of different capacity, one being larger than the other, and arranged in parallel. The smaller pressure-reducing valve shall be designed to allow minimum flow through the system.

d. 减压阀组：包含汽水分离器（及其疏水阀组）→截止阀→蒸汽过滤器（100目）→减压阀→安全阀→截止阀，及压力表等附件。
The pressure reducing valve station shall consist of separator, upstream stop valve, strainer, upstream pressure gauge, pressure reducing valve, safety valve, downstream pressure gauge and downstream stop valve.

e. 汽水分离器：为障板型，本体为铸铁，法兰接口，而 32mm 或以下，可为丝扣连接。
The separator used for removal of entrained liquid in steam shall be baffle type with flanged connection and of cast iron construction. Screwed connection shall be provided for separator size 32mm and smaller.

f. 安全阀：球墨铸铁阀体，全行程法兰连接。其设定的压力必须在设备运行的最大许可压力范围内，并与正常的运行压力间有足够的压差，以防止安全阀频繁动作。安全阀在选形时应保证其在设定压力下通过减压阀所能流过的最大流量。安全阀必须设置通气管/泄压管，通气管必须接至对人员安全处。
Full lift flanged safety valve shall be used in the steam and hot water system. Valve body of safety valve shall be of ductile iron construction. The set pressure of the safety valve must be sized within the ranged of the maximum allowable pressure in the system and provided with sufficient allowance for the pressure differential with the normal operating pressure to prevent its frequent operation. When used in a pressure reducing station, the safety valve must be sized to allow maximum flow through the pressure-reducing valve at its set pressure. Safety valve shall be fitted with vent pipe and pressure relief pipe and must be discharged at a location non-hazardous and safe to the occupants.

6. 控制阀：
Control Valve:

a. 空调热水系统中板式换热器蒸汽侧的温度调节阀：采用电动调节阀，调节精度±1℃。
The control valve at the steam side of the plate heat exchanger for air-conditioning hot water system shall be electrically actuated with accuracy of ±1°C.

b. 生活热水系统中板式换热器蒸汽侧的温度调节阀：采用自立式调节阀，调节精度±3℃。
he control valve at the steam side of the plate heat exchanger for domestic hot water system shall be self-acting type with accuracy of ±3°C.

c. 控制阀的选型：根据蒸汽进口压力、阀前后压差和蒸汽流量计算 Kv 值，再根据 Kv 值选择阀门规格。
The selection of control valve shall be based on the Kv value, which is calculated and determined from steam inlet pressure, pressure differential across the valve and steam flow rate. Using the Kv value calculated, the control valve could be selected from the published catalogue.

7. 蒸汽计量：
Metering of Steam Consumption：

a. 应在以下区域或系统设置蒸汽计量表：游泳池、洗衣房、生活热交换机房、空调热交换机房、空调加湿。
Steam meter shall be provided at swimming pool, laundry room, and domestic

hot water heat exchanger room, air-conditioning heat exchanger room and humidifier where steam is being consumed.

5.3.3. 通风系统
Ventilation Systems

A. 空调、通风系统应根据使用时间、使用功能、室内参数要求、空气洁净度标准及噪声标准的要求来划分系统。
Air-conditioning and ventilation system shall be provided according to the time and function, indoor conditions, air quality and noise level requirements of the application.

B. 酒店内每个单独的功能分区都应设置独立末端的空调系统，以保证各功能分区间的空调系统独立使用，这样不仅可以避免能源的浪费（当一个区域停止使用时，即可关闭为其服务的空调系统），而且可缩小当某个空调系统的设备出现故障时所影响的使用范围。空调通风系统包括空调新风系统、回风系统及排风系统。酒店各独立房间均能独立控制室温，所有温控器均应与室内设计师协调确定位置。
Each functional areas of the hotel shall be provided with dedicated air-conditioning terminal units. This is to ensure that the air-conditioning system of each functional areas could be operated independently and avoid wastage in energy consumptiion by switching off the associated air-conditioning when the area is not in use. This will also reduce the extent of areas affected by a faulty air-conditioning system. The air-conditioning and ventilation system (or air distribution system) shall consist of outdoor air, return air and exhaust air systems. Each hotel guestrooms shall be provided with localize temperature control in which the location of the thermostat shall be coordinated with the interior designer.

C. 酒店前勤区域（FOH）的风机盘管温控器放置于隐蔽的位置或接入 BA 控制。
Thermostats for fan coil units of FOH shall be concealed or controlled by Building automation (BA) System.

D. 为保证冬季各功能区及客房的湿度要求，应根据项目实际需要设置空调加湿系统，加湿方式宜采用蒸汽加湿，当无蒸汽源时，宜采用高压微雾气加湿；不允许采用湿膜加湿。
In order to ensure that the humidity level of each functional areas and guestrooms are achieved according to the specified requirement during winter, steam humidification system shall be provided. When steam is not available, high pressure micro mist shall be used. Wetted media (membrane type) humidifier is prohibited.

E. 所有风机盘管加新风系统中的新风机组应将室外新风处理至室内空气等焓状态。
Both sensible and latent loads of outdoor air supplied to fan coil units must be treated by Pre-Air Handling unit.

F. 所有组合式空调机组不允许吊顶安装。
Suspended air-handling unit is not allowed for installation in the hotel.

G. 空调通风系统新排风量的要求详见 5.1.2.2。
Outdoor and exhaust air quantities required for the air-conditioning and ventilation system shall be in as per Section 5.1.2.2.

H. 各区域空调通风系统具体要求如下：
The specific air-condition and ventilation requirement for the various areas shall be as follows:

1. 大堂
   Main Lobby

   a. 设置一次回风空气处理系统（机组设备应带变频控制器）。可根据室外空气焓值确定是否采用全新风运行。
   Conditioned air comprises of mixture of return and outdoor air shall be supplied to the space via air-handling unit and air distribution system. Variable frequency drive shall be provided for the supply fan of the air-handling unit for variable air volume control. Outdoor ambient enthalpy shall be measured to determine the activation of once through outdoor air system. Outdoor and exhaust air ducts must be adequately sized based on the supply air quantity to the space to facilitate the application of once through system.

   b. 空调回风口或回风总管设置 CO2 浓度探测装置，根据 CO2 浓度调节系统新风量，以满足室内空气品质及节能需求。
   CO_2 sensor shall be installed at return air grille or main return duct to regulate outdoor air intake into the space to meet both the objectives of indoor air quality and reducing energy consumption.

   c. 大堂应设置独立变频排风机（或采用双风机空气处理机组），并与新风阀或 CO2 浓度探测装置连锁，以满足大堂新风变化及全新风运行的需求。
   Dedicated variable speed exhaust air fan (or dual fans air handling unit) shall be provided for the main lobby. It shall also be linked to the outdoor air damper or CO_2 sensor, to regulate the exhaust air volume to match changes in demand for outdoor air in the main lobby, pressurization requirement and operation of the once through system.

2. 大堂吧
   Lobby Lounge

   a. 设置一次回风空气处理系统（机组设备应带变频控制器）。可根据室外空气焓值确定是否采用全新风运行。
   Conditioned air comprises of mixture of return and outdoor air shall be supplied to the space via air-handling unit and air distribution system. Variable frequency drive shall be provided for the supply fan of the air-handling unit for variable air volume control. Outdoor ambient enthalpy shall be measured to determine the activation of once through outdoor air system. Outdoor and exhaust air ducts must be adequately sized based on the supply air quantity to the space to facilitate the application of once through system. Appropriate control dampers shall be provided to facilitate such operation.

   b. 空调回风口或回风总管设置 CO2 浓度探测装置，根据 CO2 浓度调节系统新风量，以满足室内空气品质及节能需求。
   CO_2 sensor shall be installed at return air grille or main return duct to regulate outdoor air intake into the space to meet both the objectives of indoor air quality and reducing energy consumption.

   c. 大堂吧应设置独立变频排风机（或采用双风机空气处理机组），并与新风阀或 CO2 浓度探测装置连锁，以满足大堂吧人员密度波动时的新风变化及全新风运行的需求。
   Dedicated variable speed exhaust air fan (or dual fans air handling unit) shall be provided for the lobby lounge. It shall also be linked to the outdoor air damper or CO_2 sensor to regulate the exhaust air volume to match changes in demand for outdoor air due to fluctuation in occupancy, pressurization requirement and

operation of once through system. Appropriate control dampers shall be provided to facilitate such operation.

3. 大堂其他功能房
   Other Functional Rooms in Main Lobby

   a. 大堂办公、大堂商店、行李房等独立房间设置风机盘管加新风系统。并提供相应的机械排风系统。
      Individual room such as office, retails and luggage room at main lobby shall be provided with fan coil units with outdoor air and associated exhaust air systems.

4. 全日餐厅、特色餐厅、中餐厅
   All Day Dinning, Specialty and Chinese Restaurant

   a. 全日餐厅、特色餐厅等大空间用餐区域应设置独立的定风量全空气处理系统（机组设备应带变频控制器）。可根据室外空气焓值确定是否采用全新风运行。
      Dedicated constant volume air handling system shall be provided for all day dinning and special restaurant. Variable frequency drive shall also be provided for the supply air fans of the air-handling unit though the system is CAV in order to facilitate adjustment of air quantity when required. Outdoor ambient enthalpy shall be measured to determine the activation of once through outdoor air system. Outdoor and exhaust air ducts must be adequately sized based on the supply air quantity to the space to facilitate the application of once through system.

   b. 空调回风口或回风总管设置 CO2 浓度探测装置，根据 CO2 浓度调节系统新风量，以满足室内空气品质及节能需求。
      CO_2 sensor shall be installed at return air grille or main return duct to regulate outdoor air intake into the space to meet both the objectives of indoor air quality and reducing energy consumption.

   c. 餐厅区应设置独立变频排风机（或采用双风机空气处理机组）与新风阀或 CO2 浓度探测装置连锁，以满足餐厅区人员密度波动时的新风变化及全新风运行的需求。
      Dedicated variable speed exhaust air fan (or dual fans air handling unit) shall be provided for the restaurant areas. It shall also be linked to the outdoor air damper or CO_2 sensor to regulate the exhaust air volume to match changes in demand for outdoor air in the restaurant due to fluctuation in occupancy, pressurizaion requirement and operation of once through system.

   d. 全日餐厅、特色餐厅及中餐厅空气处理机组最好设置活性炭过滤器。
      Activated carbon filter shall be provided for air handling units serving all day dinning, Specialty and Chinese restaurants.

5. 餐厅包房
   Restaurant Private Room

   a. 包房内设置风机盘管加新风系统，包房及包房卫生间设置相应的排风系统，包房排风量由包房内排风及卫生间排风共同承担。
      Fan coil unit supplied with treated outdoor air shall be provided for restaurant private rooms. Exhaust air system shall also be provided for the private room and toilet attached. The exhaust air quantity required to maintain negative

pressurization for the private room may include the exhausts from private room and toilet.

6. 宴会厅及宴会前厅
   Banquet Hall and Pre-function Hall

   a. 分别设置空气处理系统（机组设备应带变频控制器）。可根据室外空气焓值确定是否采用全新风运行。
   Air-handling units shall be provided for banquet and pre-function halls respectively. The air-handling unit must be provided with variable frequency drive regardless whether it is a VAV or CAV system. Outdoor ambient enthalpy shall be measured to determine the activation of once through outdoor air system. Outdoor and exhaust air ducts must be adequately sized based on the supply air quantity to the space to facilitate the application of once through system.

   b. 空调回风口或回风总管设置 CO2 浓度探测装置，根据 CO2 浓度调节系统新风量，以满足室内空气品质及节能需求。
   CO_2 sensor shall be installed at return air grille or main return duct to regulate outdoor air intake into the space to meet both the objectives of indoor air quality and reducing energy consumption.

   c. 宴会厅设有活动式隔墙时，应对每个隔断区设置独立的全空气系统。宴会厅为高大空间时应采用上送下回的气流组织，合理设计宴会厅气流组织。
   When the banquet hall is provided with collapsible partition walls, each compartment shall be provided with a dedicated all-air air-handling unit system. When the ceiling height of the banquet hall is high, supply air shall be from the ceiling with low-level return air grille to enhance the airflow and air circulation.

   d. 宴会厅、宴会前厅应分别设置独立变频排风机（或采用双风机空气处理机组），并与新风阀或 CO2 浓度探测装置连锁，以满足室内人员密度波动时的新风变化及全新风运行的需求。
   Dedicated variable speed exhaust air fan (or dual fans air handling unit) shall be provided for the banquet and pre-function hall. It shall also be linked to the outdoor air damper or CO_2 sensor to regulate the exhaust air volume to match changes in demand for outdoor air in the hall due to fluctuation in occupancy, pressurization requirement and operation of once through system.

7. 多功能厅、大会议室（面积超过 200m²）
   Multipurpose Hall and Large Conference Room (Area over 200m²)

   a. 分别设置一次回风空气处理系统（机组设备应带变频控制器）。
   Air-handling units shall be provided for multi-purpose hall and conference room respectively. The air-handling unit must be provided with variable frequency drive regardless whether it is a VAV or CAV system. Outdoor ambient enthalpy shall be measured to determine the activation of once through outdoor air system. Outdoor and exhaust air ducts must be adequately sized based on the supply air quantity to the space to facilitate the application of once through system.

   b. 应分别设置机械排风系统，并满足室内风量平衡要求。
   Exhaust air system shall also be provided adequately to maintain the necessary air balancing and pressurization requirement.

c. 商务中心、小会议室（面积不超过 200m²）、酒店办公等
Business Center, Meeting Room (With area not more than 200m²) and Hotel Office

d. 设置风机盘管加新风系统，并提供相应的排风系统；
Fan coil unit supplied with treated outdoor air and complete with associated exhaust air system shall be provided for the business center, meeting room and offices.

8. 泳池
Swimming Pool

a. 泳池设置专用除湿热泵机组。
Dedicated dehumidification heat pump system shall be provided for the swimming pool. The system shall be a self-contained unit comprising of refrigeration unit, air-conditioning and air-distribution systems.

b. 除湿热泵机组应采用双风机，新风排风保持 1:1.1 的新排风比。通过调节热泵机组新风比，可实现在冬季最小新风量及夏季全新风的不同工况下，依靠室外新风进行有效的泳池除湿及降温，以达到节能的目的。
Dual fans system for supply and exhaust air must be adopted. A ratio of 1:1.1 shall be maintained between the outdoor and exhaust air quantity. The outdoor air quantity must also be modulated to achieve different operation modes for low outdoor air quantity during winter and all outdoor air (once through) during summer, thereby enabling energy saving via the effective control of humidity level and temperature through outdoor air delivered to the swimming pool.

c. 泳池空调系统除满足室内温湿度要求外，还需采取防止围护结构结露的措施。泳池送风口应沿玻璃幕墙及外墙布置。
Besides achieving the indoor temperature and humidity requirement for the swimming pool by the air-conditioning provided, adequate measures such as provision of supply air diffuser near the glass curtain wall, must be considered to prevent condensation on the building envelope.

d. 泳池区还应设置低温地板辐射采暖系统。
Low temperature floor heating system must be used for the swimming pool area such as at the pool deck and the changing rooms.

9. 健身娱乐区
Fitness and Entertainment Area

a. 健身房、美容美发、SPA 包房区、更衣室设置风机盘管加新风系统，并设置相应的机械排风系统。
Fan coil unit supplied with treated outdoor air and complete with associated exhaust air system shall be provided for gymnasium, beauty & hair dressing salon, SPA private room and changing room.

b. 更衣室应设置低温地面辐射采暖系统。
Low temperature floor heating system must be used for changing room.

10. 客房区
Guestroom Area

a. 客房设置风机盘管加新风系统，新风风管应直接送入客房，不允许接入风机 盘管回风箱。客房卫生间设置集中机械排风系统。卫生间内不允许设置吸顶式排风扇。客房内风机盘管宜采用直流无刷超低静音风机盘管。
Fan coil unit supplied with treated outdoor air shall be provided for the guestroom. Outdoor air shall be pre-treated and supplied directly to the guestroom and connection to the fan coil unit's return plenum is prohibited. Guestroom toilets shall be provided with centralized exhaust system and ceiling mounted fan is prohibited. Fan coil unit selected for guestroom shall be brushless DC motor super low noise type.

b. 客房电梯厅设置风机盘管加新风系统。客房走道应设置预处理新风，对于靠外墙、外窗的客房走道设置风机盘管。应对客房楼层进行风量平衡核算，保证客房相对走道、客房卫生间均为正压。
Fan coil unit supplied with treated outdoor air shall be provided for the guestroom floors lift lobbies. Guestroom floors internal corridors shall be provided with pre-treated outdoor air. For corridors that are located near external wall or windows, fan coil units shall be provided instead due to higher cooling/heating load required. Air balancing at the guestroom floors must be calculated to ensure that the guestroom is maintained at positive pressurization relative to the corridor and guestroom toilet.

c. 客房行政酒廊应根据建筑实际情况及空调区域大小设置全空气系统或风机盘管加新风系统。All air air-handling unit system or fan coil unit supplied with treated outdoor air system shall be provided for the executive lounge depending on the building layout and size of the air-conditioned zone.

11. 厨房
Kitchen

a. 厨房设置独立的送排风系统。
Dedicated supply and exhaust air system shall be provided for the kitchen.

b. 厨房工作区应设置岗位送风系统，岗位送风系统应由新风机组承担厨房内的冷热负荷，使厨房维持要求的室内参数，新风机组应设变频器，并与厨房排油烟系统连锁。
Spot-cooling/heating via supply of high flow and high velocity treated outdoor air (by pre-air-handling unit) shall be provided in the kitchen at specific task area, to maintain the required indoor conditions. The supply fan of the pre-air-handling unit shall be provided variable frequency drive and the control shall be interlocked with the kitchen exhaust system.

c. 厨房冷菜间、糕点间需设置风机盘管和其他备用空调。
Kitchen cold dish preparation and dessert preparation rooms shall be provided with fan coil units and back up by other air-conditioning system.

12. 洗衣房
Laundry

a. 洗衣房设置独立的机械送排风系统。
Dedicated mechanical ventilation system consisting of supply and exhaust air shall be provided for the laundry.

b. 洗衣房工作区应设岗位送风系统，岗位送风由新风机组提供。
Spot-cooling/heating via supply of high flow and high velocity treated outdoor

air by pre-air-handling unit shall be provided in the laundry at specific task area, to maintain the required indoor conditions.

13. 卫生间
Toilet

a. 所有公共卫生间均应设置机械排风系统，并利用相邻区域进行自然补风。
All public toilets shall be provided with mechanical ventilation system consisting of exhaust mode only. Make-up air shall be obtained via infiltration from neighboring or adjacent areas.

b. 酒店公共区卫生间、餐厅卫生间、会议区卫生间应设置空调。
Air conditioning system must be provided for all hotel public toilets, F&B toilets and meeting rooms' areas toilets.

14. 垃圾房
Refuse Room

a. 干垃圾房应设置独立的排风和补风系统；
Dedicated mechanical ventilation system consisting of supply and exhaust modes shall be provided for the dry refuse room.

b. 湿垃圾房设置冷库（由厨房顾问配合）。
Wet refuse room shall be provided with cold room (To be advised by kitchen consultant)

c. 除垃圾冷库外的垃圾处理房内应设置分体空调，一用一备。
Other than wet refuse room, all refuse rooms shall be provided with direct expansion split units air conditioning system consisting of 1 duty and 1 standby units.

15. 机房区
Equipment Room

a. 电梯机房应设置分体式空调系统，并设置相应的通风系统。
Direct expansion split units air conditioning systems with associated ventilation system shall be provided for the lift motor rooms.

b. 消控中心应设置分体式空调系统。
Direct expansion split units air conditioning system shall be used for fire command center.

c. IT 机房应设置机房专用空调，一用一备。
Dedicated air conditioning system, one duty and one standby, shall be provided for IT Server room.

d. 变配电室设置机械通风系统，并设置专用空调。
Dedicated air condtioning system with associated mechanical ventilation system shall be provided for the electrical switchroom.

e. 其他机电用房的相关通风要求详见 5.1.2.2。
Refer to Section 5.1.2.2 on the ventilation requirement for other MEP plant rooms.

5.3.4. 管道设计要求
Pipeline Design Requirement

A. 空调冷热水管系统
Air conditioning Chilled and Hot Water Piping System

1. 管道材质及连接方式如下:
Pipe Material and Type of Joints as follows:

表 5-15 空调冷热水管道材质及连接方式

Table5-15 Air conditioning chilled and hot water piping material and connection method

服务系统 System	管道材质 Pipe Material	连接方式 Type of Joint	备注 Remark
冷冻水、冷却水、采暖热水 Chilled Water, Condenser Water and Heating Hot Water	DN80 及以下采用 热镀锌钢管 Hot Dipped Galvanized Steel Pipe for DN80 and below	螺纹连接 Threaded or Screwed Joint	
	DN80 以上采用 无缝钢管 Seamless Steel Pipe for DN80 and above	焊接 Welded Joint	
空调冷凝水管 Air-conditioning Condensate Water Pipe	内外壁热镀锌钢管 Inner and Outer wall Hot Dipped Galvanized Steel Pipe	螺纹连接 Threaded or Screwed Joint	
蒸汽管 /蒸汽凝结水管 Steam Pipe/Steam System Condensate Pipe	无缝钢管 Seamless steel Pipe	法兰或焊接 Flanged or Welded Joint	
地暖热水 Floor Radiant Heating Hot water	PB (聚丁烯管) 带阻氧层 PB (Polybutylene Pipes) with Oxygen Barrier Layer	热熔连接 Thermal Fusion Joint	阻氧层位于管道外侧，主体树脂壁厚不小于 2 mm The oxygen barrier layer is provided at pipe exterior and the matrix resin thickness shall not be less than 2mm
	PE-X（交联聚乙烯管）带阻氧层 PE-X (Cross Linked Polyethylene Pipes) with Oxygen Barrier Layer	专用接头机械连接 Proprietary Mechanical Clamp Connection	
蒸汽管 /蒸汽凝结水管 Steam pipe/ Steam Condensate Pipe	无缝钢管 Seamless steel Pipe	焊接 Welded	
高压微雾加湿管 High Pressure Micro-Mist Humidifier Pipe	无缝不锈钢管焊接 Seamless Stainless Steel Pipe welded	焊接 Welded	

注：上表中管道承压能力并应根据所在系统的工作压力确定。

Note: The pressure rating of the pipes mentioned in the table above shall be selected based on the working pressure of the system.

2. 管道流速
   Pipeline Fluid Flow Velocity

   a. 空调冷热水、蒸汽管的管内介质流速须满足以下要求：
      The average velocity of fluid flow in the pipeline for air-conditioning chilled water and hot water, boiler hot water and steam shall meet the requirement stipulated below:

      1. 管径 50mm 以下，宜流速为 0.6m/s, 最大流速不超过 0.9m/s;
         For pipe diameter below 50mm, water flow velocity in the pipeline shall be 0.6m/s and not exceeding 0.9m/s.

      2. 管径 50mm 至管径 100mm，宜流速为 0.8m/s 最大流速 1.2m/s；
         For pipe diameter from 50mm to 100mm, water flow velocity in the pipeline shall be 0.8m/s and not exceeding 1.2m/s.

      3. 管径 125mm 至管径 200mm，宜流速为 1.1m/s，最大流速 1.5m/s；
         For pipe diameter from 125mm to 200mm, water flow velocity in the pipeline shall be 1.1m/s and not exceeding 1.5m/s.

      4. 管径 250mm 至管径 300mm，宜流速为 1.4m/s，最大流速 2.2m/s；
         For pipe diameter from 255mm to 300mm, water flow velocity in the pipeline shall be 1.4m/s and not exceeding 2.2m/s.

      5. 管径 350mm 及以上，宜流速为 1.8m/s，最大流速 3m/s。
         For pipe diameter from 350mm and above, fluid average velocity in the pipeline shall be 1.8m/s and not exceeding 3m/s.

      6. 蒸汽管道中最不利管道流速应控制在 15-25 m/s；
         Steam flow velocity at the most unfavorable pipeline in the steam piping system shall be limited within 15 - 25m/s

      7. 冷热水管道系统的比摩阻应控制在 200-400Pa/m。
         The friction loss of the chilled water and hot water hydronics system shall be in between 200 - 400 Pa/m of pipe.

3. 管道坡度
   Pipe Gradient

   a. 管道坡度应满足国家及当地规范的相关要求；
      Pipe gradient in the piping system shall comply with the requirement as stipulated in the National and Local codes.

4. 管道保温
   Pipe Insulation

a. 空调冷冻水、冷却水、冷凝水系统保温采用难燃 B1 级且质量不低于一级福乐斯橡塑保温或同等级别保温材料，橡塑保温厚度按下表：
Closed cell elastomeric rubber insulation with Class 1B fire retardant property, shall be used for all chilled, condenser and condensate water systems of appropriate thickness to meet the thermal insulation requirement and prevention of condensation. The quality of the closed cell rubber insulation shall be equivalent if not better than “Armaflex”. The thickness of the closed cell elastomeric rubber insulation shall be as per the table below:

表 5-16 橡塑保温厚度

Table 5-16 Thickness of the closed cell elastomeric rubber insulation

管径(mm) **Pipe Diameter**	**厚度(mm)** **Thickness**
DN25 及以下 DN25 and below	25
DN32-DN50（包括 DN50） DN32-DN50 (including DN50)	28
DN70~DN150 DN70~DN150	32
DN150 以上 Above DN150	36（41，当管道穿越非空调区域时） 36 (41, when the pipes pass through non-air conditioning areas)

注：冷凝水橡塑保温厚度不小于 20mm;

Note: The closed cell elastomeric rubber insulation thickness for condensate water pipe shall not be less than 20mm.

b. 空调、采暖热水保温应采用导热系数不大于 0.037W/m.k 离心玻璃棉，离心玻璃棉厚度应根据国内相关规范的规定选取，但不得小于 40mm。
Fiberglass insulation with thermal conductivity not larger than 0.037 W/m.k shall be used for air-conditioning and heating hot water systems. The minimum thickness of the fiberglass insulation selected shall comply with the requirement stipulated in the relevant National Codes, but shall not be less than 40mm.

c. 所有用于空调水系统的阀门、存水弯、过滤器、法兰和其它配件等应按其连接管道的保温厚度作相同厚度之保温，同时外加以 0.6mm 厚的铝板覆盖保温表面作保护，过滤器的保温须容许于清理过滤器时不会使有关保温材料受破损。阀门的保温须覆盖至阀帽。
All valves, traps, strainers, flanges and other pipe fittings for the hydronics systems shall be provided with the same insulation material and thickness as the pipeline in which they are being connected. Additional aluminum cladding or jacketing of 0.6mm thick shall be installed to provide mechanical protection to the insulation material. Access shall be provided for the insulation/cladding assembly of strainer to facilitate ease of servicing and maintenance without damaging it. The insulation for the valves shall be extended to the valve bonnet.

5. 管道安装
Pipeline Installation

a. 除机械空间外，管道不允许明装。
All pipe works in the hotel shall be concealed and no exposed pipe, except in the plant room and services space, is allowed.

6. 管道阀门
Valve

a. 管道系统的设计应保证在检修时，每次只需关闭一个立管阀门。
Design of the pipeline shall ensure that only one valve is needed to be shut-off at the vertical riser during maintenance.

b. 每套设备均应提供端口球阀和蝶阀进行隔断和关闭服务，不允许采用闸阀。
All equipment or plant must be provided with ball or butterfly valve for purpose of isolation and shut-off. Gate valve is prohibited for this application.

c. 空调水立管与每一层风机盘管供回水支管的连接方式应尽量采用同程设计，为利于风机盘管排气，客房空调水系统宜采用下供上回的形式，供水干管设置在客房的设备层或避难层，客房回水干管设置于最高层设备层（如有）或最高客房层建筑层高须提高至少 700mm 以便设置同程回水管。当同程设计困难时，可采用异程系统，但此时应在各立管与供水干管上设置平衡阀，使管路系统平衡。
Vertical risers of the hydronics system and supply/return pipes of the fan coil units at every floor must be of reverse return design. In order to aid the venting of fan coil units, guestroom room hydronics system shall design with down feed supply and up flow return circuit. The main supply pipe shall be installed at the refuge or equipment floor, while the main return pipe shall be installed at the highest equipment floor (if any) or at the highest guestroom floor with the floor to floor height elevated by 700mm to facilitate installation of the reverse return pipeline. When there is difficulty in implementing reverse return system, direct return system could also be applied with appropriate provision of balancing valves at the risers and main supply pipes to ensure water balancing of the piping system.

d. 平衡阀的设置要求如下：
Balancing valve requirements are as follows:-

1. 设计在风机盘管水系统中，服务地库和裙房的风机盘管水系统水平管道从竖井中的风机盘管主立管接出时，在回水管上安装动态压差平衡阀，同时在供水管上配套安装静态平衡阀。
Automatic balancing valves shall be provided in the hydronic system of fan coil units, especially on the horizontal pipe works branching off immediately from the main risers of those serving the basement and podium. Automatic balancing valves provided shall be installed at the return water pipe. An additional manual balancing valve shall also be required at the supply water pipe.

2. 在冷冻机房集水器的各个回水主管道上、及在裙房从竖井的主立管接出的各层水平支管的供水管上设置静态平衡阀。
Manual balancing valve shall be provided in the main return water pipes to the return header at the chiller plant room. Horizontal pipes branching off immediately from the main risers at every podium floors shall also be provided with manual balancing valves.

B. 风管系统
Air Distribution System

1. 风管管道材质及要求见下表：
Refer to the table below for the duct material and construction requirement of the air-distribution system:

表 5-17 风管管道材质
Table 5-17 Duct material and construction requirement

服务系统 System	管道材质 Duct Material	备注 Remark
厨房区域排油烟风管 Kitchen Hood Exhaust Air Duct	SUS304 级 不锈钢板 Grade SUS304 Stainless Steel Plate	钢板厚度根据风管的直径或长边尺寸确定，但不得小于 0.75mm。排油烟风管的壁厚不得小于 1.2mm。 Steel plate thickness shall depend on the duct dimension but shall not be less than 0.75mm. Kitchen hood exhaust air duct thickness shall not be less than 1.2mm.
锅炉烟囱 Boiler Chimney	SUS304 级 不锈钢板 Grade SUS304 Stainless Steel Plate	内壁 1.2mm 厚 SUS304 不锈钢板+50mm 离心玻璃棉+外壁 0.75mm 厚 SUS304 不锈钢板； Internal and external walls shall be constructed from 1.2mm and 0.75mm thick SUS304 Stainless steel plates respectively complete with 50mm thick fiberglass insulation in between the two layers of steel plate.
柴油发电机烟囱 Diesel Generator Exhaust Duct	SUS304 级 不锈钢板 Grade SUS304 Stainless Steel Plate	内壁 1.2mm 厚 SUS304 不锈钢板+100mm 岩棉+外壁 0.75mm 厚 SUS304 不锈钢板 Internal and external walls shall be constructed from 1.2mm and 0.75mm thick SUS304 Stainless steel plates respectively complete with 100mm thick rock wool insulation in between the two layers of steel plate.
普通通风、空调用风管 厨房全面排风管、送风和补风风管 General Ventilation, Air conditioning Duct, kitchen Exhaust, Supply and Make up Air Ducts	热镀锌钢板 Hot Dipped Galvanized Steel	钢板厚度根据风管的直径或长边尺寸确定，但不得小于 0.50mm。不允许采用土建风道。沿海地区或其他含盐较高的区域，风管须加上适当的涂装。 Thickness of the galvanized steel plate shall depend on the duct dimensions but shall not be less than 0.5mm. Masonry shafts are prohibited from being used as an air duct. Ducts installed at coastal areas or corrosive environment shall be painted with anti-corrosion paint.
消防排烟风管 Smoke Extract Air Duct	热镀锌钢板 Hot Dipped Galvanized Steel	钢板厚度根据风管的直径或长边尺寸确定，但不得小于 0.75mm。 Thickness of the galvanized steel plate shall depend on the duct dimensions but shall not be less than 0.75mm.

注：
Note:

①风管的制作、安装和检验需执行《JGJ14 通风管道技术规程》。
The construction, installation and testing of ductworks shall comply with JGJ141-Technical specification for Ductworks Construction。

②烟囱位于竖井内时，烟囱外壁可采用 0.75mm 厚的热浸镀锌钢　板。烟囱高度超过 30m 时，需要设置必要波纹补偿器。
When the chimney is located in masonry shaft, 0.75 mm thick hot dipped galvanized steel plate can be used for the outer layer. Flexible connector must be provided for chimney when its height exceeds 30m.

③镀锌钢板的镀锌层起到防腐作用，在大气中的保护作用与单位面 积锌层总量成正比。本标准要求双面等厚镀锌，双面锌层重量 275g/ m^2（Z275 或 ASTM G90，相当于单面 19 μm 的锌层厚　度）。当工程位于沿海地区时，因有盐份（氯化物）易形成 ZnCl2，应使用 Z275 再加上适当防腐涂装。
The purpose of the galvanized layer of the galvanized steel plate is for rust resistant. The effect of the protection provided and the area/thickness of the galvanized layer are directly proportional. This standard requires galvanization of equal thickness on both sides of the steel sheet, and the weight of the galvanized layers on both sides shall be 275g/m2 (to Z275 or ASTM G90, equivalent to thickness of 19 μm per layer). When it is installed at coastal areas, the salt content in the environment could lead to formation of ZnCL2 and therefore the application of Z275 must be supplemented and coated with a layer of anti-corrosion paint.

2. 风管保温
   Air Duct Thermal Insulation

   a. 所有的空调送风、回风系统风道均需要保温；
      All air-conditioning supply air and return air duct works shall be provided with thermal insulation of appropriate thickness.

   b. 所有处在室内与外墙新排风百叶接驳的新风管、排风管均需要保温。所有风管保温材料应选用不小于 30mm 半刚性玻璃纤维。
      Fresh air and exhaust air ducts installed within the building and connected to external louvers shall be provided with thermal insulation. Fiberglass shall be used for the duct works insulation application and thickness of the insulation shall not be less than 30mm.

5.4. 技术说明及应用指导
TECHNICAL SPECIFICATION AND APPLICATION GUIDELINE

5.4.1. 风机盘管
Fan Coil Unit

A. 风机盘管主要用于客房、酒店办公室、小会议室、商务中心等区域的供暖、供冷。
Fan coil unit shall mainly be used for heating and cooling of areas such as guestroom, hotel office, small meeting rooms, business centre and etc.

B. 采用四管制水系统的区域，风机盘管应根据功能区所需的冷热量提供制冷盘管及制热盘管，风机盘管选型应按中速参数选取，且设备制冷、制热量应在风机盘管中速时达到要求。
For areas using four-pipe system, fan coil units shall be provided with cooling and heating coil according to the cooling and heating loads requirements of the areas served. The fan coil unit shall be selected base on medium fan speed and its cooling and heating capacity shall be achieved at this speed.

C. 风机应采用双入口、叶片前弯的直接驱动型离心送风机。
The fan of fan coil unit shall be double width, double inlets, direct drive forward curve centrifugal type.

D. 风机盘管过滤器厚度不小于 25mm，其尺寸应和风机盘管相匹配；过滤器应为不燃材料制成，并符合当地消防局的要求。过滤器构造应方便取出。
The fan coil unit shall be provided with pleated panel filter with thickness not less than 25mm. The filter dimensions shall match the fan coil unit and must be constructed from fire resistance material complying with the Local Fire Safety Buearau requirement. Construction of the fan coil unit cabinet shall be such that the filter could be removed easily for cleaning and it is preferred to be on the bottom side. The efficiency of the filter shall not be less than 60%.

E. 风机盘管水管应采用无缝铜管，外配铝制散热翅片。
The fan coil unit water pipe shall be of seamless copper type with external aluminum cooling fins.

F. 风机盘管应有绝热的滴水盘以收集冷冻水盘管的所有冷凝水，包括集水管和弯头。滴水盘内外表面均应涂有防护层，并且应有至少 25mm 的玻璃纤维或橡塑保温。滴水盘须配有一外接头，供接驳排水管，滴水盘排水应带有水泵，以便于冷凝水的排放。
Fan coil unit must be provided with insulated drain pan to collect condensate water from the entire length and width of the cooling coil, including all header bends, valves and fittings at inlet and outlet pipe connections. Both inside and outside surfaces of the drain pan shall be coated with protective epoxy coating and shall be externally insulated with at least 25 mm fiberglass insulation. The drain pan shall be provided with an external outlet for connection of drain pipe and drain pump for discharge of the condensate water collected.

G. 风机盘管的安装需考虑检修和维护的需求。
Maintainance requirements shall be taken into consideration during the intallation of the fan coil unit.

H. 每个风机盘管应配备其自带的独立的电子温控设备，并应有风机的三速调节装置和温度可调开关。温度感应元件应为温控器。
Each fan coil unit shall be provided with its own independent electronic type room thermostat with 3 speeds control, temperature adjustment and on/off switch. Each room thermostat shall also have LCD temperature display in °C and temperature setting facilities, date, time, etc. The thermostat shall be able to support the application of 4 pipes on/off control valve, which can be configured by DIP-switch on the inner side of the controller front panel.

I. 风机盘管出风口与客房送风口的距离宜为 0.5-1.0m。
The distance bewteen the fan coil unit air outlet and guestroom supply air diffuser is recommended to be between 0.5 - 1.0m.

5.4.2. 空气处理机组
Air Handling Unit

A. 空气处理机，一般应包括过滤段、预热段（严寒、寒冷地区）、混合段、冷盘管段、热盘管段、加湿段及风机段。
In general, air-handling unit for use in hotel shall consist of filter section (double filter beds), pre-heat section (for extreme cold weather region), mixing air plenum, cooling coil section, heating coil section, humidification section and fan section.

B. 空气处理机应满足国家规范相关要求。
Air handling unit provided shall be constructed according to the relevant National and Local Codes requirements.

C. 空气处理机组的安装应留有足够的检修及更换设备的空间。
Sufficient space must be provided for the installation of the air-handling unit with due consideration on the operation, maintenance and replacement of the equipment.

D. 空气处理机组不得安装在石膏板或无法进行检修的吊顶内。非客房区设备的服务通道不允许从客房通道经过。
Air-handling unit shall not be allowed to install in plaster board ceiling or within ceiling space that is not accessible for maintenance. Service corridor for equipment at non guestroom area is not allowed to pass through the guestroom corridor.

E. 设备各部件要求如下：
The specifications for the various components of the air-handling unit are as follows:

1. 外壳
Casing & Panel

a. 空气处理机全部箱体板应用厚钢板制作，所有设在室内的机组内部表面应衬不小于 25mm 厚保温材料吸声，设在室外的机组内部表面要衬不小于 50mm 厚保温材料吸声。
The casing of the air-handling unit shall be constructed of galvanized steel of appropriate thickness. Air-handling unit installed indoor shall be provided with thermal break and sound attenuation material between the outer and inner skin with thickness of 25mm, while those installed outdoor shall be 50mm thick.

b. 外壳应用由可拆卸的标准段组合而成，并应提供足够的检修口以方便润滑和维护。外壳箱体应为双层金属板结构，外层与内层应分别用 1.3mm 和 0.8mm 的镀锌钢板组成，中间夹以保温材料。
The casing panels shall be of modular design and constructed of standard sections that could be easily dismantled for maintenance withot affecting the structural integrity of the unit. Adequate access sections shall be provided for ease of maintenance and lubrication of the equipment. Casing shall consist of insulated hollow section frames (cold bridging free), with fully insulated double skinned panels, each skin consisting of best heavy gauge galvanized sheet panel, 1.3mm and 0.8mm thick for the outer and inner skin respectively, reinforced and stiffened where necessary.

风机、盘管、空气过滤器和混合箱应设独立的检修口，每个检修门的尺寸至少为 600mm x 1500mm 或更大以便于大型部件的维修及替换。
Dedicated access sections shall be provided for the fan section, coil sections and mixing plenum. Each access section shall be at least 600mm x 1500mm in dimensions to facilitate replacement of large parts during maintenance.

c. 所有检修口应用氯丁橡胶密封圈密封，并装设重型铰链和插销。
All access section shall be provided with durable rubber seal and heavy duty hinges and bolt.

d. 所有的支架应该有防锈功能，底部支架应为镀锌钢架。
All the supporting brackets, frames and base rail shall be of galvanized steel construction to prevent rust and corrosion.

e. 外壳上所有的衔接点应该是密不透风的，外壳表面不应有冷凝水。
The frame of the casing shall be constructed through self locking mechanism to ensure better air tight cabinet construction. There shall be no gaps between fixed panels and between fixed panel and frame to minimize potential air leak. The panel must be constructed of adequate thickness of insulation material so that no condensation would occur on the outer skin or any parts of the casing.

f. 所有室外机组应设防雨罩。
All air-handling unit installed outdoor must be provided with weather proof shelter.

2. 风机
Fan Section

a. 送风风机应考虑双风机的设置宽度，双进口，多叶片，马达应达到 IP54 标准，F 级绝缘。马达为三角皮带传动，功率应为风机功率的 150％，马达转速必须小于 1500rpm
The supply air fan of the air-handling unit shall be of double width, double inlet, centrifugal type with forward or backward inclined aerofoil blades (depending on the air flow rate). The motor shall be constructed with protection rating of IP54 and Class F insulation. The fan shall be belt driven and shall be designed for not less than 150% of the motor capacity. The speed of the motor must not exceed 1500 rpm. Motor shall also be sized to provide the additional power requirements when the fan is operated to provide an additional 20% the capacity specified.

b. 风量大于 20,000m3/h 的送风机，均采用后倾式叶轮。
For supply air fan with air flow rate larger than 20,000 m3/h air volume, backward curved fan impeller shall be used.

c. 当系统有变风量运行需求时，应配变速变频器。
Variable frequency drive for the fan control system shall be provided when variable air volume system is adopted.

d. 风机需进行静态平衡和动态平衡测试。
Fan shall be statically and dynamically balanced.

3. 冷、热盘管
Cooling and Heating coils Section

a. 冷、热盘管应采用螺旋式翅片或片状式翅片，使用高标准的无缝铜管(管外径 12.7mm 及管壁厚度不少于 0.4mm)与其机械结合并带有联管箱。所有的翅片必须是连续的，每米不超过 400 个。铝制散热翅片的厚度不应小于 0.15mm。
Cooling and heating coils shall be plate fin type with continuous aluminum ripple corrugated fins and staggered cleanable tubes, with not more than 400 fins per meter. Thickness for the aluminium fins shall not be less than 0.15mm. High quality seamless copper tubing (with external diameter of 12.7mm and wall thickness of 0.4mm) shall be used and connection to the header shall be via mechanical joints (screwed for diameter 50mm and below and flanged for above 50mm).

b. 盘管段的设置应能从侧面取出整个盘管。盘管按列设置在钢制的公用支架上，完成装配后，进行镀镉处理。盘管的支架不能超出滴水盘。不同金属不允许接触，应用垫圈或其它防水材料隔离。采用两台盘管的大型机组，在盘管之间应设中间滴水盘，盘的两端设有滴水铜管。滑动框架使盘管可从任何一侧方便取出。
Coil section shall be of the cartridge-type, mounted on galvanized steel frame and non-corrosive aluminum rail for easy extraction from either side of the casing and supported over the entire length of the coil. The steel frame shall be galvanized after it is installed. The supporting frame of the coil shall not extrude beyond the drain pan. Different metal materials shall not be in contact with each other and shall be isolated through the use of rubber pad or other waterproof material. For larger unit with cooling coil divided into two sections, condensate drain pan shall be provided in between. Drain hole shall be provided at both ends of the drain pan to insure condensate drainage.

4. 滴水盘
Condensate Drain Pan

a. 应为空气处理机、风管和外壳里的冷冻盘管提供保温的滴水盘，通过存水弯隔离空气流通，存水弯水封高度不可小于 50mm，而且必须比风机最大静压高出 25mm。
Insulated condensate drain pan shall be provided for cooling coils installed in air-handling unit, ductwork and external casing. Trap with water seal is used to isolate the infiltration of air from the drainage system to the main supply air stream. The water seal shall not be less than 50mm and must be able to withstand maxiumum fan static pressure of 25mm H2O.

b. 滴水盘应为不锈钢板制作，加贴 25mm 聚氨酯泡沫塑料、塑料橡胶或其它认可的保温材料。每个滴水盘必须里外都油上两层沥青砂胶。滴水盘应置于整个盘管的下部，包括弯头和阀门等。
Condensate Drain pan shall be of stainess steel and double wall construction, insulated with minimum 25mm thick CFC free polyurethane foam, closed cell rubber or other approved insulations in between the outer and inner pans. The inner and outer surfaces of the drain pan shall be finished with asphalt mastic coating. The drain pan shall be sloped in two directions to ensure positive drainage and helps prevent corrosion. Drain connection shall be provided on both sides of the drain pan. The drain pan shall extend under the entire cooling coil including all bends, valves and other fittings.

c. 冷盘管的滴水盘应延伸到隔离器和控制阀之下，用防水铜接头连接至少镀锌钢管并设防结露保温。对于多排盘管，应设中间滴水盘。
The drain pan shall extend under the entire cooling coil, separator and control

valve. Waterproof copper connection with galvanized steel pipes shall be provided with insulation to prevent condensation. When several rows of coils are being used, drain pans shall be provided in between the cooling coils.

5. 回风混合箱
   Return Air Mixing Plenum

   a. 回风混合箱应为高效型，并在每个风管口的短边上设置标准镀锌钢板对开调节阀。混合箱应该有高效率的混合功能，以利于两股不同温度气流的充分混合。调节阀应有延长的柄以配合控制程序。
   The mixing chambers shall be of adequate sizes to ensure a thorough efficient mixing of filtered outdoor air and return air. The construction, materials and finishing of mixing chambers shall be identical to that of the AHU casing. Motorized damper/volume control damper shall be provided to modulate the outdoor and return air volume or flow rate. Damper used shall be opposed blade type.

   b. 所有混合箱内部必须贴有不小于 25mm 厚的离心玻璃消音棉。
   The internal surface of the mixing box shall be provided with not less than 25mm thick fiberglass complete with perforated steel plate for noise attenuation.

6. 过滤器
   Filter Section

   a. 除厨房、洗衣房空气处理机组可仅设置初效过滤器外，其他空气处理机组均应配有初效和 100mm 厚的中效过滤器。
   All air-handling unit, unless otherwise specified, shall be provided with pre-filter and final filter. Pre-filters shall be of the pleated panel type with nominal depth of 50mm and Dust Spot Efficiency of 30 to 35% and final filter shall be cartridge (bag) type filter with nominal depth of 100mm and Dust Spot Efficiency of 90%.

   b. 对于空气质量较差（PM2.5 污染严重）地区，可根据项目实际情况，考虑采用高压静电过滤器或其他形式过滤装置以防止新风对室内空气品质的不良影响。
   For regions with poor air quality (Severe pollution at PM2.5 and above), use of high voltage electrostatic filter or high efficient filter of other form shall be considered, subject to the actual situation of the project, to prevent adverse effects of outdoor air on the indoor air quality.

   c. 过滤器可从任何一侧抽出。过滤器的尺寸必需满足现场检修空间的要求。
   Side access filter housing shall be provided with access door at both sides. The size of the air filter must be selected based on the space available to facilitate on-site maintenance.

   d. 全日餐厅、特色餐厅及中餐厅空气处理机组最好设置活性炭过滤器。
   Air handling units serving all-day dinning, speciaty and chinese restaurant are preferred to be provided wih activated carbon filter to aid in odor control.

7. 软接头
   Flexible Joint

   a. 所有风管、水管与机箱的连接均应采用经过批准的软接头，并应具有抗腐蚀和防潮功能，同时用钢带或角铁固定住。

Approved flexible joint with corrosion resistant and moisture-proof features shall be used for connections of ductwork and water pipes with the air-handling unit. The flexible joints shall be fixed by steel strip or angle bar.

b. 根据机组的实际噪音及机房内的噪音要求使用防火帆布软接头。软接头应外包 25mm 厚的玻璃纤维和铝箔。
Flexible Connection material for ductwork connection with the AHU shall be of fabric construction with minimum thickness of 1.5mm and to be fire resistant. The provision of flexible connection shall take into consideration the actual noise level generated by the equipment. The flexible joint shall also be enclosed by 25mm thick fiberglass insulation complete with aluminum foil.

c. 暴露与于室外的空气处理机的软连接应该在空气处理机或风管上装有金属盖，盖的要求和空气处理机的外壳相同。
The flexible joint of the air handling unit exposed to outdoor shall be provided with metal cover at the air handling unit or duct. The material and fabrication requirement for the metal cover shall be the same as the air handling unit casing.

8. 保温
Thermal Insulation

a. 所有的设备必须在衬里做不少于 25mm 厚聚氨酯泡沫塑料的外保温，并能确保传热系数不大于 0.02W/m.K。对于暴露于室外的机组，保温层的最小厚度应提高到 50mm。
Panels shall be provided with minimum 25mm thick CFC free polyurethane foam insulation for superior thermal resistant, acoustic and vibration characteristics and non-hydroscopic. The insulation shall not absorb moisture nor promote fungal and bacteria growth. The insulation shall be totally enclosed in the panel to avoid any possibility of the insulation exposed to the air stream. The insulation material shall have a heat transfer K value of not exceeding 0.02 W/m.K. For outdoor unit, the panel insulation shall be 50mm thick.

b. 所有支架、结构构件和机组外露的表面均应保温，以防止在特殊条件下产生结露。
All supporting brackets, structures, and exposed surface of the equipment shall be insulated in order to prevent condensation under unanticipated conditions.

9. 附件
Accessories

a. 所有大于 10,000CMH 的空气处理机的回风口或回风管或回风混合箱上应设置感烟探测器(适用于 20m/s 的风速)，在火灾时关闭空气处理机以防止火灾蔓延。
Smoke detector (applicable for air velocity of 20m/s) shall be installed at return air inlet, return air duct or return air mixing plenum of air handling unit with capacity larger than 10,000CMH. Air handling unit shall be shut down in the event of fire alarm to prevent spread of fire.

10. 空调加湿
Air Conditioning Humidifier

a. 加湿方式宜采用蒸汽加湿，当无蒸汽源时，宜采用高压微雾加湿；不允许采用湿膜加湿。
Steam humidifier is recommended when humidification is required. If steam

source is not available, high pressure micro mist humidifier shall be used instead. Wetted media (membrane type) humidifier is prohibitted.

11. 空调除湿段
    Air Conditioning Dehumidifier

    a. 对于室外环境湿度大于 1.4g/kg 的地区或每年有雨季的地区，AHU 应提供除湿段。
    Dehumidification shall be provided in AHU for use in region where the outdoor environment humidity level is greater than 1.4g/kg of dry air or with annual seasonal rainfall.

5.4.3. 变风量与定风量空调箱
VRV and CAV Air Handling Terminal

A. 所有的 VAV/CAV 箱设计、构造、额定参数和测试（包括声学性能）应得到相当于空气传播委员会（ADC）等权威机构认可或被国际标准认可。
All VAV/CAV terminals design, construction, rated parameters and testing (including acoustic performance testing) must be approved by Air Diffusion Council (ADC) and other equivalent Authority or acceptable International Standards.

B. 材料应符合美国制冷协会标准(ARI)880 和国内标准。所有使用的隔声和绝热材料，包括表面和粘合剂都应是防火的，并且符合当地消防部门的要求。
All materials used for the VAV/CAV terminals shall comply with the standards of American Refrigeration Institute (ARI) 880 and local standards. All sound attenuation and thermal insulation materials, including surface and adhesive used, must be fire resistant and comply with the requirements of Local Fire Safety Beaurau.

C. VAV/CAV 末端的供电来自于各自的带有所有必要接线的 AHU 电动机控制面板。所有 VAV/CAV 末端箱的执行机构必需能通过 RS485 通讯界面与其它机组或楼宇控制系统(BMS)相联系。
The power supply to VAV/CAV terminals shall be taken from the associated AHU motor control panel complete with all the necessary wirings. All VAV/CAV terminals actuators shall be linked to other units or building management system (BMS) via RS485 communication interface.

D. 所有定/变风量箱都应是完全独立的。壳体采用优质镀锌钢板制造，厚度不少于 1.2mm，内表面粘贴不燃和防腐胶面的消声玻璃纤维保温棉，厚度 25mm，密度 48kg/m3。
All VAV/CAV terminals shall operate independently and the casing shall be constructed of high qualifty galvanized steel with thickness of not less than 1.2mm and internally lined with 25mm thick and 48 kg/m3 density fiberglass for purpose of sound attenuation and thermal insulation. The fiberglass material used must be non combustible and corrosion resistant type.

E. 外壳应密封并限制其漏风量。漏风量不超过设备表上所注的在相应工作压力下的处理风量的 1%。
Casing shall air tight and the air leakage shall not exceed 1% of the rated maxiumum air quantity at its rated working pressure.

F. 所有的声学测试应在被认可的测试实验室内进行。对空气传递出的和外壳传出的 dB 的声功率级测试结果，应将 100Pa 和 250Pa 时，从 63Hz 到 8000Hz 波段的 dB 均列出表格，并提交批准。
All the acoustic tests for the VAV/VAC terminals shall be carried out by accredited testing

laboratory. The sound power transmitted through the air stream and vibration from the casing shall be tested and the test results of the sound level (dB) shall be listed for octave band from 63Hz to 8000Hz at 100Pa and 250Pa. The test results shall be submitted for approval.

G. 变风量箱
Variable Air Volume Terminal (Box)

1. 所有的变风量箱均为可以单独控制压力的类型。
All VAV boxes shall be pressure independent type.

2. 入口静压应在 50Pa 和 500Pa 之间，每一个变风量箱的静压值的误差应控制在±5％范围内。
The inlet pressure of the VAV box must be between 50Pa and 500 Pa. Pressuer difference controlled beteen every VAV box shall be of accuracy to within ±5%.

3. 应有一个工具通过简单的调整（包括目录范围）来调节运行风量。应配备 m3/s 的刻度比例。
A tool with measurement scale in m3/s, shall be provided to modulate the operating air volume through simple adjustment.

4. 风量控制阀应采用铝或其它耐腐蚀材料坚固地制作，并且有被认可的精确的测试数据记录；风量控制阀需可以自行拆卸维修。
Air volume control damper shall be opposed blade type and of aluminium or other corrosion resistant material construction. The damper must be tested with proven test records on its air flow control accuracy. The volume control damper must be removable for ease of servicing and maintenance.

5. 风量控制阀门可以完全关断气流，无安装位置的要求，风量在厂内预先调试，每台均应进行过气流测试。控制阀门的机械系统无需维护。
The control damper shall be able to shut-off the air flow completely and there is no specific requirement on the location in which the VAV terminals must be installed. Air volume of the VAV box must be tested for its air flow in the factory. The control damper mechanism shall be maintenance free type.

6. 变风量箱壳体和阀门之间用齿轮连接，在阀前管道截面积不小于 0.04m² 时，变风量箱的气密性符合 DIN1946 标准的第四部分。
The connection between the VAV box casing and the damper shall be via gears. The duct cross-sectional area upstream of the control damper shall not be less than 0.04m2 and the air tightness of the VAV box shall comply with Part 4 of DIN1946.

H. 风机动力型变风量箱
Fan-powered VAV Terminal (Box)

1. 风机动力式变风量末端单元应包括一个消声外壳、一次风入口阀门和阀门控制、二次风风机（此风机带有速度控制的后向气流阀门），混合室和出、入口连接。
Fan powered VAV terminal unit provided shall include silencer, primary air inlet control damper, secondary air fan (with speed control via air flow damper), mixing plenum and outlet and inlet connections.

2. 二次风机和电动机的装配应是无刷直流式的。风机应进行静态和动态平衡测试。风机应配置合适的隔振措施以防止噪音的传播。风机应能变速运行，其静压应按运行时的设计机外静压来选择。
   The secondary fan shall be provided with brushless DC motor and must be statically and dynamically balanced. The fan shall be treated with adequate vibration isolators and other acoustic treatment measures to prevent transmission of vibration to the occupied space. The fan shall also be capable of variable speed operation. The selection of the fan static pressure shall be based on the design external static pressure of the system as calculated.

3. 一次风风阀应可以通过适合于末端单元的控制系统来正常关闭。风阀的驱动装置应为直接驱动，执行器为气动执行器或 24V 的电动执行器。
   Primary air damper shall be able to shut down by a suitable control system at the terminal unit. The damper mechanism shall be direct drive by using a pneumatic or 24V bi-directional electric actuators.

4. 一次风的入风口应为压力无关型，其风量可在最小和最大风量范围内任意调节。一次风阀采用 1.2mm 厚双层镀锌钢板夹一层进口的密封材料制作。在 1000Pa 的静压下，风阀可完全关闭，但风阀的漏风率小于 1%。
   The primary air inlet to the fan powered VAV box shall be pressure independent. The air quantity through the fan powered VAV box shall be capable of being modulated between the minimum and maximum volume. The primary air damper shall be constructed of double layer galvanized steel sheets each 1.2mm thick complete with imported air seal material. At static pressure of 1000 Pa, under shut-off conditions, all boxes shall not have air leakage more than 1% of the maximum air quantity.

5. 二次风进风侧配置初效过滤网，滤网为铝合金波纹网夹尼龙网。
   The secondary air inlet shall be provided with pre-filter of pleated panel type. The filter efficiency shall not be lower than 40%.

6. 所有控制元件应安装在变风量设备内部，与一次风隔离。所有其它的电子元件应放在单个控制盒内，并在侧面装一块带铰链的操作面板。面板上还需安装一个切断开关。
   All components of the control system shall be installed within the fan power VAV box but must be isolated from the primary air. All electronic components of the control system must be installed in a housing with the control panel at its side complete with a emergency shutdown switch.

7. 风速控制器应能保证将风机在控制范围内连续控制，风速采用 BA 进行控制。另外，应在风速控制器上装配一个最小电压限位器，以保证马达不会停止。
   The air velocity controller shall be able to ensure the continuous control of fan air velocity within the range of speed to be controlled. The air velocity is controlled by electronic means to ensure the smooth operation of the motor. A extra low voltage limiting device shall be installed on the speed controller to ensure non-stop operation of the motor.

5.4.4. 分体空调、变制冷剂流量机组
Split Unit and VRV System

A. 分体空调、可变冷媒容量系统主要应用于电梯机房、消防中心、IT 机房、变配电室、厨房操作间/ 备餐间、垃圾房。

Direct Expansion spilt unit and variable refrigerant volume (VRV) systems are usually used for the air-conditioning of lift motor room, fire command centre, IT room, electrical substation, kitchen cooking and preparation areas and bin centre.

B. 分体空调、VRV 机组均应具有断电恢复后自启动功能。
Split unit and VRV unit shall be able to re-start automatically after power supply is restored from a power failure.

C. 设备主要要求如下：
The equipment specifications and requirements are as follows:

1. 冷凝系统（室外机）
Condenser Unit (Outdoor Unit)

a. 室外机组须包括全封闭式压缩器、风冷冷凝器、风机及电动机等，装备在由原厂制造的金属外壳内。
The outdoor unit shall include fully enclosed compressor, air-cooled consender, fan, motor, and etc, which are assembled in a metal casing manufactured by the original factory.

b. 压缩机应采用全封闭、涡旋式或滚动双转子式压缩机。压缩机由 50Hz 的电动机直接驱动，电动机应有过载继电器和连锁继电器保护。压缩机应备有冷媒高压及低压保护装置，提供再循环保护定时器及控制环路，并备有隔震弹簧及橡胶垫。
The compressor shall be of highly efficient hermetic scroll rolling rotor type and equipped with inverter control capable of changing the speed in accordance to the cooling or heating load requirement. The compressor shall be driven by 50 Hz direct drive motor complete with necessary over current and interlocking protection. The compressor unit shall also be provided with high pressure and low pressure of refrigerants, recycling timer and associated control circuit. The outdoor unit shall be provided with multi-step capacity control to meet load fluctuation and indoor unit individual control. External spring isolator and neoprene pad shall also be provided for vibration transmission control.

c. 室外机的冷凝盘管应采用高效铝翅片 / 铜管制作。每个冷凝器将带有滴盘，以及排放到最近下水处的管子。
Outdoor unit condenser coil used shall be constructed of high efficiency aluminum fin and copper pipe. Each condenser shall be equiped with drain pan to ddischarge to the nearest drainage sysrem.

d. 风机为直驱轴流式风机，并有防护措施，适合于当地户外环境运行。并经静态及动态平衡，没有过度的噪音及振动。
The fan for the outdoor unit shall be direct driven, axial flow type. Adeuqate protective measures shall be provided and suitable for outdoor operation in local environment and climate. The fan must be statically and dynamically balanced without excessive noise and vibration.

e. 风机电动机是直接驱动方式，防护等级为 IP65，电动机设有自动复位装置，并备有过载保护，还应备有接触器和起继电器。
The fan motor shall be direct drive type with protection rating if IP65. The motor shall be provided with automatic reset feature, overload protection, contactors and relays.

f. 每个室外机组须至少配有下列保护装置包括：
Each outdoor unit shall be at least equiped with the following protective devices:-

1. 制冷剂高压保护
High Pressure Refrigerant Protection

2. 压缩机恒温保护
Compressor Constant Temperature Protection

3. 电流过载保护
Over Current Protection

4. 风机电动机过载保护
Fan Motor Overload Protection

5. 散热器防结冰保护
Radiator Anti-freezing Protection

2. 蒸发系统（室内机）
Evaporator (Indoor Unit)

a. 室内机组须包括蒸发盘管、风机及电动机、空气过滤器、膨胀阀（如果设于室内机中）及冷凝水盘、凝结水泵、控制系统及其附件(例如遥控)等装备装配在由原厂制造的机壳内。
Indoor unit shall include evaporator coil, fan, motor, air filter, expansion valve (if provided inside the indoor unit), condensate drain pan, condensate water pump, control system and all necessary accessories and ancillaries (such as remote control) and other equipment which shall be assembled inside the casing manufactured by the original factory.

b. 每个风机盘管系统内部衬有不超过 6mm 厚，比重为 32kg/m3 的玻璃纤维，带有橡胶或类似表面。
Each fan coil unit shall be provided with internal lining using fiberglass of not more than 6mm thick and density of 32 kg/m3, with rubber surface or similar material.

c. 蒸发盘管是由高效铝翅片胀接在铜管上制成。
Evaporator coil shall be made of high efficient finned aluminum with extended connection to the copper pipe.

d. 风机有双入口，叶片是离心式，向前弯曲形。风叶轮经静平衡和动平衡试验。风机为双轴承，三速电机驱动，其额定速度为 1000 转/分钟。
Fan shall be double inlet, forward curve centrifugal type and must be statically and dynamically balanced. The fan shall be provided with double bearings and its motor shall be three speeds drive with maximum speed not exceeding 1000 rpm.

5.4.5. 送排风风机
Supply and Exhaust Air Fan

A. 离心风机
Centrifugal Fan

1. 在指定的设计工况下，风机效率不应低于 75%。对于变风量风机，当其运行在 85%额定风量时，最低效率为 80%，同样，变风量风机应保证在额定风量的 30%~115%时，不发生喘振现象。
   Under specified design conditions, the fan efficiency shall not be less than 75%. For variable air volume fan running at 85% of its rated air volume, the minimum efficiency shall be 80%. In addition, when the variable air volume fan is operating at 30% to 115% of its rated air volume, surge phenomenon should not occur.

2. 除非特殊注明，当风机额定功率超过 7.5kW 时，需采用叶片后弯式离心风机。
   Unless otherwise specified, when the fan power rating exceed 7.5 kW, backward curved centrifugal fan shall be adopted.

3. 风机及电动机应安装在低碳钢槽制底座上，底座须有导轨装置以供调校电动机的位置。
   The fan and motor must be installed on low carbon steel channel base complete with appropriate railing to facilitate adjustment of the motor's poistion.

4. 应按驱动电动机功率的 150%选用 V 形皮带（三角皮带）驱动风机。电动机须采用可调三角皮带轮，能调节风机转速的 20%，风机的设计功率应接近可调节速度的中间值。在驱动和被驱动侧，所有皮带传动装置的驱动和被驱动侧都带有锥形锁定皮带轮，皮带槽应与皮带相匹配。皮带截面应由制造厂宜，在超过极限的条件下，皮带速度不应超过 23.0 m/s。
   Vee belt drive shall be provided for centrifugal fan with ample capacity and the sheaves shall be of adjustable ratio type. They shall be sized to give the required fan speed with the motor sheaves at about the middle of its range of operation. Drives and belts shall be located externally to the fan casing and rated for 150% of the required motor rating. Adjustable pitch drive shall be provided to offer easy adjustment of speed. The motor pulley pitch shall be of adjustable type to enable operating speed to be varied within limits after installation (about 20% from the design speed). All belt drives shall have taper lock pulleys on both the driver and driven and belt sets shall be matched. Belt sections shall be as per the fan manufacturer's recommendation with the overriding condition that belt speed shall not exceed 23.0 m/s.

5. 所有外露的皮带驱动装置应加上安全保护外罩，外罩应采用重型钢架及钢丝网制成，并预留测转速的检查孔。
   Belt guards with opening for speed measurement shall be provided for exposed belt drive. The belt guard shall be constructed of heavy-duty steel frame and steel mesh.

6. 风机应配有紧急锁定断路停止按钮。
   Emergency stop button shall be provided next to the fan.

B. 诱导通风风机
   Induction Fan

1. 诱导通风风机由一台离心通风机、进风过滤网、喷嘴、程序控制器、接线盒、污染物质感受器、电磁接触器、变压器、壳体、消声材料、可拆卸式检查口及安装吊环等组成。
   Induction fan shall mainly make up of a centrifugal fan, filter at the air inlet, discharge

nozzle, controller, cable junction box, pollutants sensor, contactor, transformer, fan casing, attentuator, removable inspection port, hangers, and etc.

2. 风机应为前向多翼型叶片的高压离心通风机，采用电机直接驱动的传动方式，并设有消声处理。
   Fan shall be high pressure, centrifugal, forward curved multi aerofoil blades type. The transmission method shall be direct drive complete with attentuator.

3. 电机采用 220V 电源，用高质量的无油式滚珠轴承，减小摩擦阻力及维修率，增强运转可靠性。电机采用最新环保绝缘漆，以防止长期高速运转时挥发出的气体对人体造成危害。电机应设有超高温自动保护装置。
   Voltage supply to the fan motor shall be 220V. High quality oil free ball bearing shall be provided to reduce friction loss and frequency of maintenance thereby improving the reliability of the operation. The motor shall be painted with latest environmental friendly insulation paint to prevent emission of harmful toxic gases due to long period of operation. The fan motor shall also be provided high temperature alarm and automatic protection device.

4. 风机箱应带消声功能，密封良好，且具有牢固的构造，能承受风机运行时产生的各种压力。应提供带一至三个风口的风机箱以供选择。
   The fan casing shall be provided with adequate sound attentuation, air tight, and stable structure that can withstand the pressure during the fan operation. Fan shall be provided with a plenum consisting of one to three number of outlets for selection of the air discharge direction.

5. 应提供足够强度的吊架等连接件及连接方式，保证风机的连接可靠牢固，并保持风机的动态与静态平衡。
   Hangers, connections and other fittings provided must be of adequate strength to ensure firm connection of the fan. The fan shall be statically and dynamically balanced.

6. 喷嘴由铝合金的喷头及不锈钢的挠性软管组成。喷嘴需与风机稳定连接，不得因喷嘴抖动影响气流性能。
   The nozzle shall be constructed of aluminum alloy complete with stainless steel flexible duct. Nozzle mustly be firmly connected to the fan outlet and the air flow performance shall not be affected by the vibration of the nozzle.

7. 在诱导通风机的进风端设置温度感受器，在温度超标或有突然温升时，温度感受器会将信号传至集控器中，由集控器切断所有已在运行的诱导通风风机的电源,在延时一定时间后再进行自控状态。
   Temperature sensor shall be provided at the induction fan inlet. When there is a rise or sudden surge in the temperature, the temperature sensor shall dispatch and transmit the signal pick up to the central controller which will shut down the operation of all induction fan, and reactivate the automatic control mode after a pre-set delay.

C. 管道式离心风机
   Tubular Centrifugal Fan

1. 风机外壳采用厚规镀锌钢板制成，并需适当地加固以避免在正常运行时产生震动。机壳为镀锌钢板制造，防腐，防潮功能卓越，并设有检修门。

Fan casing shall be constructed of heavy gauge galvanized steel plate, and must be corrosion resistance and moisture-proof type. The fan casing shall be properly fixed on site to avoid vibration during normal operation and must be provided with inspection door to allow access for maintenance.

2. 风机叶轮为后倾离心式非过载型叶轮，材质为铝合金，并经过静态与动态平衡测试。平衡等级为 G2.5。
   The fan impeller shall be backward curved type with non-overloading characteristic, constructed of aluminum, and shall be statically and dynamatically balanced to G2.5 requirement of ANSI/AMCA 204 “Balance Quality and Vibration Levels for Fans”.

3. 风机采用皮带传动，并且采用可调整节距型马达皮带轮，可做正负 10%转速调整，以便调整风量与静压以适合随时变化的现场要求。
   The fan shall be belt-driven with adjustable pitch drive to offer easy adjustment of speed. The motor pulley pitch shall be of adjustable type to enable operating speed to be varied within limits after installation to about 10% from the design speed. This is to allow adjustment of fan flow rate and static pressure to suit changes at site.

4. 风机可配合现场，选用单出风口、双出风口或三出风口。
   The fan selected must be able to suit the site requirement and shall be provided with one, two or three air outlets.

5. 轴承为自动校心油脂润滑滚珠轴承，符含 AFBMA(抗磨轴承生产协会) L50 = 500,000 小时等级。
   Bearings shall be heavy duty, grease lubricated, self-aligning pillow block, ball type and pre-lubricated. Bearings, shafts and impellers shall be L50 (in in accordance to AFBMA “Anti-friction Bearing Manufacturers Association” standards) selected for a minimum of 500,000 hours life on the basis of operation at 30% in excess of normal maximum speed, with full allowance for the forces and stress arising from the use of at least two drive belts.

6. 风机应设有安装架、防震弹簧、风管接驳法兰及气密式检修门等设备。
   The fan shall be provided with mounting bracket, anti-vibration spring isolators, fan connection and air tight insepction door and other accessories.

D. 厨房排风机
   Kitchen Exhaust Fan

1. 除非特殊注明，厨房排风应采用柜式离心风机，除下列要求外，风机的各项技术要求应与本说明书离心式风机章节的描述相同。
   Unless other specified, kitchen exhaust fan shall be cabinet type centrifugal fan. Other than the following requirements, the cabinet type centrifugal fan shall be of similar specifications as the centrifugal fan.

2. 厨房柜式离心风机的轴承应设在风机排风通道之外（一般为箱体之外），防止排风中的油滴或高温蒸汽对电动机、轴承及皮带造成损坏。
   The motor and bearing assembly for the kitchen cabinet type centrifuge fan shall be located outside air stream to prevent damage to the motor, bearing and belt due to grease and high temperature steam in the exhaust air.

3. 顺气流方向，排风机前应设有油过滤器，适合在不超过 150℃的温度下连续工作。
Grease filter shall be provided in the direction of the air stream before the exhaust fan and shall be suitable to operatre continuously at a temperature not higher than 150°C.

E. 防排烟风机
Smoke Control and Exhaust Fan

1. 按图纸及标书要求提供加压风机、排烟风机及排烟时补风机，风机应符合当地消防局的要求，并应有相关的证书。
Pressurization fan, smoke extraction fan and make up air fan shall be provided according to the design drawing and tender document. All fans selected shall comply with Local Fire Safety Bureau requirement with relevant certification.

2. 除非特殊说明，加压风机应是直联离心风机，风机应满足有关加压系统的操作要求。如果采用其它种类的风机，需事先提交希尔顿全球进行审批。
Unless otherwise specified, all pressurization fans must be direct driven centrifugal fan and comply with the operation requirement of the pressurization system. When other type of fans are proposed to used in the pressurization system instead of centrifugal fan, prior approval by Hilton Worldwide is required.

3. 排烟风机应采用柜式离心风机，电动机外置，由皮带驱动。风机应能在 280℃的情况下连续运行 30 分钟，而不影响正常操作。电动机也应满足此要求。
Smoke extract fan used shall be cabinet type centrifugal fan. The fan shall be belt driven with the motor located outside the air stream. The fan and motor shall be able to operate continuously for 30 minutes at a temperature of 280°C without affecting the overall performance of the system.

4. 所有轴承、皮带轮、皮带、驱动轴的设计等应适用于防排烟系统操作。
Design of all bearing, belt pulley, belt, and driving shaft shall be suitable for smoke control system operation.

5.4.6. 过滤器
Filter

A. 一般要求
General Requirement

1. 所有空调机、新风处理机、风机盘管及图纸和标书要求的其它部位，均需安装空气过滤器。空调机和新风处理机必需安装初效和中效空气过滤网（除厨房、洗衣房空气处理机组可仅设置初效过滤器外）；风机盘管必需安装初效空气过滤网。
All air-handling units, Pre-air-handling unit, fan coil units and other air distribution equipment as indicated in the drawings and tender document must be provided with air filters. Air-handling and pre-air-handling unit must be provided with pre-filter and final filter with efficiency of not less than 35% and 90% respectively. Those serving the kitchen and laundry shall only required to be provided with pre-filter with efficiency not less than 60%. Fan coil unit shall be provided with panel type filter with efficiency not less than 60%.

2. 除非特殊说明，在系统通过验收之前，应安装一次性过滤器，在验收通过后，移交给业主的系统应换为永久性过滤器，移交的备件也应为永久性过滤器。
Unless other specified, disposal type filter shall be provided before acceptance of the

testing and commissioning results. The disposable filters shall be replaced by permanent filter when the systems are handed over to owner after they have been tested, commisioned and accepted. Spare filters provided shall also be permanent type.

3. 在所有需安装过滤器而尚未安装的系统，不得运行风机。
   No fan operation is allowed before the filters are installed in the system where filters are required.

4. 在使用过滤器之前（包括一次性过滤器），应对系统进行清洁。
   System shall be thoroughly cleaned before the filters are being installed (Including disposal type filter).

5. 无论在运送、储存及安装期间，应采取正确的保护设施，以确保空气过滤器在任何情况下不受破损。
   Adequate protection must be provided during delivery, storage and installation of the air filters to prevent damages.

6. 所有过滤器应不含有石棉成分。
   No rock wool is allowed for used as filters.

7. 过滤器外框应采用防腐蚀的金属制造，而过滤器的支撑围栏和框架应是坚固耐用的，框架的构造应能使过滤器方便地抽出。
   Filter frame shall be constructed of corrosion resistant metal. The supporting peripheral and frame for filter shall be firm and durable.

8. 过滤器的框架及过滤器应按标准规格设计，可适用于不同厂家的产品。过滤器标准组件之间以及过滤器与框架之间应紧密连接，过滤器与框架之间若有细小缝隙应用密封胶垫密封以防止漏风。
   The filter media and frame shall be constructed of universal size suitable for use in equipment from different manufacturers. Connnection of filter standard internal components as well as filter and frame shall be sealed and any gaps in between must be sealed with gasket to prevent air leakage.

9. 通过空气处理机组过滤器的最大风速不能超过 2.5 m/s，通过风机盘管过滤器的最大风速不能超过 1.5 m/s。
   Filter for AHU shall be sized with air face velocity not exceeding 2.5 m/s or as recommended by the filter and AHU manufacturer, whichever is the lower. For fan coil unit, air face velocity shall not exceed 1.5 m/s.

B. 一次性空气过滤器
   Disposable Air Filter

1. 过滤器的框架应由不小于 1.3mm 的镀锌钢材制成，需配以密封垫圈及手动扣件。框架应能适用于一次性及永久性空气过滤器。
   Filter frame shall be constructed of minimum 1.3mm thick galvanized steel and equiped with air tight gasket and manual clamp. The frame shall be suitable for both disposaable and permanent air filters.

2. 过滤器应采用玻璃纤维制成，除非特殊说明，厚度为 50mm，并应在工厂经过防火处理。

Air filter media shall be constructed of fibreglass. Unless other specified, the thickness of the filter shall be 50mm and treated for fire retardant at the factory.

3. 过滤器平均效率为 30-35%。
   Filter average efficiency shall be 30% to 35%.

4. 清洁时空气阻力不超过 40Pa。设计终阻力不超过 125Pa。
   The initial (clean filter) and final air flow resistant of the filter shall not be more than 40Pa and 125 Pa respectively.

C. 板式空气过滤器 (初效过滤网)
   Panel Type Air Filter (Low Efficiency Pre-Filter)

1. 除非有特殊规定，永久性空气过滤器应采用铝质可拆洗滤芯的形式，空气处理机组的过滤器为 50mm 厚，风机盘管的过滤器为 25 mm 厚。
   Unless specially specified, removable and washable aluminium filter media shall be used for the permanent air filter. Panel type air filter with thickness of at least 50mm and 25mm shall be provided for AHU and fan coil unit respectively.

2. 过滤器应符合 ASHRAE 52-76 的平均标准，重力滞留为 90-95%。按“Cottrell Precipitate and Line”，平均效率为 30%。
   The filters proivided shall comply with the standard stipulated in ASHRAE 52-76. The arrestance of the filter shall be 90% to 95%. According to “Cottrell Precipitate and Line”, the average efficiency shall be 30%.

3. 清洁时空气阻力不超过 25Pa。设计终阻力不超过 125Pa。
   The initial (clean filter) and final air flow resistant of the filter shall not be more than 25Pa and 125 Pa respectively.

D. 袋式空气过滤器 (中效过滤网)
   Bag Type Air Filter (Medium Efficiency Filter)

1. 应采用加筋无纺布折叠成许多口袋形状，成串地、紧密连接在集气包上。
   Bag filter with synthetic media shall be used for the medium efficiency filter which is usually used as a final filter in the AHU.

2. 过滤器应符合 ASHRAE 52.1 的标准，平均过滤效率为 75-90%。
   The filter shall comply with ASHRAE 52.1 with efficiency of 75% to 90%.

3. 每个过滤器单元应配有经防锈处理的钢制框架，以支撑介质抵抗风力，使介质不致下坠或摆动。
   Corrosion resistant steel frame shall be provided for each filter to support the filter media resisting against the air flow to prevent it from sagging or oscillating.

4. 袋形过滤器应配有预过滤器，预过滤器采用板式过滤器。
   The bag filter must be coupled with a panel type pre-filter.

E. 碳性空气过滤器
   Activated Carbon Filter

1. 由厂家所制造的滑动装置含活性碳板的过滤网，设有 50mm 厚的不循环使用的初效过滤器及工厂制造的加固重型镀锌钢检修门。
   Activated carbon filter used shall be provided with factory fabricated side access slidable housing complete with 50mm disposable type low efficiency pre-filter and heavy duty galvanized steel access panel.

2. 过滤器箱应设有密封、可拆卸的检修门，碳性滤芯可从检修门滑入过滤器箱。空气阻力不应大于 80Pa。
   The filter housing must be air tight and houses the activated carbon filter media which could be access through the provision of a access panel. The air resistant of the activated carbon filter shall not be greater than 80Pa.

3. 吸收剂的厚度应是一致的，板是平均布置的，使吸收剂不会被压实。在选择吸收剂时应选取最佳的吸收效率。
   Thickness of the absorbent provided shall be the same with evenly distributed plate to prevent it from be pressed. The choice of absorbent shall be those with high aborsbing efficiency.

5.4.7. 风阀
Air Damper

A. 一般要求
General Requirement

1. 风量调节阀应按下列要求提供：
   Air volume control damper shall be provided according to the requirements listed below:

2. 在所有主送风与排风管、分支管、与风机盘管单元相接的送风接头以及所有送风口。
   All main supply/exhaust ducts, branch duct, fan coil unit supply air duct and all supply air diffusers and grilles shall be provided with air volume control dampers.

3. 所有风量调节板应符合 DW/142 标准，并应按分开的特别法兰外壳形式供货，外壳应为符合同一气密性标准的刚性结构。
   The volume control shall comply with the requirement of DW/142 and shall be provided in separate purpose made flanged casing of rigid construction conforming to the same standards of air tightness.

4. 在旋转面宽度达 300mm 的阀应为蝶型阀、大于 300mm 的风阀应为多叶对开重叠叶片型。单独的叶片应为蝶形阀专用的，在直径达到 250mm 的圆形风管中的阀应为蝶型阀。
   When width of duct is 300mm or less, single leaf butterfly damper shall be provided. When it is greater than 300mm, the damper shall be of multi-leaf type with double skin airfoil section and opposed blade configuration. Similarly, for round duct with diameter 250mm and less, single leaf butterfly damper shall be provided.

5. 要求控制面积大于 1.6m² 的风阀应采用多个风阀组成。每个风阀控制的最大面积为 1.6 m²，各有一个驱动电机操纵。
   For cross-sectional area greater than 1.6m2, multiple damper assemblies shall be used to form the entire volume control damper unit. The largest cross-sectional area in which each damper could modulate shall not be larger than 1.6m2 and it shall be motor driven.

6. 当调节阀紧闭时其漏风程度不能大于 5%。
   Air leakage allowance shall be less than 5% when the volume control damper is fully closed.

B. 电动阀
   Motorized Control Damper

1. 电动阀的执行机构应为电动型，其大小应能在设计压力和温度下提供平滑的调节控制。执行机构应为在现场可进行直接作用与反向作用切换的，并能适应开/关或连续的操作。阀门应适合于垂直和水平安装。阀门执行机构应安装于气流外部。
   Actuator for motorized control damper shall be electric driven type. The motorized control damper shall be able to operate and fulfill its modulating control function under the design pressure and temperature of the air disribution system. The actuator shall able to be manually operated on site, suited for open/close control and continuous operation.

2. 阀门、框架和支撑必须可以在全封闭的场所承受 2000Pa 的压差。
   Damper, frame and support shall be able to withstand a pressure of up to 2000Pa in a fully enclosed environment.

3. 阀门应设复位机构，在发生供电故障时，应能按要求定位在开启或关闭状态。
   Reset mechanism shall be provided to cater for fault due to power failure and shall be able to determine whether the damper shall be reset to open or close position according to the needs.

4. 电动风阀的执行机构应配有模拟讯号输出接点。
   The actuator of the motorized control damper shall be provided with interface for analogue output signal.

C. 电动排烟防火阀
   Motorized Fire and Smoke Damper

1. 电动排烟防火阀需符合有关防火规范要求并得当地消防部门认可；
   Motorized smoke and fire Damper used shall comply with the relevant fire protection codes and must be approved by the Local Fire Safety Bureau.

2. 阀体及叶片须为热浸镀锌钢片制成，并具足够的耐火要求；
   The damper and blades shall be constructed of hot dipped gavalnized steel and be fire rated according to the requirement of the fire compartmentation.

3. 除特别注明外，电动排烟防火阀须为常闭式，配置遥控及手动开启装置，并与相联的排烟风机串连，当风阀开启时，排烟风机亦相应开启，进行排烟；
   Unless specially specified, motorized fire and smoke damper shall be normally closed type. Remote control shall be provided at fire command center to control these motorized fire dampers when necessary. Manual button, located near to the fire and smoke dampers, to activate them in the event of fire by users. The fire and smoke dampers shall also interlock with the exhaust fans and shall be activated when the dampers are opened.

4. 电动排烟防火阀应同时配有一易熔片，其操作温度为 280℃，当排经的烟气温度大于 280℃时，将防火阀关闭。并只能以手动复位；
   Fusible link with temperature rating of 280°C shall be provided for the motorized fire and

smoke damper. When damper shall close when the smoke temperature through the damper exceed 280°C and can only be reset manually.

5. 电动排烟防火阀的执行机构应配有阀门状态信号输出接点。
The actuator of the motorized fire and smoke damper shall be provided with interface for analogue output signal.

D. 止回阀
Non Return Damper

1. 止回阀应对运行条件下的气流提供一个最小阻力，并在操作中保持一个稳定的位置，最大阻力应在气流回流时产生，这样它们将被强迫关闭并保持这一状态。
The non-return damper provided shall contribute to minimum air flow resistant under normal operating condition. It shall contribute to maximum air flow resistant when the air flow is reversed to force close the damper and maintain at this position as long as the air flow is in reverse direction of the normal air stream.

2. 应提供弹性带或其它特制的设备以防止阀发出噪声，并在回流条件下帮助空气密封。止回阀的最小开启风速应满足系统运行时的要求。
Adequate measures shall be taken in the construction of the damper to prevent generation of excessive noise. It must also be air tight during backflow of air stream. The minimum air velocity to open the non-return valve shall be in accordance with the system operation requirement.

E. 余压阀
Pressure Relief Damper

1. 余压阀需符合有关防火规范要求并得当地消防部门认可。
Pressure relief damper used shall comply with the standards and requirement of relevant codes and Local Fire Safety Bureau.

2. 须按图示在指定位置设置余压阀，以利用楼梯加压系统同时让相邻的楼梯前室及消防合用前室维持在 25Pa 正压。
It shall be provided at locations as indicated in the Tender Drawings. It is provided to permit residue pressure from staircase pressurization system to adjacent staircase lobby or fire fighting lobb maintaining positive pressure of 25Pa.

3. 余压阀须为单叶设计并设有配重和重锤或回倒弹簧以在正常情况下使阀门保持关闭。
Excess pressure damper shall be single leaf type with counter weight and hammer or return spring to keep close.

4. 余压阀须为无能耗自动控制，以维持楼梯间及其相邻的前室/消防合用前室之间的静压差在 25Pa 以内。
Excess pressure damper shall be non energy consumption control to maintain 25Pa positive pressure by using staircase pressurization system to increase pressure to staircase and fire stop lobby.

5.4.8. 风口
Air Terminal and Diffusing Equipment

A. 所有出口应选择有效的风量分布和低噪声水平，并应负责选择与检查散流器颈部流速、水平与垂直流体模式及噪声水平，不应使用分布情况不好和噪声水平过高的出口管。
The goal of air distribution system shall maintain a high quality of air diffusion in the occupied space. This shall be achieved with low temperature variation, good air mixing and no objectionable drafts through careful considerations on the airflow at the neck of the diffusing equipment and its horizontal and vertical air dispersions. The air diffusion equipment must also be selected such that the noise level specified in the space is achieved.

B. 选择用于变流量系统的所有出风口应能在任何情况下均匀分布风量，不会造成大容量时的缺乏或低容量时的“事故排放”，只有在生产厂家已经专门对其进行可变流量系统测试之后才能使用。
When used with the variable air volume system, the diffusing equipment must be able to provide even air distribution and must not lead to insufficient flow at all circumstances. The diffusing equipment to be used with variable air volume system must be tested by manufacturer before implementation.

C. 所有的槽形散流器及直线格栅应提供爪型可调叶片，用以控制气流方向及大小。
Unless otherwise indicated, all air terminal devices (with the exception of transfer grilles) and air diffusing equipment such as linear air diffusers, registers, and etc, shall be fitted with regulating dampers.

D. 所有出风口的内部，诸如导流叶片和风量调节装置应采用无光泽黑色漆面，外部漆面则应配以与相邻表面一样的颜色。
Internal of the air terminal shall be provided with guide vanes capable of air volume regulation and to be painted black with non glossy surface. The color of the air terminal external finishes shall match the color of the surrounding finishes.

E. 出风口管应使用剪齐的垫片安装，并与生产厂家的一致。
Trimed gasket used for the air terminal shall be of the same material as those recommended by the manufacturer.

F. 各区域风口形式应在二次精装修设计阶段与内装配合选取。
The air terminals selection for various areas must be coordinated with the interior designer.

5.5. 噪声控制要求
NOISE CONTROL REQUIREMENTS

A. 对于高级酒店，客人区域的噪声控制是非常重要的一项指标；除了需要考虑酒店外部各种介质和内部各相邻区域客人所产生的噪声以及必须使用合适的噪声隔离结构和噪声吸收材料加以控制外，机械设备运行时以及设备在设计及安装不当时产生造成的振动和噪声更应在设计阶段进行控制，以避免由于设计及安装不当所产生的振动与噪声。
For high-end hotel, noise level at the guestroom areas is a very important aspect in the operation. Besides considering the control of noise ingress from the external and noise transmission between adjacent guestroom areas through various measures such as structural isolation and use of noise absorptive material, adequate provision on the control of noise and vibration generated by equipment must also be considered during design stage.

B. 本章就机电设备及相关管道工程等产生的振动和噪声控制进行阐述。
This section shall provide the fundamental requirements on noise and vibration control on mechanical and electrical equipment.

C. 其他声学控制应由声学顾问配合。
Others noise and vibration control requirements shall be specified by and coordinated with the Acoustic Consultant.

5.5.1. 机械设备安装概要
Mechanical Equipment Installation General Requirements

A. 应在设计和安装时控制所有的机电设备，包括主设备、水管管道系统、风管管道、风口及风机盘管装置等的声压水平不超过本设计标准中 5.1.2.2 的相关要求。
The noise level generated by all mechanical and electrical equipment, inclusive of main plant, water pipeline system, air distribution system and etc, shall be controlled within the requirement stipulated in Section 5.1.1.2.

5.5.2. 风口及风机盘管等装置
Air Terminal, Fan Coil Unit and other Equipment

A. 应要求制造商提交低、中、高速下运行时的格栅/百叶风口、散流器及风机盘管装置的噪声功率水平数据。
The sound power level data of the fan coil unit, register/grilles, louvers and diffusers when the equipment operating at low, medium and high speed must be submitted by the manufacturer.

B. 格栅/百叶风口、散流器和风机盘管装置应按相关标准进行声学性能测试。
The acoustic performance of grilles/registers, louvers, diffusers and fan coil unit must be tested according to the relevant standards.

C. 客房风机盘管通常是客房的主要噪声源。故风机盘管的应采用后回风的气流方式，回风口应靠入口设置，同时保证送风管长度在 0.5~1.0m。回风口速度宜为 1-2m/s。
Fan coil unit (FCU) is usually the main source of noise generation in the guestroom. Therefore, it is essential to ensure return air is returned to the FCU at the rear and should be near to the entrance with face air velocity at the return grille between 1m/s to 2m/s. It is also essential to ensure that the supply duct is at least 0.5m to 1.0m long.

D. 空调机组、新风机组及大功率风机设备应设置于机房内，对于机房外噪声敏感区设备，应使用低噪声设备；安装在吊顶内的设备，根据区域噪声标准，设备允许的噪声应不超过下表中的规定：
Air-handling unit, outdoor air-handling unit and high capacity fan shall be located within a plant room. If the plant room is located near noise sensitive areas, the units selected must be low noise type. For suspended units installed within ceiling space, subject to the noise criteria requirement of the space, noise level generated by the equipment must not exceed the requirement stipulated hereafter:

表 5-18 空调设备允许噪声水平

Table 5-18 Air conditioning equipement allowed noise level

噪声标准 Noise Level Criteria	机壳噪声（dBA） Equipment Casing Noise	风口噪声（dBA） Noise Level due to Air Terminal
DB 35	50	65
DB 40	55	70
DB 45	60	75
DB 50	65	80

E. 安装在机房以外的空调机房、新风机组和风机、设备与风管之间的帆布连接应作隔声包扎，放置噪声外泄。
For AHU, PAU and fans installed outside a plant room or a plant room is not provided, the flexible connection between the equipment and ductwork must be enclosed by acoustic enclosure to prevent leakage of noise from the joint.

F. 新风机组、空调机组、排风机的进、出口风管应设置消声器降低设备噪声在风管中的传播。消声器的选择应根据系统所需消声量、噪声源频率特性和消声设备的声学性能等因素，综合分析后确定。
Silencer or sound attenuator shall be provided at the supply air duct and return air duct of AHU, supply air duct of PAU, exhaust fan inlet and supply fan outlet to prevent noise transmission through the ducting system. The attenuation requirement of the sound attenuator shall depend on the sound power level of the equipment for all the octave bands and the resultant sound pressure level required in the ventilated space and could only be determined after holistic analysis and calculation is conducted.

G. 设置建筑外立面的排风口和取风口，应在风管管路中设置消声器，降低设备排风到建筑外的噪声。外墙百叶的通风有效率按 50%计算，外墙百叶风速应满足以下要求：
For exhaust fan and outdoor air intake fan installed near to the building façade shall also be provided with sound attenuators to reduce noise transmission to the external. The efficiency of the external louver shall be selected based on efficiency of 50% and the face air velocity of the louver shall be as follows:

1. 排烟用外墙百叶风速：宜 4m/s，最大不超过 7m/s；
Face air velocity of external louver for smoke exhaust system is recommended to be 4m/s and shall not exceed 7m/s.

2. 排风用外墙百叶风速：宜 3m/s，最大不超过 5m/s；
Face air velocity of external louver for exhaust air system is recommended to be 3m/s and shall not exceed 5m/s.

3. 新风/补风外墙百叶风速：宜 3m/s，最大不超过 5m/s。
Face air velocity of external louver for outdoor air and make up air system is recommended to be 3m/s and shall not exceed 5m/s.

5.5.3. 风管管道系统噪声控制
Noise Control of Air Distribution System

A. 气流流经管路组件时（如弯头、阀门）出现不稳定状态，会有气流再生噪声生成。且气流再生噪声与流速的 6 次方成正比。因此控制风速是降低气流再生噪声最有效的措施。

对不同噪声标准区域，最大风速不超过以下限制：
When airflow through duct fittings such as bends and dampers, turbulent will occur this will lead to generation of noise. The noise generated is proportionally amplified 6 times with respect to the air velocity. Therefore, the control of air velocity in the duct system is the most effective means to control noise generated due to airflow. The air velocity limits with respect to the noise requirement of various areas are highlighted as follows:

表 5-19 空调风管最大风速水平
Table 5-19 Maximum air velocity of air conditioning duct

	服务区域噪声标准 Service Area Noise Standards（dBA）	最大风速 Maximum Air Velocity（m/s）
出风口喉管 Supply Air Outlet	50	3.2
	45	2.8
	40	2.5
	35	2.2
回风口喉管 Return Air Inlet	50	3.8
	45	3.4
	40	3.0
	35	2.5
主风管 Main Air Duct	50	7
	45	6
	40	5
	35	4

5.5.4. 水管道噪声控制
Noise Control of Water Pipeline

A. 空调冷热水、热水管管内介质流速须满足以下要求：
The water flow velocity in the pipeline of air-conditioning chilled water and hot water, chilled shall meet the following requirement:

1. 管径 50mm 以下，宜流速为 0.6m/s, 最大流速不超过 0.9m/s；
For pipe diameter below 50mm, water flow velocity in the pipeline shall be 0.6m/s and not exceeding 0.9m/s.

2. 管径 50mm 至管径 100mm，宜流速为 0.8m/s 最大流速 1.2m/s；
For pipe diameter from 50mm to 100mm, water flow velocity in the pipeline shall be 0.8m/s and not exceeding 1.2m/s.

3. 管径 125mm 至管径 200mm，宜流速为 1.1m/s，最大流速 1.5m/s；
For pipe diameter from 125mm to 200mm, water flow velocity in the pipeline shall be 1.1m/s and not exceeding 1.5m/s.

4. 管径 250mm 至管径 300mm，宜流速为 1.4m/s，最大流速 2.2m/s；
For pipe diameter from 255mm to 300mm, water flow velocity in the pipeline shall be 1.4m/s and not exceeding 2.2m/s.

5. 管径 350mm 及以上，宜流速为 1.8m/s，最大流速 3m/s。
   For pipe diameter from 350mm and above, fluid average velocity in the pipeline shall be 1.8m/s and not exceeding 3m/s.

5.5.5. 蒸汽管道噪声控制
Noise Control of Steam Pipeline

A. 蒸汽管道中最不利管道流速应控制在 15~25 m/s。
Steam flow velocity at the most unfavorable pipeline in the steam piping system shall be limited within 15 - 25m/s

5.5.6. 基础和隔振
Foundation and Vibration Isolation

A. 冷冻机组、冷却塔、水泵、冷水机组、空气处理机组、风机应安装在不小于 100mm 高的混凝土基础上，并配备弹簧减震器；设备进出口采用软管连接。水泵出口最好选用消锤式止回阀。
Chillers, cooling towers, water pumps, air handling units and fans must be installed on concrete plinth not less than 100 mm in height and equipped with spring vibration isolators of appropriate deflections. Pipe and duct connections to the respective equipment must be provided with appropriate flexible joints. Check valves used at pump outlet must be of type that could effectively eliminate the water hammer effect.

B. 机房内主风管须安装于弹簧隔振吊架上；冷冻机房、锅炉房、换热机房、水泵房的水管须设隔振吊架。
The hanger supports of all main air ducts in the plant room must be provided with spring vibration isolators of adequate deflections. The hanger supports of all water pipes installed in chiller plant room, boiler plant room, heat exchanger plant room and water pump room must be provided with vibration isolators.

C. 管道穿越机房墙体和楼板应预埋套管，套管和穿越管道间采用具有防火隔声的弹性材料填充密实，套管端头密封。
Embedded pipe sleeve shall be provided for pipeline penetrating the plant room walls and floors. Elastic fire rated and sound insulation material shall be provided to fully fill up the gap between the pipe sleeve and pipes with the end of the pipe sleeve completely sealed.

5.6. 节能和环保
ENERGY CONSERVATION AND ENVIRONMENTAL PROTECTION

5.6.1. 系统主要设备
Major Plants

A. 为满足节能及绿色环保的相关要求，系统主要设备须满足以下几点：
In the effort to meet the requirement in energy consumption reduction and environmental protection, the following provisions for the major equipment shall be complied:

1. 选用性能系数较高的水冷离心机组和螺杆机；
   Water-cooled centrifugal chiller and helical rotary screw chiller with higher coefficient of performance shall be selected.

2. 对于靠近江河湖海并且年径流量保持恒定的区域可考虑采用水源热泵机组，但须提供技术经济性分析报告及相关水文资料进行审批；
   For areas near river, lake or sea in which the water source is abundance, water source heat pump system could be considered. However, adequate feasibility study on the viability of the system from the economics and engineering perspective must be carried out and the report and relevant hydrological data must be submitted for approval.

3. 对冬季仍有制冷需求的房间，应设置分体空调；
   For rooms in which cooling is still required during winter shall be provided with direct expansion split unit air-conditioning system.

4. 所有空调设备的冷媒应采用环保冷媒；
   The refrigerant used for all air conditioning systems must be of environment-friendly type.

5. 冷却塔风机宜变频；
   Variable frequency drive is recommended for cooling tower fans.

6. 应为酒店冷冻水侧提供冬季、过渡季节冷却塔免费制冷系统；
   Free cooling via heat exchanger between the cooling tower condenser water circuit and the chilled water circuit shall be provided to facilitate production of chilled water during winter and transition seasons.

7. 对于服务于排风、新风、送风量需根据变化的区域，风机应变频；
   Variable frequency drives shall be provided for exhaust, outdoor and supply air fans serving areas in which the air quantities could be varied.

8. 酒店区空调水系统设备耗电量指标应小于下列指标：
   The maximum electrical energy consumption index for the hotel central refrigeration plant at full load shall be as follows:

表 5-20 空调水系统设备耗电量指标

Table 5-20 Maximum energy consumption index index for air conditioning water system

设备名称 **Name**	**耗电量指标** **Max electrical energy consumption index**
离心式制冷机组 Centrifugal chiller	0.196 ikW/kW (COP 5.1)
螺杆式制冷机组 Helical rotary screw chiller	0.204 ikW/kW（COP 4.9）
制冷（冷冻）水循环水泵一次泵 Cooling (chilled) water circulation	0.027 ikW /kW
冷却水循环水泵 Condenser water circulation pump	0.027 ikW /kW
冷却塔风机 Cooling tower fan	0.0145 ikW /kW
酒店锅炉效率 Hotel boiler efficiency	≥90%

注： 0.196 ikW/kW 表示每输出 1kW 的冷量需要消耗的电量为 0.196kW。

Note: 0.196 ikW/kW means every 1kW cooling load requires 0.196kW of electricity.

9. 冷水机组、水泵、锅炉等能耗大的设备合理搭配，既能满足设计负荷要求，又能在部分负荷时节能运行。
   The design of combination of chiller, pumps, boilers and other large power consumption equipment shall meet the design load requirement and also have energy saving under partial load operation.

5.6.2. 风系统及水系统
Air and Water Distribution Systems

A. 为满足节能及绿色环保的相关要求，系统主要设备须满足以下几点：
In the effort to meet the requirement to reduce energy consumption and environmental protection, the following provisions for the major equipment shall be complied:

1. 冷冻水系统应根据项目气候特点及实际需求采用一次泵变流量系统、二次泵变流量，从而达到节能运行的要求；
   Variable flow chilled water distribution system, namely, variable primary flow system, primary-secondary pumping system, shall be adopted in order to reduce energy consumption. However, the type of system to be applied shall depend on the climate of the site and actual requirement of the project.

2. 充分评估通风、空调设备的噪声与振动对环境的影响，必要时采取消声、隔振措 施，使之达到国家和当地有关标准。为了满足上述要求，暖通空调系统还需考虑以下几点：
   Full evaluation on the noise and vibration generated by the ventilation fans and air-conditioning equipment and the impact on the environment must be conducted. When required, sound attenuators, vibration isolation measures, must be applied in order to meet the noise requirement of an occupied space stipulated in the National or Local Codes. In order to meet this requirement, the following requirements shall be considered for the heating, ventilation and air-conditioning system:

   a. 风管尺寸应以满足噪音水平的气流速度设计；
      The air duct shall be sized based on the air velocity that could meet the desired noise level requirement.

   b. 噪音较大的风管，需有足够的隔音板安装于在风管内；
      For air duct transmitting higher noise level, adequate sound attenuation linings shall be provided in the duct.

   c. 风口选型应配合精装尺寸和区域使之满足噪音要求；
      The selection of diffusers and grilles must be coordinated with the interior designer with due consideration on the noise level requirement of the space concerned.

   d. 选用高效低噪声风机。
      High efficiency low noise fan shall be selected.

3. 过渡季节应尽量采用全新风工况对酒店功能区供冷；
   During transition season period, it is recommended to operate the air-handling unit at 100%

outdoor air quantity based on the supply air volume to provide cooling to the hotel functional areas.

4. 应尽量对空调房间的排风进行热回收；
   Heat recovery between the outdoor air intake and exhaust air from the air-conditioned space should be utilized.

5. 应在人员密度变化较大的功能区安装 CO2 浓度探测装置，满足人员变化时的新风量的需求；
   CO2 sensor shall be provided for functional areas where there is significant variation in the occupancy in order to control the outdoor air quantity to the space according to the demand.

6. 宜垃圾房排风设置活性炭过滤装置，以尽量除去异味。
   Activated carbon filter shall be provided for the exhaust air system of bin center to remove foul odor.

7. 排风系统的排出口位置避免在人员逗留区。
   Outlets of the exhaust system shall be located away from occupied areas.

8. 厨房设机械排油烟系统，厨房排油烟罩自带 UV 紫外线灯，排油烟风机入口前加 装静电式油烟净化处理装置净化处理后排放，油烟净化效率能达到 90%以上，并满足当地环评报告要求。
   Kitchen shall be provided with kitchen hood exhaust system. The exhaust air from the kitchen must be treated by an electrostatic grease filter installed at the inlet of the exhaust fan before discharging to the environment. The efficiency of the electrostatic grease filter shall be at least 90% and the air discharge to the environment must meet the local environmental requirement. Built-in UV filter must be provided for all kitchen hoods.

9. 锅炉及发电机排烟宜塔楼高空排放，且满足当地环评报告要求。
   Boiler and generator fume exhaust is recommended to be located at high level and shall meet the local environmental requirements.

10. 所有空调通风设备均设置自动控制系统，并在空调器回水管路上设置电动控制 阀，以控制室温，避免过冷过热，节省运行费用。
    All air-handling units shall be provided with modulating control valve at the return water pipe to facilitate automatic control of the room temperature to prevent over cooling or heating in order to reduce operating cost.

11. 客房风机盘管需接入 RCU 进行控制。
    Guestroom fan coil unit shall be connected and controlled by the RCU.

12. 所有空调风管及水管等，均按《公共建筑节能设计标准》中要求设置绝热层、隔汽层及保护层。
    All air-conditioning ductworks and pipe works must be provided with adequate thermal insulation, vapor barrier and protective cladding in accordance to the requirement of “Design Standard for Energy Efficiency of Public Buildings”.

13. 蒸汽系统冷凝水应回收。
    Steam condensate from the steam system must be recycled.

5.7. 调试和验收
TESTING AND COMMISSIONING

5.7.1. 调试
Testing and Commissioning

A. 设备调试
Equipment Testing and Commissioning

1. 下述设备须于制造厂内按合约文件内其它部分所订的系统测试压力进行不少于 2 小时的压力测试，有关证明测试结果须提交：
The following equipments shall be tested for its performance and pressure tested for a duration of at least 2 hours in the factory according to the performance test requirement and test pressure specified in the Contract document. The relevant test results and records must be submitted for review and approval:

    a. 制冷机蒸发器及冷凝器（至少 24 小时）
    Chiller Evaporator and Condenser (at least 24 hours)

    b. 新风处理机
    Outdoor Air-handling unit

    c. 空气处理机
    Air-handling Unit

    d. 阀门
    Valve

    e. 热交换器
    Heat Exchanger

    f. 锅炉（至少 24 小时）
    Boiler (at least 24 hours)

    g. 除氧器
    Deaerator

    h. 软水器
    Softener

    i. 水泵
    Water Pump

    j. 冷冻及采暖盘管
    Cooling and Heating coil

    k. 风机盘管
    Fan Coil Unit

    l. 板式换热器
    Plate Heat Exchanger

2. 所有水泵及风机应在制造厂内进行测试，有关证明测试结果证明文件须提交。
All pumps and fans shall be tested in the factory and the relevant test results and records must be submitted for approval.

B. 风管系统
Air Duct System

1. 低速风管系统无须进行压力试验，但仍须作气密性检查。
Duct leakage test shall be conducted for the low pressure duct system. Pressure test is not required for low pressure ductwork.

2. 防烟楼梯间、前室及消防电梯前室/合用前室的加压系统风管须按要求进行压力试验，以达到设计要求和当地消防局的要求。
The duct system for the staircase, smoke stop lobby and fireman lift lobby pressurization system must be pressure tested according to the design and Local Fire Safety Bureau requirements.

3. 所有排烟风管须按业主代表的要求进行压力试验，以达到设计要求和当地消防局的要求。
All smoke exhaust ducts shall require pressure tested in accordance with the design and Local Fire Safety Bureau requirements.

4. 系统测试数据样表详见 5.7.3 节。
Refer to Section 5.7.3 for requirement on system test records.

C. 水管系统
Water Pipeline System

1. 所有水系统管道均需按要求进行压力试验。
All water system pipes must be pressure tested.

2. 所提供的机电系统设备其工作/测试压力应符合施工图纸和国家规范的要求。
The performance and pressure test of the Mechanical and Electrical System equipment provided must be in accordance with the construction drawings and National Codes requirements.

3. 水管压力试验记录表详见 5.7.3 节。
Refer to Section 5.7.3 for requirement on water pipe pressure test records.

D. 系统平衡调试
System Balancing

1. 须提交进行平衡试验和测试仪器的位置图。当完成首次系统平衡量度后，如有需要应在适当的位置加设平衡风阀、压力接头和调节平衡旋塞，使能有效的平衡风和水系统。
Locations of the system balancing and testing instruments to be used shall be submitted to Hilton Worldwide and Consultant for review and approval before conducting the test. Upon completion of the system balancing for the first time, additional balancing valves and volume control dampers shall be added based on the test results to enhance the balancing of the hydronic and air distribution systems respectively.

2. 在完成有关水和风系统的调节平衡后须提交有关平衡报告。报告应最少包含下列各项数据：
System balancing reports shall be submitted to Hilton Worldwide and Consultant upon

completion of the hydronic and air-distribution systems. The report must at least consist of the following records:

a. 所有测量仪器的种类、型号和刻度调校日期。
Type, model and calibration date of all measuring instruments used.

b. 风量调节平衡报告：
Air volume balancing report:

1. 在主风管和支管所作的风速测试
Testing of Air Velocity at the Main and Branch Duct
2. 风管尺寸
Duct Size
3. 风速测度数量
Quantity of Air Velocity Measurement
4. 风管平均风速
Average Air Velocity in Duct
5. 总风量（m3/s）
Total Air Volume (m3/s)
6. 每个送风及进风口：
Airflow at each Supply Air Diffusers/Grilles and Return Air Grilles
7. 送风和进风口的位置和编号
Location and Serial Number of Supply Air Diffusers and Return Air Grilles
8. 种类和厂家
Types and Manufacturer
9. 有效截面面积因数、内框或接驳颈面积（m^2）
Effective Cross-sectional Area Factor, Internal Frame or Neck Size (m^2)
10. 要求和实际测度的风速（m/s）
Design and Actual Air Velocity (m/s)
11. 要求和实际测度的风量（m3/s）
Design and Actual Air volume (m3/s)
12. 导风片调整位置
Guide Vanes Position

5.7.2. 验收试验
Acceptance Test

A. 在整个工程的交工试运行完成后，将按议定的计划进行系统验收试验。
Upon completion of the project handover and commisioning of the systems, a formal system acceptance test must be conducted as per original plan and schedule.

B. 所有安装的系统及设备均需经验收试验，以证明可达到原设计的意图和要求：
Acceptance test for all systems and equipment shall be carried out to ensure compliance with the orginal design intents and requirements:

C. 冷却塔的测试
Cooling Tower Testing

1. 冷却塔须进行试运转并须对 5.7.3 小节样表规定的数据进行检测。
Cooling tower shall be tested and commissioned based on test records specified in section 5.7.3.

2. 测试每台冷却水塔在正常操作条件下运行的水压降、水流量、出入水温、风机转速、电动机操作电流量及噪音等，并与厂家所提供的数据作复核。
Each cooling tower shall be tested under normal operating conditions for its pressure drop, water flowrate, entering/leaving temperatures, fan speed, motor operating current and noise level, and these test results shall be verified against the performance data provided by the manufacturers.

D. 制冷机的测试
Chiller Testing

1. 每台制冷机均需按下列方法独立进行测试，以证明所安装的系统都达到设计要求，并须对表 5.7.3 小节中规定的数据进行检测：
Each chiller is required to be tested independently according to the following procedures to ensure that the installed systems meet the design requirements and the test records required shall be as per section 5.7.3

2. 在 100%设计负载下作三小时的稳定负载试验。
Three-hour stability load test at 100% loading.

3. 在 15%设计负载下作三小时的稳定负载试验。
Three-hour stability load test at 15% loading.

4. 制冷机须在两小时内四次反复地带不同负载进行测试，从 15%逐步提升到 100%设计负载，然后返回到 15%负载。
The chiller shall be repeatedly tested for four times within two hours under different loadings, gradually increasing from 15% to 100% of the design load, and then return back to 15% of the load.

E. 水泵
Water Pump

1. 每台水泵须测试及记录其在正常操作条件下运行所产生的压头，并与原水泵设计的性能曲线作核对比较，以证实已达到设计的流量要求。同时亦需纪录水泵电动机的电流量，以复核水泵的功率符合本规格说明书要求，须测试的数据见表 5.6-4。
The pump head of each water pump shall be tested under normal operating conditions. The test results obtained shall be verified against the original pump curve to ensure that it meets the design water flowrate. The motor current reading shall also be recorded and verified whether the actual power complies with the specifications. The test records required shall be as per Table 5.6-4.

F. 水循环系统
Water Circulation System

1. 测量每个水流设备，如过滤器、冷冻/采暖盘管等设备于正常操作条件下运行的水压降，并应与有关设备厂家所提供的设计技术数据互相核对，以作复核。须测试数据详见表 5.6-5。
The pressure drop through fittings and equipment, such as strainers, cooling and heating coils, in the water circulation system shall be tested under normal operating conditions. The test results shall be verified against the performance data provided by the manufacturers. The test records required shall be as per Table 5.6-5.

G. 送风和排风风机
Supply and Exhaust Fan

1. 测量每台风机于正常操作的条件下运行的风压差，并与该风机的特性曲线互相核对，以确定可满足设计的风量要求。 须测试数据详见表 5.6-6、表 5.6-7。
The pressure differential across each fan under normal operating conditions shall be tested. The test results shall be verified against the fan curve to ensure that the air flow quantity meets the design requirement. The test records required shall be as per Table 5.6.6 and 5.6-7.

H. 空调处理机组测试
Air Handling Unit Testing

1. 测量空调处理机组在正常操作条件下运作时，每一分段的风压差，和有关进/出盘管的风和水的状态，并与厂家所提供的技术数据作复核。水系统测试记录表格见表 5.6-5，风系统的测试表格详见表 5.6-9、表 5.6-11。
The air-handling unit shall be tested under normal operating conditions for the pressure differential across each section and the cooling/heating coil air-side and water-side performance. The test results shall be verified against the performance data provided by the manufacturer. The water and air sides test records shall be as per Table 5.6-5 and Table 5.6-9 & 5.6-11 respectively.

I. 风机盘管测试
Fan Coil Unit Testing

1. 测量风机盘管在正常操作条件下运作时，进/出盘管的空气温度、盘管冷热量等状态，并与厂家所提供的技术数据作复核。测试表格详见表 5.6-13。
To test for the entering/leaving air temperature, cooling and heating coils performance of the fan coil unit under normal operating condition. The test results shall be verified against the performance data provided by the manufacturer. The test records required shall be as per Table 5.6-13.

J. 通风系统测试
Ventilation System Testing

1. 测度每段通风主管、支管、每个百叶、格栅风口和散流器的风量。须测试数据详见表 5.6-9、表 5.6-10。
The air volume of each main air duct, branch duct, louver, grille and diffuser shall be tested and measured. The test records required shall be as per Table 5.6-13.

K. 锅炉测试
Boiler Testing

1. 锅炉的调试和试运行须由设备厂家所派遣的工程人员进行，如试调时发现有关设备未能达到要求的功能时，承包单位须负责无偿做出修正。
The testing and commissioing of the boiler shall be carried out by engineers from the manufacturer. If it is discovered during the testing that the equipment fails to meet the required performance, the contractor shall be responsible for rectification work at no additional cost.

2. 有关验收试验须证明有关设备在正常操作条件下运作能满足下列各项要求：
The testing and commissioing shall ensure the equipment is able to comply with the following requirements under normal operating conditions:

    a. 功能输出
    Power Output

    b. 热能效率
    Thermal Efficiency

    c. 各项操作情况
    Operation Status of each Component

    d. 有关控制和仪器测量
    Controls and Instrument Measurement

3. 每台设备的调试将以每隔十五分钟从设备最低负载 25%以四个等级递增至全载 100%。在达至全载时须维持运行三十分钟，然后再按序递减至 25%。
The testing for each boiler shall commence from the lowest loading at 25% and gradually increase to 100% full load via incremental of 25% loading for every 15 minutes. When the boiler reaches its full load condition, it shall keep running for 30 minutes, and after which it shall be gradually unload to 25% loading.

L. 热交换器测试
Heat Exchanger Testing

1. 热交换器测试参数详见表格 5.6-14。
The test records required shall be as per Table 5.6-14.

5.7.3. 调试验收样表
T&C sample table

表 5-21 冷却塔检查试运转记录
Table 5-21 Cooling Tower Inspection and Commissioning Record

系统 / 测试描述 System/ Test Description								
测试内容 Test Item								
品牌/型号/系列号 Brand/ Model/ Serial No.								
冷却塔检查记录 Cooling Tower Inspection Record								
冷却塔固定是否牢固 Is cooling tower firmly fixed				风叶盘动是否灵活 Is fan blade movement flexible				
电机绕组对地绝缘电阻(MΩ) Motor winding to ground insulation resistance (MΩ)				风叶旋转方向是否正确 Is fan blade rotating direction correct				
试 运 转 记 录 Commissioning Record								
轴承最高温度(℃) Bearing Maximum Temperature (℃)				电 动 机 Motor				噪声 [dB(A)] Noise [dB(A)]
风机 Fan		电动机 Motor		电压(V) Voltage (V)	运行电流(A) Running Current (A)			
允许 Allowed	实测 Actual	允许 Allowed	实测 Actual		A 相 Phase A	B 相 Phase B	C 相 Phase C	
连续运行时间 Continuous Operation Time		年 月 日 时 分 至 时 分 Y M D Hr Min to Hr Min					环境温度(℃) Environment Temperature (℃)	
备注 Remark：								

见证人 Witness	安装单位 Construction Contractor	监理(建设)单位 Supervisor (Construction)	顾问公司 Consultant
姓名 Name			
公司 Company			
职位 Position			
签名 Signature			

表 5-22 冷却塔测试记录 Table 5-22 Cooling Tower Test Record						
描述 Description		设计参数 Design Parameter		实际数值 Actual Value		备注 Remark
室外温度(干球/湿球) Outdoor Temperature (dry/ wet bulb)						
冷却水流量(l/s) Condenser Water Flow Rate (l/s)						
进/出水温(°C) Supply/ Return Water Temperature (°C)						
水压降(kPa) Water Pressure Drop (kPa)						
风机转速(rpm) Fan Speed (rpm)						
散热风量(m^3/s) Cooling Air Volume (m^3/s)						
电动机功率 (KW) Motor Power (kW)	电动机速度 (rpm) Motor Speed (rpm)					
电动机电压 (V) Motor Voltage (V)	电动机频率 (Hz)/Phase Motor Frequency (Hz)/Phase					
启动电流 (A) Starting Current (A)	运行电流 (A) Running Current (A)					
备注 Remark：						

见证人 Witness	安装单位 Construction Contractor	监理(建设)单位 Supervisor (Construction)	顾问公司 Consultant
姓名 Name			
公司 Company			
职位 Position			
签名 Signature			

表 5-23 制冷机组试运行测试
Table 5-23 Chiller Commissioning and Testing

系统 / 测试描述 System/ Test Description	
测试内容 Test Item	
品牌/型号/系列号 Brand/ Model/ Serial No.	

测试方法/测试记录
Test Method/ Test Record

日期 Date	年 月 日 Y M D	蒸发器 Evaporator						冷凝器 Condenser						压缩机 Compressor						电动机 Motor		
序号 S/N	时间 Time	制冷剂 Refrigerant		冷冻水 Chilled Water				制冷剂 Refrigerant		冷却水 Condenser Water				轴承温度 Bearing Temperature (℃)	润滑油 Lubricating Oil			吸排气压力 Suction/ Exhaust Air Pressure		电压 Voltage (V)	电流 Current (A)	温升 Temperature Rise (℃)
		压力 Pressure (MPa)	温度 Temperature (℃)	压力 Pressure (MPa)		温度 Temperature (℃)		压力 Pressure (MPa)	温度 Temperature (℃)	压力 Pressure (MPa)		温度 Temperature (℃)			压力 Pressure (MPa)	温度 Temperature (℃)	油位 Oil Level	吸入 Suction (MPa)	排出 Exhaust (MPa)			
				进 In	出 Out	进 In	出 Out			进 In	出 Out	进 In	出 Out									
1																						
2																						
3																						
4																						
5																						
6																						

备注 Remark：

见证人 Witness	施工承包单位 Construction Contractor	监理(建设)单位 Supervisor (Construction)	顾问公司 Consultant
姓名 Name			
公司 Company			
职位 Position			
签名 Signature			

表 5-24 水泵测试记录
Table 5-24 Water Pump Test Record

测试内容 Test Item						
品牌/型号/系列号 Brand/ Model/ Serial No.						
描述 Description		设计参数 Design Parameter		实际数值 Actual Value		备注 Remark
水流速度 (l/s) Water Flow Rate (l/s)						
进口泵压 (Kpa) Pump Inlet Pressure						
出口泵压 (Kpa) Pump Outlet Pressure						
扬程 (m) Pump Head (m)						
离心泵汽蚀试验扬程 (m) Centrifugal Pump Cavitation Test Pump Head (m)						
电动机功率 (KW) Motor Power (kW)	电动机速度 (rpm) Motor Speed (rpm)					
电动机电压 (V) Motor Voltage (V)	电动机频率 (Hz)/ Motor Frequency					
启动电流 Starting Current (A)	运行电流 Running Current (A)					
备注 Remark：						

见证人 Witness	施工承包单位 Construction Contractor	监理(建设)单位 Supervisor (Construction)	顾问公司 Consultant
姓名 Name			
公司 Company			
职位 Position			
签名 Signature			

表 5-25 冷冻水冷却盘管测试报告 Table 5-25 Chilled Water Cooling Coil Test Report				
被测试的盘管 Tested Coil		质量保证 Quality Assurance		
设备编号 Equipment No.		管道系统检查表是否完成？ Is the piping system checklist completed?	是/否 Yes/No	
系统 System		冷冻水系统是否检查? Is chilled water system checked?	是/否 Yes/No	
位置 Location		风量是否平衡？ Is air volume balance?	是/否 Yes/No	
		冷冻水系统是否平衡？ Is chilled water system balance?	是/否 Yes/No	
		冷冻水是否存在？ Is there any chilled water?	是/否 Yes/No	
		冷却盘管安装检查表是否完成？ Is cooling coil installation checklist completed?	是/否 Yes/No	
盘管设计数据 Coil Design Data		测试参数 Test Parameter		
制造商 Manufacturer				
型号 Model				
序列号 Serial Number				
额定负载 kW Rated Load (kW)		盘管输出功率 Coil Output Power	kW kW	
设计流量 m^3/s Design Flow (m^3/s)		风量 Air Volume	m^3/s m^3/s	
设计初干球温度 ºC Design Initial Dry Bulb Temperature (ºC)		初干球温度 Initial Dry Bulb Temperature	ºC ºC	
设计初湿球温度 ºC Design Initial Wet Bulb Temperature (ºC)		初湿球温度 Initial Wet Bulb Temperature	ºC ºC	
设计终干球温度 ºC Design Final Dry Bulb Temperature (ºC)		终干球温度 Final Dry Bulb Temperature	ºC ºC	
设计终湿球温度 ºC Design Final Wet Bulb Temperature (ºC)		终湿球温度 Final Wet Bulb Temperature	ºC ºC	
冷冻水出水温度 ºC Chilled Water Supply Temperature (ºC)		冷冻水出水速度 Chilled Water Supply Temperature	ºC ºC	

表 5-25 冷冻水冷却盘管测试报告 Table 5-25 Chilled Water Cooling Coil Test Report				
冷冻水回水温度 ºC Chilled Water Return Temperature (ºC)		冷冻水回水速度 Chilled Water Return Temperature	ºC ºC	
冷冻水流量 l/s Chilled Water Flow Rate (l/s)		冷冻水流量 Chilled Water Flow Rate	l/s l/s	
空气中静压 Pa Air Static Pressure (Pa)		空气中静压 Air Static Pressure	Pa Pa	
机外静压 kPa External Static Pressure (kPa)		机外静压 External Static Pressure	kPa kPa	
备注 Remark：				
见证人 Witness	施工承包单位 Construction Contractor	监理(建设)单位 Supervisor (Construction)	顾问公司 Consultant	
姓名 Name				
公司 Company				
职位 Position				
签名 Signature				
日期 Date				

表 5-26 空调-水系统调试报告
Table 5-26 Air Conditioning Water System Testing and Commissioning Report

系统细节描述
System Detail Description

系统细节 System Detail		测试计量点位/图编号 Measurement and Test Point/ Diagram No.	

流量计量记录
Flow Rate Measurement Record

阀门编号 Valve No.	设计流量 Design Flow Rate l/s	设计静压损失 Design Static Pressure Loss kPa	实际静压损失 Actual Static Pressure Loss kPa	流量速度 升 / 秒 Flow Rate (l/s)			% 设计容积流量速度 % Design Volume Flow Rate		
				实际 Actual	误差 Error		实际 Actual	误差 Error	
					+	-		+	-

备注 Remark：

见证人 Witness	施工承包单位 Construction Contractor	监理(建设)单位 Supervisor (Construction)	顾问公司 Consultant
姓名 Name			
公司 Company			
职位 Position			
签名 Signature			

表 5-27 离心式通风机测试报告 Table 5-27 Centrifugal Ventilation Fan Test Report				
被测试的风机 Tested Fan		质量保证 Quality Assurance		
设备编号 Equipment No.		风机/管道系统检查是否完成 Is the fan/piping system checking completed?	是/否 Yes/No	
系统 System		电力测试是否完成 Is the electrical testing completed?	是/否 Yes/No	
		风机 / 发动机 旋转是否正常 Is the fan/ motor rotation under normal operation?	是/否 Yes/No	
		超载设置 A Overload Setting		
风机数据 Fan Data		发动机数据 Motor Data		
制造商 Manufacturer		制造商 Manufacturer		
型号 Model		型号 Model		
序列号 Serial No.		序列号 Serial No.		
进风口直径 mm Inlet Diameter		框架尺寸 Frame Size		
出风口直径 mm Exhaust Diameter		电压 V Voltage		
传动皮带的数量 mm Driving Belt Quantity		单相/三相 Single Phase/ Three Phase		
滑轮直径 Pulley Diameter		电源频率 Hz Power Frequency		
设计转速 r.p.m Design Rotating Speed	.	转速 r.p.m Rotating Speed		.
所需功率 kW Required Power		滑轮直径 mm Pulley Diameter		
设计流量 m^3/s Design Flow Rate		危险级别 Risk Level		

表 5-27 离心式通风机测试报告 Table 5-27 Centrifugal Ventilation Fan Test Report			
设计进口压力 Pa Design Inlet Pressure		温度 ºC Temperature	
设计出口压力 Pa Design Exhaust Pressure		危险事故的数量 Accident Quantity	
		满载电流 A Full Load Current	
		起动装置 Starting Device	
		效率% Efficiency	
		表面温度 ºC Surface Temperature	
风机测试数据 Fan Test Data		发动机测试数据 Motor Test Data	
进风压力 Pa Inlet Air Pressure		转速 r.p.m. Rotating Speed	
出风压力 Pa Exhaust Air Pressure		电压 V Voltage	
风机转速 r.p.m. Fan Rotating Speed		电源频率 Hz Power Frequency	
流量 m^3/s Flow Rate		起动电流 A Starting Current	
		运行电流 A Running Current	
备注 Remark：			

见证人 Witness	施工承包单位 Construction Contractor	监理(建设)单位 Supervisor (Construction)	顾问公司 Consultant
姓名 Name			
公司 Company			
职位 Position			
签名 Signature			

表 5-28 轴流式通风机测试报告 Table 5-28 Axial Flow Ventilation Fan Test Report					
被测试的风机 Tested Fan			质量保证 Quality Assurance		
设备编号 Equipment No.			风机/管道系统检查表是否完成？ Is the fan/piping system checklist completed?	是/否 Yes/No	
系统 System			电力系统是否完成？ Is the electrical system completed?	是/否 Yes/No	
			风机/发电机旋转是否正常 Is the fan/ motor rotation under normal operation?	是/否 Yes/No	
			超载设置 A Overload Setting		
风机数据 Fan Data			发动机数据 Motor Data		
制造商 Manufacturer			制造商 Manufacturer		
型号 Model			型号 Model		
序列号 Serial No.			序列号 Serial No.		
进风口直径 mm Inlet Diameter			框架尺寸 Frame Size		
是否直接传动？ Direct Drive?	是/否 Yes/No		电压 V Voltage		
传动皮带的数量 Driving Belt Quantity			单相/三相 Single Phase/ Three Phase		
滑轮直径 mm Pulley Diameter			电源频率 Hz Power Frequency		
设计转速 r.p.m. Design Rotating Speed			转速 r.p.m Rotating Speed		.
所需功率 kW Required Power			滑轮直径 mm Pulley Diameter		
设计风量 m^3/s Design Air Volume			危险级别 Risk Level		
设计进口压力 Pa Design Intake Pressure			温度 ºC Temperature		
设计出口压力 Pa Design Exhaust Pressure			危险事故的数量 Accident Quantity		
			满载电流 A Full Load Current		
			起动装置 Starting Device		

表 5-28 轴流式通风机测试报告 Table 5-28 Axial Flow Ventilation Fan Test Report			
		效率% Efficiency	
		表面温度 ºC Surface Temperature	
风机测试数据 Fan Test Data		发动机测试数据 Motor Test Data	
进口压力 Pa Inlet Pressure		转速 r.p.m. Rotating Speed	
出口压力 Pa Exhaust Pressure		电压 V Voltage	
风机转速 r.p.m. Fan Rotating Speed		电源频率 Hz Power Frequency	
流量 m^3/s Flow Rate		起动电流 A Starting Current	
		运行电流 A Running Current	
备注 Remark：			

见证人 Witness	施工承包单位 Construction Contractor	监理(建设)单位 Supervisor (Construction)	顾问公司 Consultant
姓名 Name			
公司 Company			
职位 Position			
签名 Signature			

表5-29 通风空调系统总风量测试记录
Table 5-29 Ventilation Air Conditioning System Total Air Volume Test Record

系统名称 System Name	测试截面面积 (㎡) Tested Cross Section Area (㎡)	测试截面平均风速 (m/s) Tested Cross Section Average Air Velocity (m/s)	系统总风量 测试值 (m^3/h) System Total Air Volume Test Value (m^3/h)	设计值 (m^3/h) Design Value (m^3/h)	测试值与设计值偏差(%) Error between Test Value and Design Value (%)

备注 Remark：

见证人 Witness	施工承包单位 Construction Contractor	监理(建设)单位 Supervisor (Construction)	顾问公司 Consultant
姓名 Name			
公司 Company			
职位 Position			
签名 Signature			

表 5-30 风口风量测试调整记录
Table 5-30 Diffuser Air Volume Testing and Commissioning Record

风口位置或编号 Diffuser Location or Serial No.	风 口形式及规格 Diffuser Type and Specification (mm)	风口有效面积 Diffuser Effective Area	实测风速 (m/s) Actual Air Velocity (m/s)						实测风量 Actual Air Volume	设计风量 Design Air Volume	测试值与设计值偏差 Error between Test Value and Design Value (%)
			1	2	3	4	5	平均 Average			

见证人 Witness	施工承包单位 Construction Contractor	监理(建设)单位 Supervisor (Construction)	顾问公司 Consultant
姓名 Name			
公司 Company			
职位 Position			
签名 Signature			

表 5-31 空调系统试验调整评定表
Table 5-31 Air Conditioning System Testing and Commissioning Assessment Form

工程名称 Project Title		分部（或单位工程） Department (or Company)	
系统编号 System No.		试验日期 Test Date	
设计总风量 Design Total Air Volume（m^3/h）		实测总风量 Actual Total Air Volume（m^3/h）	
风机全压 Fan Total Pressure（Pa）		实测风机全压 Actual Fan Total Pressure（Pa）	
风机转速 Fan Speed（rpm）		实测风机转速 Actual Fan Speed（rpm）	
风机轴功率 Fan Shaft Power（kw）		实测风机轴功率 Actual Fan Shaft Power（kw）	
风机效率 Fan Efficiency（%）		实测风机效率 Actual Fan Efficiency（%）	
备注 Remark：			

见证人 Witness	施工承包单位 Construction Contractor	监理(建设)单位 Supervisor (Construction)	顾问公司 Consultant
姓名 Name			
公司 Company			
职位 Position			
签名 Signature			

表 5-32 冷冻水 /冷凝水管压力测试记录
Table 5-32 Chilled Water/ Condensate Water Pipe Pressure Test Record

系统/ 测试详情 System/ Test Detail			
立管编号： Riser No.		测试方法 Test Method	
设计测试压力 KPa Design Testing Pressure		测试持续时间 (Hrs) Test Duration	

测试结果 Test Result					
描述 Description	日期 Date	时间 Time	测试参数 Test Parameter	测试结果 Test Result	备注 Remark
第一次测试 First Test					
第二次测试 Second Test					

备注 Remark：

见证人 Witness	施工承包单位 Construction Contractor	监理(建设)单位 Supervisor (Construction)	顾问公司 Consultant
姓名 Name			
公司 Company			
职位 Position			
签名 Signature			
日期 Date			

表 5-33 风机盘管测试记录 Table 5-33 Fan Coil Unit Test Record						
描述 Description		设计参数 Design Parameter		实际数值 Actual Value		备注 Remark
室内单位 -通风盘管装置 Indoor FCU	型号： Model:					
总制冷量 (kW) Total Cooling Capacity (kW)						
送风风量 (CMH) Supply Air Volume (CMH)						
回风风量 (CMH) Return Air Volume (CMH)						
室外风量(CMH) Outdoor Air Volume (CMH)						
室内干球温度(°C) Indoor Dry Bulb Temperature (^{o}C)						
室内湿球温度(°C) Indoor Wet Bulb Temperature (^{o}C)						
干球温度(°C) Dry Bulb Temperature (^{o}C)						
湿球温度(°C) Wet Bulb Temperature (^{o}C)						
潜热符合 Latent Heat Load (kW) = (l/s x 2.95 x dg)						
显热负荷 Sensible Heat Load (kW) = (l/s x 1.213 x dt)						
风扇速度 (rpm) Fan Speed (rpm)						
室内噪音水平 Indoor Noise Level						
发动机功率(kW) Motor Power (kW)	发动机速(rpm) Motor Speed (rpm)					
发动机电压 (V) Moto Voltage	发动机频率 (Hz)/ Motor Frequency					
起动电流 (A) Starting Current	运行电流 (A) Running Current					
室外机组- 冷凝机组 Outdoor Unit – Condensing Unit						
制冷吸收压强 (KPa) Cooling Absorption Pressure (kPa)						
制冷排放压强 (KPa) Cooling Discharge Pressure (kPa)						
发动机推力 (KW) Motor Power (kW)	发动机转速(rpm) Motor Speed (rpm)					

发动机电压 (V) Motor Voltage (V)	发动机相位频(Hz) Motor Phase Frequency (Hz)					
起动电流 (A) Starting Current (A)	运行电流 (A) Running Current (A)					
备注 Remark：						

见证人 Witness	施工承包单位 Construction Contractor	监理(建设)单位 Supervisor (Construction)	顾问公司 Consultant
姓名 Name			
公司 Company			
职位 Position			
签名 Signature			
日期 Date			

表 5-34 蒸汽 / 低温热水 热交换器性能测试表 Table 5-34 Steam/ Low Temperature Hot Water Heat Exchanger Performance Test Table				
所测的热交换器 Tested Heat Exchanger		质量保证 Quality Assurance		
设备编号 Equipment No.		管道工程组检查表是否完成？ Is the pipeline engineering checklist completed?	是/否 Yes/No	
系统 System		蒸汽/凝结水安装是否经过检查？ Was steam/ condensed water installation checked?	是/否 Yes/No	
位置 Location		低温热水系统是否稳定？ Is the low temperature hot water system stable?	是/否 Yes/No	
		蒸汽是否可用？ Is steam be able to used?	是/否 Yes/No	
设计数据 Design Parameter		测试参数 Test Parameter		
制造商 Manufacturer				
型号 Model				
序列号 Serial Number				
额定负载 kW Rated Power		额定负载 kW Rated Power		
设计低温热水流速 l/s Design Low Temperature Hot Water Flow Rate		低温热水流速 l/s Low Temperature Hot Water Flow Rate		
设计低温热水出水温度 ºC Design Low Temperature Hot Water Supply Temperature		低温热水出水温度 ºC Low Temperature Hot Water Supply Temperature		
设计低温热水回水温度 ºC Design Low Temperature Hot Water Return Temperature		低温热水回水温度 ºC Low Temperature Hot Water Return Temperature		
设计低温热水静压 barg Design Low Temperature Hot Water Static Pressure		低温热水静压 barg Low Temperature Hot Water Static Pressure		
汽压 barg Steam Pressure		汽压 barg Steam Pressure		
蒸汽温度 ºC Steam Temperature		蒸汽温度 ºC Steam Temperature		
备注 Remark：				

表 5-34 蒸汽 / 低温热水 热交换器性能测试表
Table 5-34 Steam/ Low Temperature Hot Water Heat Exchanger Performance Test Table

见证人 Witness	施工承包单位 Construction Contractor	监理(建设)单位 Supervisor (Construction)	顾问公司 Consultant
姓名 Name			
公司 Company			
职位 Position			
签名 Signature			
日期 Date			

表 5-35 正压送风、消防排烟测试调试
Table 5-35 Positive Pressure Air Supply and Fire Smoke Extraction Testing and Commissioning

系统名称 System Name					系统编号 System S/N			区域 Area				
模拟火灾区域 Simulated Fire Area	测试楼层 Test Floor	模拟火灾层及上、下门同时开启时，门开启处风速（m/s） Simulate Fir Floor and Upper and Lower Door Open Simultaneously, Air Velocity at the Door Open Location (m/s)									系统门全关闭时压差 Pressure Difference if the Whole System Doors are Closed （Pa）	
		1	2	3	4	5	6	7	8	平均 Average V	前室/走道 Antechamber / Corridor	
		前室/走道 Antechamber/ Corridor										
		楼梯/前室 Staircase/ Antechamber									楼梯/前室 Staircase/ Antechamber	
排烟区 Smoke Extraction Area												
	测点风速 Testing Point Air Velocity	1	2	3	4	5	6	7	8	平均 Average V	风口面积 Diffuser Area m²	
排烟口 Smoke Vent												
1												
2												
3												
实测排烟量 m3/h Actual Smoke Extraction Volume (m3/h)												

表 5-35 正压送风、消防排烟测试调试 Table 5-35 Positive Pressure Air Supply and Fire Smoke Extraction Testing and Commissioning	
正压送风、消防排烟测试调试 Positive Pressure Air Supply and Fire Smoke Extraction Testing and Commissioning	
有效容积 m3 Effective Volume (m3)	
换气次数 1 次/h Air Change Rate (1 time/h)	
备注 Remark：	

见证人 Witness	施工承包单位 Construction Contractor	监理(建设)单位 Supervisor (Construction)	顾问公司 Consultant
姓名 Name			
公司 Company			
职位 Position			
签名 Signature			
日期 Date			

表 5-36 楼梯正压送风系统测试报告
Table 5-36 Staircase Positive Pressure Supply Air System Test Report

测试编号 S/N	开门位置 Door Opening Position	通过开门的风速 (9 次测量) m/s Air Velocity through Door Opening (9 Tests)									平均风速, m/s Average Air Velocity)	关门后的压差, Pa Pressure difference after Door Close	开门所需力量, N Force Required to Open the Door	备注 Remark
1.														
2.														
3.														
4.														

见证人 Witness	施工承包单位 Construction Contractor	监理(建设)单位 Supervisor (Construction)	顾问公司 Consultant
姓名 Name			
公司 Company			
职位 Position			
签名 Signature			
日期 Date			

第6章. 燃油燃气系统
SECTION 6: GAS AND FUEL SYSTEM

6.1. 燃气系统
GAS SYSTEM

A. 燃气系统由当地燃气公司设计，但方案阶段需前期预留相关的机房与管道路由，并协调与其它建筑房间的布置。
Gas system shall be designed by the local gas company. However, relevant plant room and pipe routing shall be reserved at the initial planning stage and coordinated with the layout of other architectural rooms.

6.1.1. 燃气种类
Gas Types

A. 燃气包括天然气、人工煤气及液化石油气。根据燃气压力不同又可分为：低压燃气、中压燃气、高压燃气。
Gas includes natural gas, artificial coal gas and liquefied petroleum gas. Based on different gas pressure, there is low pressure gas, medium pressure gas and high pressure gas.

B. 厨房燃气为低压燃气，燃气压力应满足厨房灶具额定压力的要求，具体要求由厨房顾问提供；
Kitchen gas is low pressure gas. The gas pressure shall meet the rated pressure of the kitchen cooker. The specific requirements shall be provided by the kitchen consultant.

C. 锅炉燃气为中压燃气，燃气压力应小于 0.4MPa。
Boiler gas is medium pressure gas. The gas pressure shall be less than 0.4MPa.

D. 当燃气进户压力大于设备额定压力时，应根据项目实际情况设置调压站及调压装置。
If the incoming gas pressure is higher than the equipment rated pressure, pressure regulator station and regulating device shall be provided based on the project actual condition.

6.1.2. 燃气量
Gas Consumption

A. 酒店燃气用气量包括：厨房燃气用量、生活热水用气量及采暖通风空调用气量。
Hotel gas consumption includes kitchen gas consumption, domestic hot water gas consumption and HVAC (heating, ventilation and air-conditioning) gas consumption.

B. 厨房燃气用量应根据厨房顾问要求预留。
Kitchen gas consumption shall be reserved as per the kitchen consultant’s requirements.

C. 生活热水及采暖通风空调用气量应根据热水负荷、采暖空调热负荷、酒店热源及酒店燃气种类进行计算。
Domestic hot water and HVAC gas consumption shall be calculated based on the hot water load, heating and air-conditioning load, hotel heat source and hotel gas type.

D. 应在以下区域设置燃气计量装置：
Gas meter shall be provided in the following areas:-

1. 建筑燃气进线总管；
Main gas incoming pipe for the building;

2. 每个厨房燃气进气总管；
Main gas incoming pipe for each kitchen;

3. 锅炉房每台锅炉燃烧器进气管；
   Gas incoming pipe for each boiler;

6.1.3. 燃气报警
Gas Alarm

A. 在以下区域设置燃气浓度检测报警器，燃气报警装置与事故通风机连锁：
Gas concentration detector alarm shall be provided in the following areas. Gas alarm device shall be interlocked with the emergency ventilation fans.

B. 酒店专用的封闭式燃气调压、计量间；
Dedicated hotel enclosed gas pressure regulator and metering room;

C. 地下室、半地下室及地上密闭的用气房间，如封闭式厨房、锅炉房等；
Basement, semi-basement and aboveground enclosed room with gas supply, such as enclosed kitchen, boiler room, etc;

D. 地下室、半地下室引入管穿墙处；
Basement and semi-basement lead-in pipe wall penetration area;

E. 有燃气管道的管道层。
Pipeline space with gas pipe

6.1.4. 燃气安装
Gas Installation

A. 燃气管道不应穿越水平防火分区，竖向管道宜布置在建筑室外，如果设置在室内管井需获得当地消防管理部门和燃气公司的批准。
Gas pipe shall not pass through horizontal fire compartment. Vertical pipe is recommended to be located out the building. If the indoor pipe riser is proposed, approval from the local fire management department and Gas Company shall be obtained.

6.2. 燃油系统
FUEL SYSTEM

6.2.1. 燃油种类
Fuel Type

A. 柴油发电机、锅炉燃烧的燃料宜使用 0#柴油。
Diesel generators and boiler is recommended to use diesel oil.

6.2.2. 储油量
Fuel Capacity

A. 柴油发电机储油量应满足不低于柴油发电机运行 24h 的燃油储油量要求；并应满足国家和地方相关规范要求。
The fuel capacity of the diesel generator shall not be less than the capacity which enable the engine to run for 24 hour and shall comply with the relevant national and local regulations.

B. 锅炉燃烧储油量应满足不低于锅炉 24h 的锅炉燃油量，并应满足国家和地方相关规范要求。对于燃油作为锅炉主燃料的项目，锅炉具体储油量须与希尔顿全球协调确定。
The fuel capacity of the boiler shall not be less than the capacity which enable the boiler to

operate for 24 hour and shall comply with the relevant national and local regulations. For project using fuel as the main mean of heating of boiler, the specific fuel capacity shall be coordinated and confirmed by Hilton worldwide.

6.2.3. 燃油系统流程图
Fuel System Flowchart

A. 酒店燃油系统宜按以下流路程图进行设计。
Please refer to the schematic below for the recommended hotel fuel system design.

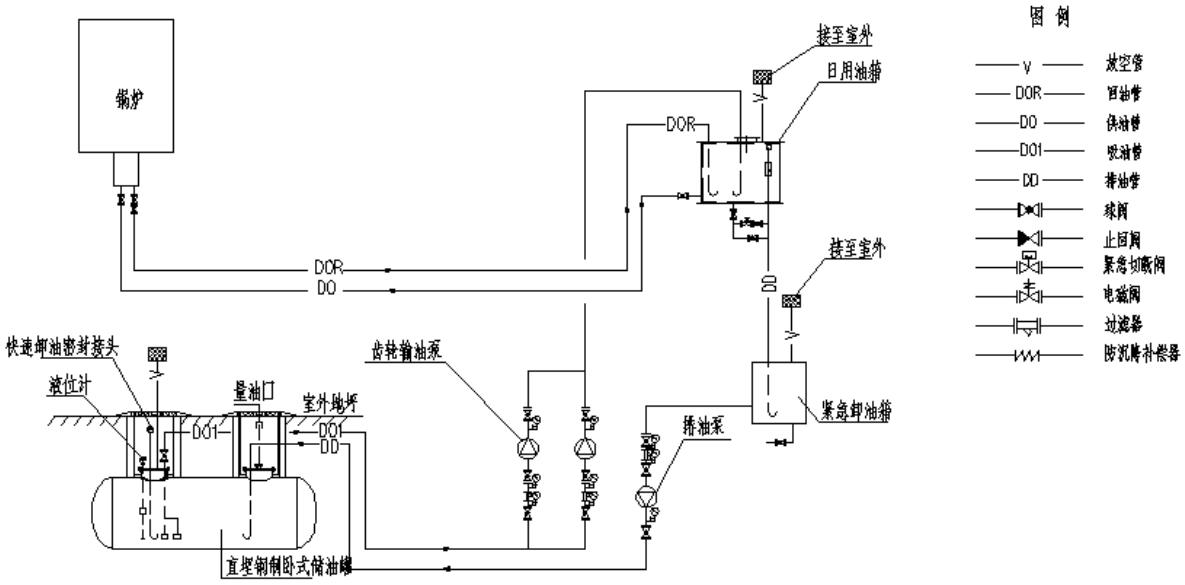


图 6-1 锅炉房燃油系统流程图

Figure6-1 Boiler Room Fuel System Flow Chart

第7章. 弱电系统
SECTION 7: EXTRA LOW VOLTAGE SYSTEM

7.1. 概述
GENERAL

A. 本章节所包含的设计内容仅适用于制定希尔顿全球基本的弱电系统标准，如果地方规范高于希尔顿全球标准，则按照高的标准执行。
Design content for this chapter is primarily intended to used as a basic standard of Extra Low Valtage (ELV) System for Hilton Worldwide. Wherever the local standard is higher than this standard, the Local standard shall be used.

B. 所有弱电系统应满足国家和当地技防办的相关要求。
All ELVA System designs shall comply with National standard and Security Technology Defense management requirement.

7.2. 设计标准和要求
DESIGN CRITERIA AND REQUIREMENT

A. 中国地区弱电系统的设计及安装必须依据但不限于下列国家标准的最新版本进行设计、安装和测试
Design and installation for ELV Systems in China shall follow but not limit to the latest version of the standards as listed below for design, installation and testing.

1. GB50314 智能建筑设计标准
   GB50314 Standard for Design of Intelligent Building
2. JGJ16 民用建筑电气设计规范-
   JGJ16 Code for Electrical Design of Civil Building-
3. GB50200 有线电视系统工程技术规范
   GB50200 Technical Code for Regulation of CATV System
4. GB50311 综合布线工程设计规范
   GB50311 Code for Engineering Design of Structured Cabling system-
5. GB50174 电子计算机机房设计规范
   GB50174 Design Code for IT Server Room
6. GB 50348 安全防范工程技术规范
   GB50348 Technical code for engineering of security and protection system
7. GB 50394 入侵报警系统工程设计规范
   GB 50394 Code of Design for Intrusion Alarm Systems Engineering
8. GB50198 民用闭路监视电视系统工程技术规范
   GB50198Technical Code for Civil Closed Circuit Monitoring TV System Engineering
9. GB50395 视频安防监控系统工程设计规范
   GB50395 Code of Design for Video Monitoring System
10. GB50396 出入口控制系统工程设计规范
    GB50396 Code of Design for Access Control Systems Engineering

11. GB 50371 厅堂扩声系统设计规范
    GB 50371 Acoustic Characteristics of the Sound Reinforcement System

12. GB/T15381 会议系统及其音频性能要求
    GB/T15381 Electrical and Audio Requirement for the Conference Systems

7.3. 网络通信与布线系统
Network Commnunication and Cabling System

7.3.1. 语音及数据布线系统
Voice and Data Cabling System

A. 总则
General

1. 此文件作为希尔顿全球的语音、数据以及无线覆盖布线标准。随着市场新的技术不断更新，语音及数据布线标准会在一定的时间段内进行更新；
   This document shall be used as voice, data and wireless coverage standard for Hilton Worldwide and shall be updated periodically with new market technology.

2. 随着 IT 技术不断发展，酒店的信息化系统必须能够应对 IT 技术不断发展更新而带来响应问题。随着新技术的出现，酒店必须对客人的需求，以及同行业的竞争做出响应。所有新建酒店必须使用六类或更高的缆线进行布线。
   Hotel IT System shall meet with the latest IT Technology development requirement and update relevant issues. The Hotel shall response to guest requirement and Profession competition. Cat6 or higher grade cabling shall be used for all new Hotels.

B. 语音系统布线要点
Voice System Cabling Criteria

1. 酒店语音系统垂直主干大对数采用三类线缆。具体大对数电缆数量根据酒店实际情况设计；
   Star topology copper based UTP cables shall be used for vertical backbone distribution of Hotel voice system. The quantity of multi-pair UTP cable shall be determined based on Hotel actual situation.

2. 酒店楼层弱电间到用户点语音系统水平布线采用六类线缆，六类线缆必须是一次成型线，中间不能出现接头；
   Cat6 cable shall be used for horizontal cabling from Hotel ELV riser to end user point. All Cat6 cables shall be single length, joint-free type, no connector is allowed.

3. 电话机与用户信息面板连接线缆采用一次成型线，中间不能出现接头。
   Connecting cable for telephone to data outlet shall be single length, joint-free type, no connector is allowed.

C. 数据系统布线要点
Data System Cabling Criteria

1. 酒店数据网络分为酒店管理网络和酒店客用网络。酒店管理网络必须和客用网络物理分隔。酒店设备网络属于酒店管理网络的子网络；

Hotel data network shall be separated into Hotel management network and Hotel guest network. The 2 network shall be physically separated. The Hotel equipment network is part of the Hotel management network system.

2. 酒店数据系统垂直主干采用多模光纤。具体光纤数量根据酒店实际情况设计；
Multi mode fibre shall be used for vertical backbone distribution of Hotel data system. The actual design quantities shall be detemined based on Hotel actual situation;

3. 楼层弱电间连到计算机机房垂直主干光纤需要有冗余；
Spare vertical backbone fibre cables shall be provided from ELV Riser to IT server room.

4. 酒店楼层弱电间到用户点数据水平布线采用六类线缆，六类线缆必须是一次成型线，中间不能出现接头；
Cat6 cables shall be used for horizontal cabling from Hotel ELV riser to end user point. All Cat6 cables shall be single length, joint-free type, no connector is allowed.

5. 每一根从弱电间到用户点数据连接线缆长度不能超过 90 米，超过 90 米的中间需要加交换设备；
All Cat6 cabling from ELV Riser to end user point shall not be more than 90m. Conversion equipment shall be used if cable is longer than 90m.

6. 酒店客房内预留 IPTV 末端点位，水平布线采用六类线缆，六类线缆必须是一次成型线，中间不能出现接头。
IPTV terminal point shall be provided in Hotel guestroom. Cat6 cables shall be used for horizontal cabling. The cable shall be single length, joint-free type, no connector is allowed.

D. 无线网络覆盖系统布线要点
Wireless Network Coverage System Cabling Criteria

1. 无线网络并入客房网，无需单独组网；
Wireless network shall be integrated with guestroom network. Separate network is not required.

2. 酒店无线网络覆盖系统水平布线采用 AC+智能型 AP 的覆盖方式。
AC+ Intelligent type AP coverage shall be used for horizontal cabling of Hotel wireless network coverage system.

E. 酒店区域语音及数据点位基本配置
Voice and Data Point Distribution for Hotel Area

1. 语音及数据点位配置要求详见 7.11.1 小节《综合布线点位表》。
Voice and data point distribution requirement shall refer to Table 7.21.1 <<Structured Cabling Point Schedule>>.

2. 酒店客人活动区域需要实现无线上网覆盖。例如：酒店总统套房、标准套房、客房、行政酒廊、宴会厅、会议室、多功能厅、游泳池、酒吧、所有餐厅、大堂、大堂吧、电梯厅、地下车库等。无线网络路由与客用网络路由合用。
Hotel guest activity area shall be covered by wireless network coverage such as Hotel presidential suite, standard room, guestroom, executive lounge, banquet, meeting room, multi function rooms, swimming pool, bar, all restaurants, main lobby, lobby bar, lift lobby

and basement carpark, etc. Wireless network coverage shall be integrated with Hotel guest network.

3. 若酒店餐饮需要无线点菜系统则在酒店内网中预留线缆及点位。
Cables and point shall be provided for wireless ordering dish system if required for Hotel restaurant.

7.3.2. 计算机网络系统
Computer Network System

A. 网络系统要求
Network System Requirement

1. 酒店数据网络分为酒店管理网络和酒店客用网络，酒店管理网络必须和客用网络物理分隔。酒店智能化设备网络独立设置，由工程部管理。
Hotel data network shall be separated into Hotel management network and Hotel guest network. The 2 systems shall be phycially separated. Hotel intelligent equipment network shall be installed seperately and managed by Hotel engineering department.

2. 酒店管理/客用网络采用二层结构，单核心组网设计，接入交换机至核心交换机之间采用千兆链路分别上连，提供冗余可靠安全的网络构架；
Hotel management and guest network shall be 2-tier structured type. Single core networking mode with gigabit link shall be used for connection with network switch and core switch to provide spare, stable and safe network structure.

3. 酒店的客房网/办公网核心交换机和接入层交换机之间以星形方式通过千兆光纤联接；
Gigabit fibre cable with star connection shall be used to connect Hotel guestroom network/office network core switch and access layer switch.

4. 酒店的客房网/办公网用户终端通过楼层配线间由接入层交换机通过千兆光纤上联核心交换机，经核心交换机及出口设备访问 INTERNET，做到千兆骨干，百兆到桌面的网络带宽；

5. Hotel guestroom network/office network end user shall be linked to upstream core switch through access switch in floor distribution room for internet access, in realization gigabits bandwidth for vertical backbone and megabits bandwidth for desktop;

6. 客房网络要求：客房网络采用 VLAN 隔离，相互禁止访问。每间客房一个 VLAN，客房 VLAN 之间不可以互相访问；
Guestroom network requirement: Guest room network shall be isolated with VLAN with no in-between network access. One VLAN for each guest room with no in-between access among guest rooms.

7. 客房网通过布署宽带计费网关系统进行管理或计费；
Guestroom network shall be managed and accounted by installing broadband accounting gateway system

8. 管理网络要求：所有用户处于同一 VLAN，不允许添加多个 VLAN，采用希尔顿标准设置 IP 地址；
Network management requirement: All users shall be under one VLAN with Hilton Worldwide standard IP address. No additional VLAN is allowed.

9. 管理网使用防火墙进行安全控制，严格控制酒店员工的上网行为；
   The management network shall be secured by firewall. Hotel staff internet surfing shall be strictly restricted.

10. 应实现客人活动区域无线网络（Wi-Fi）信号全覆盖, 范围包括酒店所有客房, 各客房楼层的走道, 酒店大堂, 商务中心, 行政酒廊, 各餐厅, 各酒吧, 各宴会厅及会议场所以及其它客人活动区域, 为酒店客人提供数据、语音的无线信号覆盖；
    Wi-Fi Signal full coverage shall be provided for guest activity areas which includes all guestrooms, guestroom corridors, hotel lobby, business center, executive lounge, restaurants, bars, banquets, meeting places and other guest activity areas to provide data and voice wireless signal coverage.

11. 无线网络并入客房网，无需单独组网；
    Wireless network shall be integrated with guestroom network. No separate network is required.

12. 客用网和管理网的网络设备需统一用一个品牌；
    Network equipment brand for guest and management network shall be of the same brand;

13. 防火墙的设置需满足酒店 IT 经理的要求；
    Firewall installation shall comply with requirement of Hotel IT Management;

14. 引入酒店的网络带宽容量为客房网 50M~100M、办公网 10M~20M。（具体宽带容量需征询酒店管理公司而定）；
    Hotel incoming network bandwidth shall be 50M ~ 100M for guestroom network and 10M ~ 20M for office network. (Actual bandwidth shall be determined by the Hotel management Operator);

B. 核心交换机配置要求
   Core Switch Configuration Requirement

1. 酒店网络采用二层结构，单核心组网设计，接入交换机至核心交换机之间采用千兆链路分别上连，提供冗余可靠安全的网络构架；
   Hotel network shall be 2-tier structured system. Single core networking mode with gigabits link shall be used for connection with network switch and core switch to provide spare, stable and safe network structure.

2. 核心交换机的交换容量应满足在端口满配置的情况下(含所有备用插槽),所有端口之间实现全线速交换即千兆全双工. 核心交换机必须具备适当扩展能力, 在满足现有需求的情况下, 至少具有 1-2 个预留业务插槽备用.该设备应具有全部第三层的交换功能，支持平滑过渡万兆骨干网络和万兆光纤的连接；支持 8 条或 8 条以上的链路汇聚和跨模块的链路捆绑。核心设备配置冗余引擎和冗余电源，确保可靠性，提供不中断的切换和升级技术；
   Exchange capacity for core switches shall be enough for all ports full speed switch namely gigabyte full duplex when all ports have been fully allocated (Including spare port). The core switch shall be expandable with minimum 1-2 reserved spare ports. The equipment shall have all the functions of the third layer with smooth transition for connecting to 10 gigabyte main frame network and 10 gigabyte fiber optic. The core switch shall also support convergence for link more than 8 links and link bonding for cross-module. The

configuration for the core switch shall be redundant for spare capacity and spare power source to assure stability with no interruption during switching and upgrading.

3. 核心设备支持环状以太网链路自动收敛技术，收敛时间必须小于 50ms（链路故障时，IP 电话都可以不中断的电信级保护技术）；
   Core equipment shall support the link auto convergence technology for the ethernet ring network with convergence time less than 50ms (Carrier grade ethernet protection for IP Phone without being cut off when there is a link fault)

4. 核心设备支持基于第三、四层的访问控制和线速流量的统计和监测，以及 QoS 功能，比如提供端口速率限制，多等级区分服务，进行基于 IP 的多媒体业务传输，保证多媒体业务的传输带宽；
   Core equipment shall support statistic and surveillance which are based on the third and fourth tier access control and line-speed flow rate. The equipment shall also support the QoS function such as port speed control with multi-grade services, multimedia services transmission based on IP techonolgy to ensure its transmission bandwidth.

5. 核心设备支持 CPU 自动防 DOS 攻击技术、端口过滤和基于第二、三、四层的丰富的访问控制 ACL，以保证网络的安全性和高可靠性；
   Core equipment shall support the CPU auto anti-DOS attack technology, port filtration and access control list (ACL) including the second, third and fourth layers to ensure safety and reliability;

C. 接入交换机和 POE 交换机配置要求
   Access Switch and POE Switch Configuration Requiremen

1. 接入层交换机上连至核心交换机，对下实现用户的桌面接入。接入层交换机根据端口数主要分为 24 口和 48 口两种型号
   Access layer switch shall be linked to upstream core switch and downstream user desktop. The switch shall be separated into two main types, 24 Ports and 48 Ports.

2. POE 交换机主要将为无线 AP 和 IP 电话提供电源。每个端口都将提供 15.4W，以确保所有接入设备电能的稳定性。
   POE Switch is mainly for power supply to wireless AP and IP Phone. Each port shall be provided with 15.4W power to ensure stable supply to the connected equipment.

3. 每台接入交换机均通过两条光纤以千兆速率上连至核心交换机，提供冗余可靠安全的网络构架。
   Each access switch shall be linked to upstream switch through two fibre cables with gigabit speed to provide spare, stable and safe network structure.

4. 要求交换容量 12Gbps(24 口)或者 17Gbps(48 口)，包转发率≥9Mpps(24 口)或者≥13Mpps(48 口)。接入层使用 10M/100M 以太网方式为用户提供接入。接入层交换机也必须支持千兆的 LACP 链路捆绑。
   Exchange capacity shall be 12Gbps(24 ports) or 17 Gbps(48 ports) with packet forwarding ratio ≥9Mpps (24 ports) or ≥13Mpps (48 ports). 10M/100M Ethernet access shall be provided at access layer for user access. Access layer switch shall support gigabit LACP Link binding.

D. 无线网络设备配置要求
Wireless Network Equipment Confirguration Requirement

1. 基于当前主流的 802.11b/g/n 技术，采用无线控制器 AC＋无线接入点 AP 设备作为系统架构；
Base on current mainstream 802.11 b/g/n technology by using wireless controller AC + wireless access point AP equipment as the system structure;

2. 在无线管理中心对无线 AP 进行统一配置和管理；
Distribution and management of the wireless AP to be centralized in wireless management center.

3. 无线覆盖区域边缘场强：大于-65dBm；
Field density for Wireless coverage boundary area: more than -65 dBm;

4. 无线覆盖区内可接通率：在无线覆盖区域内的 90%位置和 99%的时间，无线网卡可接入网络；
Switching rate in wireless coverage area: Network can be accessed by the wireless network card within 90% of all the locations and 99% of all the time which is covered by the wireless coverage area.

5. 设计应当考虑支持冗余架构，无单一故障点；
The design shall allow for spare structure with no single fault point;

6. 可提供完整的无线网络管理软件，可以集中管理所有 AP、控制器/无线交换机；软件应当具有对 150 台以上 AP 进行管理，并具有相应的扩展能力；
Able to provide integrated wireless network management software for centralised management of all AP and controller/wireless switch; The software shall be able to manage more than 150 sets of AP and have relevant expansion ability.

7. 系统应当实现自适应负载均衡（用户级/AP 级）功能、支持 AP 自愈技术；
The system shall be capable for auto-adaptive load balancing function(User Grade/AP Grade) and be able to support AP Self-healing technology;

8. 满足无线用户的无缝三层漫游要求；
Comply with the wireless user’s requirement on the third layer seamless roaming;

9. 应当能很好的支持未来无线网络发展 VoWLAN、视频、组播以及移动业务趋势；
Ability to support the future trend of wireless network development VoWLAN, video, multicast and mobile services;

10. 还应当支持用户管理、用户策略分组、用户定位等；
Ability to support user management, user grouping strategy and user orientation, etc;

11. 要求所有无线 AP 都为智能 AP，即“胖 AP”与“瘦 AP”兼容；
All wireless shall be intelligent AP which shall compatible with “Fat AP” and “Fit AP”

12. 由于无线网络服务于客人，故无线网络需考虑认证；客人终端接入，需进行身份 认证，通过后接入到互联网；
Wireless network shall serve guest with authentication: User must register through terminal with identity authentication for network connection;

13. 可在无线中心配置冗余无线控制器管理所有 AP，对其访问、安全、配置进行全局管理；
Spare wireless switch in wireless management center can be used to manage all APs to have an overall monitoring for access, safety and configuration.

14. 无线 AP 采用 POE 供电形式。
POE power supply method shall be used for wireless AP.

7.3.3. 程控交换系统
PABX System

A. 配置要求
Configuration Requirement

1. 酒店程控交换机采用基于 IP 技术的 PBX；
Hotel PABX system shall be PBX with IP Technology;

2. 客房话机可采 IP 话机或模拟话机；
Guestroom telephone shall be IP Phone or Analog phone;

3. 程控交换机容量需求：容量按客房数×2+400 计算容量线数；
PABX capacity: The capacity shall be No.of Guestrooms x 2 + 400 points;

4. PC 话务台（100 间客房配置一个话务台，最低不低于 2 个，需要配置头带耳机）；
PC Console (One Console for 100 guestrooms, but not less than 2, with headset earphone) ;

5. 原厂家电源模块，保证断电情况下保证 4 小时或以上的使用时间；
Original battery module with minimum 4 hours backup time during power failure;

6. 总机电话录音设备或系统，至少保留话务台 24 小时录音设备。
24 Hours audio recording shall be provided for main telephone recording equipment or system;

B. 功能要求：
Function Requirement:

1. PBX 的控制系统必须冗余热配置：CPU 板、机架控制板、二次电源、音频接收器、铃流发生器等公共控制部件均为双备份，双套设备互为备份，主备系统切换时不能中断正在通话的电话；
Control system for PBX shall be provided with redundancy heat configuration: Common control devices such as CPU Panel, rack mount control panel, secondary power source, audio receiver and ringing generator, etc shall be dual backup type with no phone interrupt when the main and backup system change over;

2. 具体 DID（直接呼入）业务功能；
DID (Direct-Inward-Dialing) service function;

3. 恶意呼叫追踪查询：可以通过系统查询内部恶意骚扰电话；
Malicious call tracing: can identify internal malicous call through the system;

4. 分机编号计划应能满足酒店灵活的分机号码编制计划；
   Plan for extension number shall comply with Hotel flexible requirement;

5. 多国语言提示，同时支持 4 国语言以上，本功能用于数字话机显示屏、语音信箱提示音、叫醒的语音提示及分机功能的使用引导；
   Multiple languages prompt function with minimum 4 languages for digital telephone set screen, voice mailbox alert, awake alarm and user guide function for extension telephone;

6. 具有语音导航功能；
   Video guide function shall be provided;

7. 团队入住时，PBX 能在同一时间至少呼叫 50 个客房，2 分钟内呼叫整个团队客房；
   When the Hotel is occupied by tour group, the PBX shall be able to call 50 guestrooms at the same time within 2 minutes;

8. 留言灯点亮功能 所有的分机端口必须提供留言灯点亮功能；
   Message indicator function: All extension phone port shall be provided with message indicating funciton;

9. 计费数据备份功能：PBX 的计费原始话单要求能保存 2000 张以上话单；
   Billing data backup function: At least 2000 pieces of Original telephone bill shall be saved in PBX.

10. 多方会议功能：PBX 应能提供 8 方以上的语音会议系统，用于内外线电话的会议、酒店内部的例会等；
    Multiuser conference function: the PBX shall provide video conference system for minimum 8 parties for Internal/external telephone conferenece and Hotel internal regular meeting, etc.

11. 高端数字话机：要求具备：复线功能，显示来话号码、用户姓名、VIP 的信息，支持按姓名拨号；
    High-end digital telephone set: Functions required: dual line function, incoming call display, user name, VIP Information and dialing by name.

12. 普通数字话机电话：要求具备：复线功能，显示来话号码；
    Normal digital telephone set: Functions required: dual line function, incoming call display; PBX

13. 设备应具备与公网手机的无线集成功能，利用公网手机的 V 网（虚拟网）组建无线分机系统，手机可以与交换机的分机功能一样，并实现分机与手机的短号互拨；提供 给客人和员工的的手机都可以通过交换机实现等级限定，通话记录账单的实时计费等功能；
    PBX Equipment shall have the function of wireless integration with public handphone internet to set up wireless extension mobile system; The handphone shall have the same function with the extension mobile with inter-communication ability by using short extension number; All guest and staff handphones shall be graded by switch with real-time billing function for call records;

14. 计费语音信箱系统的接口：必须实现与 JAZZ/DUVOICE/HOTSOS 或 FCS 系统的连接；
Voicemail billing system port: shall be able to linked to JAZZ/ DUVOICE/ HOTSOS or FCS system.

15. 火警电话通系统（选项） 当酒店有火警预案通知时，通过火警电话通知系统，自动告知每位住店客人，告诉客人及时撤离房间。此功能可根据用户实际情况选用。
Fireman intercom system (Optional) : When Hotel fire alarm has been activated, alert shall be sent to the system through fireman telephone to inform all guests to evacuate in time. The function is optional for user to select based on user's actual requirement.

C. PC 话务台功能要求：
PC Attendant Console Function Requirement:

1. 所有的话务台都采用 PC 方式，具有智能化的 ACD 排队功能，保证电话的正常转接。
All attendant console shall be PC type with intelligent ACD queueing function to ensure normal transfer.

2. 对所有的话务台进行在线录音，系统可通过通话日期、摘机时间、挂机时间、当前通话时间、主叫号码、被叫号码等方式查询，为保证录音质量，不能采用听筒并线方式，录音文件的存贮在半年以上，实现话务录音文件的统一管理。
Online voice recording function shall be provided for all attendant consoles; The system shall be able to check talk time, off-hook time, on-hook time, holding time, calling number and called number, etc to ensure voice recording quality; No receiver twist method is allowed; the voice recorded document shall be saved at least for half a year to ensure unified management.

3. 当 PBX 分机呼叫外线被叫电话（固定话机或移动手机）时，外线如果未及时接听电话，按主叫总机电话号码回叫时将接续到酒店的话务台处，话务台屏幕上将自动弹屏出主叫分机号码及姓名，能够解决“谁找我？”的问题。
When the PBX extension telephone been called by external telephone(Fixed telephone or mobilephone), the user can call the master station indicating his extension number and name on screen to solve the “Who look for me?” issue when the external telephone is not been engaged.

7.3.4. 无线对讲系统
WIRELESS WALKY-TALKY SYSTEM

A. 总则
General

1. 为解决酒店管理，保安巡逻、设备维修等通话联系，应配置专供工作人员通讯使用的无线对讲设备。由于各地酒店物业所在地的地理条件各不相同，可根据各地的通讯频率使用不同型号的设备。为了最佳地满足各个酒店项目的需求，应认真考虑各个设备型号、频率要求和功率要求。
Wireless walky-talky system shall be provided for hotel management, guard patrol and equipment maintenance, etc. The communication frequency shall be based on local conditions and requirements. Equipment type, frequency and power requirement shall be considered for different hotel requirement.

B. 系统要求
System Requirement

1. 酒店应配置无线数字对讲系统，该系统至少容纳 4 个工作组在系统内同时工作，所有功能需满足酒店的使用要求；
Wireless digital radio talk-back system shall be provided to allow for 4 groups concurrent operation with all functions meet with hotel requirements;

2. 应至少采用 2 套数字信道机，实现多通话组（2-4 组）；
At least 2 digital channels processors shall be provided for multiple telephony (2 -4 lines);

3. 应采用独立的手提对讲系统方式工作，本系统须有本身的频率及设备；
The system shall be provided with independent handset , frequency and equipment;

4. 电磁场覆盖面之强度须优于 150μV/m 而没有杂声及干扰，或为当地无线电委员会认可的强度；
Signal intensity shall be higher than 150μV/m with no noise/interference or approved density by local radio regulation comission;

5. 若信号强度不够，应考虑干线放大器或光纤放大器；
Trunk amplifier or fiber amplifier can be used for signal enhancement;

6. 应提供足够的天线，有关的设备及配件须确保可覆盖所有酒店区域；
Sufficient antennas with related equipment and accessories shall be provided to cover the entire hotel areas;

7. 中央控制设备放置于安保中心内。
Central control devices shall be located in security guard center.

C. 覆盖区域
System coverage

1. 所有的楼层包括楼梯、电梯、电梯厅
All floors including staircases, lifts and lift lobbies

2. 所有公共区域、客房及机电设备房
All public areas, guest rooms and M&E rooms

3. 地下室、宴会厅
Basement and banquet

4. 室外消防通道
Outdoor fire exit

5. 地下室、酒店周边红线内
Area within basement and hotel boundary line

D. 设备要求
Equipment Requirement

1. 对讲机采用双频双向自动重复方式，频率须按当地无线电委员会或有关部门规定；
   Dual-frequency bi-directional auto repeat walkie-talkie shall be used; The frequency shall comply with local radio regulation commission or related regulation;

2. 对讲机及相关设备的数量由希尔顿确定，包括皮带扣、皮套、充电器和相关配件，如 300-400 间客房至少配置 50 部对讲机；
   Quantity of walkie-talkie including belt-buckles, leather sheaths, charges and related accessories shall be determined by Hilton Worldwide; Minimum 50 sets for 300-400 guestrooms;

3. 天线宜采用室内全向天线；
   Antenna shall be indoor omnidirectional type;

4. 耦合器及功分器应采用符合通信行业标准，并符合当地无线电管理局批复的频率范围；
   Coupler and power divider shall comply with industry standard and local radio management department approved radio range;

5. 应提供储物架放置在控制室，至少可储存 100 部对讲机。储物架须为可扩展类型，而当要增加储物架时，不需更改原来的架。电池及充电组件亦须供应及安装在每一个架上；
   Expansionable storage racks shall be provided in command center to store minimum 100 sets of walkie-talkies. Battery and charger shall be provided for each rack;

6. 经希尔顿批准后，也可使用同等的产品。
   Equivalent product can be used once approved by Hilton Worldwide.

E. 牌照
   License

1. 应采用放射式的系统。所有的图纸、目录、小册子、技术资料等完全的说明开放回路以获取当地无线电委员会或有关部门的认可；
   The system shall be radial type. All complete specification such as drawings, catalogues, brochures and technical data’s shall be provided to radio regulation commission or related authority for approval;

2. 无线电对讲机获的当地电台执照。
   Local radio license shall be obtained for all walkie-talkies.

7.3.5. 内部寻呼系统
PAGING SYSTEM

A. 总则
   General

1. 酒店寻呼系统是给酒店内部管理使用的，应对高级酒店客房服务中心模式，支持酒店即时服务的无线通讯要求。使用内部分机和 PC 机发送寻呼信息，无额外通讯费用。完全自有的无线系统，酒店自行维护，保证通讯不中断。
   Hotel paging system shall be used by the hotel internal management to cater for the high end hotel room service center mode and to support hotel real-time service wireless communication requirements. Use the internal extension and PC to send paging massage

without additional communication charge. It shall be a completely independent wireless system maintained by the hotel and shall ensure no interruption to the communication.

B. 系统要求
System Requirement

2. 酒店应配置一台寻呼服务器，寻呼服务器安装在客服服务中心或 IT 机房；
The hotel shall provide a paging server which shall be located in the guest service center or the IT room.

3. 酒店内部需组建一套无线发射系统，频率由本地无线电管理委员批准；
A wireless transmitting system within the hotel shall be provided. The frequency shall be approved by the local radio management committee.

4. 寻呼发射机安装在酒店弱电井，系统采用分区域覆盖方案，发射机数量根据酒店无线覆盖要求确定；
Paging transmitter shall be installed in the hotel ELV riser. System shall use regional coverage scheme. The quantity of the transmitter shall base on the hotel wireless coverage requirements.

5. 根据酒店服务人员数量和工作岗位配置寻呼机；
Pagers shall be provided based on the quantity of staff and type of job.

6. 电磁场覆盖面之强度应为当地无线电委员会认可的强度；
The strength of the electromagnetic field coverage shall be approved by the local radio committee.

7. 系统应提供足够的天线确保可覆盖所有酒店区域。
The system shall provide sufficient antenna to ensure coverage for all the Hotel area.

C. 覆盖区域
System Coverage

1. 所有的楼层包括楼梯、电梯、电梯厅
All floors including staircase, elevator and elevator lobby

2. 所有公共区域和客房
All public area and guest room

3. 地下室、宴会厅
Basement, ballroom

4. 消防通道
Fire passageway

5. 酒店周边 200 米内（或为本地无线电管理委员要求）
Within 200 m of the hotel vicinity (or as per requirements of the local radio management committee)

D. 设备要求

Equipment Requirements

1. 系统采用频率须按当地无线电委员会或有关部门规定；
   The system frequency shall be in accordance with the requirements of the local radio committee or the relevant departments.

2. 寻呼机数量由希尔顿全球运营团队确定，包括相关配件；
   The quantity of the pager and its relevant accessories shall be determined by Hilton hotel.

3. 天线采用室内全向天线；
   Use indoor Omni-directional antenna.

4. 耦合器及功分器应采用符合通信行业标准，并符合当地无线电管理局批复的频率范围；
   Coupler and power splitters shall comply with the communication industry standards and shall comply with the frequency range approved by the local Radio Management Bureau.

E. 系统功能
   System Function

1. 系统应支持单独呼叫，分组呼叫，全体呼叫；
   The system shall support individual call, group call and all call.

2. 系统应提供电话寻呼
   The system shall provide phone paging.

3. 酒店内部局域网内任何一台电脑都可以发送寻呼信息和短信；
   Any computer connected to the hotel internal LAN shall be able to send paging information and messages.

4. 提供手机短信发送功能：信息可同时发送到手机、寻呼机，也可以选择只发送手机和寻呼机；
   Provide mobile phone text messaging function: Information can be sent to mobile phones and pagers at the same time, or can choose to only send to mobile phones or pagers.

5. 需要有酒店管理软件系统接口
   Hotel management software system interface shall be provided.

6. 系统应提供与 FCS、HOTSOS 接口。
   The system shall provide interface with FCS and HOTSOS.

7. 系统提供与酒店消防系统接口。（需与消防系统供应商联络，需消防系统提供相关接口协议）
   The system shall provide Hotel fire system interface. (Contact fire system suppliers, relevant interface protocol shall be provided by the fire system)

8. 系统提供与楼宇自控系统接口。（需与楼宇自控系统供应商联络，需楼宇自控系统提供相关接口协议）
   The system shall provide building automation control system interface. (Contact building automation control system suppliers, relevant interface protocol shall be provided by the building automation control system)

9. 提供寻呼服务器软件监测模块：
   Provide paging service software monitoring module:

10. 对服务器上的寻呼软件模块进行实时监控，发现问题自动重置模块。
    Provide real-time monitoring for the paging software module on the server. Automatically reset the module if problem is detected.

11. 发现严重软件故障，系统可自动重置服务器主机，可以应对 Windows 操作系统的常见软故障。
    If serious software fault is detected, the system can automatically reset the server and it shall be able to handle the common software faults of the Windows operating system.

12. 保证寻呼服务的 24 / 7 的连续运作能力。
    Ensure 24/7 continuous operation for paging service

F. 牌照
   Licensing

1. 系统组网方案获得当地无线电委员会或有关部门的认可；
   The system network scheme shall be approved by the local radio committee or the relevant departments.

2. 无线寻呼系统取得当地无线电管理委员会使用许可证。
   Wireless paging system shall obtain licensing from the local radio management committee

7.3.6. 室内移动覆盖系统
INDOOR MOBILE COVERAGE SYSTEM

A. 总则
   General

1. 克服建筑物的屏蔽效应阻碍，实现与外界的通信。保证建筑内部的各类移动通信用户对移动通信的使用需求。此部分可由运营商负责完成。
   Overcome the shielding effect of buildings and achieve the communication with the external world. Ensure the demand of the use of mobile communication from all kinds of mobile communication users in the building. This section can be provided by the operator.

B. 系统要求
   System Requirements

1. 本系统主要考虑地下室、电梯轿厢内以及室外实现中国移动通讯、联通、小灵通的通讯信号覆盖，覆盖工程的范围为基地内所有需信号覆盖的区域（需经测试后定），同时预留 3G 网络覆盖。
   This system shall mainly consider and achieve the communication signal coverage for China mobile, unicom, PHS in the basement, inside the elevators car and outdoors. The scope of the coverage engineering shall include all the areas which require signal coverage (to be confirmed after testing), at the same time reserve for 3G network coverage.

2. 系统宜采用三网合一的网络的设计；具体的操作模式需根据当地运营商要求。
   The system design is recommended to use triple play network. Specific operating mode shall be in accordance with the requirements of local operators.

7.4. 安全防范系统
Security Defense System

7.4.1. 视频监控系统
VIDEO SURVEILLANCE SYSTEM

A. 总则
General

1. 视频监控系统应采用基于 IP 网络的数字视频监控系统。
Digital IP Video Surveillance system basing should be applied in the hotel.

2. 应为酒店及其周边提供一个可靠、稳定的视频监控系统，图像的前端采集、传输、控制及显示记录、存储、监看、回放等采用数字设备组成视频监控系统，主要设备包含摄像机、网络传输设备、数字录像设备、显示终端等设备。
A reliable and stable video surveillance system shall be provided for the Hotel and its surrounding area; Digital devices shall be used for Image front end acquisition, transmission, control, record, store and review, etc. The system main equipment shall include camera, network transmission equipment, digital video record equipment and display terminal, etc.

B. 摄像机的最低技术要求
Minimum technical requirement for IP Video Camera

1. 至少提供≥500 线全实时视频图像
Minimum ≥500 lines full real-time video images

2. 至少支持两路码流，实时观看视频数据流和存储视频数据流
Support at least two streams with the function of online and offline video data checking

3. 应支持 H.264 或 MPEG4 压缩算法
Support H.264 or MPEG4 compression algorithm

4. 应当支持 ONVIF 协议
Support ONVIF protocol

5. 应配置自动光圈
Equipped with auto iris

6. 应提供标准 SD 插糟，可以选配 SD 本地监控码流存储卡、进行前端缓存补录
Standard SD connector shall be provided for SD local monitor stream memory card for front end cache appendix

7. 支持 DC12V/AC24V 电源输入口，及 POE 供电模式等，并可互为备份
Support DC12V/AC24 Power supply connector and POE Power supply method with backup function for each other

8. 支持音频输入输出，实现语音双向对讲
Support audio signal input/output for two-way voice transmission

9. 应具有视频移动侦测能力，并提供移动侦测报警
Video motion detection with alarm function

10. 应具有字符叠加功能
    On-screen display function

11. 应具有日志功能，可记录网络中断，设备故障等供查询功能
    Log function shall be provided with query ability to record internet interruption and equipment fault, etc

C. 摄像机选型要求：
Camera Selection Requirement:

1. 考虑到酒店大堂、主出入口等重要区域和光照有强烈对比的特殊环境，采用宽动态、背光补偿功能的彩色摄像机；同时应设置 720P 或 1080P 彩色高清高速球型摄像机，可以通过监控中心的操作键盘进行旋转、俯仰、变焦操作、全部采用球型防护罩，并结合现场情况采用金属立杆或采用挂墙支架安装。
   Color cameras with wide dynamic and backlight compensation function shall be used for high daylight contrast special and important areas such as Hotel lobby and main access, etc; 720P or 1080P speed dome color camera shall be installed and be controlled by monitoring center keyboard for different actions control such as rotate, up & down and zoom, etc. All cameras shall be dome type with protection cover mounted on a metal pole or wall bracket support depending on site condition;

2. 所有监控通往室外的公共区域出入门的摄像机应提供每一个进出人员的清晰、无遮掩的图像。在可能的情况下，这些摄像机必须在门的内外两侧安装。
   All cameras installed at common area access leading to external shall provide clear and unblocked image of all access personnel. Camera where applicable must be installed on both sides of the door, inside and outside the door.

3. 公共活动区域以及客人经过区域，为了不对客人形成过多的心理影响和压力，在采用吊顶的区域和适合安装的位置，采用美观隐蔽吸顶半球摄像机。焦距应严格按现场情况调整；
   Dome cameras shall be installed at suspended ceiling and feasible locations in public activity area and guest passage area to avoid psychological effect and pressure. The focal length shall be adjusted according to site condition;

4. 所有外部公共通道门必须装有摄像头，能够对进/出该场所的所有人产生清晰的、无遮挡的图像；摄像机应尽量小巧、不引人注目。
   All external common access doors shall be installed with camera to obtain clear and unblocked image for all access personnel; the camera shall be small and non-obvious.

5. 根据电梯轿厢的结构特点，可选用模拟摄像机通过编码器接入交换机，摄像机须具有小巧、美观、隐蔽的特点，并配置广角镜头，在视频信号中利用楼层字符叠加器将楼层运行层数叠加到画面中，同时通过采用抗干扰器起到防止干扰增强图像效果的目的；
   Considering of lift car configuration, analog cameras can be used to connect with switch through encoder; camera shall be small, neat and covert with wide angle; The floor number shall be superimposed into video signal by signal superposition devices with anti-interference devices to improve the image quality;

6. 机动车出入口、停车场（库）出入口及其他与外界相通的出入口应选用低照度带强光抑制功能的彩色固定摄像机和自动光圈镜头,应能清楚的辨别出入人员的面部特征及机动车牌号；
   Fixed type color camera and auto iris lens with Low illumination level and strong light suppression function shall be used for carpark access, parking lot (garage) access and other access linked with external to clearly identify facial feature of access personnel and car number;

7. 所有的室外摄像机必须安装结实的不低于 IP65 防拆型外壳及考虑防雷的要求；
   All outdoor cameras shall be installed in IP65 anti-dismantle solid enclosure with consideration of lightning protection requirement;

8. 摄像机根据现场实际情况布置不同的快球、半球或者枪机，前场区应无盲点产生，后场区设置摄像机点位满足运营需要。
   Different speed dome, dome or gun type cameras shall be installed base on actual situation; there shall be no blind spot at front area; camera installation for BOH shall comply with operation requirement.

D. 传输网络的要求
   Transmission Internet Requirement

1. 摄像机采用六类非屏蔽双绞线及光纤的综合布线系统架构的主干网络上运行，布线系统设计必须符合所有相关的结构化布线参数；满足综合布线系统的要求；
   Cat 6 Unshielded twisted pair cable and fiber optic structured cabling system shall be used for camera; cabling distribution shall comply with related structured cabling data to comply with the system requirement;

2. IP 系统交换机应为独立一套网络系统。
   IP system switch shall be a standalone network system.

3. IP 系统的网络的架构不应超过三级，优先考虑二级架构（核心级－接入级）；
   IP system network structure shall not be more than three-tier; Two-tier is preferred (Core switch to access switch);

4. 视频传输网络是根据弱电间与弱电机房的设置，设置不同数量、不同端口数量、不同性能的网络交换机，接入端口至少为百兆速率，上联应为千兆光模块上联。
   Video transmission network shall be equipped with network switch of different quantities, port numbers and functions; Network speed shall be minimum megabit for access switch and gigabit for upstream switch.

5. 实时观看视频数据流为组播码流，只有在客户终端设备请求调看图像时，IP 摄像机或编码器才发送视实时观看视频流，并且在多个用户同时调看同一个码流时，该码流在网络中只占用 1 路的带宽。
   Real-time video data stream shall be Multicast stream; real-time video stream can only be sent from IP camera or encoder when received request from guest end equipment; the stream shall only occupy 1 line of the network bandwidth when the stream is linked to multiple users

6. 接入层交换机
   Access switch

e. 对于摄像机分布较为集中的区域，接入交换机以 24 口为主，包转发率应不低于 6.5Mpps；
24 ports access switch shall be used for centralize distributed cameras with Mpps not less than 6.5Mpps.

f. 对于摄像机分布较为分散的区域，可适当选择 16 口，8 口交换机；16 口交换机包转发率不低于 5.4Mpps，8 口交换机包转发率不低于 2.7Mpps；
8 or 16 ports access switch shall be used for decentralized areas with Mpps not less than 5.4 for 16 ports access switch and 2.7 for 8 ports access switch;

7. 核心级交换机
Core Switch

a. 应用千兆网络设备，充分满足视频图像交换需求，并支持网络管理功能、支持网络风暴抑制功能、交换容量不低于 192Gbps，包转发率应不低于 36Mpps。: Gigabyte network equipment shall be used to comply with video image exchange requirement. The equipment shall also support network management function and network storm suppression function with switch capacity not less than 192 Gbps and Mpps not less than 36.

8. 对于 IP 系统交换机，需至少支持 10/100 Base-T 快速以太网并具备以太网供电(POE)能力。
IP system switch shall support at least 10/100 Base-T fast Ethernet with POE ability.

9. IP 摄像机供电宜采用 POE 供电方式，传输距离应不超过 70 米；
Power supply to IP camera shall be POE type with transmission distance not more than 70m;

10. 系统采用集中供电方式，在楼层弱电间设置电源箱，IP 监控系统的所有接入级交换机电源由监控中心 UPS 引到相应各弱电井的配电箱后配给 POE 交换机，球机应当经配电箱内电源适配器变压（整流）后引出至各摄像点。
Centralized power supply comprises of power panel installed in ELV Riser shall be used for this system; Access switch power supply for IP monitoring system shall be linked to UPS in monitoring center to related ELV riser distribution panel for POE switch. Ball switch shall be linked to each camera point through power transformer in power distribution panel.

11. 监控网络的带宽设计就能满足前端设备接入监控中心，并留用适当余量；所有传输节点实用带宽应不超过传输带宽 45%；
Monitoring network bandwidth design shall allow for front end equipment connection to the monitoring center with enough redundancy; transmission point occupied bandwidth less than 45% of transmission bandwidth is preferred;

12. IP 系统应设计防火墙，以防止不必要的侵入，并允许进行安全级别的访问；具体可征询希尔顿全球 IT 部意见。
Firewall should be applied for IP system to avoid unnecessary intrusion and allow for secured access; all details shall be verified with Hilton Worldwide IT Department for approval.

E. 存储设备的要求
Memory Device Requirement

1. 应根据项目实际情况选择采用分布式存储、集中式存储以及两种方式相结合的记录设备。无论在哪种情况下，存储介质必须可以扩展以供日后使用；
   Distribution type, centralized type or mixed type recording devices shall be used base on project actual situation. The memory medium shall be able to expand for future usage;

2. IP 系统的存储设备可为磁盘阵列、数字录像等设备；记录设备应支持按图像的来源、记录时间、报警事件类别等多种方式对存储的图像数据进行检索，支持多用户同时访问同一数据资源；
   IP memory equipment can be separated as disk array and digital recording equipment with multiple functions such as image source, record time and alarm event, etc. Ability to retrieve memory image data as well as multi-user access to single data resources;

3. 支持在录像加入标签，便于后续检索；
   Video shall be labeled for future retrieval;

4. 支持计划录像，手动录像，报警联动录像等各种模式，满足实际需求；
   Different types of video recording method such as auto, manual and alarm linkage, etc to meet with actual requirement;

5. 存储设备发生故障时，支持向平台服务器进行报警，提示用户；
   Whenever memory equipment is faulty, alarm signal shall be sent to platform server to alert user;

6. 支持各种 RAID 0，1，5，10 等 RAID 级别，并可配置全局热备和专用热备等，满足可靠性；
   Support different types of RAID grade such as 0, 1, 5 and 10, etc with overall heat backup and special heat backup to ensure reliability;

7. 存储设备关键模块如 BIOS，风扇，电源等就具有冗余；
   Key module of memory devices such as BIOS, fan and power supply, etc shall have redundancy;

8. 存储设备就具有一定数据保险功能，当发生断电时，保证之前录像不丢失；
   Memory devices shall have the data insurance function to ensure no information lost when power failure;

9. 存储设备应配备多种方式对磁盘进行防护，保证系统可靠性和稳定性：如磁盘顺序加电，磁盘电源短路保护，磁盘漫游，磁盘热插拔等常见技术；
   Multiple measures shall be used to protect the memory device disk to ensure system reliability and stability such as sequential charging, circuit protection, roaming and hot swap, etc;

10. 支持时间同步，具有日志功能；
    Support the function of time synchronization and logging;

11. 图像记录保存时间应不少于 31 天；须提供存贮计算书，说明摄像机如何满足该记录存储的要求；
    Image memory shall be saved for at least 31 days, to submit memory calculation manual indicating the memory record requirement for camera;

12. 摄像机监控范围内照度需满足摄像机最低照度要求，一般不小于 200lux。
Lux level within camera surveillance area shall be minimum 200 lux.

F. 显示设备要求
Display Device Requirement

1. 系统解码器、显示终端的分辨率指标应与摄像机的分辨率匹配；
Resolution for system decoder and display terminal shall comply with camera resolution;

2. 监控显示终端的配置需满足使用需求，主要由多画面轮巡显示和单画面切换显示组成；显示配置数据要求如下：

    a. Surveillance display terminal configuration mainly consists of multiple pictures sequential display and single picture switching display to comply with user requirement. Preferred configuration data as below:
    128 路图像以下（含 128）时：每 16 路图像配置 1 块屏做多画面轮巡和 1 块屏做单画面切换；不满 16 路部分按 16 路计算；
    128 lines image and below: 16 lines image for 1 screen for multiple screen turning and 1 screen for single image switching; 16 lines and below shall be calculated as 16;

    b. 超过 128 路图像时： 配置 8 块屏做多画面轮巡；前 128 路图像，每 16 路配置 1 块屏做单画面切换，超过部分第 32 路图像配置 1 块屏做单画面切换；不满 32 路部分按 32 路计算。
    More than 128 lines image: 8 screens for multiple image turning; 16 lines for 1 screen with single image switching for the first 128 lines; 32 lines for 1 screen with single image switching for the rest lines; 32 lines and below shall be calculated as 32.

3. 所有的监视器需采用专业级液晶监视器，不得采用民用型普通显示器。
All monitors shall be professional LCD type; No normal civil type shall be used.

4. 用于切换显示的显示屏最小有效尺寸不应小于 20 英寸；同时配置 2 块大屏，屏幕尺寸不低于 42 英寸。
Effective dimension for image display switch screen shall not be less than 20 inches; 2 big screens with dimension not smaller than 42 inches shall be provided.

5. 应具有报警联动显示功能，并自动将图像切换到显示通道，包括报警实时画面，报警前录像画面等；
Alarm linkage display with image auto switch function to the display channel including before and after alarm video record, etc;

6. 监控设备摆放位置应适应实际环境需求，建议到观察者距离为整个显示墙高度 3-6 倍。
Monitoring equipment install location shall comply with actual situation. The distance from observer to the display wall shall be 3 to 6 times of the wall height.

G. 系统要求
System Requirement

1. 视频监控系统保证任何人从任何通道进入酒店区域内任何楼层、区域都至少能被摄录一到二次图像记录在案，保证不遗漏。

Video surveillance system shall ensure any access entrance to Hotel floors or area can be recorded with least one or two images without failure.

2. 消防控制中心与安防控制中心合用，应在 1 层或 B1 层，主要对整个系统进行配置和权限管理，同时对所有监控图像进行操作及存储管理。
   Fire command center shall be combined with security control center and be located at level 1 or basement 1 for system allocation and authorization management as well as supervision image operation and storage management.

3. 系统应有保证信息安全的身份认证和 2 级或以上的权限管理设定模式，并应提供相应的测试方法；
   The system shall provide information secured identity reorganization function with authorization setting for grade 2 and above with related testing measures;

4. 系统应支持统一网管功能，支持对各管理模块、存储设备、NVR、IP 摄像机和编解码器的统一管理。并可对状态进行统计，查询结果可导出；
   Comprehensive network management shall be used for different management module, memory equipment, NVR, IP camera and encoder/decoder for status statistic with displayed enquiry result;

5. 系统各管理服务器应具有时钟同步的功能；
   Clock synchronization function among system servers is required ;

6. 系统的日志应包括运行日志和操作日志。运行日志应能记录系统内设备启动、自检、异常、故障、回复、关闭等状态信息及发生时间；操作日志应能记录操作人员进入、退出系统的时间和主要操作情况；并具有支持日志信息查询和报表制作等功能；
   System log shall include running log and operation log. Running log shall record equipment status information such as start, self-checking, abnormality, fault, reset and close as well as time; Operation log shall include operator log in/out time and major operation status; The system shall also have the functions of log information checking and report preparation;

7. 能通过手动或编程实现图像切换功能，图像信号应能在指定的显示设备上进行固定显示或时序显示；
   Manual or Program image switch function for image signal fixed or sequential display;

8. 具有对存储系统配置参数、系统管理日志、用户管理数据、报警文件等重要信息的自动备份功能；并应支持与对应图像数据的同步更新；
   Important information of memory system such as configuration data, system management diary, user management data and alarm document, etc. shall be auto backed up and be synchronous updated with image data;

9. 具有视频丢失检测报警和系统自诊断功能；
   Video lost detection alarm and system self-check function;

10. 具有报警联动功能；
    Alarm linkage function;

11. 系统管理服务器应支持双网口绑定，任何一个网口断开连接不影响业务正常运行；
Network dual interfaces shall be provided for system management server to allow normal operation without interruption;

12. 系统管理服务器处理认证、控制、配置、注册等信令信息，不进行图像的集中处理，当服务器故障或网络中断时，不影响正在进行的视频流的存储和监视。
CCTV management system shall complete with user access authentication, camera control, configuration and registration, etc. In the event of server or data network failure, video recording function shall not be interrupted.

H. 系统管理软件功能
System Management Software Function

1. 支持配置的保存和恢复，具有快速故障恢复能力；
Equipment storage and recovery with the ability of fast fault recovery;

2. 支持 NTP 协议；各管理服务器应支持向 NTP 服务器进行时钟同步的功能；
Support NTP protocol; All management server shall support the function of clock synchronization with NTP Server;

3. 支持记录所有功能操作、异常情况的日志，并提供多种检索、查询方案。用户日志可导出为表格；
Record all logs for operation and abnormal circumstance with different retrieval and enquiry functions. User downloading of recorded logs displayed in table format;

4. 支持对网络上如服务器、存储等设备的分布式管理；
Support distributed management to online equipment such as server, and memory devices;

5. 支持设备之间的通信管理、状态统计、检索功能。查询结果可导出为表格；
Equipment communication, status statistic and retrieval function with search result displayed in table format;

6. 支持录像状态统计、检索功能。查询结果可导出为表格；
Video status statistic and retrieval function with search result displayed in table format;

7. 如使用 NVR 存储方式，应采用嵌入式 Lunix 操作系统；
Embedded Lunix operation system shall be used if using NVR type memory;

8. 支持对所有设备进行配置和管理，如设备的名称，用户访问权限；
Configuration and management for all equipment such as name of equipment and user access authority, etc;

9. 支持视频导出，多画面显示，视频切换；
Video loading, multi-image display and video switch over;

10. 平台应具有系统管理、存储管理、数据管理、设备管理、安全管理、用户管理、日志管理等各项管理功能
The platform shall have different management functions such as system management, data management, equipment management, safety management, user management and log management, etc

11. 支持用户配置、用户登录、认证、管理等各种管理功能；
    Support different management functions such as user configuration, user-login, identification and management, etc;

12. 可查询所有用户的权限、状态、操作的历史记录；
    Able to check record for authorization, status, operation record of all users;

13. 支持互为热备份和 RAID 5 备份
    Hot backup and RAID 5 backup

I. 系统客户端软件
   System client software

   1. 提供访问整个系统的用户界面；
      User interface to access the entire system;

   2. 支持多台监视器浏览；
      Multi-screen chrome function;

   3. 观看实时或回放摄像机的多种显示方式；
      On-time or playback function;

   4. 屏幕 PTZ 和设备属性控制；
      Screen PTZ and equipment control function;

   5. 支持多种搜索和回放设置，如通过日期和时间搜索；
      Different searching and playback function such as date and time searching;

   6. 事件记录和报警界面显示
      Event record and alarm interface display;

   7. 支持定制的用户和设备许可权限。
      Authorization for specified user and equipment.

J. 监控区域要求
   Surveillance Area Requirement

   1. 酒店中至少以下区域应由酒店的闭路电视系统提供记录监控：
      CCTV System shall be provided for the areas below for record monitoring:

      a. 大堂
         Lobby

      b. 前台
         Front desk

      c. 大堂吧
         Lobby bar

      d. 贵重物品存放室（具体参见附图）
         Valuables storage room (Refer to the attachment)

e. 行李房
Luggage room

f. 所有 ATM 机
All ATMs

g. 首层所有出入口
All accesses at ground level

h. 员工出入口
Staff access

i. 自动扶梯出入口
Escalator Access

j. 主要餐厅内部和酒吧内部
All internal areas for main restaurant and bar

k. 所有厨房的出入口（可结合后勤区走廊设计）
All kitchen access (Can be designed with BOH area corridor)

l. 总出纳办公室
General cashier office

m. 宴会厅
Banquet

n. 宴会前厅
Banquet lobby

o. 多功能厅
Multi-function room

p. 游泳池（除非当地技防办要求，否则不设置摄像机）
Swimming pool (Unless specified by local authority, no camera shall be installed)

q. 所有电梯轿箱/电梯厅
All lift car/lift lobby

r. 公共区走廊
Common corridor

s. 后勤区走廊
Backup area corridor

t. 所有通向屋顶的出入口
All roof access

u. 装卸台和收货区域
Loading and unloading area

v. 入口雨棚（摄像机须能捕捉到出租汽车的车牌号码）
Entrance canopy (Camera shall be able to capture the Taxi number)

w. 停车场的所有出入口
All carpark access

x. 停车场的主要通道
Main carpark access

y. 主要候车区
Main waiting area

z. 计算机/通信机房（机房门外入口处）
Computer room/communication server room (Outside room entrance)

aa. 消防控制中心
Fire command center

bb. 主要机电机房的门外入口（高低压配电机房、制冷机房、锅炉房、热交换机房、柴油发电机房、生活水泵房、消防水泵房、中水处理机房、所有生活水箱间、电梯机房）
All M&E Room access (High/low voltage substation, chiller plant room, boiler room, heat exchanger room, diesel generator room, domestic water pump room, fire pump room, reclaimed water treatment room, all domestic water tank room and lift motor room, etc)

cc. 偏僻的入口
Remote access

dd. 自行车库出入口和车道
Bicycle garage access and driving lane

ee. 避难层和避难层的楼梯间入口
Shelter level and its staircase entrance

ff. 停机坪（若有）
Parking apron (If any)

gg. 室外广场周界区和景观区
Outdoor square boundary and landscape area

2. 希尔顿全球技术服务部审核之后，可能需要增加其它的位置
Other locations if required after audit by Hilton Worldwide technology service department;

7.4.2. 防盗报警系统
INTRUSION ALARM SYSTEM

A. 总则
General

1. 必须安装防盗报警装置，用以对仅限于授权人员或仅限于在特定时间使用的门的打开进行检测。
Theft Proof alarm system devices shall be installed for authorized staff or door open within ertain time for inspection.

B. 系统要求
System Requirement

1. 应根据酒店周围的环境考虑周界报警系统。
Boundary alarm system shall be based on Hotel nearby circumstances.

2. 入侵检测系统必须符合所有适用的区域/国家标准的要求，并要求当一个符合条件的事件发生时，为当地执法人员到场执法提供方便；
   Intrusion test system shall comply with local/national standard requirement for officer on-site enforcement convenience when intrusion is been detected;

3. 入侵报警系统宜具有显示、存储报警控制器发送的报警、布撤防、求助、故障、自检，以及声光报警、打印、统计、巡检、查询和记录报警发生的地址、日期、时间、报警类型等各种信息的功能；
   Intrusion alarm system shall have the function of display, save alarm signal from alarm controller, arm & disarm, assistant, fault, self-checking, sound-light alarm, print, statistic, patrol, check and record alarm address, date, time and alarm type, etc;

4. 入侵报警系统应具有编程、密码操作保护和联网功能；
   The intrusion alarm system shall have the functions of programming, password protection and internet access ability;

5. 入侵报警系统应设置于出入口控制系统或视频安防监控系统的联网接口；
   Intrusion alarm system shall be installed for networking interface of access control system or video surveillance monitoring system;

6. 入侵报警系统布防、撤防、报警、故障等信息的存储应不少于 31 天。
   Information storage for intrusion alarm system distribution, disarm and fault, etc shall be at least 31 days.

7. 监控中心（室）应配置中心报警控制主机和报警专用打印机，能监视和记录入网用户向中心发送的各种信息。该中心（室）能实施对监控目标的监视、监控图像的切换、云台及镜头的控制，并进行录像；当报警发生时，安防监控中心宜能显示周界模拟地形图，并以声、光信号显示报警的具体位置，能实时显示发生警情的区域、日期、时间及报警类型。
   Monitoring Center (Office) shall be provided with center alarm host controller and special alarm printer to monitor and record different information sent to the center from registered user. The Center (Office) shall be able to monitor objective, monitor image switchover, pan tilt and lens control with video record; Whenever alarm occurs, the safety monitoring center shall be able to indicate nearby simulate map with sound and light signal indicating actual location to indicate alarm area, date, time and alarm type.

8. 防盗门的门磁开关和无声报警按钮会自动激活最近的摄像头，使其对整个事件进行记录。如果摄像头是云台镜头，则会自动向这一区域摇动，并开始对事件进行运动监控；
   Operation of EM Lock or silent alarm button of the security door will activate nearby camera to record the whole event; the camera will rotate and record if it is pan-tilt type;

9. 报警系统主机及末端设备应采用安防控制中心的 UPS 系统集中供电。
   UPS in security control center shall be used for power supply to main equipment and accessories of the alarm system.

10. 报警系统应采用针式打印机。
    Dot matrix printer shall be used for the system.

C. 以下区域需设置手动或脚踢式无声报警装置
Manual or kicking type silent alarm devices shall be provided for areas as below:

1. 前台每个工作站
Each workstation near front desk

2. 总出纳办公室
General cashier office

3. 各收银处
Each cashier

4. 人力资源办公室
Human resources office

D. 以下区域需设置紧急电话
Emergency telephone shall be provided for areas as below:

1. 游泳池
Swimming Pool

2. 健身中心
Fitness Center

3. SPA 接待台
SPA Reception

4. 游泳池更衣室
Swimming pool changing room

5. Parking garage elevator lobby -- one per level
停车库电梯厅-每层一个。

E. 以下区域需设置紧急求助按钮
Emergency call button shall be provided for areas as listed below:

1. 干蒸间
Dry steam room

2. 湿蒸间
Wet steam room

3. 无障碍人士客房卫生间
Handicapped toilet in guestroom

4. 公共区无障碍人士卫生间
Handicapped toilet in public area

7.4.3. 门禁系统
CARD ACCESS SYSTEM

A. 总则
General

1. 门禁管理是现代安全防范系统的重要组成部分，同时也大大提高了酒店整体的工作效率及高效的管理水平。
Access control system is the main component of modern safety precaution system which also improve work efficiency and management level for the entire hotel;

B. 系统要求
System Requirement

1. 系统采用星型网络结构，单机损坏对整个系统无影响；
Star network structure shall be used for the system to ensure no interruption to the system when one set of equipment failure;

2. 应采用 TCP/IP 通讯方式，联网门禁可以对门的开关状态进行远程管理、记录及设置；
TCP/IP Communication method shall be used; Door access status shall be remote controlled, recorded and setted by the integrated door controller;

3. 所有的门禁应安装门磁，否则应安装红外微波双鉴探测器。
All door controller shall be installed with EM Lock or infrared microwave dual key detector;

4. 系统的识别装置和执行机构应保证操作的有效性和可靠性，应考虑有防尾随措施；
Recognizating devices and actuator shall be effective and reliable with the consideration of anti-trailing measures;

5. 系统应有现场报警、向操作（值班）员报警功能，报警信号应有声音提示；
The system shall have the function of spot alarm and alert operator/duty officer with voice prompt;

6. 设置在安全疏散口的门禁系统应与消防报警及其他紧急疏散系统联动，当发生火灾或需紧急疏散时应强制开放门锁；
Access control system installed for safety evacuation door shall be integrated with fire alarm system and other emergency evacuation system to release the EM lock during fire or emegency evacuation;

7. 当发生非消防状态断电时，应能保持系统正常使用；当供电不正常、断电时，系统的密钥信息及各记录信息不得丢失；
The system shall operate during non-fire power failure; Whenever power supply is abnormal or failure, the system key information and records shall not be lost;

8. 所有涉及门禁的区域需结合视频监控系统的摄像机联动，实时调取图像；系统应能独立运行，并应能与电子巡查、入侵报警、视频安防监控等系统联动，宜与监控中心联网；
All access control area shall be integrated with video surveillance system for real-time image collection; the system shall be able to operate independently with linkage with electronic patrol system, intrusion alarm system and video surveillance system as well as monitoring center internet;

9. 对非法进入的行为或连续 3 次不正确的识读等所有异常的开门状况均须产生报警信号并要反映到安防控制中心的管理电脑上；
   Alarm signal for abnormal door opening situation such as intrusion and 3 times wrong indentification shall be generated and reflected to management computer in safety control center;

10. 系统应具有人员的出入时间、地点、顺序等数据设置、显示、记录、查询和打印等功能，时间误差应在±10 s 以内，并有防篡改、防销毁等措施，记录存储时间不少 31 天。
    The system shall be able to set, display, record, check and print the data for all staff including the access time, location and sequences,etc; The time error shall be within 10 seconds with tamperproof and anti-destruction functions; All records shall be stored for at least 31 days.

C. 系统软件须完成且不限于下列功能
   The system software shall have but not limited to the functions as below:

1. 应采用积木式的程序设计，使系统功能的增、减、改进均极为方便；
   Blocks mode programe design shall be used for ease increase, decrease and change to the system;

2. 具有系统自维护功能；
   The system shall have the self-maintenance function

3. 软件具有严密的分级管理制度，使各级操作者责、权分明；
   The software shall have a rigorous classification management system to clarify the power and responsiblity of each level controller;

4. 软件具有完善的财务统计功能，自动完成各类报表；
   The software shall have the adequate financial accounting function to finish all reports automatically;

5. 可重新编辑持卡人的个人资料，包括姓名、性别、身份证号、国籍、地址等；
   The system shall be able to reedit personal information of the card holder which including name, agenda, IC number, nationality and address, etc;

6. 进行智能卡管理、授权发行新的智能卡、设定新的卡号及密码、制定智能卡类别、对非法卡的统计管理；
   The system shall also have the functions such as Intelligent card managemnt, authorization to issue new intelligent card, set number and password for new card, set type of intelligent card and account management for unauthorized card;

7. 查询智能卡号的使用情况;统计智能卡的出入情况；
   Check on intelligent card application; Stat on intelligent card access record;

8. 查询设备终端的功能、编号、显示动作情况及最新指令内容；
   Check function, series number, operation status and new order content for terminal equipment;

D. 门禁系统应安装在以下位置
Locations as listed below shall be equipped with Access Control System:

1. 前台办公室
Front desk office

2. 宴会厅及会议室服务通道门(限制客人进入后场区)
Service acess door for banquet and meeting room (Prohibit the guest to enter into the BOH area)

3. 首层通向室外的消防疏散门（同时安装推杆锁）
Fire escape door linked to external at ground floor (To be installed with push bar lock)

4. 所有通向屋顶的门（同时安装推杆锁）
All roof access doors (To be installed with push bar lock)

5. 由客人走廊可以到达的后场区
Accessable backup area from guest corridor

6. 话务员室
Operator Office

7. 消防控制中心
Fire Command Center

8. 总出纳办公室（此办公室需安装防盗门）
Chief Cashier Office (Security door shall be installed for this office)

9. 包裹/行李存放间
Package/Luggage Storage

10. 酒水仓库
Alcohol & Beverage Store

11. 干货仓库
Dry Ration Store

12. 员工入口（若未监视）
Staff Access (If not monitored)

7.4.4. 电子门锁系统
ELECTRONIC LOCK SYSTEM

A. 总则
General

1. 电子门锁系统主要是为酒店的客房门锁提供安全、方便、高效的管理，使酒店达到高水准、全方位、高效的智能化管理。
Electronic lock system shall be provided for hotel guestroom doors for safe, covenient and Efficient management to achieve high standard, integrated and effective intelligent target.

B. 门锁要求
Door Lock Requirement

1. 所有的锁榫头必须达到 ANSI 和 EURO 的锁头标准；
All locks shall comply with ANSI and EURO standards;

2. 智能门锁锁芯采用国际上标准的五锁舌结构，安全可靠；
Intelligent lock core shall be international standard fire cylinder type for safety;

3. 锁的结构应为模块设计，以便安装、拆卸和维护；
The lock shall be module type for easy communication, dismantle and maintenance;

4. 锁内的记忆内存可以将锁的电子控制程序进行现场升级而无须更换硬件设备；
Lock memory shall be able to upgrade the electronic control program without hardware replacement;

5. 锁内微电脑芯片可判断各种开门卡片的权限，实现多级管理；
The microcomputer chip shall be able to identify card authorization for multi-level management;

6. 锁内可以记录至少 200 条开闭锁记录；
Minimum 200 door open/close records;

7. 锁内时钟应与系统设置同步，避免提前或滞后造成房卡失效；
Lock clock shall synchronize with the system to avoid card failure;

8. 具有防强拆功能，非正常开锁时可自动报警；
Anti-forced dismantle function with auto alarm;

9. 必须可通过客房内的一个旋钮使方舌动作。
Dead bolt shall be operated by a rotate button in guestroom.

10. 必须采用编码门卡/钥匙卡。
Code card/ID card shall be used.

11. 采用兼容近场通信(NFC)的 RFID(射频识别)非接触式门锁。
Compatible Near Field Communication (NFC) Radio-Frequency Identification (RFID) non-contact door lock shall be used.

C. 系统要求
System Requirement

1. 采用离线式或在线式门锁系统；
Offline or online door-lock system;

2. 系统软件必须具备友好的操作界面，能提供实时而精确的事件报告。
Operation interface shall be user-friendly to provide real-time and accurate event report.

3. 必须提供审核/查询功能
Audit/inquiry function

4. 软件应具备房间设定、房态修改、宾客入住、门卡发行、级别设定、记录查询、操作管理等基本功能；
   Basic function such as room setting, room status revision, guest check-in, card issue, grade setting, record inquiry and operation management;

5. 应配置安装有门锁系统软件的掌上电脑，可以现场及时进行电子门锁的设置工作；
   Pocket PC with door lock software shall be provided for on site installation for electric door lock;

6. 系统可支持网络功能，可以与多个设备共享数据库；
   Network function to share database information with other equipment;

7. 制卡机应采用标准的工业接口与主机连接。制卡机的数量应根据营运需要，在 EDP 机房、总台办公室和前台分别设置，酒店的制卡机配置应不少于每 100 间房/1 台；
   Card printing machine shall use standard industrial connector to connect with host. The machine quantity shall meet with operation requirement: EDP Room, front office, front desk and minimum 1 set for 100 rooms;

8. 系统主机应配置 UPS 电源和系统备份，保证系统能在意外情况下正常工作；
   In the event of unexpected situation, UPS power supply and system backup shall be provided for system host to ensure no interruption.

9. 系统主机还需要与酒店管理系统相连，所以须为系统主机提供网络接口，便于与服务器连接；
   The system host shall be linked with hotel management system to provide network interface with server;

10. 当电脑出现故障不能发卡时，可用备用卡代替客人卡开启门锁，无需动用管理卡代替开启门锁而对客人带来不便，并在紧急情况下可使用备用机械钥匙。
    In the event of computer failure, spare card shall be used as guest card; spare key shall be used during emergency

11. 希尔顿全球可接受电子门锁品牌包括 SAFLOCK, VINGCARD, KABA, SALTO SYSTEM 和 MIWA。
    SAFLOCK, VINGCARD, SALTO SYSTEM and MIWA are acceptable by Hilton Word Wide.

D. 需要考虑安装电子门锁的位置
   Electronic Lock Installation Location

1. 每间客房
   Guestroom

2. 商务中心（无人值班的需安装门锁）
   Business center (Door lock shall be used if unmanned)

3. 会议室
   Meeting room

4. 游泳池
   Swimming pool

5. 健身中心
   Fitness center

6. 行政酒廊
   Executive lounge

7. 计算机/程控交换机房
   Computer/PBX Room

8. 布草间
   Linen room

7.4.5. 电梯梯控系统
LIFT CONTROL SYSTEM

A. 总则
General

1. 为更好的对电梯进行管理和使用，可将电梯系统与酒店的管理系统连接，实现电梯的智能化控制，提高酒店的管理水平。
   Lift system can be linked with hotel management system for intelligence control to improve hotel management and operation.

B. 系统要求
System Requirement

1. 所有的客房层电梯需设置电梯卡控；
   All guest lifts shall be equipped with card access;

2. 电子门锁卡可呼叫及使用客人电梯和服务电梯，该门锁卡与客房/员工钥匙卡互连；
   Electronic door card can be used for guest lift and service lift with interconnection with guest room/staff ID cards;

3. 系统宜与酒店门锁系统采用同一品牌；
   The system brand is preferred to be the same with hotel door lock system

4. 所有操作系统都应采用制造商提供的最新标准功能；
   All operation system shall have the latest standard function provided by manufacturer;

5. 所有操作系统采用基于微处理器的控制器，通过轿厢和侯梯厅的按钮实现自动化操作；
   All operation system shall be equipped with microprocessor based controller for auto control through press button in lift car and lift lobby;

6. 当酒店有部分机房设于综合体内其它区域时，并且需由酒店服务梯进行服务时，服务梯需设置卡控系统，并且相关楼层必须刷卡才能呼梯。
   Card access system shall be provided for service lifts in mixed development;

7. 电梯轿厢设刷卡或感应读卡器，可设定 7 个区域设置卡片控制，由酒店管理公司确定。

Lift card or sensor reader shall be provided for lift car with card access for 7 zones which shall be determined by the hotel management company.

7.4.6. 巡更系统
PATROL SYSTEM

A. 总则
General

1. 巡更系统是酒店的领导或管理人员利用本系统来完成对巡更人员和巡更工作记录进行有效的监督和管理，同时系统还可以对一定时期的线路巡更工作情况做详细记录。
Patrol system is used to effectively supervise and manage patrol walker and patrol work records by the hotel leader or manager; The system shall also be able to record the patrol works in detail for certain period;

B. 系统要求
System Requirement

1. 系统可采用离线式或在线式巡更系统；
Offline or online patrol system can be used for the system

2. 信息采集点（巡查点）装置安装离地面高度宜为 1.3m 至 1.4m；
Information collection (Patrol point) device shall be installed at the height of 1.3 to 1.4m from floor level;

3. 在授权情况下应能对巡查路线、时间、巡查点进行设定和调整；
Patrol route, time and location shall be able to set and adjusted when authorized.

4. 应具有对巡查时间、地点、人员和顺序等数据的显示、存储、查询和打印功能；应具有巡查违规记录提示；
The system shall be able to display, record, check and print the data which including the patrol time, location, staff info and sequences,etc; The system shall also have the indication of patrol infraction record;

5. 信息的存储应不少于 31 天。
Information storage shall not be less than 31 days.

6. 系统主机应采用市场最新配置的电脑。
System main equipment shall be of the latest computer allocation.

C. 巡更点设置点如下
Patrol points arrangement as listed below:

1. 各楼层出入口
Each floor access

2. 屋顶
Roof

3. 相距最远的两个楼梯出入口
Furthest distance of two staircase accesses

4. 计算机网络中心/PBX 机房出入口
   Computer network center/PBX Room access

5. 消防控制中心
   Fire command center

6. 财务办公室（包括重要办公室）
   Finance Office (Including major offices)

7. 厨房的出入口
   Kitchen access

8. 主要机电机房出入口（高低压配电机房、制冷机房、锅炉房、热交换机房、柴油发电机房、生活水泵房、消防水泵房、中水处理机房、水箱间、柴油发电机房、电梯机房）
   Main access for M&E Rooms: High/low voltage substation, chiller plant room, boiler room, heat exchanger room, diesel generator room, domestic water pump room, fire pump room, reclaimed water treatment room, water tank room, diesel generator room and lift motor room, etc

9. 避难层
   Shelter Floor

10. 地下与室外停车场
    Underground and outdoor carpark

11. 电梯厅
    Lift Lobby

12. 室外走道和广场
    Outdoor corridor and landscape

7.4.7. 停车场管理系统
CAR PARKING MANAGEMENT SYSTEM

A. 总则
   General

1. 本系统的主要组成设备包含出口机、入口机、车辆检测器、电动道闸、满位显示屏幕、图像捕捉卡、摄像机、临时卡计费系统、图像管理软件、停车场管理软件、停车管理工作站等组成。
   The main equipment of this system shall include exit machine, entrance machine, vehicle detector, electric barrier gate, car park full display screen, image capture card, camera, temporary card billing system, image management software, car park management software, car park management workstation, etc.

2. 某些酒店设置停车场管理系统，此系统为可选项，具体项目应征询希尔顿全球意见。
   There is car park management system in some hotels. This system is optional and shall consult Hilton Worldwide for specific projects.

B. 系统要求
System Requirements

1. 入口/出口屏障必须对车辆的进出进行控制；
Entrance/ exit barriers shall control the vehicle ingress and egress.

2. 固定用户应采用远距离读卡方式，读卡距离不小于 3 米；
Permanent users shall use long distance card reading. Car reading distance shall not be less than 3 m.

3. 临时用户采用一次性卡片近距离读卡取或纸票方式；
Temporary users shall use disposable card for close distance card reading or paper tickets.

4. 系统支持图像捕捉、对比功能，在出口处对图像进行比较，确保进出车辆为同一辆车；
The system shall support image capture and contrast function. Compare the image at the exit to ensure the same vehicle in and out.

5. 当车位超过 500 个时应设置车位引导系统；
If there are more than 500 parking lots, parking guidance system shall be provided.

6. 栏杆机需起落快，防砸车、防尾随。车辆出入反应时间（从来车到道闸升至最高）不大于 5 秒；
The rail shall rise and fall quickly to prevent car smash or trailing. Vehicle in and out reaction time (from the car coming to the barrier rising to the highest) shall not be more than 5 seconds.

7. 可以手动、自动、遥控三种方式控制道闸；
Three (3) modes to control the barrier, namely manual, automatic and remote control.

8. 车场空位信息显示功能；
Car park lot balance display function

9. 随机现金核对功能；
Random cash check function

10. 报表统计功能、误操作报表统计、随机各种报表统计；
Report and statistics function, error operation report and statistics, random types of report and statistics.

11. 采用开放式系统结构，具有较强的系统扩容性；
Use open system structure which is better for system expansion.

12. 系统通过停车场控制器的输出端子实现与消防报警系统等其它弱电系统的联动控制，当发生火灾，系统发出报警时，紧急抬起出口道闸；
Through the car park controller output terminal, the system shall be linked with fire alarm system and other ELV system for integrated control. During fire, when the alarm is sent, the exit barrier shall rise.

13. 在车库停车的客人在进入车库的路上从入口屏障处领卡或者取票。离开时，客人在付费站出示票据，在付费站内接收付费并且对票据进行处理，使客人能够离开停车

场；
The guests shall be able to collect card or ticket at the entrance barrier when they are on the way to the car park. When leaving, the guests need to show the ticket at the payment station for payment and receipt processing before they leave the car park.

14. 每个车道的出入口站必须配有剩余车位显示屏、条形码票据打印机或自动出票机、自动验票机、道闸、地感线圈、摄像机等设备；
The entrance and exit stations of each driveway shall be equipped with car park lot balance display, bar code receipt printer or automatic ticket issuing machine, automatic ticket checking machine, barrier gate, vehicle loop, camera and other equipment.

15. 建筑外部边界区域必须在地面维持的最低的照度需保证摄像机可以拍摄到足够清晰的图像；
Building external boundary areas shall maintain minimum illumination on the ground level to ensure clear image for the camera.

16. 应提供至少 1 个小时的 UPS 后备电源；
Minimum one (1) hour UPS power backup shall be provided.

17. 机动车出入口、停车场（库）出入口及其他与外界相通的出入口应选用低照度带强光抑制功能的彩色固定摄像机和自动光圈镜头,应能清楚的辨别出入人员的面部特征及机动车牌号。
Vehicle ingress and egress, car park (garage) entrance and exit, and other entrance and exit leading to external shall use fixed color cameras and auto aperture lens with low illumination and photo inhibition function, and shall be able to clearly distinguish between facial features and motor license plate number.

C. 付费站
Payment Station

1. 付费站必须设置在前台，门厅接待处，自动支付站，或者人工停车控制岗亭；
Payment station shall be located at the front desk, hall reception, automatic payment station, or manual parking control station.

2. 自动支付站必须具有清晰可见的说明资费标准和使用方法的指示牌；
Automatic payment station shall have a clear signage indicating the charging standard and using method.

3. 售票机和自动付费站必须有一个连接到前台或门厅接待处或人工收费岗亭的对讲系统；
Ticketing machine and automatic payment station shall have an intercom system which connects to the front desk or the hall reception or manual charging booths.

4. 自动支付站必须包括液晶显示屏、硬币付费装置、纸币付费装置、信用卡付费装置、充足的硬币回收管、遗失票据处理设施、智能条码热敏打印机、电池备份内存、收据打印机、对讲通话点，智能联网和脱机的工作模式。
Automatic payment station shall include LCD, coin payment device, paper money payment device, credit card payment device, adequate coin collection tubes, missing receipt processing facilities, smart barcode thermal printers, battery backup memory, receipt printer, intercom points, intelligent network online and offline working mode.

7.5. 有线电视及卫星电视系统
CABLE TV AND MATV SYSTEM

7.5.1. 总则
General

A. 本系统为新建酒店提供了一套完整的电视系统；
This system shall provide a complete TV system for a new hotel.

B. 电视系统节目源包括：卫星电视信号（具体接收节目见希尔顿卫星电视节目清单）、新建酒店所在地的有线电视信号、酒店自办节目信号及蓝光 DVD 播放器信号。
The TV system program shall include: Satellite TV signals (specific receiving program refers to the Hilton satellite television program list), local cable television signals, hotel internal program signals and the blue-ray DVD player signals.

C. 本系统需根据各地不同的要求进行设置。
This system shall be configured based on different local requirements.

7.5.2. 系统要求
System Requirement

A. 应用 862MHz 带宽、邻频、双向传输技术，使用专用有线电视系统设备，构建一个多功能、宽带、高性能的电视图像信号实时传输系统；
An 862 MHz bandwidth, adjacent-channel, two-way transmission technology shall be used. A dedicated cable TV system equipment shall be used to build a multifunctional, broadband, high-performance television image signal real-time transmission system.

B. 通过卫星电视接收装置接收经广电局所批准接收的卫星数套节目，并经前端设备处理后与酒店所在地的有线电视信号、酒店自办节目信号及蓝光 DVD 信号混合后，通过酒店内电视信号分配网络进行播放；
Several satellite programs which are approved by the Bureau of Radio and Television can be received by satellite TV receiver, processed by the front-end equipment, mixed with local cable television signal, hotel internal program and blue-ray DVD signal, and distributed through the Hotel TV signal distribution network.

C. 电视系统末端输出口频道间载波电平差：任意频道间≤dB，相邻频道间≤dB， 频道频率稳定度±KHz， 末端点位电平要求 68±4dB,图像清晰度应在四级以上，由室外有线信号引入的信号线缆需加装避雷保护器，以防止雷电波的侵入；
Level difference between channels at the TV system end terminal: ≤dB between arbitrary channel, ≤dB between adjacent channels, channel frequency stability ±5kHz, end point level 68±4dB, image resolution above level 4. Signal cable shall be equipped with lightning protection device if it brings in outdoor cable signal, in order to prevent lightning surge.

D. 酒店可设置卫星天线接收站，并至少预留两个 3.2m 的天线安装基础位。如果开发商与当地广电达成协议，可通过市政有线电视引入卫星天线信号，也可不设置卫星天线接收站；
A satellite antenna receiving station can be installed in the hotel and minimum two numbers of 3.2 m antenna installation base shall be reserved. If agreed between the developer and the local Bureau of Radio and Television that the satellite antenna signal can be brought in via the municipal cable TV, the satellite antenna receiving station is not required.

7.5.3. 布线要求
Wiring Requirements

A. 有线电视系统主干线缆采用多模光纤传输电视信号，到楼层弱电间通过光电转化转化成模拟信号，具体多模光纤数量根据酒店实际情况设计；
The main cabling of the cable TV system shall use multimode fiber optic to transmit TV signals which will be converted into analog signals through the photoelectric conversion in the ELV room. The specific quantity of the multimode fiber optic shall base on the actual hotel condition.

B. 有线电视系统水平线缆采用 SYWV-75-5 同轴电缆，同轴电缆必须是一次成型线缆，中间不能出现接头。
Cable TV system distribution cable shall use SYWV-75-5 coaxial cable. Coaxial cable shall be of continuous manufacturing process type, and no joint shall be allowed.

7.5.4. 系统配置
System Configuration

A. 在所有套房及客房、餐厅、餐厅包厢、大堂吧、酒吧、行政酒廊、游泳池、健身中心、宴会厅、会议室、多功能厅、员工活动室、员工餐厅等区域提供电视信号点位（若酒店有配套 SPA 及桑拿包房也需要配置电视信号点位）；
In all suites and guest rooms, restaurant, restaurant box rooms, lobby bar, bar, executive lounge, swimming pool, fitness center, ballroom, conference rooms, multi-function hall, staff activity room, staff canteen and other areas, there shall be provided with television signal points (if there are SPA and sauna room in the Hotel, there shall also be TV signal points).

B. 在每个末端电视信号点位旁边需要配置 1 根六类数据线缆及 RJ45 端口，用作 IPTV 信号点位。
Next to each TV signal terminal point, there shall be one (1) cat 6 data cable and RJ45 port, used for IPTV signal point.

7.5.5. 机顶盒配置
Set-top Box Confirguration

A. 机顶盒的配置可根据当地广电局要求进行配置。
Set-top box configuration shall be provided according to the requirements of the local Bureau of Radio and Television.

B. 现机顶盒设置情况有两种：
There are two ways of set-top box setting:-

1. 设置在有线电视机房内：对当地有线电视信号进行前端调制后与卫星电视信号混合再分配到每个末端点位；
Install in the cable TV room: Modulate the front end of the local cable TV signal, mix with the satellite TV signal and distribute to each end point.

2. 设置在每间客房内：在每间客房内对有线电视及卫星电视信号混合后的信号进行调制，并可与 IPTV 信号混合；
Install in each guest room: Modulate the mixed signals from the cable TV and the satellite TV, and the signals can be mixed with IPTV signal.

3. 上述机顶盒设置情况需要根据当地广电局要求进行配置。
   The above-mentioned set-top box configuration shall be provided according to the requirements of local Bureau of Radio and Television.

7.6. 客房控制系统
GUESTROOM CONTROL SYSTEM

7.6.1. 总则
General

A. 客房控制系统是对客房内照明、插座、空调、窗帘、服务信息等进行智能控制，为客人提供舒适的居住环境，通过智能化控制节约能源。
Guest room control system is to provide intelligent control for the guest room lighting, outlets, air conditioning, curtain, service information, etc., create a comfortable living environment for the guests, and save energy.

7.6.2. 系统要求
System Requirements

A. 客房控制系统应与门锁系统联网，具体需征询希尔顿全球。
The guest room control system is recommended to be integrated with door lock system. Refer to Hilton Worldwide for details. (To be confirmed)

B. 系统应采用 TCP/IP 架构，不推荐采用总线型，若采用总线的方式需征询希尔顿；
The system shall use TCP/IP structure. Bus structure is not recommended, if it is used, approval shall be obtained from Hilton.

C. 系统的线缆应采用非屏蔽六类线；
The system cabling shall use unshielded Cat 6 cable.

D. 华尔道夫及康拉德酒店应采用红外自动感应探测器的方式，其他品牌应采用钥匙节能总开关的方式；
Waldorf Astoria and Conrad Hotel shall use infrared automatic detector. Other brands shall use key card energy-saving master switch.

E. 系统宜与酒店管理系统通过接口进行连接；
The system is recommended to be interfaced with the Hotel management system.

F. 客房若采用电动窗帘及窗纱应控制其电源；窗帘及窗纱应设置自动回拉功能及可控制窗帘的开度；
If electric curtain or window screen is used in guest room, the power supply shall be controlled. The curtain and window screen shall be provided with automatic pull back function and the opening of the curtain shall be able to be controlled.

G. 所有客房内通过钥匙卡节能总开关或红外自动感应探测器控制的插座至少为：
The outlets which can be controlled by the guest room key card energy-saving master switch or infrared automatic detector, shall not be less than the followings:-

1. 电吹风插座
   Hair dryer outlet

2. 液晶电视电源插座
   LCD TV electric outlet

3. DVD 插座
   DVD outlet

4. 床头台灯插座
   Bedside lamp outlet

5. 落地灯插座
   Floor lamp outlet

6. 清洁插座
   Cleaning outlet

7. 书桌台灯插座
   Table lamp outlet

8. 机顶盒插座
   Set-top box outlet

9. 化妆镜接线盒
   Make-up mirror terminal box

10. 防雾镜接线盒
    Anti-fogging mirror terminal box

H. 所有客房内不受客房控制系统控制的插座至少为：
   The outlets which are not controlled by the guest room control system shall not be less than the followings:-

1. 电冰箱
   Refrigerator

2. 写字台上方国际通用插座
   International power outlet above the work surface

3. 床头上方多功能插座
   International power outlet above the bedside

4. 闹钟插座
   Alarm clock power outlet

5. 剃须刀插座
   Shaver power outlet

6. 无绳电话插座(若有)
   Wireless telephone power outlet(If possible)

7. 多媒体面板（若有）
   Multimedia Connection Panel (If possible)

I. 华尔道夫及康拉德品牌酒店和所有度假村每间客房应配置多媒体面板，希尔顿及逸林酒店每间客房多媒体面板为可选项。
Waldorf Astoria and Conrad hotel guest rooms and all resort hotels shall be provided with multimedia panel. It is optional for Hilton and Doubletree.

J. 多媒体面板上接口至少有：
Minimum socket on the multimedia connection panel include:

1. 至少两个国际通用插座
Minimum two (2) international power outlets

2. 一个 HDMI 接口
One HDMI interface

3. 两个 USB-A 型端口（其中一个 5V 充电，另一个数据读取）
Two USB-A type terminals (one for 5V charging and the other one for data reading)

4. 一组 AV 端口，其中黄色为视频信号，红色和白色为音频信号；一个 S 端子
One set of AV terminals, yellow one for Video signal, red and white ones for audio signal; one S terminal

5. 一个 VGA 接口及一个 3.5mm 立体声接口
One VGA interface and one 3.5mm stereo interface

7.7. 楼宇自控系统
BUILDING AUTOMATION SYSTEM

7.7.1. 总则
General

A. BMS 通过计算机网络技术对建筑内各个机电系统进行实时监控、控制、记录，实现分散节能控制和集中科学管理，以达到降低设备能耗和运行费用，节省人力资源，提供安全、舒适、快捷服务的环境，建立一整套酒店先进的综合物业管理机制。
BMS shall provide real-time monitoring, control, record, decentralized energy saving control and centralized scientific management for building mechanical and electrical system through the computer network technology. This is to reduce the equipment energy consumption and operation costs, save human resources, provide a safe, comfortable, efficient service environment, and establish a complete set of advanced comprehensive Hotel property management.

B. 冷源群控系统应为独立的监控系统，宜由冷源机组设备供应商提供，并通过基于 TCP/IP 的 OPC 或其它国际标准协议连接至 BMS 系统进行系统监视。
Chiller plant group control system shall be an independent monitoring system. It is recommended that the system shall be provided by the chiller plant equipment supplier and monitored through a TCP/IP based OPC or other international standard protocol with connection to BMS.

7.7.2. 系统要求
System Requirements

A. 中央控制主机设在消控中心内，并在工程部办公室内设监视分站；
The central control main equipment shall be located in the Fire Control Centre and monitoring sub-station shall be provided in the engineering department office.

B. 中央控制主机配有不间断电源支持，UPS 连接柴油发电机时保证设备在断电情况下正常工作 1 小时；
The central control main equipment shall be provided with uninterrupted power supply (UPS) with connection to diesel generators and shall ensure normal operation of the equipment under power failure for 1 hour.

C. BMS 系统应采用管理层网络及控制网络两层网络结构。管理层网络应采用基于 TCP/IP 的 OPC、BACNet 或其它国际通用的动态数据交换协议及数据库。以太网可接入酒店内部局域网；控制网络应采用开放式控制网络协议，如 BACNet、Modbus RTU 等国际通用协议；
BMS system shall use two layers of network structure, namely the management network and control network. The management network shall use a TCP/IP based OPC, BACNet or other international general dynamic data exchange protocol and database. Ethernet shall be able to connect to the hotel internal local area network (LAN). Control network shall use open control network protocol, such as BACNet, Modbus RTU and other international general agreement.

D. 所有 BMS 系统内设备应采用开放式协议系统编程，适合未来升级，系统的所有元件应采用模块化设计，未来能够增加容量；
All BMS system equipment shall use open protocol system programming, suitable for future upgrades. All the components of the system shall be modular design and shall be able to increase capacity in the future.

E. 控制网络 DDC 应采用分散式设置原则，单台 DDC 不宜超过 40 输入/输出点位；
DDC control network shall use distributed setting principle. A single DDC shall not exceed more than 40 input/output points.

F. BMS 系统前端采用传感器+执行器+DDC 控制器构架；
BMS system front-end shall use sensors, actuators and DDC controller structure.

G. DDC 控制器通过网络控制器将设备信息传输到酒店内部设备网络；
DDC controller shall transmit the equipment information to the hotel internal equipment network through the network controller.

H. DDC 已具有预设的各种控制算法，包括时间控制、条件控制、PID 控制等算法；
DDC shall have all default control algorithm, including the time control, condition control and PID control, etc.

I. DDC 应自带电池，掉电后设置参数及时间应能至少保存一个月。
DDC shall have built-in battery. The setting parameters and time shall be kept for at least one month after power off.

J. DDC 应自带点位和网路隔离功能。
DDC shall have built-in points and network isolation function.

K. 每个 DDC 控制器应有 20%的冗余输入输出点位；
Each DDC controller shall have 20% redundant input/output points.

L. DDC A/D 分辨率应不低于 12 位；D/A 分辨率应不低于 12 位；
DDC A/D resolution shall be not less than 12. D/A resolution shall be not less than 12.

M. 温度湿度传感器的量程应至少为测量点温度范围的 1.5 倍；精度要求<=5%。
The temperature and humidity sensor range shall be at least 1.5 times of the measuring point range. The accuracy shall be <= 5%.

N. 压力传感器的最大工作压力应大于最大可能压力的 1.5 倍，量程应为正常变化范围的 1.5 倍；精度要求<=5%。
The maximum working pressure of the pressure sensors shall be greater than 1.5 times of the greatest possible pressure. The range shall be 1.5 times of the normal range and accuracy shall be <= 5%.

O. 流量传感器的量程应为系统最大工作流量的 1.5 倍；并应采用电磁、管道连接式安装方式，任何管道插入式安装方式将不被接受。精度要求<=5%
Flow sensor range shall be 1.5 times of the system maximum work flow and shall use electromagnetic, pipe connection installation method. No plug-in installation for pipes shall be accepted. The accuracy shall be <= 5%.

P. 所有 DN32 以上的温控阀应采用 AO 控制的电动线性调节阀，阀门宜带自动弹簧复位及阀位反馈信号功能。
All DN32 and above temperature control valves shall use electric linear regulator which is controlled by AO. The valve gate is recommended to have functions of automatic spring reset and valve position feedback signal.

Q. BMS 系统除双电源供电外，系统主机应配置不小于 30 分钟的 UPS 电源。
In addition to dual power supply, the BMS system main equipment shall be provided with minimum 30 minutes UPS.

7.7.3. 制冷站群控系统要求
Chiller Group Control System Requirement

A. 系统图形界面监控工作站设于冷源值班室，并通过基于 TCP/IP 的 OPC 或其它国际标准协议连接至 BMS 系统进行系统监视。
A system graphical interface monitoring workstation shall be located in the chiller plant duty station, and through a TCP/IP based OPC or other international standard protocol to connect to BMS for system monitoring.

B. 系统应具有时序控制、条件控制、台数控制、顺序控制等设备控制功能。
The system shall have time control, condition control, quantity control, sequence control and other device control functions.

C. 系统应具有设备保护运行控制功能。
The system shall have equipment protection operation control function.

D. 系统应根据负荷自动加、减载机组及附属设备功能。
The system shall be able to automatically increase or reduce the operating chiller plant and its accessories based on the loading.

E. 系统应通过优化控制保证各台设备运行时间基本一致。
The system shall ensure consistent running time of individual equipment through the optimization control.

F. 控制器应采用 DDC。
Controller shall use DDC.

G. 温度传感器的量程应至少为测量点温度范围的 1.5 倍；温度传感器精度<=2%
The temperature sensor range shall be at least 1.5 times of the measuring point temperature range. The temperature sensor accuracy shall be <= 2%.

H. 压力传感器的最大工作压力应大于最大可能压力的 1.5 倍，量程应为正常变化范围的 1.5 倍；精度要求<=3%。
The maximum working pressure of the pressure sensors shall be greater than 1.5 times of the greatest possible pressure. The range shall be 1.5 times of the normal range and accuracy shall be <= 3%.

I. 流量传感器的量程应为系统最大工作流量的 1.5 倍；并应采用电磁、管道连接式安装方式，任何管道插入式安装方式将不被接受。精度要求<=3%
Flow sensor range shall be 1.5 times of the system maximum work flow and shall use electromagnetic, pipe connection installation method. No plug-in installation for pipes shall be accepted. The accuracy shall be <= 3%.

J. 所有旁通阀应采用 AO 控制的电动线性调节阀，阀门应带自动弹簧复位及阀位反馈信号功能。
All the bypass valves shall use electric linear regulator which is controlled by AO. The valve gate shall have functions of automatic spring reset and valve position feedback signal.

K. 系统需通过通讯方式读取所有制冷设备开放数据。
The system shall read the open data from all chiller plants through communication.

L. 除上述功能外，系统因同时满足 BMS 系统要求。
Except the functions above, the system shall also comply with BMS requirements.

M. 系统主要完成酒店以下机电系统的监控管理（但不仅限于此）
The system shall provide monitoring management to the followings hotel M&E system (but not limited to):-

1. 空调冷热源监视监控
Air conditioning cold and heat source surveillance and monitoring

2. 空调（新风）机组监控
Air conditioning (pre-cooled air) unit monitoring

3. 公共区域风机盘管（客房风机盘管不接入 BMS 系统）监控
Common area FCU (guest room FCU not connected to BMS system) monitoring

4. 机械送排风机监控
Mechanical ventilation fan monitoring

5. 给排水系统监视
   Water supply and drainage system monitoring

6. 泳池系统监视
   Swimming pool system monitoring

7. 变配电系统监视
   Electrical substation and distribution system monitoring

8. 后场区公共照明系统监控
   Back of house common area lighting system monitoring

9. 泛光照明系统监控
   Flood lighting system monitoring

10. 柴油发电机监视
    Diesel generator monitoring

11. 电梯监视
    Elevator monitoring

7.7.4. 通讯接口与接入方式
communication interface & Connection method

A. 以通讯接口方式接入酒店 BMS 系统的机电系统主要有（但不仅限于此）：
The M&E system with communication interface connecting to the hotel BMS system shall be (but not limited) to the followings:-

1. 冷源群控系统
   Chiller plant group control system

2. 锅炉监视系统
   Boiler monitoring system

3. 泳池监视系统
   Swimming pool monitoring system

4. 电力监视系统
   Electric power monitoring system

5. 柴油发电机
   Diesel generator

6. 电梯（预留接口）
   Elevator (reserved interfacing point)

7. 智能灯光控制系统
   Intelligent lighting control system

8. 能耗计量
   Energy consumption measurement

B. 以 DDC 控制器方式接入酒店 BMS 系统的机电系统主要有（但不仅限于此）：
The M&E system with DDC control connecting to the hotel BMS system shall be (but not limited) to the followings:-

1. 公共区域风机盘管
Fan coil unit in common area
2. 空调机组
Air conditioning unit
3. 新风机组
Pre-cooled air unit
4. 板式换热器
Plate heat exchanger
5. 膨胀水箱
Expansion tank
6. 送/排风机
Supply/ exhaust fan
7. 水箱/水池
Water tank/ water pool
8. 生活给水泵
Domestic water pump
9. 污水泵
Sewage pump
10. 集水坑
Sump pit
11. 容积式换热器
Storage heat exchanger
12. 公共照明开关
Public lighting switch
13. 泛光照明开关
Flood lighting switch

7.7.5. 监控点位
Monitoring and Controling Point

A. 各设备具体监控点位详见 7.21.3 《BMS I/O 点表及通讯接口表》；通过软件通讯接方式接入 BMS 系统的接口详见 7.21.3 《BMS I/O 点表及通讯接口表》
Each equipment detailed monitoring points refer to 7.21.3 “BMS I/O point schedule and communication interface schedule”. Software communication connection to BMS interface refers to 7.21.3 “BMS I/O point schedule and communication interface schedule”

7.7.6. 软件要求
Software Requirements

A. 应用软件应可支持全中文化的图形化操作界面监视整个 BA 系统的运行状态，提供现场图片、工艺流程图（如空调控制系统图）、实时曲线图（如温度曲线图，可几根同时显示，时间可任意推移）、监控点表、绘制平面布置图，以形象直观的动态图形方式显示设备的运行情况。
Application software shall support full Chinese graphical interface to monitor the status of the BA system operation. Provide on-site pictures, process flow diagram (such as air conditioning control system diagram), real-time curve (such as temperature curve, multi curves can be shown at the same time with any selected time frame), monitoring point table, layout plan, and use dynamic graphical presentation to display equipment operation status.

B. 通过下拉式菜单或特殊功能键进行常用功能操纵，以单击鼠标的方式可逐及细化地查看设备状态及有关参数。
Commonly used functions can be operated through the drop-down menu or special function key. Click the mouse to successively check the equipment status and related parameters.

C. 通过对图形的操作即可对现场设备进行远程启停或开关控制；通过选择操作可进行运行方式的设定，如选择现场手动方式或自动运行方式；通过交换式菜单可方便地修改工艺参数。
Through the graphics operation, remote start-stop or switch control can be achieved for devices on site. The operation mode can be selected, such as on site manual mode or automatic operation mode. The process parameters can be easily modified through the switching menu.

D. 系统的操作权限有严格的管理，管理级速应不低于 10 级，以保障系统的操作安全和管理。
System operating rights shall be strictly managed. The management classification shall be not less than 10, in order to ensure operating safety and management of the system.

E. 系统应对实时数据进行保存，保存期不得低于一年，包括所有状态改变、点位报警、实时趋势记录等。记录有研究与分析价值及应长期进行保存的数据需要建立历史文件数据库，采用数据库并形成棒状图或曲线图等显示或打印功能。
System shall save the real-time data with storage period not less than one year, including all status changes, point alarm, real-time trend record, etc. A history file database shall be built for records which are valued for research and analysis and shall be kept for long term. Use the database to form a bar chart, graph, etc. for display or print function.

F. 服务器、工作站应配置至少一套开发版软件，软件点位应有不小于 20%的冗余量。
The servers and workstations shall have at least one develop software. The software point shall have not less than 20% redundancy.

G. 服务器应具有 Web 功能。
Server shall have Web function.

7.8. 不间断电源系统
UNINTERRUPTED POWER SUPPLY SYSTEM

7.8.1. 总则
General

A. 不间断电源是为电子设备工作时提供稳定的电源，是电子设备的重要外设，对 保护计算机数据、保证电网电压和频率的稳定、防止瞬时停电、事故停电等方面起到很大的作用。
Uninterruptible power supply is to provide stable power supply for electronic equipment during operation. It is one of the important external equipment for electronic equipment. It plays a big role in situations which protect the computer data, guarantee the stability of power grid voltage and frequency, prevent instantaneous power outages, emergency outage, etc.

7.8.2. 系统要求
System Requirement

A. 不间断电源系统（UPS）须包括一组整流器 / 蓄电池充电器，蓄电池， 逆变器，静态旁路转换开关， 同步设备， 保护装置， 外部机械旁路开关及附件。
Uninterruptible power supply (UPS) system shall include a set of rectifier/ battery charger, batteries, inverter, static bypass switch, synchronization equipment, protective devices, external mechanical bypass switch and accessories.

B. UPS 系统在接入酒店应急电源的情况，UPS 容量需要满足用电设备 1 小时的不间断电源；在没有接入酒店应急电源的情况下，UPS 容量需要满足用电设备 4 小时的不间断电源。
UPS system, in the case of being connected to the hotel emergency power supply, its capacity shall be able to supply one (1) hour of uninterrupted power supply for the electrical equipment. If without connection to the hotel emergency power supply, UPS capacity shall be able to supply four (4) hours of uninterrupted power supply for the electrical equipment.

C. UPS 系统具体电气参数详见强电章节内 8.4.3.2 章节。
UPS system specific electrical parameters refer to Electrical Section 8.4.3.2.

7.8.3. 系统应用
System Application

A. 酒店消控中心设置 2 套 UPS 系统，1 套供消防系统使用，另 1 套供安防系统使用。
Two (2) sets of UPS system shall be provided in hotel fire control centre, one for fire protection system and the other one for security system.

B. 酒店电话网络机房设置 1 套 UPS 系统，供电话网络机房内设备及弱电间内接入层交换机使用。
One (1) set of UPS system shall be provided in hotel telephone network room, for the equipment in the telephone network room and the access layer switch in the ELV room.

C. 酒店卫星电视接收机房设置 1 套 UPS 系统，供卫星电视机房内设备使用。
One (1) set of UPS system shall be provided in hotel satellite TV receiver room, for the equipment in the satellite TV receiver room.

D. 酒店工程部办公室设置 1 套 UPS 系统，供 BA 系统中央控制主机使用。
One (1) set of UPS system shall be provided in the hotel engineering department office, for BA system central control unit.

E. 酒店车库岗亭内设置 1 套 UPS 系统，供酒店车库系统使用。
One (1) set of UPS system shall be provided in hotel car park police box, for hotel car park system.

7.9. 音视频系统
Audio Video System

7.9.1. 中央背景音乐系统
Background Music System

A. 概述
General Description

1. 中央背景音乐系统必须包括一套电脑音乐硬盘回放系统，并且播放音乐可通过网络进行更新。背景音乐系统音源可通过矩阵分送到不同分区。
Central background music system shall include 1 set of computer hard disk music playback system with internet update function. The system shall be able to distribute into different divisions via matrix.

2. 背景音乐系统需与消防系统完全独立分开（包括系统设备、高音质扬声器等）。
Background music system shall be independent from fire protection system (Including system equipment and high sound quality speaker, etc.)

3. 背景音乐系统设备原则上放置于消防中心，便于酒店统一管理，但需根据具体项目而定。
Background music system equipment shall generally be located in Fire Command Center for unified management but actual location to be determined.

B. 公共区域
Public Area

1. 景观
Landscape Area

a. 配置园林扬声器供播放高质量背景音乐。
Garden speakers shall be provided for high quality background music play.

b. 配置音量控制器，供调节本区域中央背景音乐音量大小。控制面板放置于隐蔽位置；或与 ID 灵活协调，放置于客人接触不到的位置，且便于员工操作。
Volume controller shall be provided to control background music and be located at concealed location or guest untouchable location for staff easy operation.‘

2. 入口雨棚
Entrance Canopy

a. 配置高品质扬声器供播放高质量背景音乐。
High quality speaker with high quality background music shall be provided.

b. 配置音量控制器，供调节本区域中央背景音乐音量大小。控制面板放置于隐蔽位置；或与 ID 灵活协调，放置于客人接触不到的位置，且便于员工操

作。
Volume controller shall be provided to control background music and be located at concealed location or guest untouchable location for staff easy operation.

3. 大堂前厅
Lobby Foyer

a. 配置天花扬声器供播放高质量背景音乐。
Ceiling speaker with high quality background music shall be provided.

b. 配置音量控制器，供调节本区域中央背景音乐音量大小。控制面板放置于前台接待台隐蔽位置；或与 ID 灵活协调，放置于客人接触不到的位置，且便于员工操作。
Volume controller shall be provided to control background music and be located at concealed location or guest untouchable location for staff easy operation.

4. 大堂
Lobby

a. 配置天花扬声器供播放高质量背景音乐，音乐信号可选择由中央背景音乐系统提供或由本地音源信号输入提供，以应对特殊活动或事件。
Ceiling speaker with high quality background music shall be provided; the music signal shall be obtained from central background music system or local source for special activities or events.

b. 本地配置键盘控制器，可进行音乐信号选择和音量控制，控制面板放置于前台接待台隐蔽位置；或与 ID 灵活协调，放置于客人接触不到的位置，且便于员工操作。
Local keypad controller shall be provided for signal selection & volume control and be located at concealed location or guest untouchable location for staff easy operation.

c. 在前台接待台可视范围内，设置一个至少 50 英寸 LED 显示器作为信息发布使用；其亦可播放电视信号。具体位置及安装型式需由 ID 和 AV 顾问根据实际情况设计而定。
At least 1 no. of 50 inches LED monitor shall be provided within visual range of front reception counter for information publishes; the monitor shall also be able to play television signal with actual location and installation type to be determined by ID and AV Consultant.

5. 公共走廊(非客房层)和卫生间
Common Corridor (Non-guestroom floors) and Toilet

d. 配置天花扬声器供播放高质量背景音乐。
Ceiling speaker with high quality background music shall be provided.

e. 配置音量控制器，供调节本区域中央背景音乐音量大小。控制面板放置于隐蔽位置；或与 ID 灵活协调，放置于客人接触不到的位置，且便于员工操作。
Volume controller shall be provided to control background music and be located at concealed location or guest untouchable location for staff easy operation.

6. 电梯厅
Lift Lobby

a. 配置天花扬声器供播放高质量背景音乐。
Ceiling speaker with high quality background music shall be provided.

b. 在所有入口，饮食区，功能楼层的电梯大堂提供背景音乐。在客房楼层的电梯大堂不提供背景音乐。
Background music shall be provided for all accesses, diet areas and lift lobby for multi-function stories, etc. No background music for lift lobby of guestroom floors.

c. 在电梯大堂、电梯轿厢内提供 LED 显示器作为信息发布，并在切实可行的情况下，推广酒店的基本设施。这些信息发布显示器应与室内设计、电梯轿厢的设计相结合。
LED monitors shall be provided for lift lobby and lift car for information publish and introduction for hotel infrastructures; the monitors shall comply with interior and lift car design requirements.

7. 商务中心
Business Center

a. 配置天花扬声器供播放高质量背景音乐。
Ceiling speaker with high quality background music shall be provided.

b. 配置就地音量控制器，供调节本区域中央背景音乐音量大小。控制面板放置于前台接待台隐蔽位置；或与 ID 灵活协调，放置于客人接触不到的位置，且便于员工操作。
Local volume controller shall be provided to control background music and be located at concealed location near front desk or guest untouchable location for staff easy operation.

8. 贵宾接待厅
VIP Reception Lobby

a. 配置天花扬声器供播放高质量背景音乐，音乐信号可选择由中央背景音乐系统提供或由本地音源信号输入提供。
Ceiling speaker with high quality background music shall be provided; the music signal shall be obtained from central background music system or local source.

b. 本地可通过键盘控制器进行音乐信号选择和音量控制。控制面板放置于前台接待台隐蔽位置；或与 ID 灵活协调，放置于客人接触不到的位置，且便于员工操作。
Local keypad volume controller shall be provided for signal selection and volumecontrol; the controller shall be located at concealed location near front desk or guest untouchable location for staff easy operation.

c. 根据使用需求设置接线箱，用于会见客人时连接话筒使用。
Junction box shall be provided for telephone receiver connection base on requirement.

d. 配置 LED 电视及点位，同时也可将宴会厅等区域现场视频信号送至 LED 电视。
LED Television and connection point shall be provided for signal transmittal from banquet to the LED Television.

C. 餐饮区域
Diet Area

1. 大堂吧
Lobby Bar

a. 配置高品质扬声器供播放高质量背景音乐，音乐信号可选择由中央背景音乐系统提供或由本地音源信号输入提供。
Speaker with high quality background music shall be provided; the music signal shall be obtained from central background music system or local source.

b. 配置键盘控制器，可进行音乐信号选择和音量控制，控制面板放置于前台接待台隐蔽位置；或与 ID 灵活协调，放置于客人接触不到的位置，且便于员工操作。
Keypad volume controller shall be provided for signal selection and volume control; the controller shall be located at concealed location near front desk or guest untouchable location for staff easy operation.

c. 设置本地设备机柜提供本地音源信号输入，以应对特殊活动或事件。设备机柜需放置于隐藏位置，或与 ID 灵活协调，且便于员工操作。
Local equipment controller enclosure shall be provided for special activities or events; the controller shall be located at concealed location near front desk or untouchable location for staff easy operation.

d. 演出区域提供话筒、扬声器连接插座面板供小型乐队、表演者连接流动影音设备。扬声器系统配置与宴会厅及多功能厅同品牌主扩声扬声器及低音扬声器，以满足各种表演使用需求。
Microphones and speakers connection outlet panel shall be provided for portable equipment of mini band or performer in performance area. The speaker shall be of the same brand with that of banquet and banquet to meet with different performance requirements.

e. 根据项目实际需求，大堂吧与全日制餐厅背景音乐系统需考虑合并使用。
Background music system for lobby bar and All-Day Dining Restaurant shall be combined based on actual requirement.

2. 全日制餐厅&包房
All-Day Dining Restaurant & Compartment

a. 配置天花扬声器供播放高质量背景音乐，音乐信号可选择由中央背景音乐系统提供或由本地音源信号输入提供。
Ceiling speaker with high quality background music shall be provided; the music signal shall be obtained from central background music system or local source.

b. 设置本地设备机柜提供本地音源信号输入，系统配置本地音源（CD/MP3/IOS 设备等）、音频处理设备、功放及与其它扬声器同品牌的吸顶扬声器等设备，以应对特殊活动或事件。设备机柜需放置于隐藏位置，或与 ID 灵活协调，且便于员工操作。
Local audio signal equipment shall be provided with CD/MP3/IOS equipment, audio handling equipment, amplifier and other speakers of the same brand for special activities or events. The equipment shall be located in concealed location for staff easy operation.

c. 本地可通过键盘控制器进行音乐信号选择和音量控制，控制面板放置于前台隐蔽位置；或与 ID 灵活协调，放置于客人接触不到的位置，且便于员工操作。
Local keypad volume controller shall be provided for signal selection and volume control; the controller shall be located at concealed location near front desk or guest untouchable location for staff easy operation.

d. 独立包厢内，在备餐间设置独立音量控制面板。包厢内可根据要求配置电视机。
Volume controller panel shall be located in pantry for compartment; Television shall be provided based on requirement.

3. 中餐厅&包房
Chinese Restaurant and Compartment

a. 配置天花扬声器供播放高质量背景音乐，音乐信号可选择由中央背景音乐系统提供或由本地音源信号输入提供。
Ceiling speaker with high quality background music shall be provided; the music signal shall be obtained from central background music system or local source.

b. 设置本地设备机柜提供本地音源信号输入，系统配置本地音源（CD/MP3 /IOS 设备等）、音频处理设备、功放及与其它扬声器同品牌的吸顶扬声器等设备，以应对特殊活动或事件。设备机柜需放置于隐藏位置，或与 ID 灵活协调，且便于员工操作。
Local audio signal equipment shall be provided with CD/MP3/IOS equipment, audio handling equipment, amplifier and other speakers of the same brand for special activities or events. The equipment shall be located in concealed location for staff easy operation.

c. 本地可通过键盘控制器进行音乐信号选择和音量控制，控制面板放置于前台隐蔽位置；或与 ID 灵活协调，放置于客人接触不到的位置，且便于员工操作。
Local keypad volume controller shall be provided for signal selection and volume control; the controller shall be located at concealed location near front desk or guest untouchable location for staff easy operation.

d. 独立包厢内，在备餐间设置独立音量控制面板。包厢内要求配置电视机。
Volume controller panel shall be located in pantry for compartment; Television shall be provided based on requirement.

4. 特色餐厅&包房
Characteristic Restaurant and Compartment

a. 配置天花扬声器供播放高质量背景音乐，音乐信号可选择由中央背景音乐系统提供或由本地音源信号输入提供。
Ceiling speaker with high quality background music shall be provided; the music signal shall be obtained from central background music system or local source.

b. 设置本地设备机柜提供本地音源信号输入，系统配置本地音源（CD/MP3 /IOS 设备等）、音频处理设备、功放及与其它扬声器同品牌的吸顶扬声器等设备，以应对特殊活动或事件。设备机柜需放置于隐藏位置，或与 ID 灵活协调，且便于员工操作。
Local audio signal equipment shall be provided with CD/MP3/IOS equipment, audio handling equipment, amplifier and other speakers of the same brand for

special activities or events. The equipment shall be located in concealed location for staff easy operation.

c. 本地可通过键盘控制器进行音乐信号选择和音量控制，控制面板放置于前台隐蔽位置；或与 ID 灵活协调，放置于客人接触不到的位置，且便于员工操作。
Local keypad volume controller shall be provided for signal selection and volume control; the controller shall be located at concealed location near front desk or guest untouchable location for staff easy operation.

d. 独立包厢内，在备餐间设置独立音量控制面板。包厢内要求配置电视机。
Volume controller panel shall be located in pantry for compartment; Television shall be provided based on requirement.

5. 酒吧
Bar

a. 配置高品质扬声器供播放高质量背景音乐，音乐信号可选择由中央背景音乐系统提供或由本地音源信号输入提供，以应对特殊活动或事件。
Speaker with high quality background music shall be provided; the music signal shall be obtained from central background music system or local source for special activities or events.

b. 设置本地设备机柜，提供本地信号源输入。设备机柜需放置于隐藏位置，或与 ID 灵活协调，且便于员工操作。
Local equipment controller shall be provided for audio signal input; the controller shall be located in concealed location for staff easy operation.

c. 本地可通过键盘控制器进行音乐信号选择和音量控制，控制面板放置于前台隐蔽位置；或与 ID 灵活协调，放置于客人接触不到的位置，且便于员工操作。
Local keypad volume controller shall be provided for signal selection and volume control; the controller shall be located at concealed location near front desk or guest untouchable location for staff easy operation.

d. 系统配置话筒、本地音源（CD/MP3）、网络音频信号接收设备、音频处理器、功放及与其它扬声器同品牌的吸顶扬声器等设备。演出区域提供话筒扬声器连接插座面板供小型乐队、表演者连接流动影音设备使用。
The system shall be equipped with microphones, local audio source (CD/MP3), internet audio signal receiver, audio processor, amplifier and other loudspeakers, etc. Microphones and speakers connection outlet panel shall be provided for portable equipment of mini band or performer in performance area.

e. 根据使用需求配置电视机，供客人观看电视或专用节目。
Television shall be provided for watching TV or specific program based on requirement.

f. 可根据使用需求配置舞台灯光系统，满足舞台照明环境效果等。
Stage lighting system shall be provided based on stage lighting effect requirements.

g. 仅度假村: 酒吧内应留出空间放置展示舞台和辅助的舞台娱乐电气设备。
Only for resort: Spare space shall be provided for stage and entertainment electric equipment in bar.

D. 行政酒廊
Executive Lounge

1. 配置天花扬声器供播放中央背景音乐。
Ceiling speakers shall be provided for central background music.

2. 配置就地音量控制器，供调节本区域中央背景音乐音量大小。控制面板放置于前台隐蔽位置；或与 ID 灵活协调，放置于客人接触不到的位置，且便于员工操作。
Local volume controller shall be provided for volume control; the controller shall be located at concealed location near front desk or guest untouchable location for staff easy operation.

3. 配置一台至少 50 英寸的 LED 高清电视机，供行政酒廊客人观看电视节目。
At least 1 set of 50 inches LED High-Definition Television shall be provided in executive lounge for guest watching television.

4. 行政酒廊会议室：
Executive lounge meeting room:

a. 可根据具体平面情况设置合适尺寸 LED 或投影幕作为显示系统供会议使用。
Suitable LED or projector screen shall be provided for meeting usage.

b. 精品店/礼品店
Boutique Shop/Gift Shop

c. 配置高音质扬声器供播放中央背景音乐。
High quality speaker shall be provided for central background music.

d. 配置恰当分区的就地音量控制器，供调节本区域中央背景音乐音量大小。控制面板放置于前台隐蔽位置；或与 ID 灵活协调，放置于客人接触不到的位置，且便于员工操作。
Local division volume controller shall be provided for background music volume control; the controller shall be located at concealed location near front desk or guest untouchable location for staff easy operation.

7.9.2. 本地音视频系统
Local Audio and Video System

A. 概述
General Description

1. 本地音视频系统设计目的是为酒店召开各种会议宴会厅，举办各种活动提供服务。利用音视频系统的先进设备和软件，实现高效，生动，直观与现代化的会议宴会活动流程。
Local Audio video system is designed for several of meetings and activities, etc. Advanced equipment and software shall be used to achieve efficient, vivid, intuitive and modern requirement.

B. 宴会前厅设计标准及要求
Banquet Lobby Design Standards and Requirements

1. 提供高质量背景音乐播放，音乐信号可选择由中央背景音乐系统提供或本地音源输入，以应对特殊活动或事件。
   Speaker with high quality background music shall be provided; the music signal shall be obtained from central background music system or local source for special activities or events.

2. 音频系统应包括敷设在建筑中连接至天花扬声器、就地音量控制器。扬声器必须带金属网罩且其颜色应当与天花板相匹配。音量控制器放置于隐蔽位置；或与 ID 灵活协调，放置于客人接触不到的位置，且便于员工操作。
   Audio system shall include ceiling speakers and local volume controllers, etc. Loud speakers shall be protected by mesh cover of the same color with ceiling. The controller shall be located at concealed location or guest untouchable location for staff easy operation.

3. 音频系统功能必须覆盖秀场展台音响、来自外界传输或者录制的音频材料、麦克风增强语音、背景音乐和听力障碍人士设施等。
   Audio system shall include stage audio equipment, external input or recorded audio signal, microphone speech enhancement, background music and facilities for hearing disabilities, etc.

4. 所提供的综合多媒体面板需与宴会厅控制室信号相结合。
   The multimedia control panel shall be integrated with banquet control room signal.

5. 提供符合以下内容的信息发布：
   Digital signage shall be provided as below:

   a. 宴会前厅入口-40 英寸的嵌墙式竖屏显示屏。
      Banquet lobby entrance – 40 inches vertical built-in display

   b. 宴会前厅-40 英寸的嵌墙式竖屏显示屏。
      Banquet Lobby-40 inches vertical built-in display

   c. 备注：具体位置及安装方式需与室内顾问结合决定。
      Remark: Final location and installation method shall be determined by interior designer.

C. 宴会厅设计标准及要求
   Banquet Design Standards and Requirements

1. 宴会厅配置一套适用于语音增强和高质量背景音乐的分布式扩声系统。所有扬声器必须为天花吸顶型、壁挂型或类似配置。
   One set of distribution sound reinforcement system for sound reinforcement and high quality background music shall be provided for banquet. All loudspeakers shall be ceiling mounted, wall mounted or other similar type.

2. 大屏幕显示系统
   Large Screen Display System

   a. 投影幕均为标准的 16:9 屏幕，投影屏幕的水平尺寸，应到最远观众距离的 1/4~1/6。为保证投影幕的平整度，宴会厅投影幕两侧需具备拉紧机构。半增益视角±90°，可视角度 180°，视角宽阔，亮度均匀，超强韧性。电

动可采用遥控器、手动控制面板、第三方集中控制系统三种方式控制升降。投影幕离地 1.5——1.8m。
Projector screen shall be standard 16:9 screen with horizontal size within 1/4 to 1/6 of the distance from the screen to the furthest audience. Tighten mechanism shall be provided for banquet projector screen to ensure its smoothness. The screen half gain view angle shall be ± 90°and the view angle shall be 180°to ensure wide view angle, brightness uniformity and high flexibility. The projector can be controlled by remote controller, manual control panel or third party central control system. The projector screen shall be of 1.5 to 1.8m height from the floor level.

b. 投影机采用三片 DLP/LCD 技术，流明度需由设计顾问根据屏幕大小和宴会厅不同使用功能下的灯光照明度而定，分辨率不低于 1280×720。
The projector shall be DLP/LCD Type with transparency determined by screen size and lighting lux level under banquet different functions as advised by design consultant. The projector resolution shall not be less than 1280 x720.

c. 宴会厅投影幕每平方米亮度应不低于 600lux。
Banquet projector screen lux level shall not be lower than 600lux/m².

d. 影音系统可根据分区情况，各分区独立或合并使用。各分区独立使用时影音信号互相不串扰；合并使用时各综合多媒体面板接入的影音信号可自由分配至各分区中的音频或视频系统中。
The Audio Video System for each zone shall be a standalone or combined type. No signal interference is allowed for two standalone system; when combined, the Integral multimedia control panel shall be able to control each zones.

e. 宴会厅四周设置综合多媒体面板，每个面板提供 4-8 路话筒输入、流动扬声器信号输出、电脑 VGA 信号/音频信号输入、RGBHV、复合视频信号输入、HDMI（可选）、DVI(可选)、6 类线接口、光纤接口（可选）等信号输入。
Integral multimedia control panel shall be provided for banquet; Each panel shall be provided with 4-8 way microphone input loudspeaker signal output, computer VGA signal/Audio signal input, RGBHV, compound video signal input, HDMI(optional), DVI(optional), Cat 6 outlet and fiber optic outlet(optional), etc.

3. 音频系统
Audio System

a. 宴会厅音频系统必须为每个宴会分区提供多路麦克风和线路电平输入信号和至少提供一路线路电平输出，以用于各分区的会议录音。每个宴会分区的音频系统处理设备必须具备 DSP 输入配置功能。
Multi-channel microphones and minimum 1 set of circuit electric input signal shall be provided for banquet audio system of each zone for meeting record. The audio processors shall have the function of DSP input for each banquet zone.

b. 音频输入/输出位置必须满足布线不会穿越客人通道。
Audio signal input/output wires shall not obstacle the guest corridor.

c. 音频系统功能必须覆盖秀场展台音响、来自外界传输或者录制的音频材料、麦克风增强语音、背景音乐和听力障碍人士设施等。
Audio system shall include stage audio equipment, external input or recorded audio signal, microphone speech enhancement, background music and facilities for hearing disabilities, etc.

d. 音频系统还应包括敷设在建筑中连接至天花扬声器、就地音量控制器。扬声器必须带金属网罩且其颜色应当与天花板相匹配。音量控制器放置于隐蔽位置；或与 ID 灵活协调，放置于客人接触不到的位置，且便于员工操作。
Audio system shall include ceiling speakers and local volume controllers, etc. Loud speakers shall be protected by mesh cover of the same color with ceiling. The controller shall be located at concealed location or guest untouchable location for staff easy operation.

e. 功能房间四周还应固定间隔安装落地式音箱进行补充，并且与麦克风/扬声器插座进行连接。
Floor stand sound boxes shall be provided for sound reinforcement with connection with microphone and loudspeaker outlets.

f. 音频支持设备、五碟式 CD 播放器和卡带录音机、讲演台、麦克风、无线麦克风（至少 4 个颈夹式和 4 个手持式）、有线麦克风以及所有必要的辅助输入装置。
Audio support equipment, 5 CD Type player and tape recorder, speech counter, microphone, wireless microphone (at least 4 nos. of neck type and 4 nos. of hand-held type), wire microphone and all necessary ancillaries and accessories.

g. 宴会厅必须配置一套一体化混音放大器系统，各分区必须具备所有区域同时播放或者各区域单独播放的能力。
Mixer/Amplifier system shall be provided for each banquet with the ability of grouped or independent broadcast.

h. 设备机柜必须置放在宴会厅控制室，机柜布置必须满足无需移动设备即可从柜前和柜后进行检修。
Equipment cabinet shall be located in banquet control room with proper location for easy maintenance from the front and back without been shifted.

4. 视频系统
Video System

a. 系统配置信号切换矩阵、电动升降投影机、一体化摄像机及控制键盘、电动投影幕、监视屏等设备。
The system shall include signal matrix switching, motorized projector, integrated camera, control keypad, motorized screen and monitors, etc.

b. 视频矩阵支持复合视频、VGA 多种信号各分辨率输入（最高分辨率要求根据投影机分辨率确定）。
The video matrix shall support compound signal and VGA signal, etc with different resolutions (The maximum resolution shall be determined by the projector resolution).

c. 视频信号传输可考虑采用双绞线设备或光纤设备（根据所投影信号分辨率高低确定）。
Signal wire can be twisted pair wire or fiber cable (base on projector signal resolution)

d. 视频系统支持各种分辨率电脑 VGA 信号、复合视频信号播放，可根据需要提供 HDMI、DVI 等高清信号播放功能（选项）。
The system shall support computer VGA signal with different resolution, compound video signal, HDMI and DIV signal(Optional), etc.

e. 现场预留网络点位，以满足远程视频电视会议设备的连接及使用。
Network points shall be reserved for remote video conference equipment.

f. 带高速互联网接入和笔记本电脑接口的投影仪和大屏幕显示、DVD 播放器或有线电视的视频图像、数字展示平台、嵌入式电子投影机、视频会议以及包括所有必要的辅助输入设备。
Projector and large screen with internet input and laptop computer connector, DVD Player, cable television video signal, digital display, build-in type electronic projector, video conference equipment and all ancillaries and accessories,etc.

g. 系统可以按各个宴会区域单独工作或者按大宴会厅组合工作。当不使用时，投影机和投影幕必须能够收回至吊顶内。
Each system shall be able to work independently or integrated; when not in use, the projector and screen shall be restored into the suspended ceiling.

5. 集中控制系统
Central Control System

a. 必须提供一个中央主控制接口，可优先控制各个子区域设定，亦可对各个子区域进行组合控制，接口安装位置需获得希尔顿认可。
Master controller shall be provided for individual or combined control to each zones; the controller location shall be approved by Hilton Worldwide.

b. 分区应当提供控制接口，以便于无需用户调节预定设置，便可直接选择音频源和进行直观的音量控制。
Local controller shall be provided for each zone for video source selection and volume control.

c. 提供集成远程触控系统的电子屏幕和投影仪升降系统。
Integrated remote control electronic screen and projector lifting system shall be provided.

6. 舞台灯光系统
Stage Lighting System

a. 宴会厅需含灯光系统，配置调光台及一定数量的灯具，如 LED 电脑灯、筒灯、电脑灯等，供宴会厅各种情景场合使用，调光台放置于影音控制室，会议灯具不使用时放置于影音储藏室。
Lighting control system shall be provided for banquet including lighting control console and light fittings such as LED lights, down lights, moving lights, etc. for different scenes requirements. The lighting control console shall be located in AV control room; Meeting lamps shall be stored in AV Storeroom when not in use.

7. 吊挂系统
Suspension System

a. 在主宴会厅的整个天花板上，每隔 6m 必须设置一个吊挂点。所设置的吊挂点（I 形螺栓）用于悬挂临时展品、灯具等。吊挂点必须能够承受 450kg 的最大载荷，并应经过持照结构工程师和施工商的确认。吊挂点的抗拉(断裂)强度至少应为工作荷载的五倍。
Suspension point (I type bolt) shall be provided every 6m for the main banquet ceiling to suspend temporary exhibits and light fittings, etc. Maximum loading for each suspension point shall be 450kg with confirmation by licensed

structural engineer and contractor. The tensile strength shall be at least five times of the working load.

b. 各种天花板悬挂的单独物件或者所有天花悬挂的支撑结构或桁架，包括采用聚酯环形吊索或其它合成材料吊索悬挂的物件在内，均需采用安全等级的钢材。
Safety grade steel shall be used for all ceiling suspension separate object and suspension structure or truss including PVC suspension or other materials.

c. 宴会厅配置一定数量的多功能吊点，供吊挂灯光、音响等音视频设备之用，吊点中需提供 DMX 信号线，双绞线信号线，音频信号线、电源线等线缆，供外加设备信号接入及供电使用，多功能吊点不用时必须隐藏起来。
Multifunction suspension points shall be provided for lighting and AV Equipment in banquet. DMX signal wire, twisted pair signal wire, audio signal wire and electrical wires, etc shall be provided for each suspension points for adapted equipment signal input and power supply. The suspension point shall be concealed when not in used.

8. 宴会厅控制室
Banquet Control Room

a. 宴会厅控制室的面积不小于 30 ㎡。
Banquet control room area shall not be less than 30m².

b. 控制室吊顶和墙面装修材料和构架应符合消防防火要求，使用阻燃型装修材料，表面阻燃涂覆处理，达到阻燃、防火的要求。（可选）
The control room suspension and wall finish material including structure shall comply with fire protection requirements. Fire rated decoration materials with fire rated surface coating shall be used (optional).

c. 控制室地板需满足：
Control room floor shall comply with requirements as below:

d. 机械强度高、承载能力强并符合设备所需、防火性能好；
High mechanical strength, loading capacity and good fire resistance ability;

e. 表面静电喷塑，柔光、耐磨、防腐蚀；
Surface electrostatic spraying, flexible polishing, wearing treatment and anti-corrosion treatment.

f. 粘贴的装饰高压层板，耐磨性及防静电性能优良、抗污染、便于清洗、装饰性强，长期使用无变形、褪色等现象；
Adhesive decorative laminated board shall be provided with wearing treatment, anti-electrostatic, pollution-resistant and durable with no distortion or fading;

g. 尺寸精度高、互换性能好、组装灵活、维护方便。
High dimension precision, good interchangeability, flexible assembly and maintenance convenience.

h. 地板需采用防静电地板，防静电地板高度参考高度为 250—300mm；如实际情况无法安装防静电地板，地面至少需为 环氧树脂防静电地板 。
Floor tile shall be antistatic type with the reference height at 250-300mm; whenever not applicable, epoxy resin antistatic floor tiles shall be used.

i. 房间要综合考虑照明灯具、空调和湿度设备的配置。
Light fitting, air-conditioner and humidity equipment distribution shall be considered for room design.

j. 控制室的高度和空间，应考虑敷设地板及吊顶装修后净高。由于控制室多采用下进线方式，地板下要敷设走线槽和通风，地板净高一般在 250—300mm 左右。
Clear height shall be determined for control room space design considering the floor and suspended ceiling height. Cable trunking and ventilation shall be provided under the floor tile in view of normal bottom entry cable; The floor tile height shall be 250 to 300mm.

D. 多功能厅设计标准及要求
Multifunction Hall Design Standards and Requirements

1. 主席台位置两侧设置综合接线箱，提供 4-8 路话筒输入、流动扬声器信号输出、电脑 VGA 信号/音频信号输入、RGBHV、复合视频信号输入、HDMI（可选）、DVI(可选)、6 类线接口等信号输入。
Integrated cable junction boxes shall be provided at the both sides of the platform with 4 to 8 ways microphone input, adapted loudspeaker output, computer VGA signal/audio signal input, RGBHV, compound video signal input, HDMI(optional), DVI(optional), Cat6 connector, etc.

2. 音频系统
Audio System

a. 提供高质量背景音乐播放，音乐信号由本地音源信号输入提供，以应对特殊活动或事件。通过安装在控制室的多通道音控面板进行音乐信号选择和音量控制。
Ceiling speaker with high quality background music shall be provided; the music signal shall be obtained from local source for special activities or events. Multi-channel audio control panel in control room shall be provided for music signal selection and volume control.

b. 系统配置音源设备、调音台、网络音频信号接收设备（可选）、音频处理器、无线话筒、功放及扬声器、效果器、监听扬声器、监听话筒信号跳线排等设备。如遇上大型活动，有线、无线话筒还可由流动设备库中补充提取。音频处理器具备均衡、延时、矩阵切换等功能，支持多种设置模式预存，支持电脑实时监控和控制，支持多台联机使用。
The system shall be provided with audio source equipment, music console, network audio signal receiver (optional), audio processor, wireless microphone, amplifier and loudspeaker, effector, monitoring speaker and monitoring microphone signal jumper,etc. In the event of large special events, wire and wireless microphones shall be also provided from mobile equipment store. The audio processor shall have the functions of balance, time relay, matrix switch, multi models pre-store, computer real-time monitor and control as well as online mode, etc.

c. 配置与其它扬声器同品牌的吸顶扬声器尺寸及数量根据层高和面积确定，主要用于会议扩声及背景音乐的播放。
Dimension and quantity for ceiling mounted speaker of the same brand shall be determined by storey height and floor area; the speakers are mainly used for sound reinforcement and background music playing.

d. 举行宴会等大型活动时，可将同品牌有源扬声器及低音音箱连接面板使用。
In the event of large special events such as banquet, active loudspeaker and woofer of the same brand can be linked to control panel.

e. 系统可保证每个分区至少同时使用 4 路有线话筒和 4 路无线话筒，无线话筒外置天线设置于各宴会厅分区。
The system shall provide at least 4 ways of wire microphone and 4 ways of wireless microphone for each zone. Exposed antenna for wireless microphones shall be located within the banquet of each zone.

3. 视频系统
Video System

a. 视频矩阵支持复合视频、VGA 多种信号各分辨率输入（最高分辨率要求根据投影机分辨率确定）。
Video matrix shall support compound videos and VGA input signals with different resolutions (the maximum resolution shall be determined by the projector resolution)

b. 视频信号传输可考虑采用双绞线设备或光纤设备（根据所投影信号分辨率高低确定）。
Signal wire can be twisted pair wire or fiber cable (base on projector signal resolution).

c. 根据多功能厅大小、层高及使用功能配置电动投影幕尺寸（16:9），幕下端距离地面约 1.5~2.0 米以保证客人视觉角度。
Motorized projector screen (16:9) shall be determined by the multifunction hall size, storey height and function. The screen bottom height shall be 1.5 to 2.0m to ensure good view angle.

d. 投影机亮度根据投影幕面积及具体使用情况配置，主舞台投影机可采用高清（720P）分辨率（选项）产品。
Projector brightness shall be determined by screen area and actual usage. Projector for main stage shall be high definition (720P) and resolution (optional) type.

e. 多功能厅投影幕每平方米亮度应不低于 1000lux。
Lux level for multifunction screen shall not be less than 1000lux/m^2.

f. 视频系统支持各种分辨率电脑 VGA 信号、复合视频信号播放，可根据需要提供 HDMI、DVI 等高清信号播放功能（选项）。
The video system shall support different resolution computer VGA signal, compound video signal display, HDMI, DIV signal (optional).

g. 视频系统支持现场视频信号录像，可制作 DVD 媒体。
The video system shall support spot video signal record function for DVD media.

h. 现场预留网络点位，以满足远程视频电视会议设备的连接及使用。
Network points shall be reserved for remote video conference equipment.

4. 集中控制系统
Integrated Control System

a. 系统配置控制主机、有线触摸屏或有线键盘（每分区 1 块，设置于后勤区）、无线触摸屏、无线触摸屏接收器、其他控制附件及控制软件等。

The system shall be provided with main control equipment, wired touch screen or wired keyboard (one for each zone, in the logistics area), wireless touch screen, wireless touch screen receivers and other control accessories and control software, etc.

b. 控制系统可控制以下并不限以下设备：
The control system shall include but not limited to the following equipment:-

1. 音频处理器
Sound processor

2. 音视频源设备（DVD/CD 等）
Audio and video source devices (DVD/CD, etc)

3. 视频信号切换矩阵
Video signal switching matrix

4. 投影机电动升降吊架
Projector electric hoist hanger

5. 电动投影幕
Electric projection screen

6. 投影机的开关
Projector switch

7. 灯光（可选）
Lighting (optional)

8. 隔断合并设备
Isolation and combination equipment

9. 其他业主另行要求的功能
Other functions required by the Client

5. 舞台灯光系统（可选，根据项目具体要求而定）
Stage Lighting System (Optional, subject to project specific requirements)

a. 舞台灯光系统以最基本使用要求配置，含调光台、硅箱、灯具（含光源）、控制信号传输设备、灯光吊杆等。
Stage lighting system shall be provided to comply with the most basic operation requirements, including lighting control console, silicon box, lamp and lantern (including luminaire), control signal transmission equipment, light truss, etc.

b. 舞台灯光悬挂的灯光吊杆为可升降的活动吊杆，每个灯杆上设置插座和并引出 DMX512 控制信号线，插座间隔应不少于 1 米。
Stage lighting suspended light truss shall be lifting truss. Each light pole shall be provided with outlet for DMX512 control signal wire. The interval between each outlet shall be not less than 1 meter.

6. 天花悬吊系统（可选）
Ceiling Suspended System (Optional)

a. 根据需求于多功能厅天花设置多组天花吊钩点（固定安装，每个点承重待定，承重要求根据具体项目而定，一般为 250~500KG），用于舞台灯光吊架、流动扬声器、标语杆、租赁设备等使用。
A few groups of ceiling hook points shall be provided at multi-function hall ceiling as per requirements (fixed installation, loading of each point to be confirmed, loading requirements subject to specific project, generally 250~250kg). This is used for stage lighting truss, mobile speakers, banner pole, rental equipment, etc.

b. 吊点附近根据需求设置灯光用电源插座、硅箱输出点、灯光控制信号点、扬声器信号接口（部分吊点）。
Lighting electric outlet, silicon box output point, lighting control signal point and speakers signal interface (part of the lifting point) shall be provided near the lifting point as per requirements.

c. 备注：多功能厅和宴会厅音视频信号实现实时连通。
Note: Multi-function hall and banquet hall audio and video signal shall achieve real-time connectivity.

E. 会议室设计标准及要求
Conference Room Design Standards and Requirements

1. 小会议室
Small Conference Room

a. 可根据具体面积设计合适尺寸 LED/LCD 代替投影机投影幕作为显示系统供客人会议显示使用。
According to specific areas, design the LED/LCD with suitable size to replace the projector projection screen which is used as display system for the guest conference display.

b. 可根据项目具体要求配置地插式或墙插式综合多媒体面板。
To provide floor-mounted or wall-mounted integrated multimedia panel based on project specific requirements.

c. 可根据项目具体要求配置 DVD/音频处理器、功放及扬声器等设备。
To provide DVD/ audio processor, power amplifier, loudspeaker equipment, etc. based on project specific requirements.

2. 大会议室
Large Conference Room

a. 必须配置可升降投影幕。投影屏幕的水平尺寸，应到最远观众距离的 1/4~1/6。
Lifting projection screen shall be provided. The horizontal and vertical dimensions of the projection screen shall be 1/4 ~ 1/6 of the distance from the furthest audience.

b. 投影屏幕必须采用 16:9 的比例。投影屏幕的控制装置必须与照明开关安装在同一高度，并且必须有相应标记。投影屏幕安装应满足使用时其底边高度不低于离地 1.0m。以保证客人视角角度。
The projection screen shall have a ratio of 16:9. The projection screen control device shall be installed at the same height as the lighting switch and labeled

properly. The projection screen shall be installed that the bottom height shall not be less than 1.0m from the ground to ensure the guest view angle.

c. 会议室投影幕每平方米亮度应不低于 1000lux。
The conference room projection screen brightness shall be not less than 1000 lux/m².

d. 音频系统：
Audio System

1. 系统配置信号接口地插或墙插面板、DVD、音频处理器、功放及扬声器等设备。
The system shall provide desktop fixed multimedia panel, DVD, audio processor, power amplifier, loudspeaker and other equipment.

2. 配置与其它扬声器同品牌的吸顶扬声器根据房间面积及层高确定相应数量，可根据需求及使用功能可配置前置同轴音箱。
To provide ceiling speaker, which is the same brand as other speakers, and determine the quantity based on the room size and height. Front coaxial speakers can be provided according to the demand and function requirements.

3. 根据使用功能及房间大小提供至少 4 路有线话筒输入，2 路无线话筒输入。有线话筒、无线话筒，作为流动设备，供各会议室共享使用。
To provide minimum four-way wired microphone input, two-way wireless microphone input based on the function and size of the room. Wired microphone, wireless microphone shall be shared by each meeting room as mobile devices.

4. 预留电话、网络点位，以满足远程会议设备的连接及使用。
To reserve telephone and network points for remote teleconference equipment connection and operation

e. 视频系统
Video system

1. 根据使用需求配置电动升降固定投影机，投影机亮度根据投影幕面积及具体使用情况配置，分辨率不低于 1024 x 768。
Electric-hoist fixed projector shall be provided as per user requirements. The brightness of the projector shall base on the projection screen area and specific usage. The resolution shall not be less than 1024 x 768.

2. 视频系统支持各种分辨率电脑 VGA 信号、复合视频信号播放，可根据需要提供 HDMI、DVI 等高清信号播放功能。
The video system shall support computer VGA signals, composite video signals play with a variety of resolution and can provide HDMI, DVI, etc. signals play function if required.

3. 设置本地设备机柜，提供本地信号源输入。设备机柜需放置于隐藏位置，或与 ID 灵活协调，且便于员工操作。

Local cabinet shall be installed to provide local sound source signal input. The equipment cabinet shall be located in hidden area. It can also be coordinated with the ID that the control panel is placed out of reach of the guest, and easy to be operated by the staff.

4. 预留网络点位，以满足远程会议设备的连接及使用。
To reserve network points for remote teleconference equipment connection and operation

3. 当隔间会议室合并为一间大会议室时
If the adjacent conference rooms are combined into a big conference room

a. 大会议室必须安装以下项目：
Large conference room shall install the followings:-

1. 大型前方投影系统。
Large front projection system

2. 一个嵌入式电动下降投影幕与一个带电动升降架的 LED/LCD 投影仪，并提供高质量的集成显示解决方案。
A recessed type electric lifting projection screen and a LED/LCD projector with electric lifting frame, and provide high quality integrated display solutions

3. 投影仪必须能够显示以下视频信号源：
The projector shall be able to display the following video signal sources:-

4. 3 个笔记本输入端口-每个会议室设置不少于两个地插式或墙插式综合多媒体面板
Three (3) notebook input terminals – each conference room shall have not less than two floor-mounted or wall-mounted integrated multimedia panels.

5. IPTV 端口
IPTV terminal

b. 视频信号源必须通过一个可编程音频关联输出接入到会议室音频系统中。
Video signal source shall pass a programmable audio associated output to connect to the conference room audio system.

c. 音频输入/输出位置必须满足布线不会穿越客人通道。设备机柜必须置放在专门的音视频设备控制室或与语音/数据配线设备共用位置。
Audio input/ output location shall meet the requirement that the wiring shall not pass through the guest corridor. Equipment cabinets shall be placed in a dedicated audio and video equipment control room or shared location with voice/ data wiring devices.

d. 音频系统功能必须覆盖秀场展台音响、来自外界传输或者录制的音频材料、麦克风增强语音、背景音乐和听力障碍人士设施等。
Audio system function shall cover the show stage acoustics, transmission or

recording audio material from outside, the microphone speech enhancement, background music and hearing disabilities facilities, etc.

F. 董事会议室设计标准及要求
Boardroom Design Standards and Requirements

1. 大屏幕显示系统
Giant Screen Display System

a. 必须配置可升降投影幕。投影屏幕的水平和垂直尺寸，应到最远观众距离的 1/4~1/6。
Lifting projection screen shall be provided. The horizontal and vertical dimensions of the projection screen shall be 1/4 ~ 1/6 of the distance from the furthest audience.

b. 投影屏幕必须采用 16:9 的比例。投影屏幕的控制装置必须与照明开关安装在同一高度，并且必须有相应标记。投影屏幕安装应满足使用时其底边高度不低于离地 1.0m。以保证客人视角角度。
The projection screen shall have a ratio of 16:9. The projection screen control device shall be installed at the same height as the lighting switch and labeled properly. The projection screen shall be installed that the bottom height shall not be less than 1.0m from the ground to ensure the guest view angle.

2. 音频系统
Audio System

a. 系统配置桌面固定多媒体面板、DVD、音频处理器、功放及扬声器等设备。
The system shall provide desktop fixed multimedia panel, DVD, audio processor, power amplifier, loudspeaker and other equipment.

b. 配置与其它扬声器同品牌的吸顶扬声器根据房间面积及层高确定相应数量，可根据需求及使用功能可配置前置同轴音箱。
To provide ceiling speaker, which is the same brand as other speakers, and determine the quantity based on the room size and height. Front coaxial speakers can be provided according to the demand and function requirements.

c. 根据使用功能及房间大小提供至少 4 路有线话筒输入，2 路无线话筒输入。有线话筒、无线话筒，作为流动设备，供各会议室共享使用。
To provide minimum four-way wired microphone input, two-way wireless microphone input based on the function and the size of the room. Wired microphone, wireless microphone shall be shared by each meeting room as mobile devices.

d. 预留电话、网络点位，以满足远程会议设备的连接及使用。
To reserve telephone and network points for remote teleconference equipment connection and operation

e. 设置本地设备机柜，提供本地信号源输入。设备机柜需放置于隐藏位置，或与 ID 灵活协调，且便于员工操作。
Local cabinet shall be installed to provide local sound source signal input. The equipment cabinet shall be located in hidden area. It can also be coordinated with the ID that the control panel is placed out of reach of the guest, and easy to be operated by the staff.

3. 视频系统
   Video System

   a. 根据使用需求配置电动升降固定投影机，投影机亮度根据投影幕面积及具体使用情况配置，分辨率不低于 1024 X 768。
   Electric-hoist fixed projector shall be provided as per user requirements. The brightness of the projector shall base on the projection screen area and specific usage. The resolution shall not be less than 1024 x 768.

   b. 视频系统支持各种分辨率电脑 VGA 信号、复合视频信号播放，可根据需要提供 HDMI、DVI 等高清信号播放功能。
   The video system shall support computer VGA signals, composite video signals play with a variety of resolution and can provide HDMI, DVI, etc. signals play function if required.

   c. 预留网络点位，以满足远程会议设备的连接及使用。
   To reserve network points for remote teleconference equipment connection and operation

   d. 提供数字会议系统（根据不同酒店要求及具体使用功能）
   To provide digital conference system (according to different hotel requirements and specific function)

   e. 提供至少一台 55 英寸电视作为远程视频会议使用。
   To provide minimum one (1) 55 inch TV for remote video conference

   f. 提供与宴会厅之间的音视频信号互送转播。（可选）
   To provide audio and video signals transmission and broadcast between banquet halls (optional)

4. 集中控制系统
   Integrated Control System

   a. 系统配置控制主机、有线或无线触摸屏、其他控制附件及控制软件等。
   The system shall be provided with control main equipment, wired or wireless touch screen, and other control accessories and control software, etc.

   b. 控制系统可控制以下并不限以下设备：
   The control system shall include but not limited to the following equipment:-

      1. 音频处理器（音量调整、模式调整等）
      Audio processor (volume adjustment, mode adjustment, etc)

      2. 音视频源设备（DVD/CD 等）
      Audio video source equipment (DVD/CD, etc)

      3. 视频信号切换矩阵
      Video signal switching matrix

      4. 投影机电动升降吊架
      Projector electric hoist hanger

      5. 电动投影幕
      Electronic project screen

6. 投影机/LED 电视
   Projector/ LED TV

7. 一套视频会议系统
   One (1) set of Video conference system

8. 灯光（可选）
   Lighting (optional)

G. 康乐区域
   Recreation Facilities

5. 健身中心
   Fitness Centre

c. 健身室
   Fitness Room

1. 健身室每 55 ㎡提供一台带遥控操作的至少 32 英寸的壁挂电视。电视机安装高度应靠近天花板，并且由 TV 系统引来信号。需通过红外遥控器控制。另力量训练区需根据项目具体情况设置 LED 电视机。
   A minimum 32 inch wall hung TV with a remote controller shall be provided for fitness room at every 55m2. The TV installation height shall be close to the ceiling, and receiving signal from TV system. The control shall be via an infrared remote controller. LED TV can be provided for strength training area based on project specific condition.

2. 音频系统必须设置本地机柜，提供本地音源信号输入。设备机柜需放置于隐藏位置，或与 ID 灵活协调，且便于员工操作。音频系统还应包括敷设在建筑中连接至天花扬声器、音量控制器。
   Local cabinet shall be installed for the audio system to provide local sound source signal input. The equipment cabinet shall be located in hidden area. It can also be coordinated with the ID that the control panel is placed out of reach of the guest, and easy to be operated by the staff. The audio system shall also include the installation in buildings connected to ceiling speaker and volume controller.

3. 必须提供恰当分区的就地音量控制器，放置于隐蔽位置；或与 ID 灵活协调，放置于客人接触不到的位置，且便于员工操作。扬声器必须带金属网罩且其颜色应当与天花板相匹配。
   Local volume controller shall be provided for areas with suitable zoning. The volume controller shall be located in hidden area. It can also be coordinated with the ID that the control panel is placed out of reach of the guest, and easy to be operated by the staff. The loudspeaker shall be equipped with metal mesh cover and the color shall match the surroundings.

d. 瑜伽/有氧室
   Yoga/ Aerobic Room

1. 瑜伽/有氧室每 55 ㎡提供一台带遥控操作的至少 32 英寸的壁挂电视。电视机安装高度应靠近天花板，并且由 TV 系统引来信号。需通过红外遥控器控制。
   A minimum 32 inch wall hung TV with a remote controller shall be provided for spa/ aerobic room at every 55 m2. The TV installation height shall be close to the ceiling, and receiving signal from TV system. The control shall be via an infrared remote controller.

2. 音频系统必须设置本地机柜，提供本地音源信号输入。设备机柜需放置于隐藏位置，或与 ID 灵活协调，且便于员工操作。音频系统还应包括敷设在建筑中连接至天花扬声器、音量控制器。
   Local cabinet shall be installed for the audio system to provide local sound source signal input. The equipment cabinet shall be located in hidden area. It can also be coordinated with the ID that the control panel is placed out of reach of the guest, and easy to be operated by the staff. The audio system shall also include the installation in buildings connected to ceiling speaker and volume controller.

3. 必须提供恰当分区的就地音量控制器，放置于隐蔽位置；或与 ID 灵活协调，放置于客人接触不到的位置，且便于员工操作。扬声器必须带金属网罩且其颜色应当与天花板相匹配。
   Local volume controller shall be provided for areas with suitable zoning. The volume controller shall be located in hidden area. It can also be coordinated with the ID that the control panel is placed out of reach of the guest, and easy to be operated by the staff. The loudspeaker shall be equipped with metal mesh cover and the color shall match the surroundings.

e. SPA&理疗室
   SPA & Physical Therapy Room

1. 提供一套覆盖整个水疗中心的音频系统。 音频系统必须包括一套电脑音乐硬盘回放系统，并且播放音乐可通过网络进行更新。
   A set of audio system which covers the entire spa Centre shall be provided. The audio system shall include a set of computer music hard disk playback system, and the music shall be able to be updated through the network.

2. 设置本地机柜，提供本地音源信号输入。设备机柜需放置于隐藏位置，或与 ID 灵活协调，且便于员工操作。音频系统还应包括敷设在建筑中连接至天花扬声器、音量控制器。
   Local cabinet shall be installed to provide local sound source signal input. The equipment cabinet shall be located in hidden area. It can also be coordinated with the ID that the control panel is placed out of reach of the guest, and easy to be operated by the staff. The audio system shall also include the installation in buildings connected to ceiling speaker and volume controller.

3. 必须提供恰当分区的就地音量控制器，放置于隐蔽位置；或与 ID 灵活协调，放置于客人接触不到的位置，且便于员工操作。扬声器必须带金属网罩且其颜色应当与天花板相匹配。
   Local volume controller shall be provided for areas with suitable zoning. The volume controller shall be located in hidden area. It can also be coordinated with the ID that the control panel is placed out of reach of the guest, and easy to be operated by the staff. The loudspeaker shall be equipped with metal mesh cover and the color shall match the surroundings.

4. 理疗间必须有独立的键盘控制器，可选择音源和调节音量。控制面板放置于隐蔽位置；或与 ID 灵活协调，放置于客人接触不到的位置，且便于员工操作。
   Independent keyboard controller shall be provided for physical therapy room to select the sound source and adjust volume. The control panel shall be located in hidden area. It can also be coordinated with the ID that the control panel is placed out of reach of the guest, and easy to be operated by the staff.

f. 游泳池
   Swimming Pool

1. 提供高质量背景音乐播放，音乐信号可选择由中央背景音乐系统提供或本地音源信号输入。
   High quality background music shall be provided. The music signal can be chosen from the central background music system or local audio signal input.

2. 必须提供恰当分区的就地音量控制器，放置于隐蔽位置；或与 ID 灵活协调，放置于客人接触不到的位置，且便于员工操作。扬声器颜色应当与四周环境相匹配。
   Local volume controller shall be provided for areas with suitable zoning. The volume controller shall be located in hidden area. It can also be coordinated with the ID that the control panel is placed out of reach of the guest, and easy to be operated by the staff. The color of the speaker shall match the surroundings.

g. 网球场
   Tennis Court

1. 必须提供恰当分区的就地音量控制器。配置高品质扬声器，颜色应当与装修单位协调。
   Local volume controller shall be provided for areas with suitable zoning. High quality loudspeakers shall be provided. The color shall be coordinated with the decoration unit.

2. 配置音量控制器，供调节本区域背景音乐音量大小。控制面板放置于隐蔽位置；或与 ID 灵活协调，放置于客人接触不到的位置，且便于员工操作。
   Volume controller shall be provided to adjust the local background

music. The control panel shall be located in hidden area. It can also be coordinated with the ID that the control panel is placed out of reach of the guest, and easy to be operated by the staff.

H. 后勤区域
Logistics Area

1. 员工餐厅/休息室
Staff Canteen/ Lounge

a. 配置天花扬声器供播放高质量背景音乐，音乐信号可选择由中央背景音乐系统。本地可通过键盘控制器进行音乐信号选择和音量控制。
To provide ceiling speaker for high quality background music. Music signal can be chosen from the central background music system. Local control via keyboard controller for music signal selection and volume control.

b. 提供至少一台带有 DVD 播放器的壁挂式 40 英寸 LED/LCD 高清电视机。
To provide minimum one (1) wall-mounted 40 inch LED/LCD HD TV with DVD player.

2. 培训室
Training Room

a. 提供一台高流明投影机和 16:9 投影幕，供酒店培训使用。
To provide one (1) high lumen projector and 16:9 projection screen for hotel training purpose.

b. 需根据具体平面大小，配置一台高清电视机及一台 DVD 播放器。
To provide one (1) HD TV and one (1) DVD player based on room size.

c. 其它音视频设备可根据具体项目而配置。
Other audio Video equipment shall be provided based on specific project requirements.

3. 学习与休闲室
Study Room and Lounge

a. 需根据具体平面大小，配置一台高清电视机及一台 DVD 播放器。
To provide one (1) HD TV and one (1) DVD player based on room size.

b. 其它音视频设备可根据具体项目而配置。
Other audio Video equipment shall be provided based on specific project requirements.

4. 行政办公会议室
Administrative Office Meeting Room

a. 提供一台高流明投影机和 16:9 投影幕。
To provide one (1) high lumen projector and 16:9 projection screen.

b. 其它音视频设备可根据具体项目而配置。
Other audio Video equipment shall be provided based on specific project requirements.

I. 流动设施
Mobile Facilities

1. 音频设备
Audio Equipment

c. 酒店流动音频设备，可根据项目具体情况配置但不少于以下配置：
Hotel mobile audio equipment shall be provided based on project specific condition but not limited to the followings:-

1. 有源扬声器及支架 2 对
Two (2) pairs of active loudspeaker and bracket

2. 有源低音扬声器 1 对
One (1) pair of active bass loudspeaker and bracket

3. 无线话筒含话筒架(包括手持、领夹、头戴)根据宴会厅、多功能厅、会议室房间数量、瑜伽/有氧室及使用功能配置具体数量。
Wireless microphone with microphone holder (including hand-holder, tie-clip, head-wearing), the quantity of the microphone shall base on the quantity of the banquet hall, multi-function hall, conference room and yoga/ aerobic room and function requirements.

4. 有线话筒含话筒架（包括鹅颈话筒、手持等）根据宴会厅、多功能厅、会议室房间数量、瑜伽/有氧室及使用功能配置具体数量。
Wired microphone with microphone holder (including gooseneck microphone, hand-holder, etc.), the quantity of the microphone shall base on the quantity of the banquet hall, multi-function hall, conference room and yoga/ aerobic room and function requirements.

5. 流动机柜（包括音源、音频处理设备、小型调音台等）2 套
Two (2) sets of mobile cabinet (including sound source, audio processing equipment and small sound mixer, etc)

6. 远程会议主机 1 台
One (1) remote conference main equipment

7. 自动混音器（可选）
Automatic mixer (optional)

8. 话筒线缆、扬声器线缆等。
Microphone cable, speaker cable, etc

2. 视频设备
Video Equipment

a. 酒店流动视频设备，可根据项目具体情况配置但不少于以下配置：
Hotel mobile video equipment shall be provided based on project specific condition but not limited to the followings:-

1. 单片 DLP/LCD 技术，5000 流明，分辨率不低于 1024*768，标准 16:9 比例 2 台

Single-chip DLP/LCD technology, 5000 lumens, resolution not less than 1024*768, two (2) numbers of equipment with standard 16:9 ratio

2. 流动投影幕 100” 2 套（可选，根据项目具体情况而定）
   Two (2) sets of mobile projector screen 100” (optional, subject to project specific condition)

3. DVD 2 台
   Two (2) DVD

4. 视频会议主机 1 台
   One (1) Video conference equipment

5. 电子白板（可选，与投影机配合）
   Electronic whiteboards (optional, cooperated with the projector)

6. 高清信号传输模块（可选）
   High definition signal transmission module (optional)

7. 各类视频、RGB、VGA 信号连接线缆。
   All kinds of video, RGB, VGA signal connection cables

8. VGA 信号转换器
   VGA signal converter

J. 技术参数说明
   Technical Parameter Specification

1. 声音压力等级&频率响应
   Acoustic Pressure Level & Frequency Response

a. 酒店音频系统通常需不间断运行，且声压及频响反应不因超负荷运行而减少。对于会议宴会区域，音频系统能为会议或演讲提供更高的音效等级。常规运行的声压级和频率响应所能达到的标准，推荐值详见附表十九：声压级和频率响应推荐值
   Hotel audio system usually requires uninterrupted operation, and the acoustic pressure and frequency response shall not be reduced due to overload operation. For conference and banquet area, the audio system shall provide higher level of sound effects for meeting or speech. Recommended values for acoustic pressure level and frequency response under normal operation are shown in table 19: Acoustic Pressure Level and Frequency Response Recommended Values.

7.9.3. 客房音视频系统
Guestroom A/V System

A. 标准客房：
   Standard Guest Room

1. 所有新建酒店标准客房电视机不少于 40”LCD/LED 高清电视机。
   All new hotel guest rooms TV shall be LCD/LED HD TV with minimal size of 40".

2. 多媒体输入面板、浴室伴音系统及 IOS 设备播放系统（IOS 系统如 Ihome）可根据项目情况而配置。（可选）
   Multimedia input panel, bathroom sound system and IOS devices broadcasting system (IOS system such as Ihome) can be provided according to the project requirements (optional).

B. 套房：
   Suite

1. 所有新建酒店套房电视机最小尺寸不少于 46”LED 高清电视机。
   All new hotel suites TV shall be LED HD TV with minimal size of 46".

2. 配置 2.1/5.1HIFI 影音系统，可根据项目情况而定。
   2.1/5.1HIFI AV system can be provided according to project requirements.

3. 浴室电视根据项目具体情况配置。
   Bathroom TV shall be provided based on project specific condition.

C. 总统套房：
   Presidential Suite

1. 总统套房/行政套房电视机最小尺寸不少于 60”LED 高清电视机。
   Presidential suite/ executive suite TV shall be LED HD TV with minimal size of 60".

2. 配置 5.1HIFI 影音系统，可根据项目情况而定。
   5.1HIFI AV system can be provided according to project requirements.

3. 浴室电视根据项目具体情况配置。
   Bathroom TV shall be provided based on project specific condition.

D. IPTV 互动电视(可选)
   IPTV (Optional)

1. IPTV 即交互式网络电视，利用宽带有线电视网，集互联网、多媒体、通讯等技术于一体；
   IPTV, i.e. Internet Protocol television, is using the broadband cable television network and is integrated with the Internet, multimedia, communication and other technology.

2. 用户终端形式采用是 IP 机顶盒+电视机；
   The user terminal shall be of IP set-top box + TV type.

3. IPTV 系统在酒店内传输主干线路采用 4 芯多模光缆，水平线路采用 CAT6 线缆；
   The hotel IPTV system transmission main line shall use 4 core multimode fiber optic cable. The horizontal line shall use cat 6 cable.

4. IPTV 系统具体业务需征询当地的广电局。
   IPTV system specific business shall consult local Bureau of Radio and Television.

7.9.4. 信息发布系统
Information Release System

A. 概述
General

1. 信息发布系统是一套专业化的数字媒体远程播放控制系统，设计需考虑系统能够提供丰富多样的视频，图片，滚动字幕等多媒体组合播放模式，并能实现实时信息与本地硬盘信息的灵活组合播放，在实际应用上满足多样化且管理简单，使用方便等需求。
Information release system is a set of professional digital media remote control system. The design shall consider that the system shall be able to provide a variety of video, images, scrolling subtitles and other multimedia combination play mode. The system shall also achieve flexible combination with the real-time data and the local hard disk information, and satisfy diversification on practical applications, ease of management, and user friendly, etc.

B. 系统要求
System Requirement

1. 所有宴会厅、会议室、董事会议室和前厅区必须安装信息发布显示终端。必须显示希尔顿会议图标(若适用)、房间名称和公司信息(若要求)。
Digital signage terminal shall be installed for all the banquet halls, conference rooms, boardroom, and lobby areas. The Hilton conference icon (if applicable), room name and the company information (if required) shall be displayed.

2. 每个信息发布显示终端必须配置 20A 的电源插座，并从 FMB 引来一根 CAT6 网线。
Each digital signage terminal shall be equipped with 20A electric outlet, and a Cat6 cable from the FMB.

3. 屏幕中心高度为离地 1.5m。
The height of screen center shall be 1.5 m from the ground.

4. 显示终端必须易于进行检修。
Display terminal shall be ease of maintenance.

C. 系统点位
Terminal point

1. 酒店大堂主入口-50 英寸独立显示屏
Hotel lobby main entrance – 50 inch independent screen display

2. 电梯轿厢-15 英寸显示屏
Elevator car – 15 inch screen display

3. 会议室入口-32 英寸嵌墙式显示屏
Conference room entrance – 32 inch recessed screen display

4. 董事会议室外墙-15 英寸嵌墙式显示屏
Boardroom exterior wall – 15 inch recessed screen display

5. 大堂通往宴会厅的道路口指示-40 英寸的嵌墙式显示屏
Route indicator from the lobby to banquet hall – 40 inch recessed screen display

6. 宴会前厅入口-40 英寸的嵌墙式竖屏显示屏
   Banquet lobby entrance – 40 inch recessed vertical screen display

7. 宴会前厅-40 英寸的嵌墙式竖屏显示屏
   Banquet lobby – 40 inch recessed vertical screen display

8. 宴会厅登记台-32 英寸带移动底座显示屏
   Banquet hall registration counter – 32 inch screen display with movable base

9. 宴会厅外墙-40 英寸的嵌墙式竖屏显示屏
   Banquet hall exterior wall – 40 inch recessed vertical screen display

D. 所有区域显示屏尺寸需由室内顾问和 AV 顾问协调而定。
   The size of the screen in all the areas shall be coordinated and confirmed by the interior consultant and AV consultant.

7.9.5. 智能灯光控制系统
INTELLIGENT LIGHTING CONTROL SYSTEM

A. 总则
   General

1. 现代化的建筑对照明的要求越来越高，调光系统的实现不但可以很好的节约能源，延长灯具的使用寿命，降低酒店的运行费用，而且可以营造出不同的照明环境，让顾客感到典雅舒适的气氛。
   The requirements for modern architectural lighting are getting higher and higher. The implementation of the dimming system not only can be good for energy-saving, prolong the service life of lamps and lanterns, reduce the operation cost of the hotel, but also can create different lighting environment, make an elegant and comfortable atmosphere for the customers.

B. 智能灯光控制系统要求
   Intelligent Lighting Control System Requirements

1. 系统分区控制完全独立，互不干扰，一个分区停止工作不影响其他分区和设备的正常运行；任意分区中任意器件损坏也不影响本区域内其他器件正常工作。
   System zone control shall be completely independent and without interference. One non-working zone shall not affect the normal operation of other zones and equipment. Any damaged device in any zone shall not affect the operation of other devices in the same zone.

2. 每个调光回路应具有本地控制、自动控制及中央远程控制功能。
   Each dimming circuit shall have local control, automatic control and central remote control function.

3. 灯光系统应能预设置多种灯光场景，以适应不同场合的灯光要求，供工作人员任意选择。
   Lighting system shall be able to pre-set different lighting modes, in order to meet the lighting requirements for different occasions, which can be easily selected by the staff.

4. 宴会厅至少不少于 6 种场景模式；会议室至少不少于 4 种场景模式。
   There shall not be less than six (6) modes for ballroom and not less than four (4) modes for conference room.

5. 调光系统应为电脑控制，连网可基于 RS485 或 Ethernet 网络架构，通过灯控软件实现对系统的控制。
   Dimming system shall be computer controlled. It can be connected to a network based on RS485 or Ethernet network structure, through the lighting control software to achieve the control of the system.

6. 在正常供电中断时，系统能自动应急，应急回路自动达至全亮。
   During the normal power supply interruption, the emergency system shall be automatically activated. The emergency circuits shall automatically turn on to its full lighting.

7. 调光系统应接入楼宇自控管理系统。
   Dimming system shall be connected to the building automation management system.

8. 客房楼层区域的公共照明分路控制，不设置调光功能。
   The public lighting for guest floor common areas shall be separated controlled without dimming function.

9. 酒店客房内灯光控制详见 RCU 章节。
   Hotel guest room lighting control refers to RCU section.

C. 酒店以下区域应设置智能中央调光控制系统（但不仅限于此）：
   Intelligent central dimming system shall be provided (but not limited) to the following areas in the hotel:-

1. 酒店大堂
   Hotel lobby

2. 大堂吧
   Lobby bar

3. 餐厅
   Restaurant

4. 酒吧
   Bar

5. SPA
   SPA

6. 宴会厅
   Ballroom

7. 宴会前厅
   Ballroom front hall

8. 会议室
   Conference room

9. 行政酒廊
   Executive lounge

10. 多功能厅
    Multi-purpose hall

11. 总统套房
    Presidential suite

7.10. 调试和验收
TESTING AND COMMISSIONING

7.10.1. 概述
General

A. 本章节仅对调试进行最基本的要求。
This section is the basic requirements for testing and commissioning.

B. 所有的调试需做好完整记录，记录表格需获得项目管理公司和设计顾问的审定。在项目管理公司和设计顾问认可调试记录后，方可作为正式文件提交酒店管理公司。
All testing and commissioning shall have complete records. The record forms shall be approved by the project management company and the design consultant. Only after approved by the project management company and design consultant, the test records can be submitted to the hotel management company as official documents.

C. 必要时，酒店管理公司将选择性的参与调试验收。
When necessary, the hotel management company will selectively attend the testing and commissioning.

D. 酒店管理公司有权对有疑问的地方要求重新调试。
The hotel management company has the right to ask for retest if there are queries for certain areas.

7.10.2. 验收规范
Acceptance Test Standards Reference

1. 智能建筑工程质量验收规范-GB50339-2003
   Code for Acceptance of Quality of Intelligent Building Systems GB50339-2003

2. 综合布线工程验收规范-GB50312
   Code for Engineering Acceptance of Generic Cabling System for Building and Campus GB50312

3. 建筑设备监控系统检验标准-DGTJ 08-605-2004
   Standard for Inspection of Building Automation Systems DGTJ 08-605-2004

4. 建筑电气工程施工技师验收规范-GB50303
   Code of Acceptance of Construction Quality of Electrical Installation in Building GB50303

7.10.3. 网络通信与布线系统
Network Commnunication and Cabling System

A. 语音及数据布线系统
Voice and Data Cabling System

1. 所有安装的电缆，在验收前采用专用 FLUKE 测试仪器进行全面的连续运行测试，测试各类语音及数据线缆的各项性能质量参数是否合格；
For all cable installation, a comprehensive and continuous operation test shall be conducted by using FLUKE test equipment before acceptance. To test and qualify all types of voice and various data cable quality performance parameters.

2. 按整体测试内容要求，根据各信息点的标记图进行一一测试，测试的同时做好标号工作，把各点号码在信息点处及配线架处用标签纸标明并在平面图上注明，以便今后对系统进行管理、使用及维护；
According to the overall system test requirements, the information point shall be tested and marked one by one based on labeled graph. Each point number at the information point location and distribution frame shall be indicated with label paper and marked on the floor plan, for the ease of future system management, use and maintenance.

3. 六类非屏蔽线缆测试参考标准：ANSI/ EIA568B，TIA 六类非屏蔽布线标准和 ISO-E 级布线标准；
Cat 6 unshielded wire testing reference standards: ANSI/EIA568B, TIA cat 6 unshielded cabling standards and ISO-E cabling standards.

4. 光纤测试主要采用“衰减值”或者“损耗”来判断被测链路的光纤质量；
Fiber optic test mainly uses "attenuation value" or "loss" to determine the fiber optic quality under the tested link.

5. 现场设备及线缆的型号需与设备采购清单一致；
The devices and cable type on site shall tally with the equipment procurement list.

6. 当以上调试工作完成后，系统符合设计要求时，可进行系统试运行工作。
After completion of the testing and commissioning, if the system is in compliance with the design requirements, the system can proceed with the trial operation.

B. 计算机网络系统
Computer Network System

1. 计算机等设备需要正常开启；
Computer and other equipment shall start normally.

2. 计算机在连接网线的状态下，桌面网络带宽能达到 100M；
With the connection cable, the computer desktop network bandwidth shall reach 100M.

3. 计算机在在连接相应的酒店网络内，能对该网络中的数据进行读取并上传；
If connected to the hotel network, the computer shall be able to read the data in the network and upload.

4. 无线网络设备能满足酒店使用要求；
Wireless network equipment shall meet the hotel operation requirements.

5. 当以上调试工作完成后，系统符合设计要求时，可进行系统试运行工作。
   After completion of the testing and commissioning, if the system is in compliance with the design requirements, the system can proceed with the trial operation.

C. 程控交换机系统
   PABX System

1. 程控交换机及话机等设备需要正常开启；
   PABX and telephone equipment shall start normally.

2. 电话通话过程中除程控交换机自带功能外还需要具有语音信箱、计费等相关功能。
   In addition to the built-in functions of the PABX during telephone communication, there shall also be voicemail, billing, and other related functions.

3. 当以上调试工作完成后，系统符合设计要求时，可进行系统试运行工作。
   After completion of the testing and commissioning, if the system is in compliance with the design requirements, the system can proceed with the trial operation.

D. 无线对讲系统
   Wireless Intercom System

1. 应采用手持场强测试仪、频谱仪、综合测试仪等设备测试在酒店及周边红线内任意点位上无线对讲系统信号的空间场强，判断信号质量等级与干扰与否及对讲设备信号转发情况；
   Portable field intensity tester, spectrometer, comprehensive test instrument and other testing equipment shall be used to test the wireless intercom system signal space field intensity in the hotel and any point within the surrounding red line. This is to verify the signal quality level, interference condition and the intercom equipment signal trasmission status.

2. 根据测试结果提交场强测试报告、试运行报告。
   Coverage test report and commissioning report shall be submitted based on the test results.

E. 内部寻呼系统
   Hotel Internal Paging System

1. 在系统在正常供电后，对系统设备进行工作状态调整、系统设备编程、初始化调整等；
   After there is normal power supply to the system, the working status ajustment, programming, initialization, etc. shall be conducted for the system equipment.

2. 应采用测试仪等设备测试在酒店及周边红线内任意点位上寻呼系统信号的空间场强，判断信号质量等级与干扰与否及寻呼信息的发送和接收情况；
   Tester and other testing instrument shall be used to test the paging system space field intensity in the hotel and any point within the surrounding red line. This is to verify the signal quality level, interference condition, and the paging message transmit and receiving status.

3. 测试该系统与其它系统的联动，对各功能进行逐个的设定和运行；
   Test the interaction between this system and the other systems. Set up and run each function one by one.

4. 当调试工作完成后，系统符合设计要求时，可进行系统试运行工作。进行系统的数据测试和纪录工作，提交相关报告；
   After completion of the testing and commissioning, if the system is in compliance with the design requirements, the system can proceed with the trial operation. The reports for the system test data and records shall be submitted.

5. 系统调试完成，对酒店 IT 部、工程部和系统使用部门培训。
   After completion of the system commissioning, training shall be provided for hotel IT department, engineering department and system operation department.

7.10.4. 安全防范系统
Security Defense System

A. 概述
General

1. 本安防系统的调试及验收包含视频监控系统、防盗报警系统以及巡更系统；
   This security system commissioning and acceptance test shall include video monitoring system, anti-theft alarm system and patrolling system.

2. 应对所有线缆的测试，其中包括电源线及控制线、接头的焊接等；
   All of the cables shall be tested, including power cable and control cable, and welding joint, etc.

3. 应对所有的终端设备进行调试
   Commissioning shall be conducted for all the terminal equipment.

4. 摄像机：应对安装位置、视野范围、安装高度等进行检查和调试，画面高度符合本标准；
   Camera: Installation location, field of vision, installation height, etc. shall be inspected and tested. Image height shall comply with this standard.

5. 探测器：应对安装位置、高度以及设备覆盖的范围、灵敏度进行调试，需符合设计要求；
   Detector: Installation location, height, equipment coverage, sensitivity, etc. shall be tested and shall comply with this standard.

6. 根据当地技防办的要求，提供整套安防系统的设计及测试、验收报告。
   Complete security system design, test and acceptance reports shall be submitted as per the requirements of the local Technical Security Management Office.

B. 门禁系统
Access Control System

1. 在系统通电前，首先用三用表、兆欧表、接地电阻测量仪对系统各连线的电阻、绝缘电组合系统接地点组进行测量，并提交相关测试结果；
   Before the system energiztion, avometer, megohm meter, and earthing resistance

measuring instrument shall be used to test each wire resistance, insulated integrated system earthing points in the system, and related test results shall be submitted.

2. 在系统阻抗测试正常后，即可对系统通电进行测试；
After the results of the system impedance test is normal, the system electrify test can be conducted.

3. 系统在各模块通电正常后，即可对系统设备进行工作状态调整、系统设备编程、初始化调整等工作；
After there is normal power supply to each module of the system, the working status ajustment, programming, initialization, etc. shall be conducted for the system equipment.

4. 前端设备均调试完成，工作正常后，就可进行系统的联调工作。测试时，对各前端设备（读卡器、出门按钮、电锁、门磁等）逐个进行测试，并调整定义它们之间的联动关系；并对各种系统功能，如电子巡更、门禁级别、操作员级别等，进行逐个的设定和运行；
After completion of the front-end equipment commissioning and normal operation, integrated system commissioning can be carried out. During the test, the front-end equipment (such as card reader, push button, electric lock, door contact, etc.) shall be tested one by one, and adjust and define the relationship between them. For various system functions, such as electronic patrolling, access control level, operator level, etc., shall be setup and run one by one.

5. 当以上调整工作完成后，系统符合设计要求时，可进行系统试运行工作。进行系统的数据测试和纪录工作，提交相关报告。
After completion of the testing and commissioning, if the system is in compliance with the design requirements, the system can proceed with the trial operation. The reports for the system test data and records shall be submitted.

C. 门锁系统
Door Lock System

1. 本系统在正常供电后，可对系统设备进行工作状态调整、系统设备编程、初始化调整等工作；
After there is normal power supply to the system, the working status ajustment, programming, initialization, etc. shall be conducted for the system equipment.

2. 测试该系统与其它系统的联动，对各功能进行逐个的设定和运行；
Test the integrated function with other systems, such as smart card, etc., and set-up and run one by one.

3. 当以上调试工作完成后，系统符合设计要求时，可进行系统试运行工作。进行系统的数据测试和纪录工作，提交相关报告。
After completion of the testing and commissioning, if the system is in compliance with the design requirements, the system can proceed with the trial operation. The reports for the system test data and records shall be submitted.

D. 电梯楼层控制系统
Elevator Floor Control System

4. 在系统在正常供电后，对系统设备进行工作状态调整、系统设备编程、初始化调整等；
   After there is normal power supply to the system, the working status ajustment, programming, initialization, etc. shall be conducted for the system equipment.

5. 对各控制设备（控制按钮等）、安全性能逐个进行测试，并测试与其它系统联动功能，如一卡通等，进行逐个的设定和运行；
   For each control equipment (control button, etc.), safety and performance shall be tested individually. Test the integrated function with other systems, such as smart card, etc., and set-up and run one by one.

6. 当调试工作完成后，系统符合设计要求时，可进行系统试运行工作。进行系统的数据测试和纪录工作，提交相关报告。
   After completion of the testing and commissioning, if the system is in compliance with the design requirements, the system can proceed with the trial operation. The reports for the system test data and records shall be submitted.

E. 停车场管理系统
   Car Park Management System

1. 硬件单体调试主要是为了初步检验设备的运转情况，并为通道整体调试做好基础，如有下列设备的，调试如下：
   Hardware unit commissioning is mainly for the preliminary inspection for the equipment working condition, and to prepare for overall commissioning. If there is equipment provided as per list below, the commissioning is as follows:-

2. 显示屏调试：调试时通过停车管理软件与设备通讯将其分别定义为：总余位条屏和出口收费条屏，其中收费显示屏可通过软件将一些日常显示字符下载至收费条屏显示，收费金额显示以及余位显示是能过软件实时更新的。通过软件将日常显示字符下载至显示屏；
   Display screen commissioning: During commissioning, using the car park management software and communication equipment to define: total car park lots balance striped display screen and exit charging striped display screen. Some daily display characters can be downloaded to the charging display screen through the software. The charging amount and the car park lots balance display can be real-time updated through the software. Daily display characters can be downloaded to the screen through the software.

3. 吐票箱调试：当有车停在指定位置时，可以通过自助方式领取卡片或纸票，来测试设备是否能正常工作，票箱内条屏能电后是否能正常显示字符，对讲分机与主机是否能正常通话，读卡机当本系统卡片靠近读卡区时会听到读卡声音；
   Ticket stand commissioning: When there is a car parked in the designated position, cards or paper tickets can be received by self-service, and test whether the equipment is working normally, whether the striped screen in the ticket stand can display characters properly after power on, whether there is normal conversation between the intercom and the main unit, whether card reading sound can be heard if the card is close to the card reading zone.

4. 道闸、摇控器调试：道闸通电后通过主板上的抬落杆是否能正常起落，栏杆在落到位时是否与水平平行，抬起时栏杆是否与水平垂直，摇控器是否能正常摇控闸机抬

落杆；
Barrier and remote controller commissioining: Whether the rail will rise and fall normally through the mainboard after power on, whether the rail is parallel to the horizontal in down position, whether lift is vertical in up position, and whether the remote controller can control the barrier rail normally.

5. 地感检测器调试：地感检测器分为单向与双向之分，但具体调试过程一致，通电后检测器接收器有指示灯会检测线圈是否正常；
Vehicle loop detector commissioning: There are one-way and two-way detectors, but the detailed commissioning process is the same. After power on, the indicator light at the detector receiver will detect the coil condition.

6. 摄像机调试：通过软件调试摄像机图像清晰度，并对摄像机对应通道作相应的登记；
Camera commissioining: Through the software to adjust camera image resolution, and register the camera relevant channels accordingly.

7. 系统联动调试：所有调试完毕后，可通过客户端对系统内的收费方式、车位布置等相关信息设置，并通过客户端软件发卡，模拟使用，提交相关测试及运行正常的报告。
Integrated system commissioning: After completion of all commissioning, based on the system charging method, car lot location and other relevant information setting from the client side, and through the client side software card, to simulate the operation. Test and normal opertaion reports shall be submited.

7.10.5. 有线电视及卫星电视系统
CATV and MATV System

A. 前端设备调试
Front end equipment commissioning

1. 接入有源放大器输入端，调整输入端电位器，使任意频道间信号强度≤10db，相邻频道间≤3db；
Connect to active mixer input end and adjust the input end potentiometer. The signal strength between any channels shall not be more than 10 dB and between adjacent channels shall not be more 3 dB.

2. 接入无源混合器输入端（在强信号频道的混合器输入端加衰减器）,调整混合器输出端，各频道电平差控制在 3dB 内；
Connect to passive mixer input end (put attenuator at the mixer input end in strong signal channel), adjust the mixer output end, and maintain the channel level difference within 3 dB.

3. 送入的自办节目，逐个检查设备的正常工作情况及输出电平的大小，将前端设备调试到正常工作状态；
Send in the self-programmed. Inspect the normal operation of equipment and the size of the output level. Set the front-end equipment commissioning under normal working condition.

4. 前端设备调试完毕后，送信号至干线系统。
   After the front-end equipment commissioning is completed, send signal to the main line system.

B. 干线系统调试
   Main Line System Commissioning

1. 调整各频道信号电平差；
   Adjust each channel signal level difference

2. 干线放大器输入端串入一只频率均衡器，根据放大器输出信号电平差的情况，分别串入 6dB、10dB、12dB 等频率不等的均衡器，调整到正常工作；
   Connect in series a frequency equalizer to the input end of the main line amplifier. According to the amplifier differential output signal level, connect in series 6dB, 10dB, or 12dB, etc. frequency equalizers of different ranges, until reach normal working condition.

3. 同时调整干线放大器输入端电平大小，当产生交互调干扰时，适当减少输入端电平，可直接串入衰减器，调到输出电平符合设计要求。
   At the same time adjust the size of input level of the main line amplifier. When there is interference, properly reduce the input level. Attenuator can be directly connected in series, until the output level is in accordance with the design requirements.

C. 分配系统调试
   Distribution System Commissioning

1. 在电视信号分配网络的输入端送一个信号（一般选用 UHF 频道，或用电视信号发生器产生）调整输出端电平，使之与原设计的输入电平相等，用场强仪测量电视接收机在分配、分支器各输出端的电平，观察分析信号电平和重影现象，判定安装质量好坏，发现解决问题。
   Send a signal (usually UHF channel, or produced by the television signal generator) to the input end of the TV signal distribution network to adjust the output level, and make the output level be equal to the input level of the original design. Use field strength meter to measure television receiver output level in the distribution and branch. Observe and analyze the signal level and double image display, determine the installation quality, find and solve the problem.

2. 当以上调试工作完成后，系统符合设计要求时，可进行系统试运行工作。
   After completion of the testing and commissioning, if the system is in compliance with the design requirements, the system can proceed with the trial operation.

7.10.6. 客房控制系统
Guest Room Control System

A. 线缆的调试：若联网线缆敷设非屏蔽双绞线，需通过 FLUKE 测试仪测试并提交测试报告；
   Wiring commissioning: If network cable installation is using unshielded twisted-pair cable, it shall pass the test by FLUKE test instrument and the test report shall be submitted.

B. 灯光控制系统调试：各回路灯光控制要求及控制及门磁、柜磁、红外的逻辑关系应符合希尔顿的要求，每个灯光开关必须对应的控制相应的灯光回路；提交相关的控制要求及控制逻辑关系；

Lighting control system commissioning: The lighting control requirements of each loop and the logic relationship between the control and the door contact, cabinet contact, infrared shall meet Hilton requirements. Each light switch shall control its associated lighting circuit. Relevant control requirements and control logic relationship shall be submitted.

C. 空调控制系统的调试：空调温控器的功能（开关、菜单功能、温度设置、冷热模式切换）正常；风机盘管高中低档输出及控制正常；电动阀或电磁阀的开与关与空调温控器的设置逻辑相符；空调的欢迎模式、待租模式、入住模式、保温模式、日间模式、夜间模式符合希尔顿的要求；
Air conditioning system commissioning: The function of the air conditioning thermostat (switch, menu function, temperature setting, and hot and cold mode switchover) shall be normal. FCU high, medium and low-grade output and control shall be normal. Open and close of the electric valve and solenoid valve and the air conditioning thermostat setting logic shall be consistent. Air conditioning welcome mode, rent mode, check-in mode, constant temperature mode, daytime mode, night mode shall be in accordance with Hilton requirements.

D. 服务信息系统调试：各种服务信息（请勿扰、SOS）控制功能及逻辑关系符合希尔顿的要求；
Services information system commissioning: The control function and logic for different services information (Do not disturb, SOS) shall meet Hotel requirements.

E. 系统联动调试：所有调试完毕后，可通过酒店管理软件对客房的空调、服务信息等相关信息进行相关的控制。
System integrated commissioning: After completion of all the commissioning, use hotel management software to control the guest room air conditioning, service information and other relevant information.

7.10.7. 楼宇自动化系统
Building Automation System

A. 现场设备调试
On Site Equipment Testing and Commissioning

1. 传感器调试
Sensor Testing and Commissioning

a. 校准传感器，必要时可进行软件修正。
Calibrate the sensor, if necessary, use software to correct.

2. DDC 调试
DDC Testing and Commissioning

a. 结合末端探测设备调试 DDC 各点位，并做好相关记录。
With combination of terminal detection equipment to test each DDC point, and make records.

b. 测试 DDC 断电时设置参数及程序是否可保存 3 天以上。
Whether the parameter settings and program of the DDC power failure test can be kept for more than three (3) days

B. 系统监控设备调试
System Monitoring Device Testing and Commissioning

1. 需根据《BMS 点表》逐点调试点位反馈、监控功能。
"BMS Point Schedule" shall be used to test the feedback and monitoring function of each point.

C. 系统软件调试
System Software Testing and Commissioning

1. 监控页面上信息的控制结构大多采用树型结构，可通过鼠标点击层层深入直到在电子地图上具体设备或较大设备的运行原理示意图或表格式显示图。
The control structure of the information on the monitoring page usually uses tree structure. Use the mouse to click layer by layer until reach the specific equipment on the electronic map or larger equipment operation schematic or table diagram.

2. 监控页面上背景图片尽量根据建筑物的特点来设计，各控制、显示点在监控页面上要设置清楚、美观、形象、生动，操作顺敞，观察容易。电子地图要清晰，上面的设备点按实际位置、方向摆放。
The background image on the monitoring page shall be as far as possible based on the characteristics of the building to design. The control and display points on monitoring page shall be clear, artistic, vivid, easily operated and observed. The electronic map shall be clear and the equipment point shall be located in accordance with the actual location and direction.

3. 安装好已开发的接口软件网关，根据各子系统的点位图表，进行相应监控点的配置，设置一些传统的监控管理功能，如时间表、趋势图、报警。
Install the developed interface software gateway. According to the point chart of each subsystem, configure the relevant monitoring point. Some traditional monitoring management functions, such as schedule, trend chart, alarm can be set up.

4. 通过 BAS 软件平台的拖/放功能，可以很方便地进行监控点的组态；当点位数量很多时，组态时间长会看得眼花缭乱，容易出错，最好做一些分段标记，便于调试。调试结束时去掉相应的表记。
Through the drag/drop function of the BAS software platform, the monitoring point can be easily configured. When there are many points, long time configuration will cause dazzling and may easily result in error. It is better to make some segmentation tags which are easy for commissioning and remove those tags after the end of commissioning.

D. 系统总体调试
System Overall Testing and Commissioning

1. 集成系统总体调试是先完成 BAS 系统与每个子系统的连接调试，再分别逐步进行系统集成，组成较大的控制系统，最终完成整个网络系统的调试。
Integrated system overall commissioning is to complete the commissioning for the connection between BAS system and each sub-system first, then complete the respective system integration, gradually form a larger control system, and finally complete the whole network system commissioning.

2. 逐点调试系统点位，确定点位反馈至工作站图形界面的响应时间。DI、DO 点小于 5 秒，AI、AO 点小于 10 秒，同时验证各软件点位的正确性。
   Conduct commissioning for each system point and determine the feedback of the point to the workstation graphics interface response time. DI and DO less than 5 seconds, AI, AO points less than 10 seconds, at the same time, verify the correctness of each software points.

3. 当以上调试工作完成后，系统符合设计要求时，可进行系统试运行工作。
   After completion of the testing and commissioning, if the system is in compliance with the design requirements, the system can proceed with the trial operation.

7.10.8. 不间断电源（UPS）系统
Uninterrupted Power Supply (UPS) System

A. UPS 主机进行自检功能巡查，可以检查出主要故障并报警；
   UPS main equipment shall have self-checking function which can find out the main fault and send the alarm.

B. 模拟供电故障，检查 UPS 主机及电池的运行状态是否满足设计使用要求；
   Simulate power supply failure and check UPS and battery operation status whether meet the design requirements.

C. 当以上调试工作完成后，系统符合设计要求时，可进行系统试运行工作。
   After completion of the testing and commissioning, if the system is in compliance with the design requirements, the system can proceed with the trial operation.

7.10.9. 音视频系统
Audio Video System

A. 在系统通电前，首先用万用表、接地电阻测量仪对系统各连线的电阻、绝缘电组合系统接地点组进行测量，并提交相关测试结果；
   Before the system commissioning, multi-meter and grounding resistance measuring instrument shall be used to test the resistance of each wire in the system and the electrical insulation system earth points and the test results shall be submitted.

B. 在系统阻抗测试正常后，即可对系统通电进行测试；
   After successful testing of the system impedance, the system commissioning can be conducted.

C. 本系统在各设备通电正常后，即可对系统设备进行工作状态调整、系统设备编程、初始化调整等工作；
   After each module in the system is successfully energized, system status adjustment, system equipment programming and initialization, etc. can be conducted for the system equipment.

D. 系统各设备均单体调试完成后，就可进行系统的联调工作。测试时，对各设备（投影机、功放、音响、音源、区域分配器等）逐个进行测试并对各种系统功能（如舞台灯光控制、音视频系统、集中控制系统、会议扩声、同声传译等）进行逐个的设定和运行；
   After commissioning of each module and equipment in the system, integrated test for the system can be conducted. During the test, each module (projector, power amplifier, speaker, sound source, regional distributor, etc.) shall be tested and each system function (such as stage lighting control, audio Video system, integrated control system, conference room amplification, simultaneous interpretation, etc.) shall be individually set and operated.

E. 当以上调试工作完成后，系统符合设计要求时，可进行系统试运行工作。
After completion of the testing and commissioning, if the system is in compliance with the design requirements, the system can proceed with the trial operation.

7.10.10. 智能灯光控制系统
Intelligent Lighting Control System

A. 在系统通电前，首先用万用表、接地电阻测量仪对系统各连线的电阻、绝缘电组合系统接地点组进行测量，并提交相关测试结果；
Before the system commissioning, multi-meter and grounding resistance measuring instrument shall be used to test the resistance of each wire in the system and the electrical insulation system earth points and the test results shall be submitted.

B. 在系统阻抗测试正常后，即可对系统通电进行测试；
After successful testing of the system impedance, the system commissioning can be conducted.

C. 本系统在各模块通电正常后，即可对系统设备进行工作状态调整、系统设备编程、初始化调整等工作；
After each module in the system is successfully energized, system status adjustment, system equipment programming and initialization, etc. can be conducted for the system equipment.

D. 系统各模块及设备均单体调试完成后，就可进行系统的联调工作。测试时，对各模块逐个进行测试并对各种系统功能进行逐个的设定和运行；
After commissioning of each module and equipment in the system, integrated test for the system can be conducted. During the test, each module shall be tested and each system function shall be individually set and operated.

E. 当以上调试工作完成后，系统符合设计要求时，可进行系统试运行工作。
After completion of the testing and commissioning, if the system is in compliance with the design requirements, the system can proceed with the trial operation.

7.11. 弱电附表
ELV ATTATCHED TABLE

下述所列点表仅作为项目的设计指导，并不作为具体项目的要求。具体项目的点位设计仍需根据项目的具体情况和特点由设计单位或顾问公司设计，并应提交给酒店管理公司和顾问公司确认。

The point schedules attached below only serve as the design guidelines, but not the specific requirements of the project. The point schedule of specific projects shall still base on the actual project conditions and characteristics which are designed by the design unit or consultant company and shall be submitted to the hotel management and the consultant company for confirmation.

7.11.1. 综合布线点位表
Structured cabling Point Schedule

区域 Area	区域名称 Area Description	点位设计原则 Point Design Principle	语音 Voice Point	办公网络 Office Network	客用网络 Guest Network	无线网络 Wireless Network	求助电话 Emergency Call
客房区 Guest Area	标房（大床房） Standard Room (Big Bed Room)	语音：写字台、床头、卫生间； Voice Point: Desk, Bed Head, Toilet; 数据：写字台； Data Point: Desk Wireless 无线网络：2 间客房 1 个。 Network: 1 point for 2 guest rooms	3		1	½	
	标房（双床房） Standard Room (Double Bed Room)	语音：写字台、床头、卫生间； Voice Point: Desk, Bed Head, Toilet; 数据：写字台、床头； Data Point: Desk, Bed head; 无线网络：2 间客房 1 个。 Wireless Network: 1 point for 2 guest rooms	3		2	½	
	套房 Suite Room	语音：写字台、床头、卫生间、客厅； Voice Point: Desk, Bed Head, Toilet, Living Room; 数据：写字台、客厅； Data Point: Desk, Living Room; 无线网络：1 间套房 1 个。 Wireless Network: 1 point for 1 suite room	4		2	1	

区域 Area	区域名称 Area Description	点位设计原则 Point Design Principle	语音 Voice Point	办公网络 Office Network	客用网络 Guest Network	无线网络 Wireless Network	求助电话 Emergency Call
	总统套房 Presidential Suite	语音：主人房、夫人房、卫生间 x2、写字台、客厅、餐厅、备餐间 x 2； Voice Point: Master Bedroom, Madame Room, Toiletx2; 数据：写字台、床头 X2。 Data Point: Desk, Bed Headx2; 无线网络：1 间总统套房 2 个。 Wireless Network: 2 Points for each presidential Point	9		3	2	
	残疾人客房 Handicapped Guest Room	语音：写字台、床头、卫生间； Voice Point: Desk, Bed Head, Toilet; 数据：写字台； Data Point: Desk; 求助电话：床头； Emergency Call: Bed Head 无线网络：2 间客房 1 个。 Network: 1 Point for 2 Guest Rooms	3		1	½	1
	公共区域走道、楼梯间及电梯厅 Common Corridor, Staircase and Lift Lobby	语音：电梯厅。 Voice Point: Lift Lobby	1				

区域 Area	区域名称 Area Description	点位设计原则 Point Design Principle	语音 Voice Point	办公网络 Office Network	客用网络 Guest Network	无线网络 Wireless Network	求助电话 Emergency Call
	行政酒廊 Executive Lounge	语音：接待处 X4、备餐间 X1，客人上网区 X1； Voice Point: Reception x4, Pantry x1, Guest Network Zone x1 办公数据：接待处 X4、备餐间 X1、打印机 X2； Office Data: Reception x4, Pantry x1, Printer x2; 客用数据：客人上网区每个位置 X1，每个会议区 X1。 Guest Data Point: Each position x1 for Guest Network Zone, Each Meeting Area x1; 无线网络：1 间行政酒廊 1 个。 Wireless Network: Executive Lounge x1.	6	7	2	1	
	布草间 Linen Room		1				
酒店大堂接待区 Hotel Lobby Reception Area	大堂前厅 Lobby Foyer					2	
	大堂 Lobby					3	
	前台 Front Desk	按 3 个接待台划分，每个接待台 2 个语音，4 个网络。 Divided into 3 reception counters, 2 voice points and 4 network points for each counter	6	12			
	大堂吧 Lobby Bar		2	2		2	
	贵重物品存放室 Valuables Storage Room		1	1			
	行李间 Luggage Room		1	1			

区域 Area	区域名称 Area Description	点位设计原则 Point Design Principle	语音 Voice Point	办公网络 Office Network	客用网络 Guest Network	无线网络 Wireless Network	求助电话 Emergency Call
	大堂前台办公区 Office Area Near Lobby Front Desk	语音：每个办公位 X1； Voice Point: Each workstation x1; 数据：每个办公位 X1。 Data Point: Each Workstation x1.	1	1			
	公共休息区 Public Lounge Area	根据内装实际功能情况设置。 To be installed based on interior outfitting				4	
酒店商务区 Hotel Business Area	会议室 Meeting Room		2	1	2	1	
	会议前厅 Meeting Lobby			1		1	
	商务中心 Business Center		2	2	4	1	
	家具储藏 Furniture Storage		1				
	宴会厅 Banquet	考虑最多分隔为 3 个厅，每个厅内设置 1 个办公网络、3 个客用网络、3 个网线网络。 Separated into Maximum 3 subzones with office network x1, guest network x1 and wired network x3 for each zone.		3	12	9	
	宴会前厅 Banquet Lobby		3	3		2	
	宴会厅服务走廊 Banquet Lobby					1	1
	衣帽间 Cloak Room		1				
酒店公共区 Hotel Common Area	酒吧/咖啡吧 Bar/Coffee Shop		4	1	1	1	
	全日/自助餐厅 All Day/ Self-Service Corridor		4	2		2	

区域 Area	区域名称 Area Description	点位设计原则 Point Design Principle	语音 Voice Point	办公网络 Office Network	客用网络 Guest Network	无线网络 Wireless Network	求助电话 Emergency Call
	中餐厅 Chinese Restaurant	语音：收银台 X2、接待台 X1、每个包间 X1、每个备餐间 X1。 Voice Point: Cashier x2, Reception x1, each compartment x1, each pantry x1. 数据：收银台 X2、接待台 X1、每个包间 X1、每个备餐间 X1。 Data Point: Cashier x2, Reception x1, each compartment x1, each pantry x1;	5	5		3	
	特色餐厅 Characteristic Restaurant		4	2		2	
	礼品商店 Gift Shop		3	2		1	
	餐厅包间 Restaurant Compartment		1	1			
	公共卫生间 Common Toilet						
	公共残疾人卫生间 Handicapped Common Toilet						1
	电梯厅 Lift Lobby		1			1	
	电梯轿厢 Lift Car			1			
康体中心 Health Center	接待室 Reception Office		2	2			
	游泳池 Swimming Pool		2	2		1	2
	更衣室 Changing Room						
	卫生间 Toilet						1

区域 Area	区域名称 Area Description	点位设计原则 Point Design Principle	语音 Voice Point	办公网络 Office Network	客用网络 Guest Network	无线网络 Wireless Network	求助电话 Emergency Call
	健身中心 Fitness Center			1		1	1
	Spa 洗浴 Spa Bath						1
	Spa 包房/理疗室 Spa Compartment/Physical therapy room					1	1
	Spa 休息 Spa Lounge		2	2		1	
	美容美发 Beauty & Hairdressing		1	1			
酒店后勤区 Hotel Backup Area	各办公室 Each Office	每个办公位： Each Workstation: 语音 X 1；数据 X 1。 （注：每个办公室因至少为网络打印机和传真机预留 1 个数据点和一个语音点。 Voice Point x1; Data Point x1. (Remark: At least 1 data point and 1 telephone point shall be reserved for network printer and fax machine)	1	1			
	总经理办公室 General Manager Office	语音：每个办公位 X2； Voice Point: Each workstation x2; 数据：每个办公位 X2。 Data Point: Each workstation x2 ;	2	2			
	财务总监办公室 Chief Financial Officer Office	语音：每个办公位 X2； Voice Point: Each workstation x2; 数据：每个办公位 X2。 Data Point: Each workstation x2 ;	2	2			

区域 Area	区域名称 Area Description	点位设计原则 Point Design Principle	语音 Voice Point	办公网络 Office Network	客用网络 Guest Network	无线网络 Wireless Network	求助电话 Emergency Call
	员工餐厅/休息室 Staff Canteen /Lounge		2	2		1	
	员工淋浴间 Staff Shower Room						
	员工更衣室 Staff Changing Room						
	员工卫生间 Staff Toilet						
	员工培训 Staff Training Room		1	4		1	
	员工娱乐室 Staff Entertainment Room		1	1	1	1	
	员工出入口 Staff Access	员工考勤机预留点位 Staff Attendance Machine		2			
	制服间 Uniform Room		1	1			
	工程部/维修间 Engineering/ Maintenance Department		4	4			
	备餐间 Pantry		1	1			
	储藏间 Storage		1				
	总仓库 General Storage		1				
	化学品仓库 Chemical Storage		1				
	危险品仓库 Hazardous Goods Storage		1				
	洗衣房 Laundry		2	1			

区域 Area	区域名称 Area Description	点位设计原则 Point Design Principle	语音 Voice Point	办公网络 Office Network	客用网络 Guest Network	无线网络 Wireless Network	求助电话 Emergency Call
酒店粗加工区 Hotel Food Rough Treatment Room	食品准备间 Food Preparation Room		1	1			
	食物、饮料储藏室 Food and drink storage		1	1			
	凉菜间 Cold Dish Room			1			
	糕点裱花间 Cake Decoration Room			1			
	巧克力间 Chocolate Room			1			
	面包房 Bakery			1			
	果汁加工间 Fruit Processing Room			1			
	蔬菜粗加工间 Vegetable rough treatment room			1			
	肉类/鱼类粗加工间 Meat/Fish rough treatment room			1			
	烧腊间 BBQ Room			1			
	花房 Greenhouse		1	1			
	垃圾处理间 Waste Treatment Room		1	1			
	冷库 Cold Storage		1	1			

区域 Area	区域名称 Area Description	点位设计原则 Point Design Principle	语音 Voice Point	办公网络 Office Network	客用网络 Guest Network	无线网络 Wireless Network	求助电话 Emergency Call
酒店厨房区 Hotel Kitchen Area	热厨/烹饪间 Hot Kitchen /Cooking Area						
	洗碗间/洗锅间 Dishwasher /Boiler Washing Room						
酒店机电用房 Hotel mechanical and electrical rooms	变配电室 Electrical Substation		1	2			
	制冷站 Chiller Plant		1	1			
	锅炉房 Boiler Room		1				
	热交换机房 Heat Exchanger Room						
	通风机房 Ventilation Room						
	发电机房 Generator Room		1				
	柴发机房/锅炉房储油间 Diesel Generator Room/ Boiler Oil Storage Room						
	空调机房 Air Handling Unit Room		1				
	电梯机房 Lift Motor Room		1				
	生活水箱房 Domestic Water Tank Room		1				

区域 Area	区域名称 Area Description	点位设计原则 Point Design Principle	语音 Voice Point	办公网络 Office Network	客用网络 Guest Network	无线网络 Wireless Network	求助电话 Emergency Call
	水泵房 Water Pump Room		1				
	污水处理机房 Waste Water Treatment Room						
	中水机房 Reclaimed Water Pump Room		1				
	电信进线间 Main Distribution Frame(MDF) Room						
	IT 机房 IT Server Room		4	4			
	AV 控制间 AV Control Room		1	1	1		
	电视机房 CATV Room		1				
	话务员值班室 Operator Duty Office		6	6			
	设备机房值班室 Equipment Duty Room		1	1			
	消防/保安监控室 Fire Command /Security Monitoring Room		2	4			1
	地下车库 Underground Carpark						

7.11.2. 安保点位表
Security Point Schedule

区域 Area	区域名称 Area Description	视频监控系统 CCTV System	门禁系统 Access Control System	门锁系统 Door-Lock System	防盗/报警系统 Anti-theft /Alarm System
客房区 Guest Room Area	每间客房 Each Guest Room			√	
	无障碍人士客房卫生间 Handicapped Toilet in Guest Room				√
	客房通道及楼层办公主要通道 Guestroom corridor and main access for each floor services area	√			
	楼梯间/电梯厅 Staircase /Lift Lobby	√			
	行政酒廊 Executive Lounge			√	
	布草间 Linen Room			√	
酒店大堂接待区 Hotel Lobby Reception Area	大堂 Lobby	√			
	前台 Front Desk	√			√
	大堂吧 Lobby Bar	√			
	贵重物品存放室 Valuables Storage Room	√	√		
	行李房 Luggage Room	√	√		
	所有 ATM 机 All ATM Machines	√			
	前台办公室 Front Desk Office		√		
酒店商务区 Hotel Business Area	宴会厅及会议室服务通道门 Banquet and Meeting Room Service Corridor		√		

区域 Area	区域名称 Area Description	视频监控系统 CCTV System	门禁系统 Access Control System	门锁系统 Door-Lock System	防盗/报警系统 Anti-theft /Alarm System
	会议室 Meeting Room			√	
	商务中心 Business Center			√	
	宴会厅 Banquet	√	√		
	宴会前厅 Banquet Foyer	√			
	多功能厅 Multi-Purpose Hall	√			
	各收银处 Each Cashier				√
酒店公共区 Hotel Common Area	酒吧 Bar	√			
	主要餐厅 Main Restaurant	√			
	公共无障碍人士卫生间 Handicapped Common Toilet				√
	自动扶梯出入口 Escalator Access	√			
	所有电梯轿箱/电梯厅 All Lift Car/Lift Lobby	√			
	公共区走廊 Common Area Corridor	√			
康体中心 Health Center	游泳池 Swimming Pool	√		√	√
	游泳池更衣室 Swimming Pool Changing Room				√
	健身中心 Fitness Center	√		√	√
	Spa 接待台 Spa Reception				√

区域 Area	区域名称 Area Description	视频监控系统 CCTV System	门禁系统 Access Control System	门锁系统 Door-Lock System	防盗/报警系统 Anti-theft /Alarm System
	干蒸间 Dry Steam Room				√
	湿蒸间 Wet Steam Room				√
酒店后勤区 Hotel Backup Area	总出纳办公室 General Cashier Office	√	√		√
	人力资源办公室 Human Resources Office				√
	后勤区走廊 Backup Area Corridor	√			
	员工出入口 Staff Access	√	√		
	员工餐厅 Staff Canteen	√			
	总仓库 General Storage	√			
	装卸台和收货区域 Loading and Unloading Area	√			
酒店粗加工区 Hotel Rough Treatment Area	所有的酒水储藏室 All Alcohol & Beverage Storages	√	√		
	干货仓库 Dry Ration Store	√	√		
酒店厨房区 Hotel Kitchen Area	所有厨房出入口 All Kitchen Access	√			
酒店机电用房 Hotel Mechanical and Electrical Rooms	高低压配电机房 High and Low Voltage Substation	√			
	制冷机房 Chiller Plant Room	√			
	锅炉房 Boiler Room	√			

区域 Area	区域名称 Area Description	视频监控系统 CCTV System	门禁系统 Access Control System	门锁系统 Door-Lock System	防盗/报警系统 Anti-theft /Alarm System
	热交换机房 Heat Exchanger Room	√			
	柴油发电机房 Diesel Generator Room	√			
	电梯机房 Lift Motor Room	√			
	生活水泵房 Domestic Water Pump Room	√			
	消防水泵房 Fire Pump Room	√			
	中水处理机房 Reclaimed Water Treatment Room	√			
	所有生活水箱间 All Domestic Water Tank Room	√			
	计算机/通信机房 Computer/ Telecommunication Room	√		√	
	话务员室 Operator Office		√		
	消防控制中心 Fire Command Center	√	√		
其他区域 Other Areas	偏僻的入口 Remote Entrance	√			
	入口雨棚 Entrance Canopy	√			
	首层所有出入口 All Accesses at Ground Level	√			
	首层通向室外的消防疏散门 Fire Evacuation Door to external at ground level		√		
	有用处通往室外的消防疏散门（若有） Fire Evacuation Door in Utilized Area to External (If Any)		√		
	由客人走廊可以达到的后场区		√		

区域 Area	区域名称 Area Description	视频监控系统 CCTV System	门禁系统 Access Control System	门锁系统 Door-Lock System	防盗/报警系统 Anti-theft /Alarm System
	Accessible Backup Area from Guest Corridor				
	所有通向屋顶的出入口 All Roof Accesses	√	√		
	停车场的所有出入口 All Carpark Accesses	√			
	停车场的主要通道 Carpark Main Accesses	√			
	主要候车区 Main Waiting Area	√			
	自行车库出入口和车道 Bicycle Parking Garage Access and Traffic Lane	√			
	避难层 Shelter Floor	√			
	楼梯出入口 Staircase Access	√			
	停机坪（若有） Parking Apron (If Any)	√			
	室外广场周界区和景观区 Square Outdoor Surrounding and Landscape	√			

7.11.3. BMS I/O 点表及通讯接口表
BMS I/O Point Schedule and Communication Connection Point Schedule

表一：冷源系统

Table 1: Cole Source System

序号 Series No.	点位描述 Point Description	点位类型 Point Type				备注 Remark
		DI	DO	AI	AO	
1	**冷冻机组 Chiller Plant**					
1.1	启停控制 ON/OFF Control		1			
1.2	手/自动状态 Manual/Auto Status	1				
1.3	运行状态 Operation Status	1				
1.4	故障报警 Fault Alarm	1				
1.5	冷冻水及冷却水供回水温度 Chilled and Cooling Water Supply/Return Water Temperature			2		
1.6	冷冻水及冷却水供回水压力 Chilled and Cooling Water Supply/Return Water Pressure			2		
1.7	冷冻水及冷却水电动隔断阀开关控制 Chilled and Cooling Water Motorized Isolation Valve ON/OFF Control Status		2			
1.8	冷冻水及冷却水电动隔断阀状态反馈 Chilled and Cooling Water Motorized Isolation Valve ON/OFF State Feedback	4				
1.9	水流开关状态 Water Flow ON/OFF Status	2				
2	**冷冻水泵及冷却水泵 Chilled and Cooling Water Pump**					
2.1	启停控制 ON/OFF Control		1			
2.2	手/自动状态 Manual/Auto Status	1				
2.3	运行状态 Operation Status	1				
2.4	故障报警 Fault Alarm	1				
2.5	水泵压差状态 Water Pump Pressure Drop Status	1				
2.6	变频控制及反馈 Variable Frequency Control and Feedback			1	1	变频泵使用
3	**冷冻水总管 Chilled Water Main Pipe**					
3.1	旁通阀调节控制及阀位反馈 Bypass Valve Control and Valve State Feedback			1	1	

序号 Series No.	点位描述 Point Description	点位类型 Point Type				备注 Remark
		DI	DO	AI	AO	
3.2	压差 Pressure Drop			1		
3.3	供回水温度 Supply & Return Water Temperature			2		
3.4	供回水压力 Supply & Return Water Pressure			2		
3.5	回水流量 Return Water Flow Rate			1		
4	**冷却水总管** **Cooling Water Main Pipe**					
4.1	旁通阀调节控制及阀位反馈 Bypass Valve Control and Valve State Feedback			1	1	
4.2	供回水温度 Supply & Return Water Temperature			2		
4.3	供回水压力 Supply & Return Water Pressure			2		
5	**冷却塔** **Cooling Tower**					
5.1	启停控制 ON/OFF Control		1			
5.2	手/自动状态 Manual/Auto Status	1				
5.3	运行状态 Operation Status	1				
5.4	故障报警 Fault Alarm	1				
5.5	供回水温度 Supply & Return Water Temperature				2	
5.6	供回水隔断阀开关控制及阀位反馈 Supply & Return Water Isolation Valve ON/OFF Control and Valve State Feedback	4	2			
5.7	高、低水位 High/Low Water Level	2				
6	**膨胀水箱** **Expansion Tank**					
6.1	高、低水位报警 High/Low Water Alarm	2				

表二：热源系统

Table 2: Heat Source System

序号 Series No.	点位描述 Point Description	点位类型 Point Type				备注 Remark
		DI	DO	AI	AO	
1	**锅炉** **Boiler**					
1.1	手/自动状态 Manual/Auto Status	1				
1.2	运行状态 Operation Status	1				
1.3	故障报警 Fault Alarm	1				
1.4	蒸汽温度 Steam Temperature			1		蒸汽锅炉 Steam Boiler
1.5	蒸汽压力 Steam Pressure			1		
1.6	蒸汽总计量表 Steam Sum Meter			1		
1.7	热水供回水温度 Hot Water Supply & Return Water Temperature			2		热水锅炉 Hot Water Boiler
1.8	热水供回水压力 Hot Water Supply & Return Water Pressure			2		
1.9	热水流量 Hot Water Flow Rate			1		
1.10	水位 Water Level			1		
2	**循环泵** **Circulation Pump**					
2.1	启停控制 ON/OFF Control		1			
2.2	手/自动状态 Manual/Auto Status	1				
2.3	运行状态 Operation Status	1				
2.4	故障报警 Fault Alarm	1				
2.5	压差状态 Pressure Drop Status	1				

表三：热交换系统

Table 3: Heat Exchange System

序号 Series No.	点位描述 Point Description	点位类型 Point Type				备注 Remark
		DI	DO	AI	AO	
1	**一次侧总管** **Primary Side Main Pipe**					
1.1	供回水总管温度 Supply & Return Water Main Pipe Temperature			2		
1.2	供回水总管压力 Supply & Return Water Main Pipe Pressure			2		
1.3	电动阀调节控制/反馈 Motorized Valve Control/Feedback			1	1	
2	**二次侧总管** **Secondary Side Main Pipe**					
2.1	供回水温度 Supply & Return Water Temperature			2		
2.2	供回水压力 Supply & Return Water Pressure			2		
2.3	旁通阀调节控制/反馈 Bypass Valve Control/Feedback			1	1	
3	**板式换热器** **Panel Type Heat Exchanger**					
3.1	一次侧回水温度 Primary Side Return Water Temperature			1		
3.2	一次侧回水压力 Primary Side Return Water Pressure			1		
3.3	二次侧供水温度 Secondary Side Supply Water Temperature			1		
3.4	二次侧供水压力 Secondary Side Supply Water Temperature			1		
4	**二次侧水泵** **Secondary Side Water Pump**					
4.1	启停控制及变频控制 ON/OFF Control and Variable Frequency Control		1		1	
4.3	手/自动状态 Manual/Auto Status	1				
4.4	运行状态 Operation Status	1				
4.5	故障报警 Fault Alarm	1				

表四：空调机组

Table 4: Air-conditioning Plant

序号 Series No.	点位描述 Point Description	点位类型 Point Type				备注 Remark
		DI	DO	AI	AO	
1	启停控制 ON/OFF Control		1			
2	手/自动状态 Manual/Auto Status	1				
3	运行状态 Operation Status	1				
4	故障报警 Fault Alarm	1				
5	过滤网报警 Filter Alarm	1				
6	加湿器/阀开关控制 Humidifier/Valve On/Off Control		1			
7	新风、供风、回风温度 Fresh Air/Supply Air/Return Air Temperature			3		
8	供、回水温度 Supply and Return Water Temperature			4		四管制 Four Pipes Type
9	供风压力 Supply Air Pressure			1		
10	回风湿度 Return Air Humidity			1		
11	回风二氧化碳浓度 Return Air CO_2 Density			1		
12	电动水阀调节控制 Motorized Water Control Valve Operation				2	冷、热水阀门 Cold and Hot Water Valve
13	电动风阀调节控制 Motorized Air Control Valve Operation				2	新风、回风风阀 Fresh and Return Air Damper

表五：新风机组

Table 5: Fresh Air Fan

序号 Series No.	点位描述 Point Description	点位类型 Point Type				备注 Remark
		DI	DO	AI	AO	
1	启停控制 ON/OFF Control		1			
2	手/自动状态 Manual/Auto Status	1				
3	运行状态 Operation Status	1				
4	故障报警 Fault Alarm	1				
5	过滤网报警 Filter Alarm	1				
6	加湿器/阀开关控制 Humidifier/Valve ON/OFF Control		1			
7	新风、供风温度 Fresh air and Supply Air temperature			2		
8	供、回水温度 Supply and Return Water Temperature			4		四管制 Four Pipe Type
9	供风压力 Supply Air Pressure			1		
10	供风湿度 Supply Air Temperature			1		
11	电动水阀调节控制 Motorized Water Valve Control				2	冷、热水阀门 Cold and Hot Water Valve
12	新风电动风阀开关控制 Fresh Air Motorized Damper ON/OFF Control		1			

表六：风机盘管（公共区域）

Table 6: Fan Coil Unit (Common Area)

序号 Series No.	点位描述 Point Description	点位类型 Point Type				备注 Remark
		DI	DO	AI	AO	
1	三速控制 Three Speed Control		3			
2	电磁阀开关控制 Solenoid valve ON/OFF Control		1			
3	运行状态 Operation Status	1				
4	回风温度 Return Air Temperature			1		

表七：排烟/加压风机

Table 7: Exhaust Fan/Compressor

序号 Series No.	点位描述 Point Description	点位类型 Point Type				备注 Remark
		DI	DO	AI	AO	
1	手/自动状态 Manual/Auto Status	1				
2	运行状态 Operation Status	1				
3	故障报警 Fault Alarm	1				

表八：厨房排油烟风机

Table 8: Kitchen Exhaust Air Fan

序号 Series No.	点位描述 Point Description	点位类型 Point Type				备注 Remark
		DI	DO	AI	AO	
1	手/自动状态 Manual/Auto Status	1				
2	运行状态 Operation Status	1				
3	故障报警 Fault Alarm	1				

表九：机房送/排风机

Table 9: Equipment Room Supply/Exhaust Air Fan

序号 Series No.	点位描述 Point Description	点位类型 Point Type				备注 Remark
		DI	DO	AI	AO	
1	启停控制 ON/OFF Control		1			
2	手/自动状态 Manual/Auto Status	1				
3	运行状态 Operation Status	1				
4	故障报警 Fault Alarm	1				
5	机房温度 Room Temperature			1		

表十：车库送/排风机

Table 10: Carpark Supply/Exhaust Air Fan

序号 Series No.	点位描述 Point Description	点位类型 Point Type				备注 Remark
		DI	DO	AI	AO	
1	启停控制 ON/OFF Control		1			
2	手/自动状态 Manual/Auto Status	1				
3	运行状态 Operation Status	1				
4	故障报警 Fault Alarm	1				
5	一氧化碳浓度探测 CO Density Detection			1		数量根据探测范围设置 Quantity shall be determined by Detected Area

表十一：其它送/排风机

Table 11: Other Supply/Exhaust Air Fan

序号 Series No.	点位描述 Point Description	点位类型 Point Type				备注 Remark
		DI	DO	AI	AO	
1	启停控制 ON/OFF Control		1			
2	手/自动状态 Manual/Auto Status	1				
3	运行状态 Operation Status	1				
4	故障报警 Fault Alarm	1				

表十二：生活给排水系统

Table 12: Domestic Supply and Waste Water System

序号 Series No.	点位描述 Point Description	点位类型 Point Type				备注 Remark
		DI	DO	AI	AO	
1	**生活水池/水箱** **Domestic Water Pool/Tank**					
1.1	高低液位报警 High/Low Water Level Alarm	2				
2	**生活供水水泵** **Domestic Supply Water Pump**					
2.1	手/自动状态 Manual/Auto Status	1				
2.2	运行状态 Operation Status	1				
2.3	故障报警 Fault Alarm	1				
3	**潜污泵** **Submersible Sewage Pump**					
3.1	手/自动状态 Manual/Auto Status	1				
3.2	运行状态 Operation Status	1				
3.3	故障报警 Fault Alarm	1				
3.4	供电电源状态 Power Supply Status	1				
4	**集水坑** **Sump Pit**					
4.1	高液位报警 High Level Alarm	1				

表十三：强电系统

Table 13: Midium Voltage System

序号 Series No.	点位描述 Point Description	点位类型 Point Type				备注 Remark
		DI	DO	AI	AO	
1	**高压回路** **High Voltage Circuit**					
1.1	电流 Current			3		
1.2	电压 Voltage			3		
1.3	KW			1		
1.4	KWH			1		
1.5	频率 Frequency			1		
1.6	开关状态 ON/OFF Status	1				
1.7	超载报警 Overload Alarm	1				
2	**变压器** **Transformer**					
2.1	超温报警 Overheating Alarm	1				
3	**低压回路** **Low Voltage Circuit**					
3.1	电流 Current			3		
3.2	电压 Voltage			3		
3.3	KW			1		
3.4	KWH			1		
3.5	开关状态 Switch Status	1				
3.6	超载报警 Overload Alarm	1				
4	**公共照明回路** **Common Area Lighting Circuit**					
4.1	开关控制 ON/OFF Control		1			
4.2	手/自动状态 Manual/Auto Status	1				
4.3	开关状态 ON/OFF Status	1				
5	**柴油发电机** **Diesel Generator**					
5.1	开关状态 ON/OFF Status	1				

序号 Series No.	点位描述 Point Description	点位类型 Point Type				备注 Remark
		DI	DO	AI	AO	
5.2	手/自动状态 Manual/Auto Status	1				
5.3	故障报警 Fault Alarm	1				
5.4	油罐液位报警 Oil Level Alarm for Oil Tank	2				
5.5	电池低压报警 Low Battery Alarm	1				
5.6	电流 Current			3		
5.7	电压 Voltage			3		
5.8	KW			1		
5.9	频率 Frequency			1		

表十四：电梯/自动扶梯

Table 14: Lift/Escalator

序号 Series No.	点位描述 Point Description	点位类型 Point Type				备注 Remark
		DI	DO	AI	AO	
1	**电梯** **Lift**					
1.1	运行状态 Operation Status	1				
1.2	故障报警 Fault Alarm	1				
1.3	上/下行状态 Up/Down Status	1				
2	**自动扶梯** **Escalator**					
2.1	运行状态 Operation Status	1				
2.2	故障报警 Fault Alarm	1				
2.3	上/下行状态 Up/Down Status	1				
2.4	供电电源状态 Power Supply Status	1				

表十五：室外环境

Table 15: Outdoor Environment

序号 Series No.	点位描述 Point Type	点位类型 Point Type				备注 Remark
		DI	DO	AI	AO	
1	室外温度及湿度 Outdoor Temperature and Humidity			2		

表十六：IT 机房

Table 16: IT Server Room

序号 Series No.	点位描述 Point Description	点位类型 Point Type				备注 Remark
		DI	DO	AI	AO	
1	房间温度 Room Temperature			1		
2	房间湿度 Room Humidity			1		
3	漏水探测报警 Water Leak Detection Alarm	1				

表十七：接入 BMS 系统的软件通讯接口

Table 17: Communication Interface for BMS System Software

序号 Series No.	通讯监视系统 Communication Monitoring System	通讯协议 Communication Protocol	备注 Remark
1	锅炉监视系统 Boiler Monitoring System	Modbus RTU/国际开放协议 Modbus RTU/International Open Protocol	读取协议开放的所有数据 To Read All Protocol open Data
2	发电机组 Generator Plant		
3	远程水表 Remote Water Meter		
4	远程电表 Remote Ammeter		
5	其它远程计量表 Other Remote Meters		
6	冷源群控系统（包括冷源机组） Cold Resource Integrate control System (Including Chiller Plant)	Modbus/OPC/国际开放协议 Modbus OPC/International Open Protocol	
7	电梯监视系统 Lift Monitoring System		
8	灯光控制系统 Lighting Control System		
9	电力监视系统 Electric Monitoring System		
10	游泳池监控系统 Swimming Pool Monitoring System		

7.11.4. 调试验收样表
T&C sample table

表一：综合布线电气及光纤性能测试

Table 1: Structured cabling and Fiber Optic Functional Test

综合布线电气及光纤 **Structured cabling and Fiber Optic**						
检验方 Tested by						
序号 Serial No.	检验事项名称 Test Item Description	外观 Appearance	数量 Quantity	连接 Connection	性能 Performance	备注 Remarks
1	机房环境 Room Environment					
2	防火措施 Fire Protection Measure					
3	机柜安装 Equipment Cabinet Installation					
4	光纤线缆 Fiber-Optic Cable					
5	配线模块 Accessory Module					
6	双绞线缆 Twist Pair Cable					
试运行说明： Commissioning Test Description and solution:						

见证人 Witness	施工承包单位 Contractor	监理公司 Management Company	业主/顾问公司 Client/Consulting Company
姓名 Name			
公司 Company			
职位 Designation			
签名 Signature			
日期 Date			

表二：视频监控系统性能测试

Table 2: CCTV System Functional Test

视频监控系统 **CCTV system**						
检验方 Tested by						
序号 Serial No.	检验事项名称 Test Item Description	外观 Appearance	数量 Quantity	连接 Connection	性能 Performance	备注 Remarks
1	摄像机 Camera					
2	线缆 Cable					
3	监视器 Monitor					
4	系统性能 System Function					
5	管理软件 Management Software					
6	后备电源 Backup Battery					

试运行说明：
Commissioning Test Description and solution:

见证人 Witness	施工承包单位 Contractor	监理公司 Management Company	业主/顾问公司 Client/Consulting Company
姓名 Name			
公司 Company			
职位 Designation			
签名 Signature			
日期 Date			

表三：防盗报警系统性能测试

Table 3: Security Alarm System Functional Test

防盗报警系统 Security Alarm System						
检验方 Tested by						
序号 Serial No.	检验事项名称 Test Item Description	外观 Appearance	数量 Quantity	连接 Connection	性能 Performance	备注 Remarks
1	报警按钮 Alarm Button					
2	探测器 Detector					
3	报警键盘 Alarm Keyboard					
4	报警控制器 Alarm Controller					
5	线缆 Cable					
6	管理软件 Management Software					
7	后备电源 Backup Battery					

试运行说明：
Commissioning Test Description and solution:

见证人 Witness	施工承包单位 Contractor	监理公司 Management Company	业主/顾问公司 Client/Consulting Company
姓名 Name			
公司 Company			
职位 Designation			
签名 Signature			
日期 Date			

表四：巡更系统性能测试

Table 4: Patrol System Functional Test

巡更系统 **Patrol System**						
检验方 Tested by						
序号 Serial No.	检验事项名称 Test Item Description	外观 Appearance	数量 Quantity	连接 Connection	性能 Performance	备注 Remarks
1	巡更点 Patrol Point					
2	巡更棒 Patrol Rod					
3	通讯座 Communication Console					
4	线缆 Cable					
5	备用电源 Backup Battery					
6	管理软件 Management Software					

试运行说明：
Commissioning Test Description and solution:

见证人 Witness	施工承包单位 Contractor	监理公司 Management Company	业主/顾问公司 Client/Consulting Company
姓名 Name			
公司 Company			
职位 Designation			
签名 Signature			
日期 Date			

表五：门禁系统性能测试

Table 5: Access Control System Functional Test

门禁系统 **Access Control System**						
检验方 Tested by						
序号 Serial No.	检验事项名称 Test Item Description	外观 Appearance	数量 Quantity	连接 Connection	性能 Performance	备注 Remarks
1	门禁控制器 Access Controller					
2	读卡器 Card Reader					
3	出门按钮 Exit Button					
4	电控锁 EM Lock					
5	线缆 Cable					
6	管理软件 Management Software					
试运行说明： Commissioning Test Description and solution:						

见证人 Witness	施工承包单位 Contractor	监理公司 Management Company	业主/顾问公司 Client/Consulting Company
姓名 Name			
公司 Company			
职位 Designation			
签名 Signature			
日期 Date			

表六：电子门锁统性能测试

Table 6: Electrical Locking System

电子门锁系统 **Electrical Locking System**						
检验方 Tested by						
序号 Serial No.	检验事项名称 Test Item Description	外观 Appearance	数量 Quantity	连接 Connection	性能 Performance	备注 Remarks
1	发卡器 Card Sender					
2	IC 卡 IC Card					
3	线缆 Cable					
4	门锁 Door Lock					
5	管理软件 Management Software					

试运行说明：
Commissioning Test Description and solution:

见证人 Witness	施工承包单位 Contractor	监理公司 Management Company	业主/顾问公司 Client/Consulting Company
姓名 Name			
公司 Company			
职位 Designation			
签名 Signature			
日期 Date			

表七：电梯楼层控制统性能测试

Table 7: Lift Floor Control System Functional Test

电梯楼层控制系统 Lift Floor Control System						
检验方 Tested by						
序号 Serial No.	检验事项名称 Test Item Description	外观 Appearance	数量 Quantity	连接 Connection	性能 Performance	备注 Remarks
1	发卡器 Card Sender					
2	IC 卡 IC Card					
3	线缆 Cable					
4	控制器 Controller					
5	电梯读卡器 Lift Card Reader					
6	管理软件 Management Software					
试运行说明： Commissioning Test Description and solution:						

见证人 Witness	施工承包单位 Contractor	监理公司 Management Company	业主/顾问公司 Client/Consulting Company
姓名 Name			
公司 Company			
职位 Designation			
签名 Signature			
日期 Date			

表八：无线对讲系统性能测试

Table 8: Wireless Communication System Functional Test

无线对讲系统 **Wireless Communication System**						
检验方 Tested by						
序号 Serial No.	检验事项名称 Test Item Description	外观 Appearance	数量 Quantity	连接 Connection	性能 Performance	备注 Remarks
1	前端天线 Front Side Antenna					
2	功分器 Power Divider					
3	耦合器 Coupler					
4	同轴线缆 Coaxial Cable					
5	中继台 Transmitter					
6	对讲机 Walkie Talkie					
7	避雷器 Lightning Arrestor					
试运行说明： Commissioning Test Description and solution:						

见证人 Witness	施工承包单位 Contractor	监理公司 Management Company	业主/顾问公司 Client/Consulting Company
姓名 Name			
公司 Company			
职位 Designation			
签名 Signature			
日期 Date			

表九：酒店内部寻呼系统性能测试

Table 9: Hotel Internal Paging System Functional Test

酒店内部寻呼系统 Hotel Internal Paging system						
检验方 Tested by						
序号 Serial No.	检验事项名称 Test Item Description	外观 Appearance	数量 Quantity	连接 Connection	性能 Performance	备注 Remarks
1	前端天线 Front Side Antenna					
2	寻呼机 Pager					
3	寻呼发射器 Beeper Catapult					
4	局域网交换机 LAN Exchange					
5	电话交换机 Telephone Exchange					
6	线缆 Cable					
7	管理软件 Management Software					
试运行说明： Commissioning Test Description and solution:						

见证人 Witness	施工承包单位 Contractor	监理公司 Management Company	业主/顾问公司 Client/Consulting Company
姓名 Name			
公司 Company			
职位 Designation			
签名 Signature			
日期 Date			

表十：停车场管理系统性能测试

Table 10: Carpark Management System Functional Test

停车场管理系统 **Carpark Management System**						
检验方 Tested by						
序号 Serial No.	检验事项名称 Test Item Description	外观 Appearance	数量 Quantity	连接 Connection	性能 Performance	备注 Remarks
1	电动道闸 Electric Gate Barrier					
2	车辆探测器 Car Detector					
3	读卡器 Card Reader					
4	LED 显示屏 LED Screen					
5	系统主机 System Main Equipment					
6	线缆 Cable					
7	管理软件 Management Software					
试运行说明： Commissioning Test Description and solution:						

见证人 Witness	施工承包单位 Contractor	监理公司 Management Company	业主/顾问公司 Client/Consulting Company
姓名 Name			
公司 Company			
职位 Designation			
签名 Signature			
日期 Date			

表十一：卫星数字电视及有线电视系统性能测试

Table 11: Digital Satellite Television and CATV System Functional Test

卫星数字电视及有线电视系统 Digital Satellite Television and CATV System						
检验方 Tested by						
序号 Serial No.	检验事项名称 Test Item Description	外观 Appearance	数量 Quantity	连接 Connection	性能 Performance	备注 Remarks
1	接收设备 Receiving Equipment					
2	系统输出电平 System Output Level					
3	系统载噪比 System Carrier to Noise Ratio(CNR)					
4	系统载波互调比 System Carrier Wave Ratio					
5	伴音及调频广播声音 Sound and FM Broadcast					
6	同轴电缆 Coaxial Cable					
7	放大模块 Amplifier					
8	电视图形质量 Television Image Quality					
试运行说明： Commissioning Test Description and solution:						

见证人 Witness	施工承包单位 Contractor	监理公司 Management Company	业主/顾问公司 Client/Consulting Company
姓名 Name			
公司 Company			
职位 Designation			
签名 Signature			
日期 Date			

表十二：客房控制系统性能测试

Table 12: Guestroom Control System Functional Test

客房控制系统 **Guestroom Control System**						
检验方 Tested by						
序号 Serial No.	检验事项名称 Test Item Description	外观 Appearance	数量 Quantity	连接 Connection	性能 Performance	备注 Remarks
1	客房控制主机 Guest Room Main Control Equipment					
2	控制面板 Control Panel					
3	线缆 Cable					
4	管理软件 Management Software					
试运行说明： Commissioning Test Description and solution:						

见证人 Witness	施工承包单位 Contractor	监理公司 Management Company	业主/顾问公司 Client/Consulting Company
姓名 Name			
公司 Company			
职位 Designation			
签名 Signature			
日期 Date			

表十三：楼宇自动化管理系统性能测试

Table: Building Automation Management System Functional Test

楼宇自动化管理系统 **Building Automation System**						
检验方 Tested by						
序号 Serial No.	检验事项名称 Test Item Description	外观 Appearance	数量 Quantity	连接 Connection	性能 Performance	备注 Remarks
1	传感器安装 Sensor Installation					
2	DDC 安装 DDC Installation					
3	双绞线缆 Twist Pair Cable					
4	网络控制器 Network Controller					
5	控制主机 Main Equipment Controller					
6	管理软件 Management Software					
试运行说明： Commissioning Test Description and solution:						

证人 Witness	施工承包单位 Contractor	监理公司 Management Company	业主/顾问公司 Client/Consulting Company
姓名 Name			
公司 Company			
职位 Designation			
签名 Signature			
日期 Date			

表十四：不间断电源 UPS 系统性能测试

不间断电源 UPS **Uninterruptible Power Supply**						
检验方 Tested by						
序号 Serial No.	检验事项名称 Test Item Description	外观 Appearance	数量 Quantity	连接 Connection	性能 Performance	备注 Remarks
1	UPS 主机 UPS Server					
2	防火措施 Fire Prevention					
3	电池安装 Battery Installation					
4	连接线缆（电池与电池之间） Inter Connecting Cable (between Batteries)					
5	连接线缆（电池与 UPS 主机之间） Inter Connecting Cable(between Battery and UPS Server)					
试运行说明： Commissioning Test Description and solution:						

见证人 Witness	施工承包单位 Contractor	监理公司 Management Company	业主/顾问公司 Client/Consulting Company
姓名 Name			
公司 Company			
职位 Designation			
签名 Signature			
日期 Date			

表十五：智能灯光控制系统性能测试

Table 15: Intelligent Lighting Control System Functional Test

智能灯光控制系统 **Intelligent Lighting Control System**						
检验方 Tested by						
序号 Serial No.	检验事项名称 Test Item Description	外观 Appearance	数量 Quantity	连接 Connection	性能 Performance	备注 Remarks
1	灯光控制模块 Lighting Control Module					
2	防火措施 Fire Prevention					
3	双绞线缆 Twisted Pair Cable					
4	灯光控制面板 Lighting Control Panel					
5	灯光控制主机 Lighting Control Main Equipment					
6	管理软件 Management Software					

试运行说明：
Commissioning Test Description and solution:

见证人 Witness	施工承包单位 Contractor	监理公司 Management Company	业主/顾问公司 Client/Consulting Company
姓名 Name			
公司 Company			
职位 Designation			
签名 Signature			
日期 Date			

表十六：声压级和频率响应推荐值

Table-16 Acoustic Pressure Level and Frequency Response Recommended Values

区域 Area	常规运行声音压力等级 Regular Operation Acoustic Pressure Level	最大声音压力等级 Maximum Acoustic Pressure Level	频率响应 Frequency Response
特定餐厅 Special restaurant	70-80dB	90dB	70Hz – 20KHz*
全日制餐厅 All day dining restaurant	70-80dB	90dB	70Hz – 20KHz*
大堂酒廊天花 Hall lounge ceiling	70-80dB	90dB	90Hz – 16KHz
大堂酒廊舞台 Hall lounge stage	70-80dB	100dB	50Hz – 20KHz*
大堂 Hall	70-80dB	90dB	70Hz – 20KHz*
健身中心 Fitness Centre	80-90dB	100dB	70Hz – 20KHz*
体操房 Gym	90-100dB	105dB	70Hz – 20KHz*
健身中心湿区/更衣室 Fitness Centre wet area/ Changing room	70-80dB	80dB	90Hz-16KHz
水疗－公共区 Spa – common area	60-70dB	80dB	70Hz – 20KHz
水疗－理疗室 Spa – physical therapy room	55-65dB	75dB	40Hz -20KHz
客流走廊 Guest corridor	60-70dB	70dB	90Hz-16KHz
洗手间 Restroom	60-70dB	70dB	90Hz-16KHz
吧台天花 Bar ceiling	70-90dB	100dB	70Hz – 20KHz
吧台前区 Bar front area	70-90dB	100dB	40Hz-20KHz*
会议室/多功能室吸顶喇叭 Meeting room/ Multi function room ceiling speaker	70-80dB	100dB	70Hz – 20KHz
会议室/多功能室前区音箱 Meeting room/ Multi function room front area sound box	70-80dB	100dB	50Hz-20KHz*
宴会厅吸顶喇叭 Ballroom ceiling speaker	70-90dB	105dB	50Hz-20KHz*
宴会厅前区音箱 Ballroom front area sound box	80-90dB	105dB	50Hz-20KHz*

第8章. 供配电系统
SECTION 8: ELECTRICAL SYSTEM

8.1. 概述 GENERAL

A. 电力是酒店的主要动力来源，可靠的供电系统至关重要，否则酒店就无法正常运行。供电系统须符合当地供电标准要求，如果当地标准低于本设计标准要求，需以本设计标准作为设计标准。
Power is the main energy source for hotel. The power supply system must be reliable to support its normal operation. The design standard of power supply system shall meet with local design standard. Whenever the local design requirement is lower than this standard, this standard shall be implemented accordingly.

B. 本标准供电电压等级划分如表 8-1 所示.
Standard supply voltage levels as shown in Table 8-1.

表 8-1 供电电压等级划分
Table 8-1 Standard supply voltage levels

序号 No.	电压等级 Voltage Level	电压要求 Voltage Range	备注 Remark
1	高压 High Voltage	35kV≤Un≤220 kV	高压设计标准以国家规范及当地供电部门要求为设计依据 High Voltage Design standard shall comply with National standard and Local requirement
2	中压 Medium Voltage	1 kV < Un <35 kV	
3	低压 Low Voltage	50 V < Un≤1 kV	

8.2. 设计标准和要求 DESIGN CRITERIA AND REQUIREMENT

1. JGJ16 民用建筑电气设计规范
   JGJ16 Code for electrical Design of Civil Buildings
2. GB50053 10kV 及以下变电所设计规范
   GB50053 Code for Design of 10kV and Under Electric Substation
3. GB50060 3-110kV 高压配电装置设计规范
   GB50060 Code for Design of High Voltage Electrical Installation (3~110kV)
4. GB50052 供配电系统设计规范
   GB50052 Code for Design of Electric Power Supply Systems
5. GB50054 低压配电设计规范
   GB50054 Code for Design of Low Voltage Electrical Installations

6. GB50055 通用用电设备配电设计规范
   GB50055 Code for Design of Electric distribution of General-purpose Utilization Equipment

7. GB/T50062 电力装置的继电保护和自动装置设计规范
   GB/T50062 Code for Design of Relay Protection and Automatic Device of Electric Power Installations

8. GB50217 电力工程电缆设计规范
   GB50217 Code for Design of Cables of Electric Engineering

9. GB50034 建筑照明设计标准
   GB50034 Standard for Lighting Design of Buildings

10. GB50045 高层民用建筑设计防火规范
    GB50045 Code for Fire Protection Design of Tall Buildings

11. GB50016 建筑设计防火规范
    GB50016 Code of Design on Building Fire Protection and Prevention

12. GB50057 建筑物防雷设计规范
    GB50057 Code for Design of Structures Against Lighting

13. GB50189 公共建筑节能设计标准
    GB50189 Design Standard for Energy Efficiency of Public Buildings

8.3. 中压配电系统
MEDIUM VOLTAGE DISTRIBUTION SYSTEM

8.3.1. 概要
General

A. 酒店供电须按一级负荷的供电要求设计。一级负荷应由两个电源供电，当一个电源发生故障时，另一个电源不应同时受到损坏。
Electricity Supply to the Hotel shall be designed as Category I, fed via 2 independent electrical incoming power sources. When there is a fault on one incoming source, the other must be able to provide continuous power supply without failure.

B. 提供独立的市政输入电源给酒店使用。市政输入电源应为两路以上电源，若其中一路电源中断供电时，其余线路应能满足酒店全部用电需求。
Incoming Power sources for the hotel shall be fed from independent municipal power supply. The power source shall contain at least two incoming power supply. When there is a power failure on any one of the source, the other source shall be able to support the entire load requirement.

8.3.2. 系统设计要求
System Design Requirement

A. 当地政府部门颁发适用于供配电系统的技术要求
Codes for Electrical distribution system by local authorities

8.3.3. 技术说明及应用指导
Specifications and Application Guides

A. 中压配电
Medium Voltage

1. 市政两路输入电源单母线分列运行，中间设置母联开关，当其中一路市政电源断电时，另一路市政电源可经中压母联开关送电至所有变压器。
2 incoming power source of municipal power supply shall be linked to a single busbar separated by busbar coupler. Once there is power failure to one incoming power supply, the busbar coupler shall close and operate to link up all outgoing transformers.

2. 方案阶段需提供当地供电形式及供电故障频率。若当地有两路以上 100%容量中压进线时，方案阶段柴油发电机常用容量可按总变压器容量的 20%进行预估，实际选用容量应在施工图阶段根据实际负荷计算后确定。
During the Concept design stage, methodology of local incoming power supply and the frequency of local power failure shall be furnished. Where 2 or more of 100% capacity municipal power source is available, the standby diesel generator capacity shall be 20% of the total transformer capacity during design stage. The actual selected diesel generator capacity shall be determined based on the load calculation during the construction drawing stage.

B. 计量
Metering

1. 市政中压进线电源采用中压供电中压计量，并需根据当地供电局要求配置中压进线市政总计量表，需给酒店用电开具独立的电费账单。
Municipal Medium Voltage incoming power supply shall be metered by installing the approved State Grid or Local Electricity Supply Grid meter at the Medium Voltage side. The Local Electricity Bureau or State Grid is able to issue individual electricity bills to the hotel independently.

8.4. 中压配电设备
MEDIUM VOLTAGE EQUIPMENT

8.4.1. 概要
General

A. 中压配电设备为酒店供电的核心设备，要求系统设备的运行具有足够的可靠性，要求系统运行的稳定性，保证不发生或不轻易发生设备损坏而造成整个酒店停电。
Medium Voltage Switchgear is the core electricity equipment for the Hotel and shall be of high quality, safety and reliable performance type during continuous operation to avoid minimal power disruption to the entire Hotel.

8.4.2. 系统设计要求
System Design Requirement

A. 中压开关设备
Medium Voltage Switchgear

1. 中压开关设备需满足国家和当地法规要求。
   Medium Voltage Switchgear shall comply with National and Local government standard requirement.

2. 中压开关设备主接线方式为单母线分列运行，中间设置母联开关。联络开关需具有机械和电气联锁，宜采用手动操作。
   The mode of connection for Medium Voltage Switchgear shall be single busbar separated by busbar coupler with two incoming sources. The busbar coupler shall be installed with mechanical and electrical interlock, normally by manual operated.

B. 中压电缆
   Medium Voltage Cable

1. 中压电缆需满足国家和当地法规要求。
   Medium Voltage Cable shall comply with National and Local government standard requirement.

8.4.3. 技术说明及应用指导
Specifications and Application Guides

A. 开关设备
   Switchgear

1. 酒店的所有中压开关设备的断路器应采用真空断路器或 SF6 型断路器。严禁使用油浸式断路器。选用真空断路器时，应装设电涌保护器。
   All Medium Voltage Circuit Breakers used for Hotel shall be vacuum type or sulphur hexafluoride (SF6) type. No oil-type circuit breaker is allowed. Vacuum type circuit breaker shall be equipped with Surge Protection Devices (SPD).

2. 中压开关设备应采用综合保护装置，综合保护装置须具有遥测、遥信和遥控功能。
   Integrated measuring and protection devices shall be used for measurement, signal communication and control under Medium Voltage Switchgear Design.

3. 母线联络开关应采用与市政电源进线开关相同型号的断路器。母线联络开关采用手动操作。
   Busbar coupler breaker shall be the same model as the incoming breaker. The busbar coupler breaker shall be manually operated.

4. 中压开关设备配出开关的出线侧应装设与该回路开关电器有机械连锁的接地开关电器和电源指示灯。
   All outgoing circuit breakers in Medium Voltage Switchgear shall be mechanical-interlocked with earth switch and indication lights.

B. 中压电缆
   Medium Voltage Cable

1. 室外敷设的中压电缆须采用金属铠装耐火型电缆。室内敷设的中压电缆可采用普通耐火型电缆。
   Outdoor Medium Voltage cable shall be Fire Rated Armored type. Indoor Medium Voltage cable shall be normal Fire Rated Type.

8.5. 低压配电系统
LOW VOLTAGE DISTRIBUTION SYSTEM

8.5.1. 概要
General

A. 低压配电系统包括低压配电柜及配电箱、母线、谐波抑制器、功率因数补偿设备、低压配电电缆等。
The Low Voltage power distribution system includes LV Main Switchboard and distribution board, busduct, Harmonic Filter, Power factor correction equipment, LV Distribution cables and etc.

B. 照明用电、动力用电、消防用电应分别自成配电系统。
Lighting system loading, Mechanical equipment loading and Fire equipment loading shall be self-contained distribution system.

C. 冷冻机组及其配套水泵、冷却塔等大功率设备应由独立的动力负荷变压器组供电，以减少其启动时对照明负荷的影响。
Independent transformer shall be provided for high power equipment (such as chillers, pumps and cooling towers, etc) to reduce impact on the lighting load when started.

D. 变压器低压侧至用电设备之间的配电级数不宜超过三级。
Cascade levels of LV supply from transformer to equipment shall not be more than 3 steps.

E. 生活水泵房、制冷机房、厨房、餐厅、大堂、宴会厅、健身中心、洗衣房等大容量负荷采用放射式配电，消防用电设备应在末级配电箱位置进行两电源自动切换后再供电至设备。
Large Loads areas such as domestic water pump room, Chiller plant room, kitchen, dining hall, main lobby, ballroom, fitness center and laundry, etc shall be provided with radial type power distribution. Dual incoming power source with ATS Function shall be provided at distribution board serving Fire protection equipment.

F. 大型机房应设置独立的照明与动力配电箱，例如冷冻机房、生活水泵房、锅炉房、消防泵房、厨房、洗衣房、柴油发电机房等。
Large-scale equipment room such as chiller plant room, domestic water pump room, boiler room, fire sprinkler pump room, kitchen, laundry, diesel generator room, etc shall be provided with individual distribution switchboards for lighting and power outlet.

G. 酒店各功能区域应设置独立的照明配电箱。如大堂、宴会厅、餐厅、SPA 和桑拿、游泳池、酒吧等。
Hotel different function areas such as main lobby, ballroom, dining hall, SPA, sauna, swimming pool, bar, etc shall be provided with individual lighting distribution boards.

H. 方案阶段在无法获取相关机电条件情况下，酒店不同功能区域的照明与小动力的预留负荷密度可参考表 8-2 所示：
When no related ME information are available during Design stage, reserved Electrical load density for lighting and small power in different areas in Hotel shall refer to table 8.2.

表 8-2 各区域负荷密度参考值

Table 8-2 Electrical load density reference for different areas

序号 No.	区域 Area	用电容量 Load Consumption	备注 Remark
1	室内停车库 Indoor Carpark	15W/m²	
2	机电设备房 ME Plant Room	30W/m²	不含主设备用电 Excluding Main Equipment Power consumption
3	垃圾间 Trash collection area	5.5kW	
4	厨房 Kitchen	800~1200W/m²	详细数据由厨房顾问提供 Detailed data shall be provided by Kitchen Consultant
5	后勤区洗衣房 Laundry in BOH Area	120kW	详细数据由洗衣房顾问提供 Detailed data shall be provided by Laundry Consultant
6	布草间 Linen room	15kW	
7	员工办公室 Staff Office	40W/m²	
8	员工更衣室 Staff Changing Room	15W/m²	
9	服务通道 Service Corridor	25W/m²	
10	公共通道 Common Corridor	25W/m²	
11	酒店大堂 Hotel Lobby	70W/m²	
12	大堂吧 Lobby Bar	30kW	
13	前台 Front Desk	50W/m²	
14	展示厅 Exhibition Hall	80W/m²	
15	休息室 Lounge	30W/m²	
16	餐厅 Dining Hall	75W/m²	
17	宴会厅前厅 Pre-function ballroom	100W/m²	
18	宴会厅 Ballroom	150 ~250W/m²	另外预留200kW临时舞台用电，不计入变压器计算负载 Reserved 200kW for temporary stage, not calculate the load
19	宴会厅AV控制室 Ballroom AV control room	20kW	
20	会议室 Meeting Room	40 W/m²	

序号 No.	区域 Area	用电容量 Load Consumption	备注 Remark
21	健身房 GYM Room	80 W/m²	
22	SPA	200W/m²	
23	室内泳池机房 Indoor Swimming Pool machine room	30kW	
24	标准客房 Standard Room	3.5kW/间 3.5kW/Unit	
25	标准套房 Standard Suite	5.5kW/间 5.5kW/Unit	
26	总统套房 Presidential Suite	25kW/间 25kW/Unit	
27	行政酒廊 Club Lounge	50kW	
28	楼层客房服务区域 Guest Room Service Area	8kW/层 8kW/Floor	
29	泛光照明 Floodlight	100kW	

注：

Note:

①表中的用电容量指末端设备参考功率；

Load consumption shown in the table refers to equipment reference power.

②厨房设备主要采用燃气厨房设备，采用电气厨房设备需要增加厨房用电量；

Remark: Kitchen equipments are mainly Gas equipment, Electricity consumption will be high if use electricity type;

③需要系数和功率因素可参考《工业与民用配电设计手册》《民用建筑电气设计手册》与《全国民用建筑工程设计技术措施-电气》。

Demand coefficient and power factor can refer to《 Industrial and Civil distribution Design manual 》and 《Civil building electrical Design manual and Technical measures》.

8.5.2. 系统设计要求
System Design Requirement

A. 低压开关装置
Low Voltage Switchgear

1. 低压总进线断路器与母联断路器之间设置机械、电气联锁。每两台变压器的低压配电柜采取单母线分段运行，中间设联络开关（电气加机械联锁），平时分列运行，当一路主电源或主变压器失电或需停电检修时，通过断路器自动脱扣装置断开酒店保障负荷以外的负荷，中间联络开关自动闭合，保证酒店的保障负荷供电，并使总负载容量不超过变压器可承受的容量范围，酒店的保障负荷指 8.5.2 节中需由柴油发电机供电的负荷。
Mechanical and electrical interlocks shall be installed in-between main circuit breakers and

bus coupler. Each of the two incoming sections shall be operated separately with interlock (Mechanical and electrical interlock) under normal condition. When there is power failure or maintenance at one incoming power supply or transformer, bus coupler shall operate to serve essential loading and disconnect non-essential loading to ensure the total loading capacity less than transformer capacity. Essential loadings as stated in chapter 8.5.2 shall be served by standby diesel generator.

2. 配电房内低压配电柜的配置必须要有 20%的备用开关，低压配电柜防护等级不低于 IP3X。
   20% of spare circuit breakers shall be provided for LV Main Switchboard in Switch room. The IP grade shall not be lower than IP3X.

3. 每个配电箱内需至少预留 25%的回路开关，并且不少于 2 回路开关作为备用。配电箱的防护等级不低于 IP3X。
   At least 2 nos or 25% of the spare breakers shall be provided in distribution board. IP Grade for distribution board shall not be lower than IP3X.

B. 母线
   Bus Bar

1. 酒店客房层宜采用密集型插接式母线，不允许采用绝缘穿刺连接或电缆插接箱的方式。大容量的用电设备如冷水机组、风冷热泵建议采用密集型母线直接供电。
   Electrical supply distribution to Hotel Guest rooms level shall be by means of Vertical busduct system with tap-off units. No insulation puncture connection and cable tap off box is allowed. Compact busduct trunking system shall be used for power supply to large loads equipment such as chiller plant and Air-cooled heat pump, etc.

2. 由柴油发电机引至低压配电柜的母线应为耐火密集型母线槽或矿物绝缘电缆。
   Fire resistant compact busduct or Mineral insulated cable shall be used from Standby diesel generator to LV Main Switchboard.

3. 母线插接箱可配套各种型号的断路器，断路器开关具有过流、短路保护。
   Different types of circuit breakers with over current protection and short circuit protection shall be used in Busduct Tap-Off units.

C. 功率因数补偿
   Power Factor Correction

1. 校正后的变压器低压侧功率因数不低于 0.95，并需满足国家规范及地方标准要求。
   The corrected power factor at LV side of transformer shall not be lower than 0.95 and comply with National and Local standard design requirement.

2. 功率因数补偿设备的选择应考虑负载类型及谐波电流的影响。
   Load type (Inductive or Capacitive) and harmonic current shall be considered for Power factor correction equipment selection.

D. 低压配电电缆
   LV Distribution Cable

1. 低压配电电缆应满足表 8.3 要求.
   LV Distribution Cable shall comply with requirement as stated in Table 8.3.

表 8-3 低压电缆选型

Table 8-3 Type of LV Cable

序号 No.	供电区域	电缆型号 Voltage Range	备注 Remark
1	非消防用电的低压配电电缆 Non-Fire Protection Distribution Cable	无卤低烟A级阻燃交联聚乙烯绝缘聚烯烃护套电力电缆（WDZA-YJY） XLPE Type, Grade A, LSZH Flame Retardant Insulation Power Cable	
2	普通动力与照明电线 Normal Power and lighting cable	低烟无卤B级阻燃交联聚乙烯绝缘电线(WDZB-BYJ) XLPE Type, Grade B,LSZH Flame Retardant Insulation Power Cable	
3	消防用电的低压配电电缆 Fire Protection Distribution Cable	矿物绝缘型电缆(BTTE/YTTW)或无卤低烟耐火A级阻燃交联聚乙烯绝缘聚烯烃护套电力电缆(WDZAN-YJY)。 Mineral Insulated Cable or XLPE Type, LSZH Fire Rated PVC Insulation Power Cable.	
4	消防末端分支电线 Fire Protection final sub circuit cable	低烟无卤B级阻燃耐火交联聚乙烯绝缘电线(WDZBN-BYJ) LSZH, Flame Retardant, Fire Rated, PVC Insulation Power Cable	

2. 低压配电每根电缆应为一根中间无接头的电缆。在不可避免有接头时，电缆接头应按电缆制造商的标准要求制作连接头。
   LV Distribution cable shall be joint-free type without connector. Otherwise, the cable joint shall comply with cable manufacturer standard requirement when necessary.

3. 由变配电站低压配电柜配出的各种电缆，用电缆桥架经电力竖井及各层配电间，再分送至各用电点。其中消防线路、一级负荷配电线路应与普通负荷配电线路采用不同的金属线槽或金属桥架敷设，如需要合用线槽和桥架时，均须用金属隔板分隔。线槽和桥架应采用热浸镀锌钢材，禁止采用喷塑、电镀锌、静电喷涂、烤漆等钢材。
   Outgoing electrical cables from LV Main Switchboard shall be installed in cable trunking via electrical riser and distribution room to serve final distribution. Fire protection distribution and Cat 1 cables shall be installed in separate trunking or tray from the Normal power cable. Whereby shared trunking or tray is used, partition shall be provided within the trunking or tray to separate different type of cables. Trunking or tray shall be of hot dipped galvanized steel type. Spraying plastic, electric galvanize, electrostatic spraying or stove vanishing are not allowed.

4. 低压电缆穿管敷设时，于混凝土内的暗敷导管应采用 SC 焊接钢管或英标三级管，管壁厚度不小于 1. 5mm；非混凝土内的暗敷导管应采用英标三级管或 JDG 管，管壁厚

度不小于 1. 5mm；潮湿区域明敷导管(如地下室和水泵房、游泳池)应选用螺纹连接英标四级热浸镀锌钢导管；室外直埋导线管应选用应采用 SC 热镀锌焊接钢管或重型英标四级管；室内干燥区域明敷导线管宜选用英标三/四级管或 JDG 管。
Concealed conduit in concrete slab or wall for LV Cable shall be of SC Welded steel or BS Class type 3 and the thickness shall be at least 1.5mm; Concealed conduit in non-concrete or brick wall shall be of BS Class 3 or JDG type and the thickness shall be at least 1.5mm; Surface conduit for wet area(basement, pump room and swimming pool) shall be of Hot-dipped galvanized threaded, BS Class 4 type; Underground conduit for outdoor area shall be SC hot-dipped galvanized or Heavy duty BS Class 4 type; Surface conduit for indoor dry area shall be of BS Class 3/4 or JDG Type.

5. 穿导管的绝缘电线（两根除外），其总截面积（包括外护层）不应超过管内截面积的 40%。
Total cross-section area of the cables in conduit shall not be more than 40% of the conduit cross-section area.

6. 线槽内电线或电缆的总截面不应超过线槽内截面的 20%。控制、信号或与其类似的线路，电线或电缆的总截面不应超过线槽内截面的 50%。
Total cross-section area of the LV cables in conduit shall not be more than 20% of the conduit cross-section area. Total cross-section area of ELV Cable such as control cable and signal cable in conduit shall not be more than 50% of the conduit cross-section area.

7. 在电缆桥架上可以无间距敷设电缆。电力电缆的总截面不应大于桥架内截面的 40%，控制电缆不应大于桥架内截面的 50%。
Cables in trunking or tray can be zero-gap installed. Total cross section area of power cable shall be not more than 40% of the trunking or tray internal cross section area. Total cross section area for control cable shall be not more than 50% of the trunking or tray internal cross section area.

E. 低压配电计量：
Low Voltage Power Metering:

1. 计量采用智能计量电表，并接入 BA 系统或能源计量系统。
Intelligent meter shall be used for power monitoring and to be linked to BA system or energy metering system.

2. 以下区域应在低压柜出线回路或者在楼层配电箱设置分计量表：
Sub meters should be installed at the outgoing circuit or floor distribution board in following areas:

序号 No	**区域 Area**	**配电柜计量表 Metering at substation**	**区域配电箱计量 Metering at regional distribution panel**
1	大堂 Lobby		√
2	客房层 Guest floor	√	

序号 No	区域 Area	配电柜计量表 Metering at substation	区域配电箱计量 Metering at regional distribution panel
3	宴会厅/宴会前厅 Ballroom/Pre-function	√	
4	多功能厅/会议室 Function room/Meeting room	√	
5	商务中心 Commercial center		√
6	所有客人餐厅/员工餐厅 All guest restaurant/ staff kitchen		√
7	水疗/桑拿 SPA/Sauna		√
8	游泳池照明 Pool lighting		√
9	游泳池循环系统 Pool circulation system	√	
10	健身房 Fitness center		√
11	酒吧/大堂吧 Bar/Lobby bar		√
12	精品店/礼品店 Sundries/Gift Shop		√
13	美容美发店 Salon		√
14	电梯 Elevator	√	
15	自动扶梯 Escalator	√	
16	制冷机房 Chiller room		
17	生活水泵房 Dosmectic water pump room	√	
18	锅炉系统 Boiler system	√	
19	生活热交换机组 Domestic Heat exchange unit	√	
20	空调热交换机组 Air heat exchange unit	√	
21	空调机组 AHU, PAU	√	

序号 No	区域 Area	配电柜计量表 Metering at substation	区域配电箱计量 Metering at regional distribution panel
22	厨房 Kitchen		
23	洗衣房 Laundry	√	
24	停车场 Parking lot	√	
25	室外泛光照明 Outdoor lighting	√	
26	室外景观照明 Outdoor landscape lighting	√	
28	供电至其它物业馈线 Power supply to other properites	√	

8.5.3. 技术说明及应用指导
Specifications and Application Guides

A. 变压器
Transformer

1. 变压器须为干式变压器，变压器需选用 SCB10 或能耗更低的变压器。
Transformer shall be dry type and the model shall be SCB 10 or lower energy consumption type.

2. 变压器须具有强迫风冷功能，变压器的外壳防护等级为 IP3X。
Transformer shall be provided with Forced air cooling function and its casing IP Grade shall be IP3X.

3. 每台变压器的负载率不应超过 80%。
Each transformer loading ratio shall not be more than 80%.

4. 变压器须具有高温、超温报警，并与中压开关设备的综合保护装置相连。
High and over temperature alarm devices shall be installed for transformer, and shall be linked with integrated protection devices.

5. 变压器的初级和次级线圈的绝缘等级不低于 H 级。
Insulation class for transformer primary and secondary coil shall not be lower than Class H.

6. 变压器绕组的接线方式应为 Dyn-11 型。变压器的分接头调压范围为±2x2.5%Ue。
Connection mode for transformer shall be Dyn-11. The regulating range of tap changer shall be ±2x2.5%Ue.

7. 变压器的导体材料应为电气级铜，变压器的铁心应为高磁导率冷轧取向硅钢片。
Transformer conductor shall be electrical grade copper. Transformer core shall be high magnetic conductivity cold-rolled grain oriented silicon steel.

B. 低压开关装置
Low Voltage Switchgear

1. 低压开关装置包括变配电房的低压配电柜、低压配电箱及配电控制箱。
LV Switchgear shall include LV Main Switchboard in substation and sub distribution boards and control panels.

2. 低压配电房中由柴油发电机供电的开关柜一般为集中布置，以便于在两路市政断电时自动切换至柴油发电机供电。
Standby diesel Generator control panel shall be centralized in the LV Main Switch room for Auto transfer to emergency power supply when there is power failure at both sides of the 2 incoming municipal power supplies.

3. 低压配电柜应在电气成套厂完成生产并通过国家规定的相关测试。不接受现场组装。
LV Switchboard shall be manufactured and assembled by Switchboard manufacturer with related testing approval by National standard in manufacture factory. Field assembly is not allowed.

4. 低压开关装置中 630A 以上的断路器，须采用框架式断路器，630A 及以下的断路器采用塑壳型断路器。低压配电柜内断路器应采用电子式脱扣器。
Air Circuit Breaker shall be used for breaking capacity above 630A and installed with electrical tripping unit. Molded Case Circuit Breaker shall be used for breaking capacity at 630A and below. Electrical tripping unit shall be used for the circuit breakers in LV Distribution Board.

5. 低压开关装置内的电缆和开关要有清晰的标识。
Cables and breakers in LV Switchgear shall be labeled clearly.

6. 配电箱采用双门设计，外侧门打开时，可操作断路器，但不会碰到带电的端子。内侧门可采用透明的塑胶门，有利于在门外看到全部终端的热成像从而有助于日常检查松开的终端。
Distribution Boards shall be two-layer door type. Circuit breaker shall be operable without touching any live part when the external door is open. Internal door shall be transparent insulating plastic type for thermal imaging check on any lose connection.

7. 电动机容量在 15kW 以下时，应采用直接启动；电动机容量在 15kW 及以上应采用降压启动。
Direct on line (DOL) start shall be used for motor capacity lower than 15kW; Reduction Voltage Starting shall be used for motor capacity at 15kW and above.

8. 消防水泵及喷淋泵严禁采用变频控制装置和软启动。
Variable frequency control device and soft start shall not be used for fire pump or sprinkler pump.

C. 母线
Bus Bar

1. 母线的导体材料需为电气级铜，并需镀银处理。
   Busduct conductor material shall be electrical grade copper with silver tinning.

2. 安装于室外和潮湿地方的母线槽防护等级为 IP65。安装于变配电房、强电井的母线槽防护等级不低于 IP42。
   IP Grade for Busduct installed at outdoor and wet areas shall be IP65. IP Grade for Busduct installed in substation, Electrical Riser shall not be lower than IP42.

3. 母线须成套由专业厂家设计及制造，母线必须通过国家认可的型式测试。
   Busduct shall be designed and manufactured by qualified manufacturers accepted by National test standard.

4. 母线插接箱具有机械连锁，以防止插接箱开关在“闭合”位置时抽出，插接箱需加一接地设备，当插进母线时，该接地设备须先与母线接地接触。
   Mechanical interlock shall be provided to prevent plug-in unit be extracted when the interlock is in the “Close” position. Earth protection device shall be provided and connected to the busduct earth when plugged in.

5. 母线槽插接箱的接触头须镀银处理。箱体防护等级为 IP30。
   Plug-in unit connector shall be silver tinned. IP Grade for casing shall be IP30.

6. 插接箱带内部连锁机构，在带电运行的情况下，箱门打开时，机构会自动切断保护开关的电源。
   Plug in unit shall have internal interlock and will operate to cut off the supply when the door of the plug in unit is opened.

D. 功率因数补偿
   Power Factor Correction

1. 功率因数补偿设备安装于低压配电柜处。
   Power factor correction equipment shall be installed in LV Switchgear.

2. 功率因数补偿设备为成套的智能型免维护移相式静电电容补偿装置，补偿方式需是单相补偿和三相补偿并用。电容器组具备自动过零投切、分相补偿等功能。主要设备为电容器串联电抗器，电容器以 25kVAr 至 30kVAr 为一级来转换。
   Power factor correction equipment shall be phase-shifting static capacitor compensator with the function of single and three phase compensation. The compensator shall have the function of zero-off switching and phase compensation, etc. Integral part of the compensator shall be capacitor and reactor which linked in series. Transition for capacitor shall be 25kVAr to 30kVAr per step.

E. 谐波抑制器
   Harmonic Filter

1. 宴会厅 AV 控制设备配电箱应设置有源滤波器；
   Active power filter shall be provided for AV Electrical Distribution Board in Ballroom

2. 酒店调光系统应自带谐波抑制器；
   Harmonic Filter shall be provided for Hotel lighting dimming system

3. 变频器应采用谐波率低的变频器；
   AC drives shall be low harmonic type.

8.6. 备用电力系统
EMERGENCY POWER SUPPLY

8.6.1. 概要
General

A. 备用电力系统主要包含柴油发电机系统、UPS 系统和 EPS 系统。
   Emergency power system mainly includes diesel generator system, UPS system and EPS System.

B. 在火灾或平时酒店全部市政进线电源断电或给柴油发电机所连接的低压母线段供电的 2 台变压器同时故障时柴油发电机系统自动启动并供电，柴油发电机的常载容量应可满足本标准所要求的由柴油发电机供电的负载容量。
   The diesel generator system shall start and provide electricity supply when Fire, normal municipal power failure or fault on Transformers. The system capacity shall comply with the design standard requirement.

C. 柴油发电机不允许和市电并列运行。
   Diesel generator shall not operate in parallel with municipal power supply.

8.6.2. 系统设计要求
System Design Requirement

A. 柴油发电机和控制装置
   Diesel Generator and Control Device

1. 应提供单独的柴油发电机给酒店使用。柴油发电机常载容量计算时至少需预留 20% 的余量。
   A Standalone diesel generator shall be provided for Hotel. The generator capacity calculation shall consider 20% spare capacity.

2. 平时酒店全部市政进线电源断电时自动启动并给酒店保障负荷供电，若出现火灾状况时，通过各配电箱的断路器分励脱扣装置切除所有非消防电源。
   Generator shall Auto start to supply power for Hotel essential equipment when normal municipal power supply failures. Non-fire protection equipment shall be isolated by shunt trip devices in distribution boards under fire condition.

3. 柴油发电机作为酒店后备电源，酒店有两路及两路以上市政电源进线时，应由柴油发电机供电的负载如表 8.4 所示：
   When two or more municipal power sources are available, the standby diesel generator shall serve the essential loads, see table 8.4:

表 8-4 柴油发电机供电的负载

Table 8-4 Essential loads served by standby diesel generator

序号 No.	设备类型 Equipment	市电平时停电 Normal Municipal power failure		市电停电且发生火灾 Normal Municipal power failure with Fire Occurrence		EPS
		需计算负荷 Load calculation needed	保持供电 Keep power supply	需计算负荷 Load calculation needed	保持供电 Keep power supply	
1	**普通重要动力负荷** Essential Power loading					
1.1	移动覆盖通信机房总配电箱 Mobile coverage communications room distribution box	√	√			
1.2	有线电视/卫星天线机房总配电箱 CATV /SATV room distribution box	√	√			
1.3	停车场管理系统总配电箱 Carpark Barrier System	√	√			
1.4	所有其它弱电系统与楼层设备(含所有 DDC) Other ELV system and floor equipment（including DDC）	√	√			
1.5	有线电视/卫星天线机房空调 CATV /SATV room air conditioner	√	√			
1.6	电梯机房空调 Elevator room air conditioner	√	√			
1.7	所有收银机/ATM 机 All cash register/ATM equipment	√	√			
1.8	冷库自带冷机 Cold storage	√	√			
1.9	冷库冷却塔 Cold storage cooling tower	√	√			
1.10	冷库循环泵 Cold storage pumps	√	√			
1.11	厨房排油烟风机/风罩 Kitchen range hood fan	√	√			

序号 No.	设备类型 Equipment	市电平时停电 Normal Municipal power failure		市电停电且发生火灾 Normal Municipal power failure with Fire Occurrence		EPS
		需计算负荷 Load calculation needed	保持供电 Keep power supply	需计算负荷 Load calculation needed	保持供电 Keep power supply	
1.12	生活水泵房总动力配电箱 Domestic water pumps distribution boards	√	√			
1.13	锅炉房总动力配电箱 Boiler room distribution boards	√	√			
1.14	生活热交换机房总配电箱 Domestic hot water exchanger room distribution boards	√	√			
1.15	其它生活冷热水系统设备 Other domestic hot water system equipment	√	√			
1.16	供应大堂、大堂吧、全日餐厅、宴会厅、会议室、总统套房和行政酒廊的新风机组 PAU for lobby, lobby bar, all-day dining, ballroom, meeting room, presidential suites and executive lounge	√	√			
1.17	免费冷却水系统(含冷却塔和循环泵) Free cooling system (including the cooling tower and the circulating pump)	√	√			
1.18	所有排水泵 All sump pumps	√	√			
1.19	所有污水提升装置 All ejector pumps	√	√			
1.20	所有客梯 All passenger Elevators	裙房和塔楼各一部 One for podium and one for tower block	√		√	

序号 No.	设备类型 Equipment	市电平时停电 Normal Municipal power failure		市电停电且发生火灾 Normal Municipal power failure with Fire Occurrence		EPS
		需计算负荷 Load calculation needed	保持供电 Keep power supply	需计算负荷 Load calculation needed	保持供电 Keep power supply	
1.21	所有服务梯 All service Elevators	裙房和塔楼各一部 One for podium and one for tower block	√		√	
1.22	宴会厅 AV 控制室设备 AV control equipment for ballroom		√			
1.23	所有自动扶梯 All escalators		√			
2	**消防动力负荷** **Fire Fighting power loading**					
2.1	变配电室总配电箱 LV Switch room Main LV switchboard	√	√	√	√	
2.2	柴油发电机房总配电箱 diesel generator room distribution boards	√	√	√	√	
2.3	消防控制/安保中心总配电箱 Fire command room/Security center distribution boards	√	√	√	√	
2.4	消防控制/安保中心机房空调 Fire command room/Security center air conditioner	√	√	√	√	
2.5	IT/PABX 机房总配电箱 IT/PABX room distribution boards	√	√	√	√	
2.6	IT/PABX 机房空调 IT/PABX room air conditioner	√	√	√	√	
2.7	所有消防电梯 All firemen Elevators	√	√	√	√	
2.8	所有消防泵 All fire Pumps		√	√	√	
2.9	所有消防风机 All smoke control and extraction fans		√	√	√	

序号 No.	设备类型 Equipment	市电平时停电 Normal Municipal power failure		市电停电且发生火灾 Normal Municipal power failure with Fire Occurrence		EPS
		需计算负荷 Load calculation needed	保持供电 Keep power supply	需计算负荷 Load calculation needed	保持供电 Keep power supply	
2.10	所有事故风机 All accident emergency fans		√		√	
2.11	所有气体灭火系统 All gas fire extinguishing system		√	√	√	
2.12	所有大空间灭火系统 All large space fire extinguishing system		√	√	√	
2.13	所有防火卷帘 Electrical fire curtains		√	√	√	
3	**保障照明负荷**					
3.1	酒店前台和前台办公室照明和小动力 Lighting and outlet of front desk and front office	√	100%回路 100% Circuit		100%回路 100% circuit	100%回路 100% circuit
3.2	总经理办公室照明和小动力 Lighting and outlets of manager office	√	100%回路 100% Circuit		15%回路 15% circuit	15%回路 15% circuit
3.3	总统套房照明和小动力 Lighting and outlets of presidential suites	√	100%回路 100% Circuit		15%回路 15% circuit	15%回路 15% circuit
3.4	生活水泵房/污水泵房照明 Domestic water pump room/sump pump room lighting	√	100%回路 100% Circuit		15%回路 15% circuit	15%回路 15% circuit
3.5	中水机房照明（若有） Reclaimed water treatment station lighting	√	100%回路 100% Circuit		15%回路 15% circuit	15%回路 15% circuit
3.6	AV 控制室照明 AV control room lighting	√	100%回路 100% Circuit		100%回路 100% circuit	100%回路 100% circuit
3.7	热交换机房照明 Hot water exchange room lighting	√	100%回路 100% Circuit		15%回路 15% circuit	15%回路 15% circuit
3.8	锅炉房照明 Boiler room lighting	√	100%回路 100% Circuit		15%回路 15% circuit	15%回路 15% circuit
3.9	医务室照明 Infirmary lighting	√	100%回路 100% Circuit		100%回路 100% circuit	100%回路 100% circuit
3.10	电梯机房与轿厢照明 Elevator equipment room	√	100%回路 100% Circuit		100%回路 100% Circuit	100%回路 100% circuit

序号 No.	设备类型 Equipment	市电平时停电 Normal Municipal power failure		市电停电且发生火灾 Normal Municipal power failure with Fire Occurrence		EPS
		需计算负荷 Load calculation needed	保持供电 Keep power supply	需计算负荷 Load calculation needed	保持供电 Keep power supply	
	and car lighting					
3.11	所有厨房冷库照明 All kitchen cold storage lighting	√	100%回路 100% Circuit		100%回路 100% Circuit	100%回路 100% Circuit
3.12	大堂和大堂吧照明 Lobby and lobby bar lighting	√	30%回路 30% circuit		15%回路 15% circuit	15%回路 15% circuit
3.13	宴会厅照明 Ballroom lighting	√	30%回路 30% circuit		15%回路 15% circuit	15%回路 15% circuit
3.14	宴会前厅照明 Pre-function ballroom lighting	√	30%回路 30% circuit		15%回路 15% circuit	15%回路 15% circuit
3.15	全日餐厅照明 All-day dining restaurant lighting	√	30%回路 30% circuit		15%回路 15% circuit	15%回路 15% circuit
3.16	会议室/多功能厅照明 Meeting/function room lighting	√	30%回路 30% circuit		15%回路 15% circuit	15%回路 15% circuit
3.17	SPA 包房和健身中心 SPA room and fitness center lighting	√	30%回路 30% circuit		15%回路 15% circuit	15%回路 15% circuit
3.18	行政酒廊照明 executive lounge lighting	√	30%回路 30% circuit		15%回路 15% circuit	15%回路 15% circuit
3.19	客梯电梯厅照明 Guest Elevator lobby lighting	√	30%回路 30% circuit		15%回路 15% circuit	15%回路 15% circuit
3.20	客房走廊照明 Guestroom corridor lighting	√	30%回路 30% circuit	√	30%回路 30% circuit	30%回路 30% circuit
3.21	前场区其余照明 Other FOH area lighting	√	30%回路 30% circuit		15%回路 15% circuit	15%回路 15% circuit
3.22	制冷机房照明 Chiller room lighting	√	30%回路 30% circuit		15%回路 15% circuit	15%回路 15% circuit
3.23	游泳池机房照明 Pool equipment room lighting	√	30%回路 30% circuit		15%回路 15% circuit	15%回路 15% circuit
3.24	厨房照明 Kitchen room lighting	√	30%回路 30% circuit		15%回路 15% circuit	15%回路 15% circuit
3.25	洗衣房照明 Laundry lighting	√	30%回路 30% circuit		15%回路 15% circuit	15%回路 15% circuit

序号 No.	设备类型 Equipment	市电平时停电 Normal Municipal power failure		市电停电且发生火灾 Normal Municipal power failure with Fire Occurrence		EPS
		需计算负荷 Load calculation needed	保持供电 Keep power supply	需计算负荷 Load calculation needed	保持供电 Keep power supply	
3.26	办公室照明 Office lighting	√	30%回路 30% circuit		15%回路 15% circuit	15%回路 15% circuit
3.27	停车库照明 Car parking lighting	√	20%回路 20% circuit		10%回路 10% circuit	10%回路 10% circuit
3.28	其它设备机房 Other equipment room	√	20%回路 20% circuit		10%回路 10% circuit	10%回路 10% circuit
3.29	后场区其余有人长期逗留房间照明 Long-term stay room of BOH lighting	√	20%回路 20% circuit		10%回路 10% circuit	10%回路 10% circuit
4	**消防照明负荷** Fire lighting					
4.1	疏散楼梯间/防烟楼梯间/前室照明 Fire staircase/ smoke control staircase/front room lighting	√	100%回路 100% circuit	√	100%回路 100% circuit	100%回路 100% circuit
4.2	消防电梯前室照明 Fire Elevator front room lighting	√	100%回路 100% circuit	√	100%回路 100% circuit	100%回路 100% circuit
4.3	后勤走廊照明 BOH corridor lighting	√	15%回路 15% circuit	√	15%回路 15% circuit	15%回路 15% circuit
4.4	其它疏散通道照明(11lux) Other evacuation aisle lighting (11lux)	√	100%回路 100% circuit	√	100%回路 100% circuit	100%回路 100% circuit
4.5	前场区/后场区有人活动区域照明(11lux) Active area of FOH and BOH (11lux)	√	100%回路 100% circuit	√	100%回路 100% circuit	15%回路 15% circuit
4.6	客房内一盏应急照明灯 One emergency light in guestroom	√	100%回路 100% circuit	√	100%回路 100% circuit	100%回路
4.7	消防与控制中心照明 Fire control center lighting	√	100%回路 100% circuit	√	100%回路 100% circuit	100%回路
4.8	变配电室照明 Substation room lighting	√	100%回路 100% circuit	√	100%回路 100% circuit	100%回路
4.9	柴油发电机房/储油间照明 Diesel generator room / oil storage room lighting	√	100%回路 100% circuit	√	100%回路 100% circuit	100%回路
4.10	消防泵房照明 Fire pump room lighting	√	100%回路 100% circuit	√	100%回路 100% circuit	100%回路

序号 No.	设备类型 Equipment	市电平时停电 Normal Municipal power failure		市电停电且发生火灾 Normal Municipal power failure with Fire Occurrence		EPS
		需计算负荷 Load calculation needed	保持供电 Keep power supply	需计算负荷 Load calculation needed	保持供电 Keep power supply	
4.11	IT 通信机房/程控交换机房照明 IT/PABX room lighting	√	100%回路 100% circuit	√	100%回路 100% circuit	100%回路
4.12	话务员室照明 Attendant room lighting	√	100%回路 100% circuit	√	100%回路 100% circuit	100%回路
4.13	工程部照明 Engineering office lighting	√	100%回路 100% circuit	√	100%回路 100% circuit	30%回路 100% circuit
4.14	保安部办公室照明 Security office lighting	√	100%回路 100% circuit	√	100%回路 100% circuit	100%回路 100% circuit
4.15	避难层照明(若有) Refuge floor lighting (if any)	√	100%回路 100% circuit	√	100%回路 100% circuit	100%回路 100% circuit
4.16	航空障碍灯照明(若有) Aviation obstacle lighting (if any)	√	100%回路 100% circuit	√	100%回路 100% circuit	100%回路 100% circuit
4.17	屋顶直升飞机停机坪照明(若有) The helicopter apron lighting on the roof (if any)	√	100%回路 100% circuit	√	100%回路 100% circuit	100%回路 100% circuit
4.18	防排烟机房照明 smoke control and extraction fan room lighting		100%回路 100% circuit	√	100%回路 100% circuit	100%回路 100% circuit
4.19	消防电梯机房照明 Fire Elevator equipment room lighting		100%回路 100% circuit	√	100%回路 100% circuit	100%回路 100% circuit
4.20	气体灭火系统钢瓶间照明 Gas fire extinguishing system room lighting		100%回路 100% circuit	√	100%回路 100% circuit	100%回路 100% circuit
4.21	强电间照明 Electrical Riser lighting		100%回路 100% circuit	√	100%回路 100% circuit	100%回路 100% circuit

4. 若当地仅有一路电源供给时，柴油发电机常载容量需满足酒店全部实际负荷的供电要求。
   Where only one municipal power supply is available, the standby diesel generator capacity must be able to meet with the Hotel Total Power Load requirement.

5. 柴油发电机房应尽量靠近变配电房，并且需要有便利的运输通道。
   Generator room shall be near to substation with clear transport passageway.

6. 一般情况下，柴油发电机在燃料供应可靠的区域时应储存柴油发电机全负荷连续运行 24 小时的燃料。在燃料供应不可靠的区域时须提供柴油发电机储油量分析报告给

希尔顿全球审批确定，并且不少于柴油发电机全负荷连续运行 48 小时的燃料。
Wherever areas that have reliable sources of fuel availability, 24 hours of fuel storage shall be provided for Generator to operate under full load condition. Otherwise, a feasibility study shall be submitted to Hilton Worldwide for approval, all but not less than 48 hours of fuel storage shall be provided.

B. 不间断电力供应系统
Uninterruptible Power Supply System

1. 提供不间断电电源给不允许断电的负载使用。酒店运营管理用电脑、所有服务器、收银机系统、程控交换机、BAS、电视机房、消防控制中心、消防广播、监控系统等设置就地 UPS 电源。当 UPS 和应急发电机相连时，应能够保证 1 小时的供电时间，当 UPS 没有和发电机相连时，应能够保证至少 4 小时的供电时间。
Localized Uninterrupted power supply shall be provided for essential equipment such as Hotel operation management computers, all IT servers, POS system, PABX System, BAS System, Communication room, fire command centre, Emergency voice broadcast and Security monitoring system, etc. When UPS is connected via Emergency power source, the UPS shall provide at least 1 hour of continuous power supply, otherwise, the backup time shall be at least 4 hours.

C. 应急电力供应系统（EPS）
Emergency Power Supply System (EPS)

1. 应急照明及疏散指示标志均由集中式 EPS 供电，EPS 电源接自应急配电箱供电。EPS 的蓄电池初装容量，应保证备用时间不小于 90min。
Emergency lightings and exit lightings shall be served by EPS which shall be linked to Emergency switchboard for power supply. Battery capacity of the EPS shall be sufficient for back up time of at least 90mins.

8.6.3. 技术说明及应用指导
Specifications and Application Guides

A. 柴油发电机和控制装置
Diesel Generator and Control Device

1. 柴油发电机应能在全部市政电源断电后的 15 秒内自动起动及电源自动切换，并供电给接自柴油发电机的负载。在市政电源恢复后，所有负载将被自动切换回市政电源供电，柴油发电机在冷却后自动停车。
When all municipal power supply fails, the emergency load shall be transferred to the Generator within 15sec by the auto transfer switch. When the normal power supply is restored, the auto transfer switch shall then operate and switch back to normal power source. Diesel generator shall stop running after cooling down time.

2. 柴油发电机启动信号取柴油发电机应急电源转换开关和变压器低压侧总进线开关，当检测到变压器低压侧总进线开关无电压信号或电源转换开关主供电回路无电压信号时，自动启动柴油发电机电源。
Diesel generator starting signal cabling shall be linked via auto transfer switch and LV Main switchboard incoming circuit breaker. Once no voltage signal is detected from main circuit breaker or auto transfer switch, the diesel generator shall be initiated.

3. 柴油发电机应该在 1500 转/分的正常全负荷运行，其输出功率的功率因数应不低于 0.8。
   Diesel generator rotating speed shall be 1500 rpm under full load and the power factor shall not be less than 0.8.

4. 柴油发电机应配备电子调速器，可满足在正常运行状况下将频率维持在额定频率的±0.25%以内。
   Electronic speed governor shall be installed for diesel generator to maintain the rated frequency within the range of ±0.25%.

5. 柴油发电机组应配备住宅型消音器，消音器应安装在带有隔振器的垫板上，从而能够限制噪声的传递。在排气口 3m 处测量的噪音量不超过 65dBA 或当地法规规定的更低水平。
   Residential type silencer shall be installed with vibration isolator to limit the noise transmission. Noise level at 3 meter away from the exhaust opening shall be less than 65dBA or lower level as stated in local regulation.

B. 不间断电力供应系统
   Uninterruptible Power Supply System

1. UPS 应该是在线式，由整流器、逆变器和电池组成。
   UPS shall be on-line type which includes rectifier, inverter and battery.

2. UPS 具有以下运行模式：
   UPS operation mode as below:

3. 正常模式：UPS 用于向负载提供精密的和没有瞬变的电力。输入电源通过整流器整流后给蓄电池充电，同时再通过逆变器变化为交流电给负载供电。
   Normal mode: UPS shall provide precise and no transient to the supply loads. Part of the incoming power shall be used for battery charging by rectifier and the rest shall be converted to AC Power to serve loading by the inverter.

4. 紧急模式：在正常输入电源断电时， UPS 的蓄电池自动经逆变器变化为交流电给负载供电。
   Emergency mode: When normal power failures, UPS Battery shall serve the linked supply loads with converted AC Power by inverter.

5. 旁通模式：UPS 发生故障时，通过一个静态快关自动转换为由输入电源直接给负载供电。
   Bypass mode: Static switch shall operate to transfer supply loads directly to incoming normal power source when there is failure to UPS.

6. UPS 具有欠电压和过电压保护功能。
   Under-voltage and over-voltage protection function shall be provided for UPS.

8.7. 照明系统
LIGHTING SYSTEM

8.7.1. 概要
General

A. 照明系统是酒店内的主要耗电系统之一。照明系统由照明灯具、连接电线、及灯具控制开关组成。酒店照明系统分为普通照明、事故应急照明和消防应急照明。
Lighting system is the major electricity consumption system in Hotel which comprises of Light fixture, connecting cable and lighting control switch. Hotel lighting can be separated as normal lighting, emergency lighting and fire emergency lighting.

B. 普通照明指酒店正常运营时所需的照明；事故应急照明指市政停电时保证人员安全活动所需的照明；消防应急照明指消防时保证人员安全疏散所需的照明。
Normal Lighting refers to lighting required for Hotel normal operation; Emergency lighting refers to security activity lighting required when normal power failure; Fire emergency lighting refers to Fire safety evacuation lighting.

8.7.2. 系统设计要求
System Design Requirement

A. 酒店各区域最低照度要求如表 8-5 所示：
Table 8.5 provides the minimum lux levels requirement for hotel different areas:

表 8-5 各区域最低照度值
Table 8-5 the minimum lux levels of hotel different areas

序号 NO.	区域 AREA	照度（LUX） LUX	备注 REMARK
1	**室外停车场** **OUTDOOR CARPARK**		
1.1	入口 Entrance	100	
1.2	车道 Driveway	20	
1.3	车位 Parking Lot	20	
2	**室内停车场** **INDOOR CARPARK**		
2.1	入口 Entrance	100	
2.2	车道 Driveway	75	
2.3	车位 Parking Lot	100	
3	**客区** **GUEST AREA**		
3.1	主入口 Main Entrance	200	
3.2	大堂 Lobby	200	
3.3	服务台 Service desk	300	
3.4	客人活动区 Guest Activity Area	100	
3.5	客房入口处的客房走廊 Corridor near guestroom entrance	150	

序号 NO.	区域 AREA	照度（LUX） LUX	备注 REMARK
3.6	休息室 Lounge	200	
3.7	休息室服务台 Lounge service desk	300	
3.8	出口楼梯间 Exit Staircase	200	
4	**餐饮区** **DINING AREA**		
4.1	餐厅 Dining Hall	100	
4.2	餐厅服务区 Dining hall service area	500	
4.3	酒廊/酒吧 Bar	50	
4.4	咖啡厅 Coffee shop	300	
4.5	行政酒廊 Club Lounge	300	
5	**商业设施** **COMMERCIAL FACILITIES**		
5.1	杂货/礼品店 Grocery Store/Gift shop	300	
5.2	商务中心 Business center	500	
5.3	客用洗衣房 Guest Laundry	300	
5.4	自动售货间 Vending Room	300	
5.5	美容美发间 Hairdressing Beauty	400	
5.6	SPA（调光） SPA (Dimmable Light)	50	
6	**会议设施** **CONFERENCE FACILITIES**		
6.1	宴会前厅 Ballroom foyer	300	
6.2	宴会厅 Ballroom	350	
6.3	会议室 Meeting Room	500	
7	**娱乐区** **ENTERTAINMENT AREA**		
7.1	室内游泳池 Indoor Swimming Pool	300	
7.2	室外游泳池 Outdoor Swimming Pool	50	
7.3	更衣室 Changing Room	200	

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序号 NO.	区域 AREA	照度（LUX） LUX	备注 REMARK
7.4	更衣室（服务台） Changing Room(Service Desk)	300	
7.5	室外跑步操场 Stadium	20	
7.6	健身中心 Fitness Center	400	
8	**客房** **GUESTROOM**		
8.1	地面 Floor	100	
8.2	床头 Bed	300	
8.3	书桌台 Desk Table	300	
8.4	座椅 Chair	300	
8.5	壁橱 Cabinet	300	
9	**客房浴室** **GUEST BATHROOM**		
9.1	梳妆台 Dresser	500	
9.2	浴缸/淋浴（浴帘封闭） Bathtub/Shower (Enclosed Curtain)	50	
9.3	座便器区 Water Closet Area	200	
10	**后勤区** **BACK OF HOUSE AREA**		
10.1	办公室 Office	500	
10.2	服务通道 Service Tunnel	200	
10.3	厨房 Kitchen	300	
10.4	员工休息区 Staff Lounge Area	300	
10.5	储藏室 Store	200	
10.6	洗衣房 Laundry	400	
10.7	工程部办公室 Engineering Department Office	500	
10.8	机电房 ME Room	300	
10.9	电脑房 Computer Server Room	300	
10.10	布草房 Linen Room	300	

序号 NO.	区域 AREA	照度（LUX） LUX	备注 REMARK
10.11	收货/垃圾区 Loading/Unloading Area	200	

B. 精装区域照明系统应由建筑师、专业的照明顾问、室内设计师、机电顾问及设计院相互协作来选择灯具样式和定位灯具。
ID areas lighting shall be design by architect, professional lighting consultant and interior designer, ME consultant and Design Institute shall coordinate all the lighting selection and location.

C. 楼梯间采用二路独立的照明，其中一路照明灯需满足本标准对楼梯间照度的要求，采用声光控制，并且消防时强制点亮；另一路灯设置于楼梯出口处，常亮，照度不低于 11lux。
Two separate lighting controls shall be provided for staircase lighting. One group of light shall be provided to meet with staircase lux level requirement with sound and light control. All the lights in this group shall be forced on under fire condition. The other group shall be 24-Hour lighted and installed near staircase exit door with minimum level of 11lux.

D. 除设备机房区可采用自带蓄电池灯具或者双头应急灯以外，其余区域应急照明采用集中 EPS 供电；超高层建筑或者其它功能复杂综合体建筑宜设置智能应急照明系统，灯具具有巡检功能，以便于及时查询故障状态。
All other areas emergency lights shall be supported by EPS. As for ME plant rooms, lightings, it can be fitted with emergency battery pack or two-headed emergency lights can be used. Intelligent emergency lighting systems with monitoring capability to detect faulty lighting shall be installed in ultra-high-rise buildings or other functional complexity complex buildings.

E. 景观照明应与所在区域整体光环境及街区照明协调，应采用长寿命、高光效光源和高效灯具。需预留景观、泛光照明的用电。
Landscape lighting shall be harmonious with entire light environment and street lighting. Long-life and high light efficiency light fittings shall be selected. Power supply to landscape lighting and floodlighting shall be provided.

8.7.3. 技术说明及应用指导
Specifications and Application Guides

A. 灯具
Lighting Fixture

1. 所有荧光灯应采用 T5 超细支管荧光灯，光效不低于 90lm/W。相邻的荧光灯应该由不同的相位电路供电以避免频闪效应。
The fluorescent lamps should be T5 superfine tube fluorescent, and the efficiency of fluorescent should be not less than 90lm/W. Separate circuits shall be provided for adjacent fluorescent lamps to avoid stroboscopic effect.

2. 装饰性灯具需根据功能和美学要求来选择，并需经过建筑师和室内设计师的同意。
Decorative light selection shall base on performance and aesthetics and approved by architect and interior designer.

3. 由于实际产生的流明、颜色的变化、具体的开氏温度、设计关系和美学上存在巨大差异，因此需要提交所选择的灯具类型以进行审查和书面批准。在客人区的所有灯具必须为由开氏温度决定的一致的灯光颜色。客人区标准的色温是 2700 开氏度，除

非另有其它批准。
Submit selected fixture types for review and written approval due to wide differences in actual lumens produced, color variations, specific Kelvin temperature, design relationship and aesthetics. All light fixtures in guest areas must have a consistent light color determined by the Kelvin temperature. The standard color temperature for guest areas is 2700 Kelvin unless approved otherwise.

B. 照明控制系统
Lighting Control System

1. 各区域照明控制开关设置如表 8-6 所示。
Table 8-6 provides the lighting control switches of each functional area.

表 8-6 各区域照明控制要求
Table 8-6 Lighting control switch requirement of Hotel different areas

序号 No.	区域 Area	照明控制要求 Lighting control requirement	备注 Remark
1	室外照明 Outdoor lighting	分区控制，连接到BA系统 Zoning control and linked to BA System	
2	服务走廊 Service corridors	连接到BA系统 Linked to BA system	
3	大堂 Lobby	开关控制或调光控制 Switch control or Dimming control	
4	公共卫生间 Communal Toilet	连接到BA系统控制 Linked to BA system	
5	厨房 Kitchen	就地墙面开关 Local switches control	
6	餐厅 Restaurant	调光控制 Dimming control panel	
7	酒吧 Bar	调光控制 Dimming control panel	
8	咖啡厅 Cafe	调光控制 Dimming control panel	
9	宴会前厅 Pre-function ballroom	调光控制 Dimming control panel	
10	宴会厅 Ballroom	调光控制 Dimming control panel	
11	会议室 Meeting room	调光控制 Dimming control panel	
12	健身中心 Fitness center	开关控制。开关设于客人无法到达的位置 Switch control with location at back of house area.	
13	SPA中心 SPA center	调光控制 Dimming control panel	

序号 No.	区域 Area	照明控制要求 Lighting control requirement	备注 Remark
14	泳池区域 Swimming Pool	开关控制，开关设于客人无法到达的位置 Switches installed in a location that is not accessible by guests	
15	楼梯灯 Staircase lighting	声光控制或红外控制 Sound and light control or infrared control	
16	客用走廊 Guest Corridor	连接到BA系统控制 Linked to BA system	

2. 餐厅、宴会厅、大堂、酒吧、会议厅、行政会所、SPA、总统套房需安装智能调光系统，调光系统应采用可控硅整流器型。调光系统应为无级输出的方式来控制光源。
   Automatic dimming system shall be installed for dining hall, ballroom, lobby, bar, meeting room, administrative club, SPA and presidential suite. The system shall use silicon controlled rectifier. The lighting control system shall be step less output control.

3. 每个调光区域需配备一个主控制站用来编制不同的照明场景，场景的编制软件应是一种视窗软件，不再需要其他的编程工具。
   Central control station shall be provided for different lighting zone to create difference scenes. The scenes program software shall be windows software without other program tools.

4. 智能照明控制主机设置于消控中心并连接至 BA 系统进行集中控制。
   Main equipment for lighting control system shall be located in fire command center and linked to BA System for centralized control.

C. 插座
   Power Outlet

1. 各功能区域的插座设置参考表 8-7 所示。
   Electric Socket outlet arrangement for different function areas as shown in table 8-7.

表 8-7 各区域插座设置要求

Table 8-7 Power outlets for each functional area

序号 No.	区域 Area	插座设置 The power outlet set	备注 Remark
1	入口雨篷 Entrance	靠近入口处1个室外防水插座 One exterior waterproof outlet adjacent to entry Porte	
2	停车库 Parking garages	每20m距离一个16A的带开关插座 A 16A switched outlet every 20m	
3	景观 Landscape	每个主景观区一个16A的防水插座 A 16A weatherproof outlet in each primary landscaped area	

序号 No.	区域 Area	插座设置 The power outlet set	备注 Remark
4	前台 Front desk	每个工作站工作台上一个五孔电源插座 Provide a five-hole outlet above every workstation 每个工作站工作台下四个五孔插座 Provide 4nos five-hole outlets below every workstation 台上和台下回路应分开，并且每路16A电气回路供电不能超过三台工作站 Separate circuit for top and bottom of desktop. Maximum of three workstations for each 16A Power circuit.	
5	行李房 Luggage room	行李房入口附近设置一个X射线检查设备用电源插座 Power socket outlet for X-Ray Equipment shall be provided near luggage room entrance	
6	公共卫生间 Public restroom	洗手盆侧墙上一个五孔插座 Provide a five-hole outlet located on a sidewall of the water basin	
7	POS终端设备 POS machines	4个插座以及一个额外的16A五孔插座 4nos of outlets and an additional 16A five-hole outlet	
8	厨房 Kitchen	配合厨房设计的需求，另提供八个额外的通用插座 According to the kitchen design needs with an additional eight general outlets	
9	餐厅 Restaurant	每个服务台4个电源插座 Provide 4nos of outlet at each service station	
10	酒吧 Bar	每个鸡尾酒台一个16A的五孔插座 A 16A five-hole outlet at each cocktail station	
11	咖啡厅 Cafe	固定座位区提供客人取电用的方便插座 Provide convenience outlets for guest use at fixed seating locations	
12	行政酒廊 Executive lounge	礼宾台提供三个五孔插座 3nos five-hole outlets at concierge desk 四周墙上每隔1.5m设置一个插座 Outlets in perimeter walls spaced at 1.5m 客用电脑工作站提供两个五孔插座 Provide 2nos five-hole outlets at guest pc workstations	

序号 No.	区域 Area	插座设置 The power outlet set	备注 Remark
13	宴会厅 Ballroom	每56㎡提供4个电源地插 4nos of floor outlets per every 56m² 四周墙上每隔不超过6m安装一个五孔插座 Provide duplex outlets at no more than 6m o n center around perimeter walls. Maximum t wo outlets per circuit 每个宴会单间内两个30A单相插座 Two single phase 30A outlets in each ballroom subdivision 每个宴会厅一个60A三相电源插座 One 60A 3-phase outlet in each ballroom	
14	会议室 Meeting room	永久性墙体上每隔6m应安装一个插座 Provide a outlet at every 6m on permanent walls 每74m²提供四个电源地插 Provide 4nos floor outlets per every 74m² 餐柜位置提供一个16A的五孔插座 A 16A five-hole outlet at credenza	
15	商务中心 Business center	每个工作台下提供两个五孔通用插座，台上提供两个五孔插座 Provide 2nos five-hole outlets below counter and two five-hole outlets above the counter 接待区至少提供十个插座 Provide a minimum of 10nos outlets at the reception area	
16	休息区 Breakout area	沿墙每隔3m至4m提供一个插座 Provide a outlet at 3m to 4m along the wall	
17	客房走廊 Guestroom corridor	每隔15m设置一个插座 A outlet every 15m	
18	服务走廊 Service corridor	每隔20m一个通用五孔插座 Provide a 16A five-hole outlet every 20m on each wall	
19	宴会厅服务走廊 Ballroom service corridor	整条走廊上以1.8m的中心间隔设置五孔插座 Provide a five-hole outlet at 1.8m on center the entire length of the corridor	
20	办公室	每个工作位至少配置两个五孔插座 Provide 2nos five-hole outlets at each desk 每面墙上至少提供一个五孔插座，并且插座的间距不超过6m Provide a minimum of 1no five-hole outlet on each wall with spacing not to exceed 6m on center	
21	洗衣房 Laundry	每面墙上至少提供一个16A五孔插座，并且插座的间距不超过6m Provide a minimum of one 16A five-hole outlet on each wall with spacing not to exceed 6m on center	

序号 No.	区域 Area	插座设置 The power outlet set	备注 Remark
22	工程部 Engineer's office	在工作台中心900mm高度和每面墙上以不超过6m的中心距安装16A的五孔通用插座 Provide a minimum of 1no 16A five-hole outlet at 900mm on center at workbench and on each wall with spacing not to exceed 6m on center 工作台至少应提供一个30A的三相插座箱 At least one of 30A Three phase outlet box shall be provided for workstation.	
23	储藏区 Storage	每面墙上应至少提供一个通用五孔插座，并且插座间的中心距离不超过6m Provide a minimum of 1no five-hole convenience outlet on each wall with spacing not to exceed 6m on center	
24	机电房 Mechanical rooms	每面墙上应至少提供一个通用五孔插座，并且插座间的中心距离不超过6m Provide a minimum of 1no five-hole convenience outlet on each wall with spacing not to exceed 6m on center	
25	卸货区 Unloading area	1个防水插座 One waterproof outlet	

2. 和应急电路连接的电源插座，应配置 LED 指示灯或醒目标签。
   The socket outlets linked to emergency power source shall be provided with LED Indication light or clear label.

3. 电源插座的安装高度一般为距地 300mm，洗衣房等潮湿区域的电源插座的安装高度一般为距地 900mm。精装区域插座的样式和安装位置由室内设计师确定。
   General installation height for socket outlet shall be 300mm above ground level. Installation height for socket outlet for wet areas such as laundry shall be 900mm. The type and location of the socket outlets shall be approved by interior designer.

8.8. 防雷和接地保护
LIGHTNING AND EARTHING PROTECTION

8.8.1. 概要
General

A. 本章节包括了整个酒店的防雷和接地要求。
   This section includes Hotel Lightning protection and Earthing standards.

8.8.2. 系统设计要求
System Design Requirement

A. 防雷
   Lightning Protection

4. 建筑幕墙、卫星天线、烟囱、冷却塔及突出屋面的金属物均应和屋面避雷带连接。
   Building façade, Antenna, chimney, cooling tower and exposed metal part shall be bonded to the building lightning strip.

5. 配电系统设有防雷设施。在中压电源侧设置避雷器。在低压侧设三级浪涌保护器保护。第一级设于低压配电柜低压进线开关处，第二级设于楼层配电箱处，第三级设于电子设备的末端配电箱处。
   Power distribution system shall be provided with lightning protection devices. Lightning arrester shall be installed at the medium voltage power source side. 3 levels surge protection device shall be installed at Low Voltage side. First level for Incoming power main circuit breaker, second level for floor distribution panel and third level for final electric equipment distribution panel.

6. 屋顶及室外设备用电配电箱应设置第一级浪涌保护器。
   Power distribution panel installed at roof top and outdoor area shall be protected by First level Surge Protection devices.

7. 当建筑高度超过 45m 时，应采取下列措施防侧击雷：
   Side flash protection for building higher than 45m shall follow the methods as stated below:

   a. 建筑物内钢构架和钢筋混凝土的钢筋应互相连接；
      Steel structure and rebar in building shall be linked together;

   b. 应利用钢柱或钢筋混凝土柱子内钢筋作为防雷装置引下线。结构圈梁中的钢筋应每三层连成闭合回路，并应同防雷装置引下线连接；
      Steel structure and rebar concealed in pillar shall be used as earthing conductor; Rebar in structure ring beam shall be linked as closed loop at every three layers and connected to earthing of lightning protection system;

   c. 应将 45m 及以上外墙上的栏杆。门窗等较大金属物直接或通过预埋件与防雷装置相连；
      Large metal located at 45m and above such as railing at external wall and window frame shall be linked to lighting protection device directly or via embedded component.

8. 进入建筑物的各种线路及金属管道采用埋地引入，并在入户端将电缆的金属外皮、钢导管及金属管道与接地网相连。
   All building incoming cables and metal pipes shall be laid underground. Metal casing, metal conduit and metal pipes shall be earthed by connecting to the grounding via connection terminal.

9. 防雷系统应满足当地防雷办验收的要求。
   Lightning protection system shall comply with requirement from Local lightning protection authority.

B. 接地
   Earthing Protection

1. 酒店接地系统一般包括防雷接地系统、配电接地系统、弱电接地系统。所有的接地系统利用基础钢筋作为共用接地极，各接地极系统接地引下线在不同位置单独敷设，共用接地极接地电阻不应大于 1 欧姆。
   Earthing system shall include lightning protection earthing system, power distribution earthing sytem and extra low voltage earthing system. All the earthing system shall use

foundation rebar as common earth electrode with individual down conductor at different locations. The overall earthing system resistance value shall not be more than 1Ω.

2. 室内配电系统采用 TN-S 接地保护系统，PE 线单独设置，插座及电气设备金属外壳均应与 PE 线连接。对于室外配电系统可采用 TT/TN-S 接地保护系统；对于别墅可采用 TT/TN-C-S 接地保护系统。
   Earthing system for indoor power distribution system shall be TN-S type with individual PE as main earthing. Socket outlet and electrical equipment casing shall be linked to the PE main earthing. Earthing system for outdoor power distribution system can be TT or TN-S type; Earthing system for villa power distribution system can be TT or TN-C-S type.

3. 变配电所及强、弱电井均设接地引下线两组，接地电阻不应大于 1 欧姆。
   Consumer switch room, electrical riser and ELV Riser shall have two individual down conductor with earth resistance no more than 1Ω.

4. 应采用总等电位联结，等电位联结中金属管道连接处应可靠地连通导电，下列导体应作总等电位联结：
   Equipotential connection shall be applied for earthing for metallic pipe joint by using conductors as below:

   a. PE 干线；
      PE main earthing;

   b. 接地极的接地干线；
      Main earthing rod connecting to earth bar;

   c. 水管、煤气管、采暖及空调管道等金属管道；
      Metallic pipes such as water pipe, gas pipe, heat pipe and air-con pipes, etc.

   d. 金属构件等导电体。
      Conductive metal component

5. 洗衣房、厨房、卫生间、所有浴室采用等电位联结，等电位联结应包括金属给排水管、金属浴盆、金属采暖管等金属设施。
   Equipotential bonding shall be applied for laundry, kitchen, toilet and all the bathrooms including metal facilities such as metal water pipes, metal bath tub and metal heating pipes.

6. 游泳池采用辅助等电位联结。必须将 0、1 及 2 区内所有装置外可导电部分，与位于这些区内的外露可导电部分的保护连接起来，并经过总接地端子与接地装置相连。
   Supplementary equipotential bonding shall be used for swimming pool. All conductive part of the equipment categorize in zone 0, 1 and 2 shall be linked with earth protection equipment from main earth terminal.

8.8.3. 技术说明及应用指导
Specifications and Application Guides

A. 卫生间等电位箱采用 25*4 镀锌扁钢与立柱内主筋焊接，等电位接地线采用 BVR6 铜芯导线穿 DN20 管敷设。
   Toilet equipotential bonding comprises of 25x4mm galvanized steel plate welded to column rebar, earth cable shall be of BVR6 copper cable with DN20 casing protection.

B. 网架、幕墙等电位接地由立柱内主筋引出 40*4 镀锌扁钢与预埋铁板焊接。
Equipotential earthing mesh and façade shall be bonded to the column rebar structure using 40x4mm galvanized steel plates by welding.

C. 消防控制室、计算机网络、通讯、楼宇自动化、闭路电视、电梯机房等弱电机房均设弱电专用接地极，接地电阻不大于 1 欧姆，弱电专用接地极采用 BVR50 铜芯导线穿 DN32 管保护引至机房各设备。
ELV Rooms such as fire control room, IT server room, communication room, building automation room, CCTV Room and lift motor rooms shall be provided with individual earthing system. Earth resistance shall not be more than 1Ω. The earthing cable for ELV system shall be BVR50 copper cable with DN32 casing protection.

8.9. 节能和环保
ENERGY SAVING AND ENVIRONMENTAL PROTECTION

8.9.1. 低压开关装置
LV Switchgear

A. 低压配电柜低压侧进行集中无功补偿，低压侧功率因数不低于 0.95，中压侧功率因数不低于 0.92，并需满足当地供电部门的要求。
Reactive power compensation devices shall be installed to maintain the power factor no lower than 0.95 for Low Voltage side and 0.92 for Medium Voltage side and shall also meet with Local Electricity board's requirement.

8.9.2. 照明系统
Light System

A. 尽量使用 LED 灯具。
LED light fixture shall be used whenever applicable.

B. 所有的荧光灯须采用电子镇流器或节能型电感镇流器。中压钠灯、金属卤素灯应采用节能型电感镇流器。气体放电灯应配就地电容补偿装置，使功率因数不低于 0.9。
All fluorescent light shall use electronic ballast or energy-saving induction ballast. High pressure sodium lamp and metal halide lamp shall use energy-saving induction ballast. Gas discharge lamp shall use capacitor for compensation to maintain power factor not less than 0.9.

C. 靠近窗口处有日光照射时，可考虑采用光电控制关闭灯具或对灯具调光，以减少电能消耗。
Lighting sensor on/off control or dimmer control shall be used for lighting near window to reduce electricity consumption.

D. 采用智能照明系统来尽可能多地关闭灯具。例如，半夜时，采用时间控制自动客人走道的照明关掉 50%。
Lighting control system shall be used for lighting control whenever applicable. For example, 50% of lightings along the guestroom corridor area shall be turned off at midnight by timer switch control.

E. 尽可能利用调光系统减少能源消耗。
Dimming system shall be used to reduce energy consumption whenever applicable.

8.10. 调试与验收
TESTING AND COMMISSION

A. 配电柜的仪表，各类继电器，合闸装置、联动、连锁装置的试验调整，应按设计和设备出厂及当地供电部门的规定进行调整试验，以保证设备的安全运行。
Testing and commissioning for meters, relays, circuit breakers and interlocking devices in distribution switchboard shall comply with design requirement, factory statement and Local regulation to ensure safety operation of the equipment.

B. 中低压配电柜的试验调整，应由专业技术人员和技术工人进行，根据设计提供的技术数据，并应满足国家规范和当地供电部门提供的要求和技术参数进行试验调整。
Testing and commissioning for Medium and Low distribution switchboards shall be conducted by Professional Engineer and technician, with reference to the design technical data fully comply with the National standard and local regulation.

C. 按图纸要求分别模拟试验控制、连锁、操作、继电保护盒信号动作，正确无误，灵敏可靠，试验结果应符合设计要求。
Simulation test shall be carried for control, interlocking, operation and protection relay devices shall comply with design requirement with high accuracy and reliable sensitivity. The test result shall also comply with design requirement.

D. 1kV 及以下配电装置及馈电线路的绝缘电阻值不应小于 0.5MΩ。测量馈电线路绝缘电阻时，应将断路器、用电设备、电器和仪表等断开。
Insulation resistance for distribution devices with nominal voltage at 1kV and below shall not be less than 0.5MΩ. All outgoing circuit breakers, electrical equipment and meters from feeder line shall be disconnected during insulation resistance.

E. 为了保证供电系统正常工作，需要进行一系列的测试，以确保供电系统的安装满足规范、技术规格书和当地标准、法规的要求。测试需满足
A series of testings shall be carried out to ensure system normal operation after installation and comply with regulation, technical speicification and local standard requirements as listed as below:

1. GB50150 电气装置安装工程电气设备交接试验标准
GB50150 Standard for hand-over test of electric equipment electric equipment

2. GB50303 建筑电气工程施工质量验收规范
GB50303 Code of acceptance of construction quality of electrical installation in building

3. 等标准和规范要求，主要包括内容如表 8.8 所示：
And with other standards and regulations which mainly includes items as listed at table 8.8.

表 8-8 电气验收和调试项目
Table 8-8 Electric testing items

序号 No.	设备与系统 Equipment and System	检验或试验项目 Testing items	备注 Remark
1	变压器 Transformer		

序号 No.	设备与系统 Equipment and System	检验或试验项目 Testing items	备注 Remark
1.1		所有分接头的电压比 Voltage ratio for all tap changers	
1.2		与铁心绝缘的各紧固件及铁心绝缘电阻 Insulation resistance for iron core and fasteners	
1.3		测量绕组连通套管的绝缘电阻 Insulation resistance test for winding and bushing	
1.4		绕组连同套管的交流耐压试验 AC withstand voltage test for winding and bushing	
1.5		额定电压下的冲击合闸试验 Switching impulse voltage test under rated voltage	
1.6		变压器超温报警保护 Transformer thermal alarm protection	
2	**配电装置 Distribution devices**		
2.1		测量绝缘电阻 Insulation resistance Test	
2.2		交流耐压试验 AC withstand voltage test	
2.3		检查配电装置内不同电源的馈线间或馈线两侧的相位应一致 Phasing check for different feeder lines in distribution devices	
2.4		接地故障测试 Earth fault test	
3	**电力电缆 Power Cable**		
3.1		测量绝缘电阻 Insulation resistance test	
3.2		交流耐压试验 AC withstand voltage test	
4	**防雷接地系统 Lightning protection and earthing system**		
4.1		测量接地电阻 Earth resistance Measurement	
5	**照明系统 Lighting System**		
5.1		测量各功能区域照度值 Lux level measurement for different function areas	
5.2		测量各区域照度均匀度 Average Lux level measurement for different areas	

序号 No.	设备与系统 Equipment and System	检验或试验项目 Testing items	备注 Remark
6	**调光系统 Lighting Dimming System**		
6.1		测试各照明场景满足设计要求 Test for different lighting scene to meet with design requirement	
7	**柴油发电机 Diesel generator**		
7.1		测试柴油发电机供油回路 Fuel supply circuit test	
7.2		测试柴油发电机自启动并带负载运行 Auto self start and loading test	

F. 酒店项目在投入运营前 2 个月，应完成所有供电系统的调试和验收。提供以下书面文件供酒店管理公司知悉、备存。
All testing and commissioning test for Power distribution system shall be completed with proper documentation to Hotel management for verification and endorsement at least 2 months before Hotel operation.

1. 调试验收记录；
   Debugging and acceptance report;
2. 相关部门的供电系统的验收合格报告；
   Qualification test report issued by related authorities;
3. 防雷接地检测报告；
   Lightning protection and earthing test report.

8.10.1. 调试验收样表
T&C sample table

表 8-9 变压器测试报告 Table 8-9 Transformer Test Report			
检验方 Suveyor			
序号 Series No.	**测试内容 Test Item**	**测试结果 Test Result**	**备注 Remark**

试运行说明： **T&C Brief:**			
见证人 **Witness**	施工承包单位 **Contractor**	监理公司 **Management Company**	业主/顾问公司 **Client/Consulting Company**
姓名 **Name**			
公司 **Company**			
职位 **Designation**			
签名 **Signature**			
日期 **Date**			

表 8-10 接地测试报告 (高压设备/低压设备/发电机组/防雷) Table 8-10 Earthing Test Report (High Voltage Equipment/Low Voltage Equipment/Generator/Lightning Protection)				
检验方 Surveyor				
序号 Series No.	点位编号 Location Series No.	位置 Location	测试参数 (Ω) Test Parameter (Ω)	备注 Remark
试运行说明： T&C Brief:				

见证人 Witness	施工承包单位 Contractor	监理公司 Management Company	业主/顾问公司 Client/Consulting Company
姓名 Name			
公司 Company			
职位 Designation			
签名 Signature			
日期 Date			

表 8-11 绝缘电阻测试记录
Table 8-11 Insulation Resistance Test Record

检验方 Surveyor																
序号 Series No.	电源/回路编号 Power/Circuit Series No.	相位 Phase	电缆尺寸/型号 (mm^2) Cable Size /Type (mm^2)	绝缘电阻 (MΩ) Insulation Resistance(MΩ)										相序试验 Phase Sequence Test	连通性试验 Connection Test	备注 Remark
				A-B	A-C	B-C	A-N	B-N	C-N	A-PE	B-PE	C-PE	N-PE			

表 8-11 绝缘电阻测试记录
Table 8-11 Insulation Resistance Test Record

试运行说明：
T&C Brief:

见证人 **Witness**	施工承包单位 **Contractor**	监理公司 **Management Company**	业主/顾问公司 **Client/Consulting Company**
姓名 **Name**			
公司 **Company**			
职位 **Designation**			
签名 **Signature**			
日期 **Date**			

表 8-12 交流耐压测试报告 Table 8-12 AC Withstand Voltage Test Report				
检验方 Surveyor				
序号 Series No.	点位编号 Location Series No.	位置 Location	测试结果 Test Result	备注 Remark
试运行说明： T&C Brief:				

见证人 Witness	施工承包单位 Contractor	监理公司 Management Company	业主/顾问公司 Client/Consulting Company
姓名 Name			
公司 Company			
职位 Designation			
签名 Signature			
日期 Date			

表 8-13 照度测试报告 Table8-13 Lux Level Test Report				
检验方 Surveyor				
序号 Series No.	点位编号 Location Series No.	位置 Location	测试参数 (Lux) Test Parameter(Lux)	备注 Remark
试运行说明： T&C Brief:				
见证人 Witness	施工承包单位 Contractor	监理公司 Management Company		业主/顾问公司 Client/Consulting Company
姓名 Name				
公司 Company				
职位 Designation				
签名 Signature				
日期 Date				

表 8-14 发电机组装置测试报告 Table 8-14 Generator Test Report						
检验方 Surveyor						
序号 Series No.	描述 Description	引擎停止 Engine Stop	适配器控制块 Adapter Controller	警报 Alarm	显示 Display	备注 Remark
1	润滑油低压 Lubricating Oil Low Pressure					
2	高水位温度 High Water Level Temperature					
3	低频率 Low Frequency					
4	超速 Over Speed					
5	紧急停止 Emergency Stop					
6	起动失败 Start Failure					
7	接地故障 Earth Fault					
8	自动启停 Auto On/Off					
9	过电流 Over Current					
10	手动一（开始/停止） Manual-(On/Off)					
11	蓄电池充电器 Battery Charger					
12	低油位 Low Oil Level					
试运行说明： T&C Brief:						

表 8-14 发电机组装置测试报告 Table 8-14 Generator Test Report			
见证人 Witness	施工承包单位 Contractor	监理公司 Managing Company	业主/顾问公司 Client/Consulting Company
姓名 Name			
公司 Company			
职位 Designation			
签名 Signature			
日期 Date			

第9章. 声学性能
SECTION 9: ACOUSTIC PERFORMANCE

9.1. 项目前期噪音调查
PRE-DEVELOPMENT NOISE SURVEYS

A. 在项目开始前，必须在项目所在地周围若干位置进行连续 24 小时的噪声测量。或于项目所在地周围若干位置在早上、中午、傍晚和夜间各进行一次噪声测量，每个测试位置测试时间不少于 5 分钟。
Prior to commencement of the project, a minimum of 24 hours continuous monitoring must be undertaken at a number of locations around the development site. or to measure the noise level at critical locations around the development site once in the morning, noon and evening, and time taken for each measurement shall not be less than 5 minutes.

B. 数据收集目的在于
Data must be collected to enable

1. 确定现有重大噪声源和振动源。
Significant existing noise and vibration sources to be identified.

2. 确定酒店每个立面的一天内不同时间段的噪声水平。
Noise levels incident on each facade of the hotel development throughout the day to be determined.

3. 确定已存在背景噪声水平（如果当地规范有相关要求）。
Pre-existing background noise levels to be established (where required by local codes).

4. 根据测试数据确定幕墙或窗户的玻璃规格。
According to test data, to make a determination of the curtain wallor window specifications.

9.2. 室外（建筑外部）噪音入侵
EXTERNAL (BUILDING EXTERIOR) NOISE INTRUSION

A. 酒店设计和施工必须保证包括通风设备在内所有外部固定噪音源产生的噪音不超过以下室内噪音水平值。
External building fabric, including any ventilators, must be designed and built to ensure that the following internal noise levels are not exceeded due to any regularly occurring external noise source.

B. 酒店噪音测量必须在先前噪声调查确定的一天中噪声最大的两个小时进行。
Measurements of noise within the hotel must be taken during the noisiest two hour period of the day, as identified in the noise survey.

房间 **Room**	建筑外部噪声入侵室内水平 **External Intrusion Noise Level**
	正常工作状态 **Full Service Grade**
客房 Guestroom 白天 Daytime (07: 00 – 23: 00): 夜晚 Night-time (23: 00 – 07: 00):	$35dBL_{Aeq.16h}$ $30dBL_{Aeq.8h}$/40dB $L_{Amax（fast）}$ *
会议室/商务中心 Meeting/Business Center	$35dBL_{Aeq.5min}$
宴会厅/多功能厅 Ballroom/Multi-purpose Hall	$35dBL_{Aeq.5min}$
西餐厅/中餐包房/酒吧 Western Restaurant/Chinese Restaurant Private Room/Bar	$37dBL_{Aeq.5min}$
行政酒廊 Executive lounge	$35dBL_{Aeq.5min}$
中餐厅 Chinese Restaurant	$40dBL_{Aeq.5min}$
大堂/前台接待/公共区域 Lobby/reception/guest corridors	$42dBL_{Aeq.5min}$
健身中心 Fitness center	$40dBL_{Aeq.5min}$
水疗 Spa	$37dBL_{Aeq.5min}$
后勤办公室/员工培训室 BOH Office/Staff Training Room	$40dBL_{Aeq.5min}$
*以上数据为距离玻璃幕墙/玻璃窗户 1m 处测量。 The above parameters shall be measured at 1m away from the curtain wall/window glazing. *对于位于或毗邻中枢国际机场的酒店，在获得希尔顿全球许可时，飞机引起的最大噪声水平可放宽至 $50dB_{L\,Amax(fast)}$。 For hotels on or close to major international airports, maximum noise levels due to aircraft may be relaxed to $50dB_{L\,Amax(fast)}$ subject to permission from Hilton Worldwide.	

C. 设备安装和设计必须确保室内空气中传递噪声不会超过以上标准值。
Equipment installations must be designed and installed to ensure that atmospheric noise does not result in the above internal values being exceeded.

9.3. 内部隔音
INTERNAL SOUND INSULATION

A. 邻近区域的水平和垂直内部隔音，包括通过风管和竖井的声音串扰，必须满足 2514.05.N 小节规定的最低性能要求。
Sound insulation between vertically and horizontally adjacent spaces, including crosstalk via ductwork and service risers, must achieve the minimum levels of performance set out in Section 2514.05.N.

B. 空气隔声和隔振的性能目标值应采用现场实测教据。必须采用事先确定的方案，向 希尔顿全球证明隔音性能。
Performance targets are set as in‐situ values for airborne and impact sound insulation. Sound

insulation performance must be demonstrated to Hilton Worldwide by means of an agreed program of pre‐completion testing.

C. 计权隔声量(Rw R'w)[1] 的隔声性能与隔声等级(STC, ASTC)[2]一般情况下在数值上是相等的。因此，在本标准中这两个参数被认做可以进行互换。
Numerically, the sound insulation performance descriptors of weighted sound reduction (Rw R'w)[1] and sound transmission class (STC, ASTC)[2] are generally equivalent. Within this document, therefore, the parameters are considered directly interchangeable.

根据 BS EN lS0 140‐4:1998“声学‐建筑和建筑构件隔声测量‐第 4 部分：房间之间空气声隔声的现场测量”和 BS EN lS0 717‐1:1997“声学‐建筑和建筑构件隔声测量‐第 1 部分：空气声隔声”进行测量。
BS EN lS0 140‐4:1998 ‘Acoustics ‐ Measurement of sound insulation in buildings and of building elements ‐ Part 4: Field measurements of airborne sound insulation between rooms' and weighted according to BS EN lS0 717‐1:1997 Acoustics ‐ Rating of sound insulation in buildings and of building elements ‐ Port l: Airborne sound insulation'

根据 ASTM E90:2009“实验室测量建筑物隔墙和构件的空气声传输损失的标准试验方法”和 ASTM E413‐10“隔声等级分类”进行测量。
Apparent sound transmission class measured in accordance with A5TM E90:2009 'Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements, and weighted as described in ASTM E413‐10 'Classification for Rating Sound Insulation

D. 空气声隔声目标是实验室测试隔声性能，即 Rw 或 STC 值应当比现场实测数据高大约 5dB 以上（砖石砌体）和 10dB 以上（轻质隔墙）。
The airborne sound insulation targets are achieved by constructions achieving laboratory‐tested sound reduction values, i.e. Rw or STC, of around 5dB greater (masonry constructions) and around 10dB greater (lightweight constructions) than the in‐situ requirement.

E. 必须将所有侧面因素纳入考虑，如外墙和天花板空隙，以及一些有可能破坏整体隔音效果的连接位置细节。
All due account must be taken of flanking elements, e.g. external walls and ceiling voids, and junction detailing which might otherwise compromise the overall sound insulation.

F. 客房和卫生间之间主要考虑门的隔音性能。但隔墙的隔声性能必须达到 Rw/STC 45dB。
Sound insulation between a guestroom and its ensuite is controlled by the door. Notwithstanding, the partition construction must be capable of achieving sound reduction Rw /STC 45dB.

G. 如果房间要求增强屏蔽由门厅或走廊传来的噪声，则门和门框设计必须通过相关实验室认证（需提交完整的支持文件供希尔顿全球进行审核），并满足以下最低性能要求。
Where rooms require enhanced acoustic privacy from entrance lobbies or corridors, doors and frames must be of a design that has been proven by laboratory testing (with full supporting documentation being made available to Hilton Worldwide) to achieve the following minimum performance standards.

表 9-1 门隔声性能要求
Table9-1 Weighted Sound Reduction Index of Doors

房间 **Room**	**门计权隔声指数** **R_w 或 STC** **Weighted Sound Reduction Index of Doors, R_w or STC** **满负荷工作等级** **Full Service Grade**
客房入口 Guestroom entrance	28dB（门内外距离门 1 米处测量） 28dB（Measured at 1m away from the door） 35dB（门外距离门 1 米处和客房卧室或客厅中间测量） 35dB（Measured at 1m away from the door and guestroom bedroom or center of living room）
客房连通门	45dB（连通门两侧距离连通门 1 米处测） 45dB（Measured at 1m away from the door at both sides） 50dB（连通门和分户墙整体隔声量） 50dB（Overall noise isolation by the inter-connecting door and separation wall.）
会议室/多功能厅入口 Meeting/function room entrance	28dB（门内外距离门 1 米处测量） 28dB（Measured at 1m away from the door）
行政酒廊 Executive lounge	28dB（门内外距离门 1 米处测量） 28dB（Measured at 1m away from the door）
办公室 Offices	28dB（门内外距离门 1 米处测量） 28dB（Measured at 1m away from the door）
注： Note： (1) 客房平面布局应避免客房门距离电梯厅 5 米以内。 Guestroom layout should avoid placing guestroom door within 5m from lift lobby. (2) 门内外距离门 1 米处测量隔声量达到 FSTC28 的门必须采用 50 毫米厚的实心木门，并配备密封条。 When noise level inside and outside the door measured at 1m away reaches FST28, the door shall be provided with 50mm thick solid core wooden door complete with seal strips.。 (3) 连通门必须由 1 扇 50 毫米厚的实心木门和 1 扇 ASTC42 的隔声门组成，并配备密封条。 The connecting door must consist of sound insulation door in 1 50 mm thick solid wood doors and 1 door isolation with ASTC42 complete with seal strips. (4) 门节点参考图纸。 Door detail shall refer to drawings.	

H. 客房之间的隔门即客房连通门的设计和安装需达到 9.10 小节的隔声等级要 求。
Doors connecting guestrooms must be designed and installed to achieve sound reduction values listed in Section 9.10.

I. 尽管开有门的隔墙的隔声量会受到门的影响，但开有门的隔墙仍须按 9.10 小 节规定的隔声量设计。比如，客房入口所在的隔墙（走道墙）设计必须达到 Rw/ASTC 45。

Although the provision of door at separation wall will inevitably affect the noise insulation, the separation wall with door shall still be designed and constructed according to the specification stipuloted in section 9.10. The wall where guestroom entrance door is located shall be designed and constructed to Rw/ASTC 45.

J. 服务于门厅、休息厅、餐厅和酒吧的卫生间入口，必须通过一个长直的隔声前室才 能进入，并且最好在前室的两端均有门。电干手器不能安装在与噪声敏感区域共用 的隔墙上。
Toilets serving lobbies, lounges, restaurants and bars must be accessed via an acoustically lined lobby, preferably with doors at either end. Electric hand‐driers must not be mounted on walls shared with noise sensitive areas.

K. 玻璃移门的隔声性能必须满足相邻房间的噪声敏感度要求，并且根据项目不同进行明确规定。除非另有说明，连接室外 的玻璃移门（包括门框）隔声量必须达到 Rw/ASTC 35，并且应按照生产商的标准进 行安装以最大限度提高现场隔声性能。
Sound insulation performance of sliding glass doors must reflect the sensitivity of the adjoining rooms and must, therefore, be clarified on a project basis. Unless otherwise stated, sliding glass doors connecting to the external (including the frame) must be capable of achieving sound reduction Rw/STC 35dB and must be installed in accordance with the supplier's instructions in order to maximize the in‐situ sound insulation.

9.4. 内部噪声源
INTERNAL NOISE SOURCES

表 9-2 内部噪声源水平

Table9-2 Internal noise source level

房间	噪声水平，Leq
Room	Noise Level, Leq
客房 Guestroom	NR30（中风速，床头位置测量） NR30（Middle-speed, measured from bedside）
客房卫生间	NR35
Guestroom bathroom	
会议室/多功能厅/办公室/商务中心 Meeting/function rooms	NR35
宴会厅 Ballroom	NR 35
西餐厅/中餐包房/酒吧 Bar/restaurant/PDR	NR35
中餐厅	NR38
行政酒廊 Executive lounge	NR35
大堂/前台接待处/公共区域 Lobby/reception/guest corridors	NR40
健身中心 Fitness Center	NR40
水疗 Spa	NR35

房间	噪声水平，Leq
后勤办公室/员工培训室 BOH Office/Staff Training Room	NR35
后场/服务区 BOH/service areas BOH/	NR40-45
注： Note: 客房风机盘管应尽量选择低静压、低噪音的机型。如果选择了高静压、高噪声的风机盘管，必须采取声学处理措施以降低风机盘管运行噪声。 Guestroom fan coil unit shall be low static pressure and low noise type. If high static pressure fan coil unit is selected, appreciate acoustic measures shall be taken to reduce the noise made by the operation of the fan coil unit. FCU 节点图 FCU detail drawing	

A. 建筑设备（包括设备机房）在有人房间内产生的空气与结构传递噪声不能超过以下值。
Airborne and structure‐borne noise from building services (including equipment rooms) must not exceed the following values within occupied spaces.

表 9-3 外部入侵噪声水平

Table9-3 External Intrusion Noise Level

房间 Room	外部入侵噪声水平,L_{eq} External Intrusion Noise Level, L_{eq}
	满负荷工作等级 Full Service Grade
客房 Guestroom	NR25
客房卫生间 Guestroom bathroom	NR35
会议室/多功能厅 Meeting/function rooms	NR30
宴会厅 Ballroom	NR30
酒吧/餐厅/休息区 Bar/restaurant/breakout 西餐厅/中餐包房/酒吧 Western Restaurant/Chinese Restaurant Private Room/Bar	NR35 NR30
中餐厅 Chinese Restaurant	NR33
行政酒廊 Executive lounge	NR35 NR30
大堂/接待处/客人走廊 Lobby/reception/guest corridors	NR40 NR35
健身中心 Fitness Center	NR40 NR35
水疗 Spa	NR35 NR30

房间 **Room**	**外部入侵噪声水平,L_{eq}** **External Intrusion Noise Level, L_{eq}** **满负荷工作等级** **Full Service Grade**
办公室 Offices 后勤办公室/员工培训室 BOH Office/Staff Training Room	NR35
后场/服务区 BOH/service areas BOH/	NR40-45

B. 建筑设备噪声不得包含任何可能吸引注意的特征，例如敲打声、撞击声或啸叫声。
Building services noise must not contain any feature, such as knocking, rattling or whistling, that is likely to attract attention.

C. 雨污水管和其它管道穿越房间时，必须进行降噪处理，并保证将管道的最大泄漏噪声水平控制比所穿越的房间噪声水平至少低 5dB。排水管一般应采用铸铁管，如果采用了 PVC 管或静音管必须对卫生间的横管采取包层处理。
Waste systems, rainwater pipes and general plumbing must be treated to ensure that maximum breakout noise levels are controlled to levels at least 5dB below the corresponding building services noise level for the room through which it passes.

D. Elevators/lifts must be designed and shafts constructed to ensure that noise associated with any part of the elevator/lift cycle (including door operation) does not exceed the values listed below.
垂直电梯/升降机以及电梯井道设计，必须保证与之运行的任何部分（包括开关 门操作）相关的噪声不超过以下数值。

表 9-5 电梯/升降机噪音水平
Table9-5 Noise from elevator/lift

房间 **Room**	**电梯/升降机噪音 , $L_{Amax,FAST}$** **Noise from elevator/lift, $L_{Amax,FAST}$**
客房 Guestroom	25dB
会议室/多功能厅 Meeting/function rooms	30dB
酒吧/餐厅 Bar/restaurant	35dB
行政酒廊 Executive lounge	30dB
健身中心 Fitness Center	35dB
水疗 SPA	30dB
办公室 Offices	40dB
电梯/升降机厅 Elevator/lift lobbies	50dB

房间 **Room**	电梯/升降机噪音 , $L_{Amax,FAST}$ **Noise from elevator/lift, $L_{Amax,FAST}$**
电梯客梯轿厢 Elevator Car	50dB (通风系统正常运行时) (Normal operation of ventilation system)
自动扶梯 Escalator	55dB(A) 50dB (距离1米处测量) (Measured of 1m away)
(1) 酒店平面布局应尽量避免电梯井道与客房或会议室等噪声敏感区相邻。 Hotel layout shall avoid abutting the lift shaft with guestroom, office or noise sensitive areas. (2) 如果无法避免电梯井道与客房或会议室等噪声敏感区相邻，那么电梯井道内电梯导轨必须考虑减振处理，并且考虑电梯井道墙体增加额外的声学处理措施，以避免或减少电梯运行时产生的振动和噪声对相邻噪声敏感区的影响。 If it is impossible to avoid abutting the lift shaft with the guestroom, office or noise sensitive areas, then the lift shaft hoist coil shall be provided with vibration isolation and necessary acoustic treatment to the walls of the lift shafts. This is to eliminate or minimize the impact of noise generated during the operation of the lift on the noise sensitive areas.	

9.5. 混响噪声控制
CONTROL OF REVERBERANT NOISE

A. 直接通往客房的公共区域内必须安装表面吸声材料辅以适当的地毯和地毯垫来 达到声学性能要求。如果客房走廊没有地毯，则必须使用吸音天花板和/或墙面材料。
Acoustically absorbent finishes must be installed within common areas from which direct access is gained to guestrooms, with suitable conditions being provided by fitting standard carpet and pad. Where corridors have no carpet, acoustically absorbing ceiling and/or wall linings must be provided.

B. 其它区域的饰面设计和安装，必须保证在通常情况下有客人入住或员工工作的位置 不超过以下混响时间。混响时间按照 500Hz 至 2kHz 范围内倍频程算数平均值考虑。
In other areas, finishes must be designed and installed to ensure that the following reverberation times are not exceeded at positions normally occupied by guests or at staff workstations. Values of reverberation time must be determined as the arithmetic average of octave band values from 500 Hz t0 2 kHz, inclusive.

表 9-6 混响时间限制

Table9-6 Reverberation time control

房间 **Room**	最大混响时间(秒) **Maximum reverberation times, seconds**
客房 Guestroom	0.5
会议室/多功能厅 Meeting/function room	0.8
宴会厅 Ballroom	1.5
大堂/接待处	1.5

房间 **Room**	最大混响时间(秒) **Maximum reverberation times, seconds**
Lobby/reception	
酒吧/餐厅 Bar/restaurant	1.0 1.5
行政酒廊 Executive lounge	0.8
水疗 Spa	1.0
室内游泳池 Indoor Swimming Pool	2.5
注： Note: 室内设计在选材时应考虑到混响时间，特别是大堂应考虑设置一定面积软包材料包饰面或摆放具有吸声作用的家具。 The material selected for the interior finishes must take into account the reverberation time required, especially for the main lobby with consideration of soft material with appreciate area or furniture that can absorb sound.	

9.6. 邻近场所
ADJOINING DEMISES

A. 建筑结构的设计和建造必须确保从任何附近场所传来的噪声控制在以下值或更低。
Building fabric must be designed and built to ensure that noise transfer from any adjoining demise is controlled to the levels shown below, or lower.

表 9-7 邻近场所入侵噪音水平

Table 9-7 Adjacent Demise Intrusion Noise Level

房间 **Room**	邻近场所入侵噪音水平 **Adjacent Demise Intrusion Noise Level**
客房 Guestroom	25dB $L_{Aeq,5min}$ and 35dB $L_{Amax(fast)}$
会议室/多功能厅 Meeting/function rooms	NR25 $L_{eq,5min}$
酒吧/酒廊/餐厅 Bar/lounge/restaurant	NR30 $L_{eq,5min}$
大堂/接待处/客人走廊 Lobby/reception/guest corridors	NR30 $L_{eq,5min}$
办公室 Offices	NR30 $L_{eq,5min}$

9.7. 外部噪音排放
EXTERNAL NOISE EMISSIONS

A. 酒店外距离最近的受影响区接收噪声水平必须符合当地政府的要求，或者满足酒店周界噪声水平不超过 50dBLAeq，或公共区不超过 45dBLAeq，以更严格要求为准。当地规范可能要求对项目开发前后环境噪声条件进行比较。参见第 9.1 小节。

Noise levels at the nearest affected receiver must comply with the requirements of the local authority or attain a noise level not exceeding 50dB LAeq at the site boundary or 45dB LAeq in public areas, whichever is the more stringent. Local codes may involve comparison with pre‐development ambient noise conditions. Refer to Section 9.1.

B. 建筑对内噪声影响的控制参见 9.3 小节。
Refer to Section 9.3 to ensure suitable control of self‐noise impact on the building.

9.8. 振动/结构传递噪声
VIBRATION/STRUCTURE‐BORNE NOISE

A. 所有设备（无论安装在设备机房或有人房间）、电梯、电梯电机和风管/管道系统等必须与建筑结构进杼隔离，以保证按照 IS02631‐2:2003‘机械振动与冲击一人体暴露于全身振动的评价一第 2 部分：建筑振动（1Hz 至 80Hz）’进行测量和评估时，在所有有人房间的任何方向上（垂直或水平）地板振动控制在不超过 0.05ms2 的水平。
All equipment (whether located in equipment rooms or occupied spaces), elevator/lifts, elevator/lift motors and ductwork/pipe work systems must be isolated from the building structure in order to ensure that vibration within the floor of any occupied room is controlled to a level not exceeding 0.05ms‐2 in any direction (vertical or horizontal), when measured and evaluated in accordance with IS0 2631‐2:2003 'Mechanical vibration and shock ‐ Evaluation of human exposure to whole‐body vibration - Part 2:Vibration in buildings(1 Hz t0 80 Hz)'.

B. 更多指导性信息参见 BS6472:1992”人体暴露于建筑振动的评估(1Hz 至 80Hz)"或 ANSI S2.71‐1983(R2006)”机械振动与冲击一人体暴露于全身振动的评价一第 2 部分 建筑振动(1Hz 至 80Hz)"。
More specific guidance is provided within BS6472:1992 'Evaluation of human exposure to vibration in buildings(1 Hz t0 80 Hz)', or ANSI S2.71‐1983 (R2006) 'Mechanical vibration and shock ‐ Evaluation of human exposure to whole‐body vibration—Part 2:Vibration in buildings(1 Hz t0 80 Hz)'.

C. 参见第 9.4 小节。
Refer to Section 9.4

9.9. 特殊情况
SPECIAL CONDITIONS

A. 降雨噪声
Rainfall Noise

1. 轻型或玻璃屋面的降雨噪声设计必须满足在降雨量 40mm/h 时不得超过以下水平，并应向希尔顿全球提供相关计算书进行符合性验证。
Noise from rainfall on exceed the following lightweight or glass roofs must be designed so to not levels under a rainfall rate of 40mm/h. Calculations demonstrating compliance must be submitted to Hilton Worldwide upon request

表 9-8 降雨噪音水平

Table9-8 Rainfall Noise Level

房间 Room	降雨噪音水平, L_{eq} Rainfall Noise Level, L_{eq}
客房，包括卫生间 Guestroom, including bathroom	NR40
大/小会议室 Meeting/conference rooms	NR45
酒吧/酒廊/餐厅 Bar/lounge/restaurant	NR50
大堂/接待处/客人走廊 Lobby/reception/guest corridors	NR50
办公室 Offices	NR45

2. 对于经常发生这种类型或更严重降雨的地区，可能采用更严格的标准。
   In regions where such rainfall, or heavier, occurs frequently, more stringent criteria may be applicable

3. 雨水排水管要求参见 9.4 小节。
   Refer to Section 9.4 for requirements for rainwater pipes

B. 地面传递振动
   Groundborne Vibration

1. 如果酒店建造于潜在地面传递噪声源之上或两者毗邻，比如道路中有大量重型 货物运输工具及地面/地下铁路，噪声源传递到有人房间的振动和/或再辐射噪声水平不能超过以下值。
   Development of sites located above or close to potential sources of groundborne vibration, e.g. roads carrying a high percentage of heavy goods traffic and surface/ underground railway lines, must ensure that resultant vibration and/or re‐radiated noise levels within occupied rooms does not exceed the values listed below.

表 9-9 地面传递振动
Table9-9Groundborne Vibration

房间 Room	地板有感振动，振动剂量值 $m/s^{1.75}$ x, y 或 z-axes Tactile Vibration in Floors, Vibration Dose Value $m/s^{1.75}$ x, y or z-axes	再辐射噪音，$L_{Amax,fast}$ Re-radiated Noise, $L_{Amax,fast}$
		满负荷工作 Full Service
客房，包括卫生间 Guestroom, including bathroom	0.2 to 0.4 (07.00h –23.00h) 0.1 to 0.2 (23.00h –07.00h)	35dB
大/小会议室 Meeting/conferen ce rooms	0.2 to 0.4 (07.00h –23.00h)	35dB
酒吧/酒廊/餐厅 Bar/lounge/restaurant	0.2 to 0.4 (07.00h –23.00h)	40dB
大堂/接待处/客人走廊 Lobby/reception/guest corridors	0.2 to 0.4 (07.00h –23.00h)	40dB

房间 **Room**	地板有感振动，振动剂量值 $m/s^{1.75}$ x, y 或 z-axes **Tactile Vibration in Floors, Vibration Dose Value $m/s^{1.75}$ x, y or z-axes**	再辐射噪音，$L_{Amax,fast}$ **Re-radiated Noise, $L_{Amax,fast}$**
		满负荷工作 **Full Service**
办公室 Offices	0.4 to 0.8 (07.00h –23.00h)	50dB

2. 参见 BS6472:2008“人体暴露于建筑振动的评估一第 1 部分：爆炸以外 的振动源”。
Refer to BS6472:2008 'Evaluation of human exposure to vibration in buildings Part l:Vibration sources other than blasting'.

9.10. 隔声矩阵
SOUND INSULATION MATRICES

A. 下列矩阵中列出为邻近区域（隔墙和地板）之间现场空气声隔声要求，dB R’ w[3]/ASTC[4J。施工完成后必须进行现场性能测试。
The following matrix lists required in‐situ airborne sound insulation between adjacencies (walls and floors), dB R’ w[3]/ASTC[4J. Performance must be tested upon completion.

表 9-10 邻近区域（隔墙和地板）隔声矩阵

Table 9-10 Adjacent(Walls and Floors) Sound Insulation Matrix

	客房 Guestroom	**设备间/竖井或储藏间 Equip. room/ riser or store**	**没有门的走廊 Corridor, no door**	**餐厅、酒吧、游戏室 Restaurant, Bar, Game Room**	**多功能厅 Function Room**	**会议室、董事会议室、培训室 Meeting, Board, Training Rooms**	**行政酒廊、商务中心 Exec Lounge, Bus. Center**	**健身、水疗中心 Fitness Ctr, Spa**	**办公室 Office**	**厕所/更衣室 WC/ Change Room**	**厨房/洗衣房 Kitchen, laundry**
客房 Guestroom	55dB	60dB	60dB	60dB	60dB	60dB	60dB	60dB	60dB	60dB	65dB
设备间/竖井或储藏间 Equip. room/ riser or store			45dB	45dB	45dB	50dB	50dB	45dB	50dB	45dB	40dB
没有门的走廊 Corridor, no door				45dB	45dB	45dB	45dB	45dB	45dB	45dB	50dB
餐厅、酒吧、游戏室 Restaurant, Bar, Game Room				40dB	45dB	55dB	55dB	45dB	50dB	45dB	50dB** (no door)
多功能厅 Function Room					50dB*	55dB	55dB	45dB	55dB	45dB	50dB** (no door)
会议室、董事会议室、培训室 Meeting, Board, Training Rooms						50dB*	50dB	50dB	50dB	50dB	55dB
行政酒廊、商务中心 Executive Lounge/ Business Center							50dB	50dB	50dB	50dB	55dB
健身中心、水疗中心 Fitness Center/Spa									50dB	45dB	55dB

	客房 Guestroom	设备间/竖井或储藏间 Equip. room/ riser or store	没有门的走廊 Corridor, no door	餐厅、酒吧、游戏室 Restaurant, Bar, Game Room	多功能厅 Function Room	会议室、董事会议室、培训室 Meeting, Board, Training Rooms	行政酒廊、商务中心 Exec Lounge, Bus. Center	健身、水疗中心 Fitness Ctr, Spa	办公室 Office	厕所/更衣室 WC/ Change Room	厨房/洗衣房 Kitchen, laundry
办公室 Office									45dB	50dB	55dB
厕所/更衣室 WC/ Change Room										40dB	45dB
厨房、洗衣房 Kitchen, laundry											

*适用于固定隔断。活动隔断的最低隔声等级必须为 3dB 以下。

* Applies to fixed partition. Moveable partitions must have minimum acoustic rating 3dB lower.

**基于方面进出和卫生方面考虑，厨房的门不能安装隔声密封装置。墙上如果开门，则墙体隔音等级至少应达到 R'w 40dB。

** Doors to kitchens cannot be fitted with seats for reasons of accessibility and hygiene. Where there is a door, walls must be constructed to achieve R'w 40dB minimum.

根据 BS EN ISO 140-4: 1998"声学-建筑和建筑构件隔声测量-第 4 部分: 房间之间空气声隔声的现场测量"和 BS EN ISO 717-1: 1997"声学-建筑和建筑构件隔声测量-第 1 部分: 空气声隔声”测量表面计权隔声量。

Apparent weighted sound reduction index measured in accordance with BS EN ISO 140-4: 1998 ‘Acoustics – Measurement of sound insulation in buildings and of building elements – Part 4: Field measurements of airborne sound insulation between rooms’ and weighted according to BS EN ISO 717-1: 1997 ‘Acoustics – Rating of sound insulation in buildings and of building elements – Part 1: Airborne sound insulation’

根据 ASTM E90: 2009 "实验室测量建筑物隔墙和构件的空气声传输损失的标准试验方法”和 ASTM E413-10”隔声等级分类"测量表面隔声等级。

Apparent sound transmission class measured in accordance with ASTM E90: 2009 ‘Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements’ and weighted as described in ASTM E413-10 ‘Classification for Rating Sound Insulation’

表 9-11 现场隔声量要求

Table 9-11 Site Noise Isolation Requirement

房间/墙体 Room/Wall	现场隔声量(STC) Site Noise Isolation
客房分户墙 Separation Wall of Guestroom	55
客房管井墙（分户） Shaft Wall of Guestroom	55（管井墙连管井空间的整体隔声量）
客房走道墙 Corridor Wall of Guestroom	45
会议室/多功能厅/宴会厅 Meeting Room/Multi-purpose Hall/Ballroom	50
行政酒廊 Executive Lounge	50
餐厅/中餐包房 Restaurant/Chinese Restaurant Private Room	45
活动隔断 Operable partitions	45
办公室 Office	45
健身房 GYM	45
水疗 SPA	45
厨房 Kitchen	45
洗衣房 Laundry	45
设备机房 M&E rooms	45

(1) 两不同功能房间相邻，其分隔墙体的隔声量必须以高要求的墙体设计。
When 2 rooms of different function abutting each other, the design and construction of the separation of dividing walls shall meet the requirement of the more stringer one.

(2) 厨房/洗衣房与噪声敏感房间相邻时，其墙体除应以噪声敏感房间墙体隔声要求为准外，还应考虑增加额外的声学处理措施。
When kitchen/laundry room is abutting a noise sensitive room, beside provision of partition or separation wall meeting the requirement for the noise sensitive room, additional acoustic measures must also be taken.

(3) 设备机房与噪声敏感房间相邻时，其墙体除应以噪声敏感房间墙体隔声要求为准外，还必须增加额外的声学处理措施。
When M&E plant room is abutting a noise sensitive room, beside provision of partition or separation wall meeting the requirement for the noise sensitive room, additional acoustic measures must also be taken.

(4) 墙体相关节点。
Detailed wall drawings

B. 活动隔断
Moveable Partition

1. 活动隔断假天花以上部分必须用石膏板封堵
Moveable partition and above suspended ceiling must be provided with gypsom or plaster board seal.

2. 活动隔断安装完毕后，活动隔断展开后必须能够抵住藏板间内的边墙体，而不是抵住藏板间门板。如果这一要求无法实现，必须加强藏板间门板的隔声量。
   When the moveable partition is installed, the moveable portition upon opening shall be capable & suppecting the side walls of the partition board homing and not the door of the partition board homing. If this cannot be achieve, the noise isolation of the partition board homing shall be strengthen.

3. 活动隔断品牌建议：
   Recommended moveable partition boads

C. 以下矩阵列出了对房间（地板）的撞击声隔声要求，$dBL_{nT,w}$[5]。施工完成后必须进行现场性能测试。
   The following matrix lists required impact sound insulation to rooms (floors), $dBL_{nT,w}$[5]. Performance must be tested upon completion.

表 9-11 房间（地板）的撞击声隔声要求($L_{nT,w}$)

Table 9-11 Impact sound insulation to rooms (floors)($L_{nT,w}$)

<table>
<tr><th rowspan="2">楼下空间
Space Below</th><th colspan="8">楼上空间
Space Above</th></tr>
<tr><th>客房
Guest room</th><th>餐厅、酒吧、游戏室
Restaurant, Bar, Game Room</th><th>多功能厅
FunctionRoom</th><th>会议室、董事会议室、培训室
Meeting, Board, Training Rooms</th><th>行政酒廊、商务中心
Executive Lounge, Business Center</th><th>办公室
Office</th><th>厕所/更衣室
WC/ Chanching Room</th><th>健身中心、水疗中心
Fitness Center, Spa</th><th>厨房/洗衣房、酒吧储藏室
Kitchen, laundry, bar store</th></tr>
<tr><td>客房
Guestrrom</td><td>50dB</td><td>45dB</td><td>45dB</td><td>50dB</td><td>50dB</td><td>50dB</td><td>50dB</td><td rowspan="6">*</td><td rowspan="6">**</td></tr>
<tr><td>餐厅、酒吧、游戏室
Restaurant, Bar, Game Room</td><td colspan="7" rowspan="4">55dB</td></tr>
<tr><td>多功能厅
Function Room</td></tr>
<tr><td>会议室、董事会议室、培训室
Meeting, Board, Traning Rooms</td></tr>
<tr><td>行政酒廊、商务中心
Executive lounge, Business Center</td></tr>
<tr><td>健身中心、水疗中心
Fitness Center, Spa</td><td colspan="7">55dB</td></tr>
<tr><td>办公室
Office</td><td colspan="7">60dB</td></tr>
</table>

*酒店的平面布局应避免在噪声敏感房间的上方布置健身房和水疗中心（包括泳池），否则应采取一切可能措施以控制结构噪声不会传递到楼下。
*Hotel layouts must avoid arrangement of health clubs and spas (including pools noise sensitive spaces unless all due measures are employed to control transfer structure‐borne sound to below.

**可不必考虑厨房、洗衣房和储藏室的撞击噪声水平。当这些区域位于噪声敏感房 间（如客房或会议室等）之上时，必须提高撞击噪声水平要求，即至少降低 10dB。 强烈推荐采用浮筑混凝土/垫层楼板。当设备机房位于噪声敏感房间之上时（如客 房或会议室等），设备机组的基础必须采取浮式处理。当客房上层房间为有人房间 （如客房、会议室、餐厅、中餐包房、行政酒廊等）时，上层有人房间地面如果采 用硬质地面（即非铺设地毯地面），如木地板或石材，那么硬质地面区域（卫生间 除外）推荐增加垫层。
**Impact sound levels within kitchens, laundries and storages are not of concern. Where these areas occur above sensitive areas, the corresponding impact sound level must be improved, i.e., lowered by at least 10dB. Installation of floating concrete/screed floors is highly recommended. When the M&E plant room is located above noise sensitive area (such as guestroom and office), the equipment and plant room shall be installed on floating suppect or plinth. When the floor above the guestroom is occupied (such as guestroom, meeting room, F&B, Chinese restaurant private room, executive lounge and etc), and the occupied floor above is provided with hard flooring (that is not carpeted), such as wooden or granite flooring, then the hard surface of the area (except toilet) shall be added with additional floor screed.

根据 BSENIS0140‐7:1998“声学一建筑和建筑构件隔声测量一第 7 部分：房间之间空气声隔声的现场测量”和 BSENIS0717‐2:1997“声学一建筑和建筑构件隔声测量一第 2 部分：撞击声隔声”测量加权标准化撞击声压级。
Weighted standardized impact sound pressure level measured in accordance with BSEN IS0 140‐7:1998 'Acoustics ‐ Measurement of sound insulation in buildings and of building elements ‐ Part 7:Field measurements of impact sound insulation of floors' and weighted according to BS EN IS0 717‐2:1997 'Acoustics ‐ Rating of sound insulation in buildings and of building elements ‐ Part 2:Impact sound insulation'

D. 以下矩阵列出了对房间（地板）的撞击隔声要求，FIIC[6]。楼板上方房间施工完成后必须进行现场噪声测试。
The following matrix lists required impact sound insulation to rooms (floors), dB FIIC[6].
Performance to be tested upon completion Space Above

表 9-12 房间（地板）的撞击声隔声要求(FIIC)
Table 9-12 Impact sound insulation to rooms (floors)(FIIC)

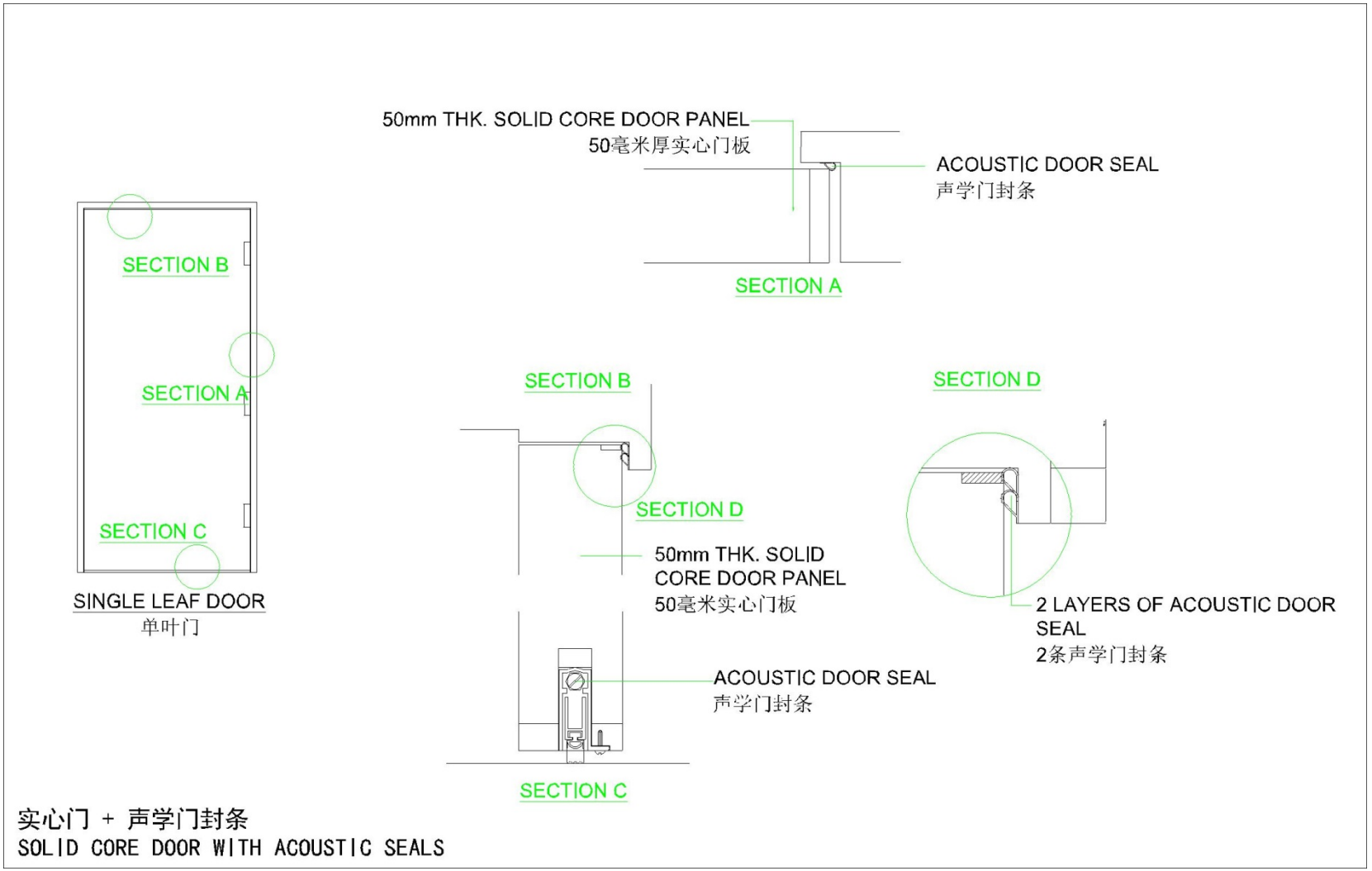
<table>
<tr><th rowspan="2">楼下房间
Space Below</th><th colspan="9">楼上房间
Space Above</th></tr>
<tr><th>客房
Guest room</th><th>餐厅、酒吧、游戏室
Restaurant, Bar, Game Room</th><th>多功能厅
FunctionRoom</th><th>会议室、董事会议室、培训室
Meeting, Board, Training Rooms</th><th>行政酒廊、商务中心
Executive Lounge, Business Center</th><th>办公室
Office</th><th>厕所/更衣室
WC/ Changing Room</th><th>健身、水疗中心*
Fitness Center, Spa</th><th>厨房/洗衣房、酒吧储藏室
Kitchen, laundry, bar store</th></tr>
<tr><td>客房
Guestroom</td><td>60dB</td><td>65dB</td><td>65dB</td><td>60dB</td><td>60dB</td><td>60dB</td><td>60dB</td><td rowspan="6">*</td><td rowspan="6">**</td></tr>
<tr><td>餐厅,酒吧
Restaurant, Bar,</td><td colspan="7" rowspan="4">55dB</td></tr>
<tr><td>多功能厅
Function Room</td></tr>
<tr><td>会议室,培训室
Meeting, Board, Training Rooms</td></tr>
<tr><td>行政酒廊商务中心
Executive Lounge, Business Center</td></tr>
<tr><td>健身,水疗中心
Fitness Center, Spa</td><td colspan="7">55dB</td></tr>
<tr><td>办公室
Office</td><td colspan="7">50dB</td></tr>
</table>

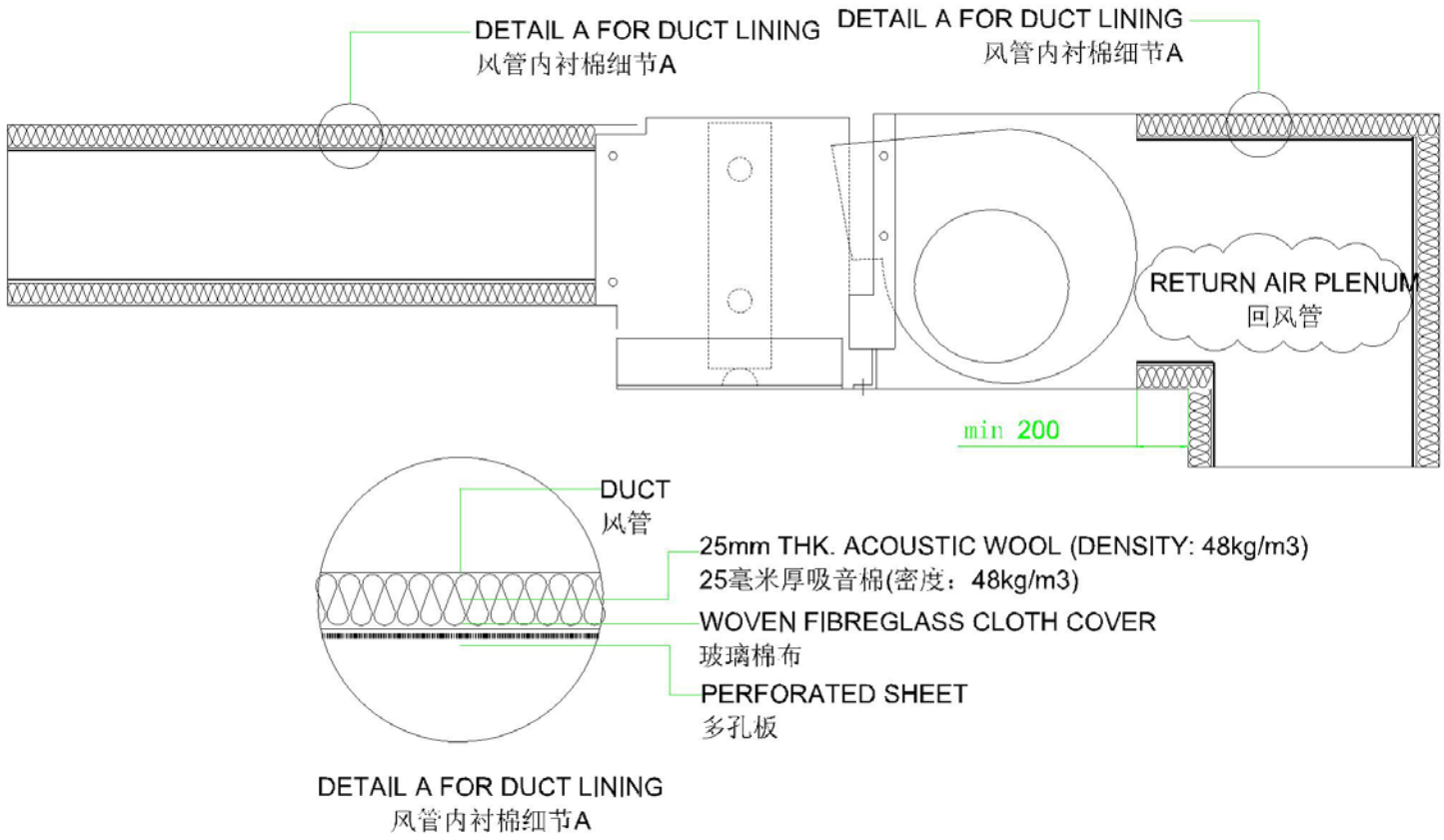
*酒店的平面布局应避免在噪声敏感房间的上方布置健身房和水疗中心（包括泳池），否则应采取一切可能措施以控制结构噪声不会传递到楼下。
*Hotel layouts must avoid arrangement of health clubs and spas (including pools) above noise sensitive spaces unless all due measures are employed to control transfer of structure‐borne sound to below.

**可不必考虑厨房、洗衣房和储藏室的撞击噪声水平。当这些区域位于噪声敏感房间（如客房或会议室等）之上时，必须提高撞击噪声水平要求，即至少降低 10dB。强烈推荐采用浮筑混凝土/垫层楼板。当设备机房位于噪声敏感房间之上时（如客房或会议室等），设备机组的基础必须采取浮式处理。当客房上层房间为有人房间（如客房、会议室、餐厅、中餐包房、行政酒廊等）时，上层有人房间地面如果采用硬质地面（即非铺设地毯地面），如木地板或石材，那么硬质地面区域（卫生间除外）推荐增加垫层。
**Impact sound levels within kitchens, laundries and stores are not of concern. Where these areas occur above sensitive areas, the corresponding impact sound level must be improved, i.e. lowered, by at least 10dB. Installation of floating concrete/screed floors is highly recommended.

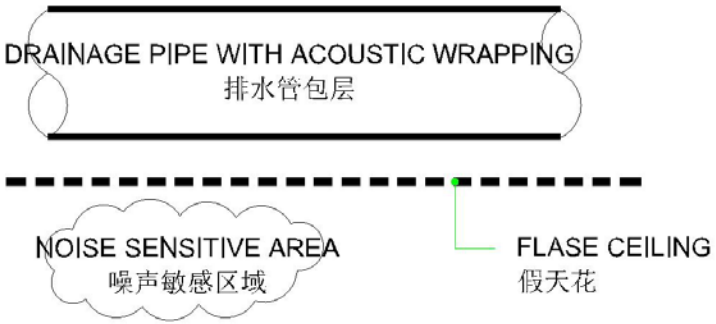
现场撞击隔声等级应满足 ASTM E1007‐04e1"通过天棚地板及其支承结构传导的夯击机械撞击声的现场测量方法”和 ASTM E989‐06”撞击隔声等级标准分类(IIC)”的要求。
6 Field impact insulation class determined in accordance with ASTM E1007 ‐ 04e1 'Standard Test Method for Field Measurement of Tapping Machine Impact Sound Transmission Through Floor‐Ceiling Assemblies and Associated Support Structures' and ASTM E989 ‐ 06 'Standard Classification for Determination of Impact Insulation Class (IIC)

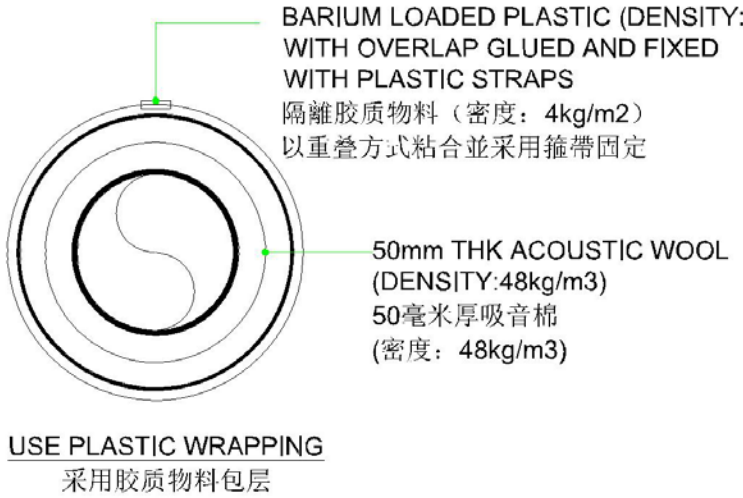
9.11. 附录 节点大样图
Appendix Node shop drawing





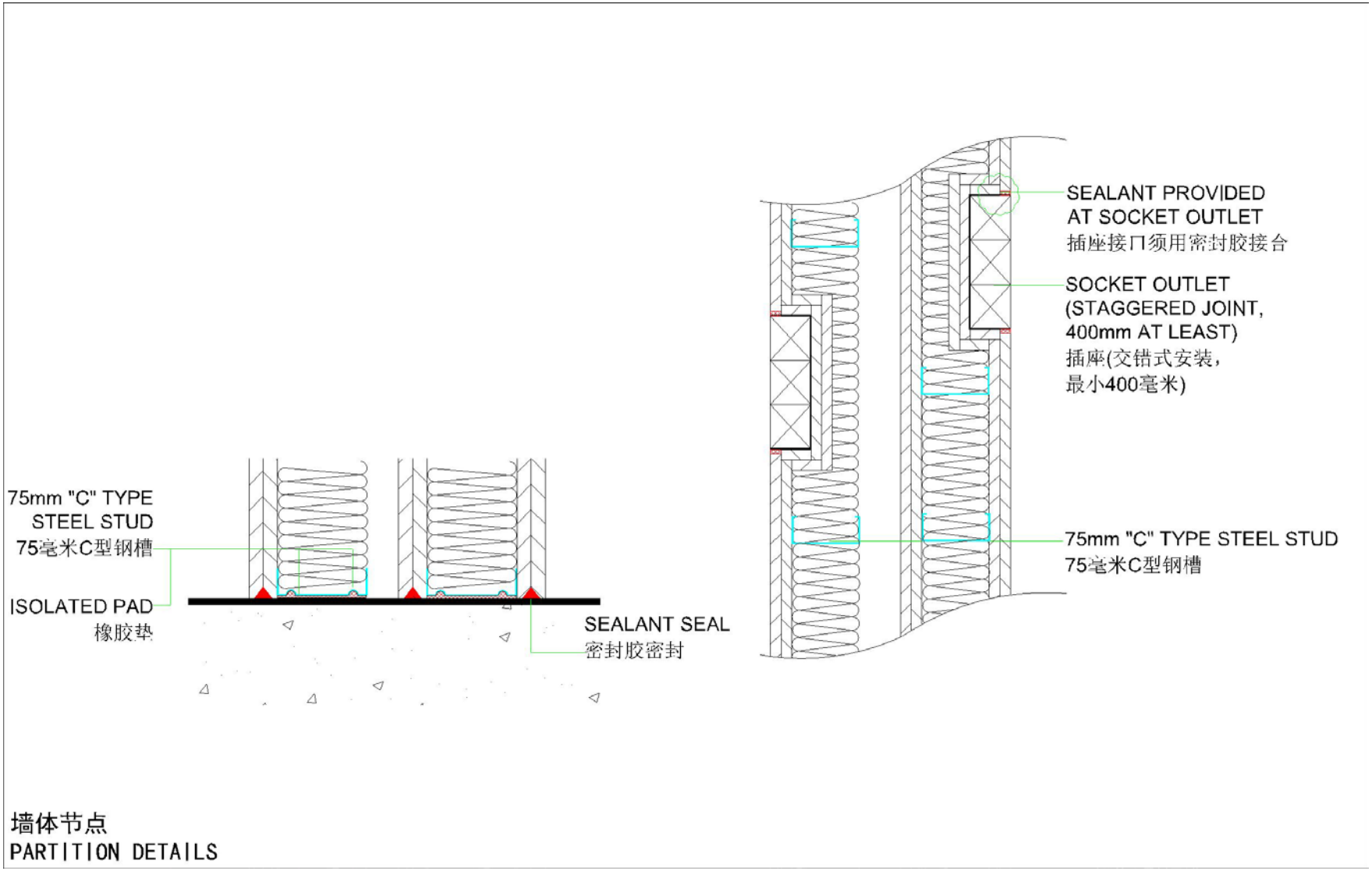
盘管风机声学处理
ACOUSTIC TREATMENT FOR FCU



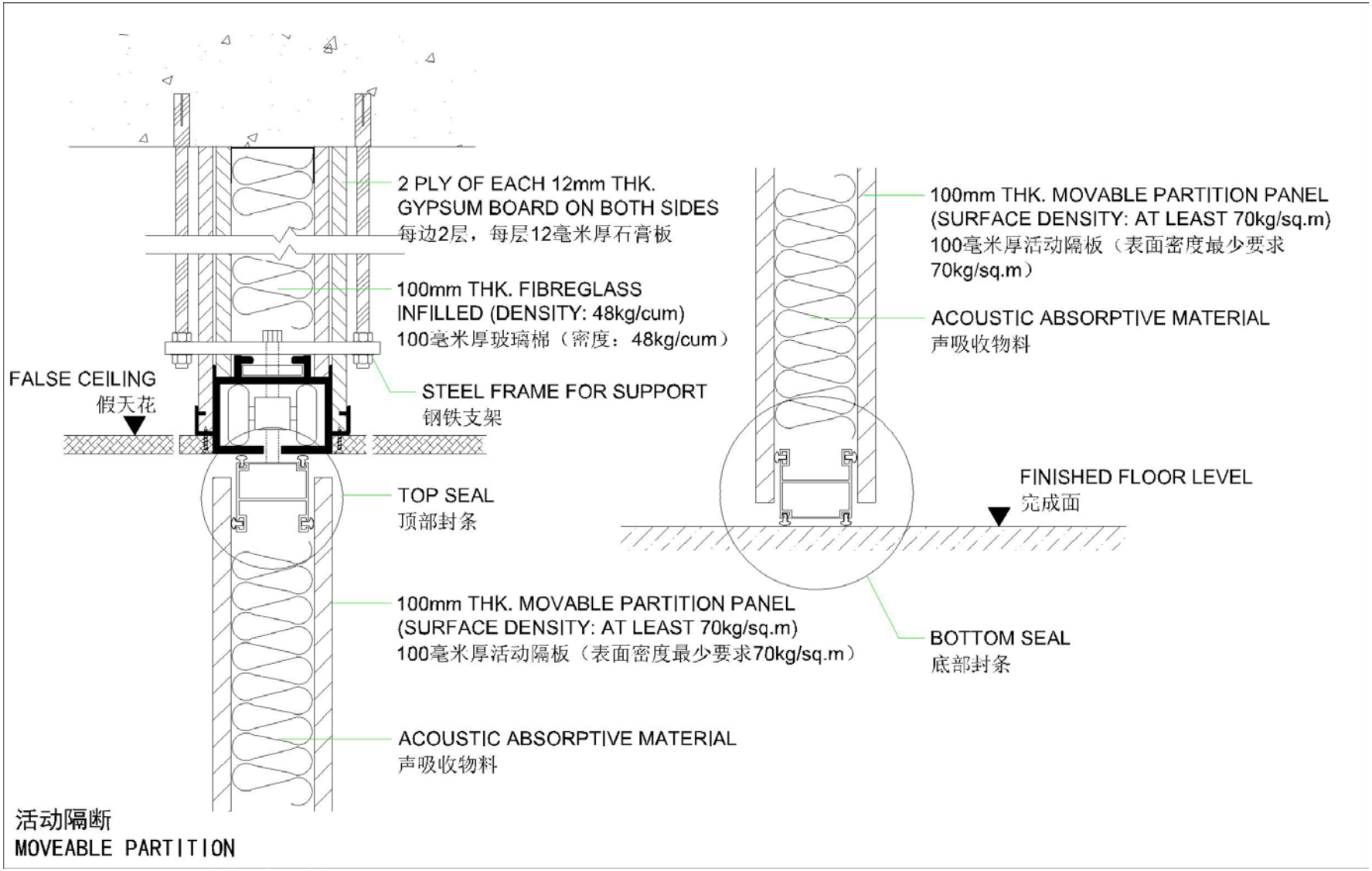


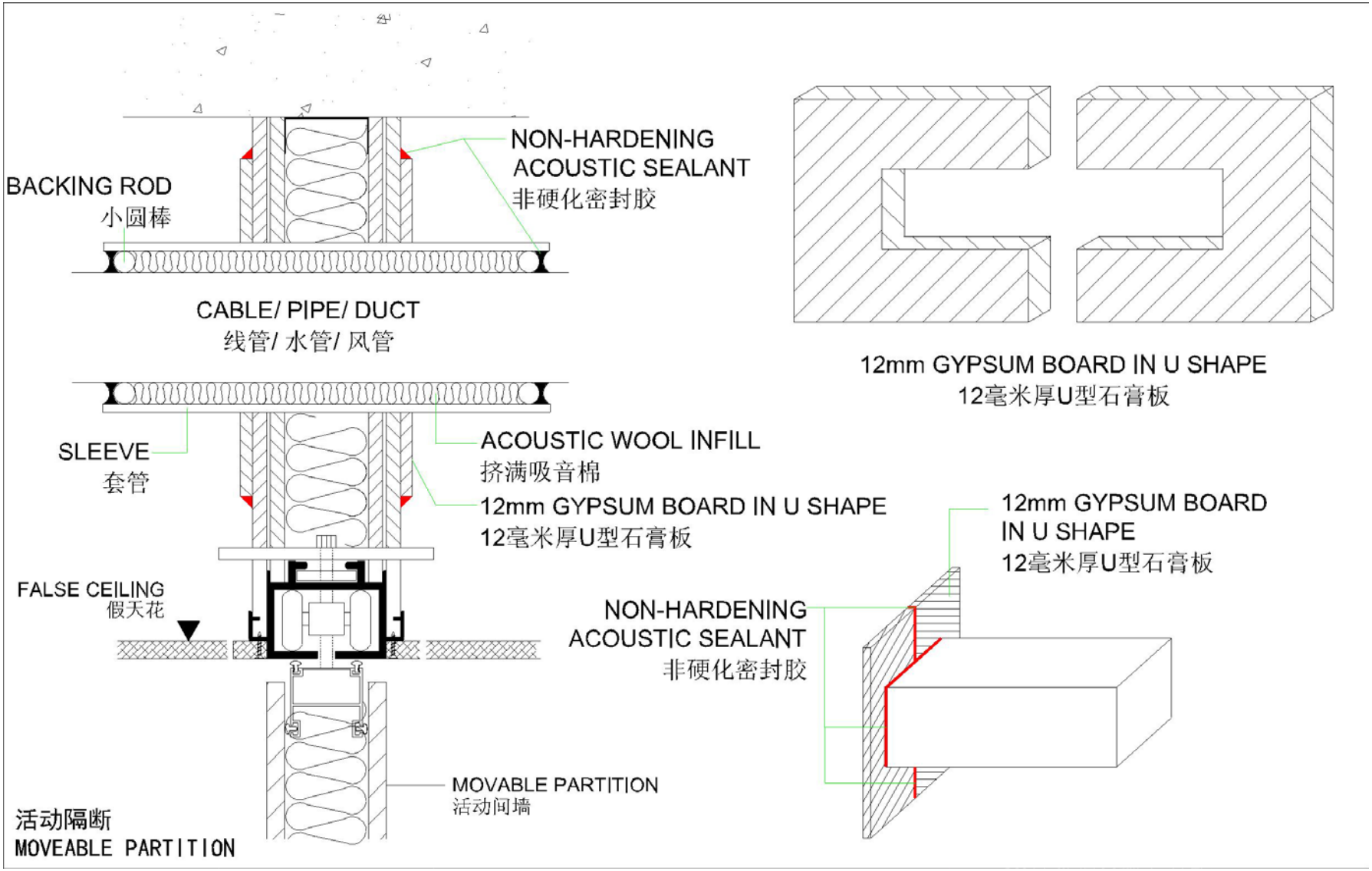
NOTE: DRAINAGE PIPES ACORSS NOISE SENSITIVE AREA HAVE TO ACOUSTIC WRAPPING TO AVOID NOISE IMPACT.
备注：经过噪声敏感区域的排水管须进行声学包层，避免噪声影响。

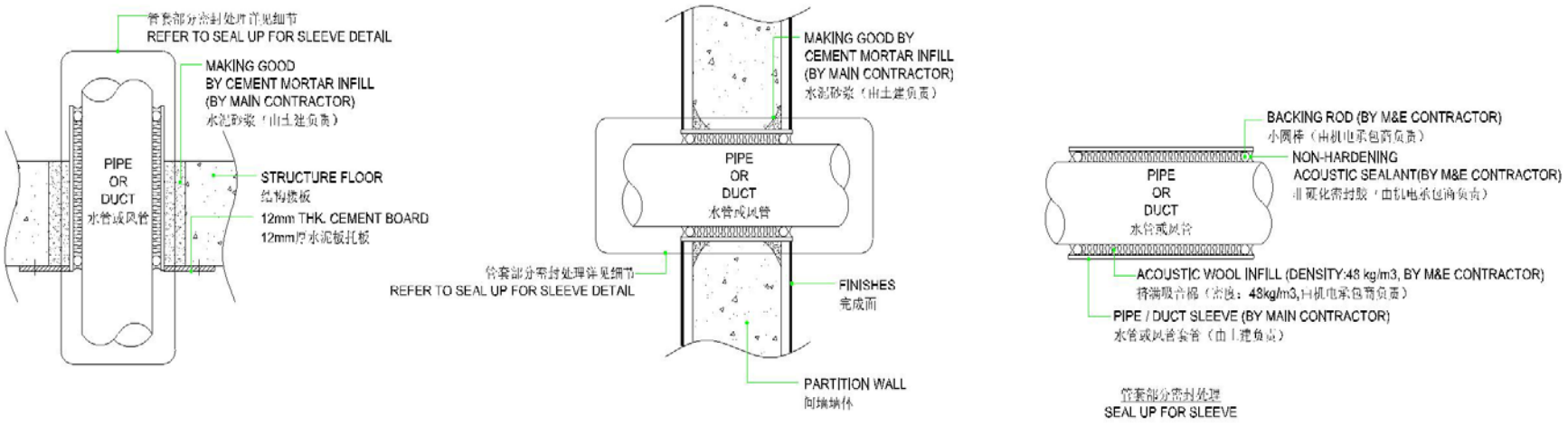
PVC排水管包层处理
ACOUSTIC WRAPPING FOR PVC DRAINAGE PIPE



墙体节点
PARTITION DETAILS

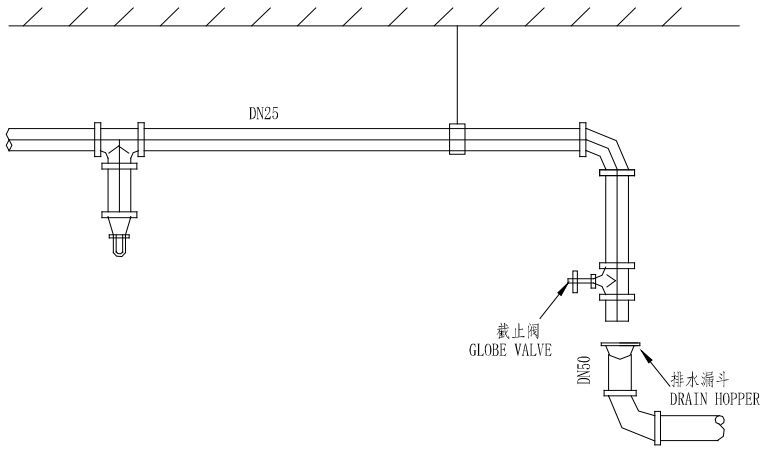

2 PLY OF EACH 12mm THK.
GYPSUM BOARD ON BOTH SIDES
每边2层，每层12毫米厚石膏板
100mm THK. FIBREGLASS
INFILLED (DENSITY: 48kg/cum)
100毫米厚玻璃棉（密度：48kg/cum）
FALSE CEILING
假天花
STEEL FRAME FOR SUPPORT
钢铁支架
TOP SEAL
顶部封条
100mm THK. MOVABLE PARTITION PANEL
(SURFACE DENSITY: AT LEAST 70kg/sq.m)
100毫米厚活动隔板（表面密度最少要求70kg/sq.m）
ACOUSTIC ABSORPTIVE MATERIAL
声吸收物料
100mm THK. MOVABLE PARTITION PANEL
(SURFACE DENSITY: AT LEAST 70kg/sq.m)
100毫米厚活动隔板（表面密度最少要求
70kg/sq.m）
ACOUSTIC ABSORPTIVE MATERIAL
声吸收物料
FINISHED FLOOR LEVEL
完成面
BOTTOM SEAL
底部封条
活动隔断
MOVEABLE PARTITION

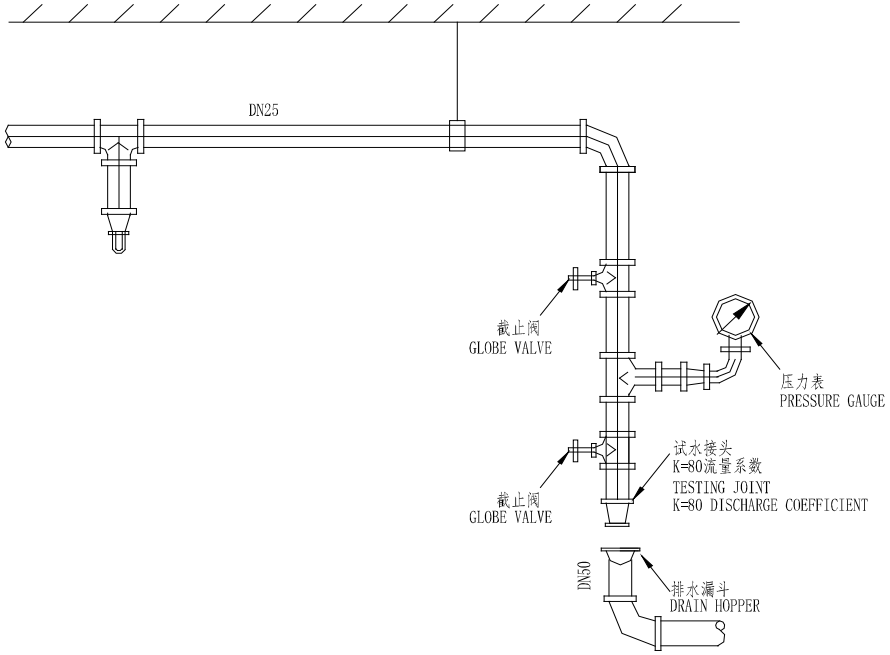

NON-HARDENING
ACOUSTIC SEALANT
非硬化密封胶
BACKING ROD
小圆棒
CABLE/ PIPE/ DUCT
线管/ 水管/ 风管
12mm GYPSUM BOARD IN U SHAPE
12毫米厚U型石膏板
SLEEVE
套管
ACOUSTIC WOOL INFILL
挤满吸音棉
12mm GYPSUM BOARD IN U SHAPE
12毫米厚U型石膏板
FALSE CEILING
假天花
NON-HARDENING
ACOUSTIC SEALANT
非硬化密封胶
12mm GYPSUM BOARD
IN U SHAPE
12毫米厚U型石膏板
MOVABLE PARTITION
活动间墙
活动隔断
MOVEABLE PARTITION



管道穿越砖墙及楼板密封处理
PENETRATION SEAL UP FOR BLOCK WALL & FLOOR

第10章.参考图纸及图片
SECTION 10: REFERENCE DRAWING AND PICTURE





	图名: 喷淋系统末端试水装置示意图 TITLE: INSTALLATION DETAIL FOR AUTOMATIC FIRE SPRINKLER SYSTEM TEST DRAIN FITUP	图纸编号:FS-01 DRAWING NO.:FS-01	专业: FS DOMAIN: FS
		比例: 无 SCALE: 无	日期: 2013.06.27 DATE: 2013.06.27

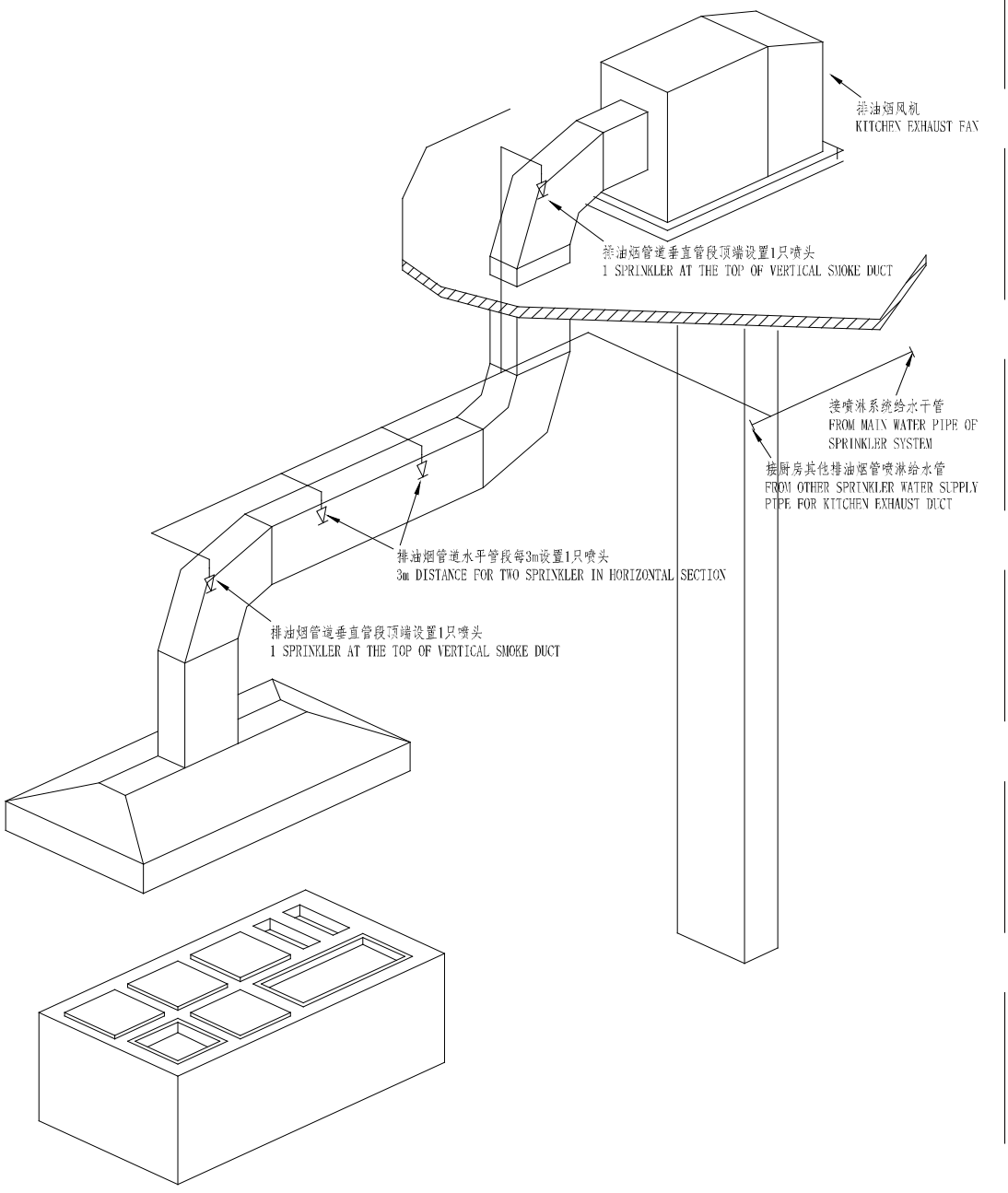


图 例
LEGEND

序号 NO.	图例 LEGEND	图例名称 NAME	
1	↓	喷淋头	SPRINKLER HEAD

	图名: 厨房排油烟管道内 260°C喷头安装示意图 TITLE: INSTALLATION DETAIL FOR 260°C RATING SPRINKLER HEAD IN KITCHEN EXHAUST DUCT	图纸编号: FS-02 DRAWING NO.: FS-02 比例: 无 SCALE: NONE	专业: FS DOMIAN: FS 日期: 2013.06.27 DATE: 2013.06.27

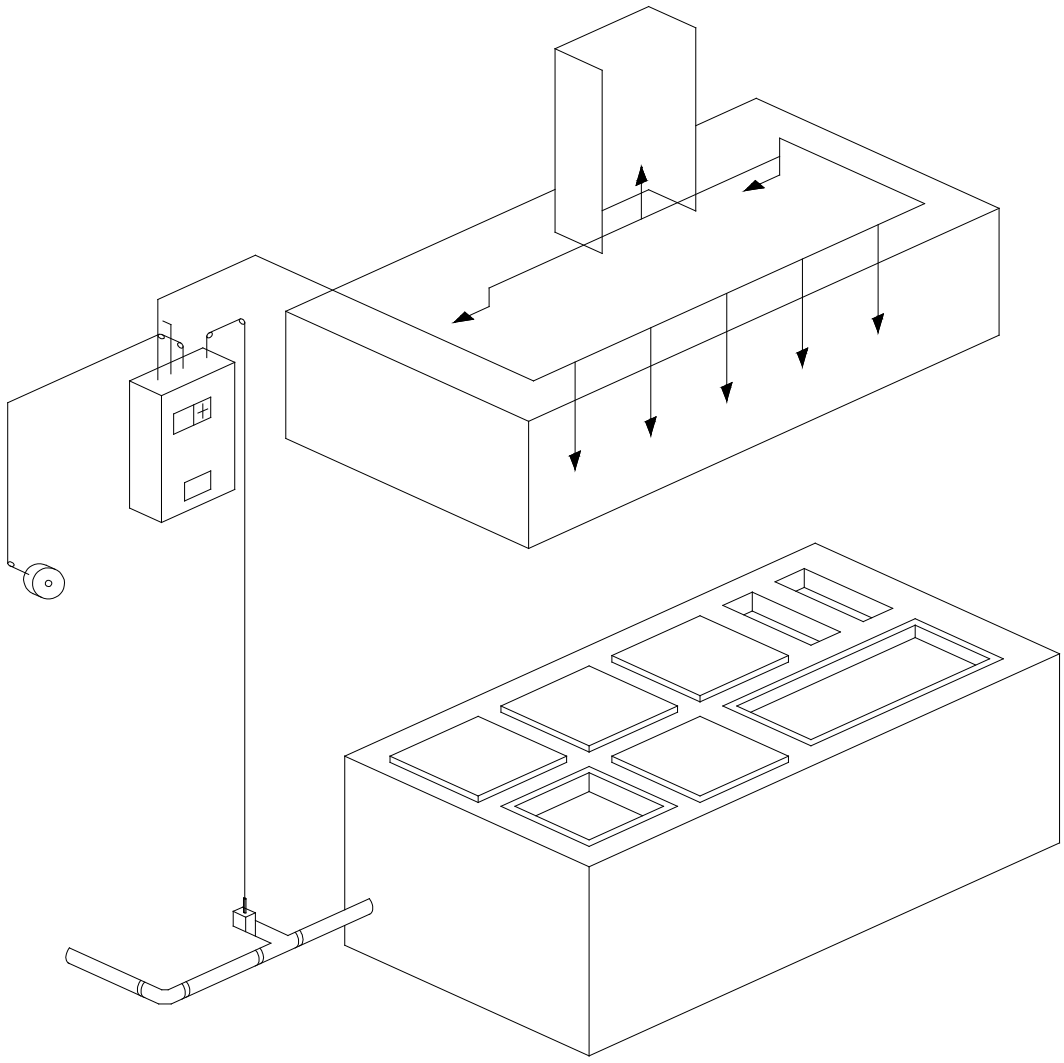


图 例
LEGEND

序号 NO.	图例 LEGEND	图例名称 NAME	
1		湿式化学灭火系统喷头	WET CHEMICAL SPRINKLER

	图名: 厨房排油烟罩湿式化学灭火系统 TITLE: INSTALLATION DETAIL FOR KITCHEN HOOD FIRE SUPPRESSION SYSTEM	图纸编号: FS-03 DRAWING NO.: FS-03	专业: FS DOMAIN: FS
		比例: 无 SCALE: NONE	日期: 2013.06.27 DATE: 2013.06.27

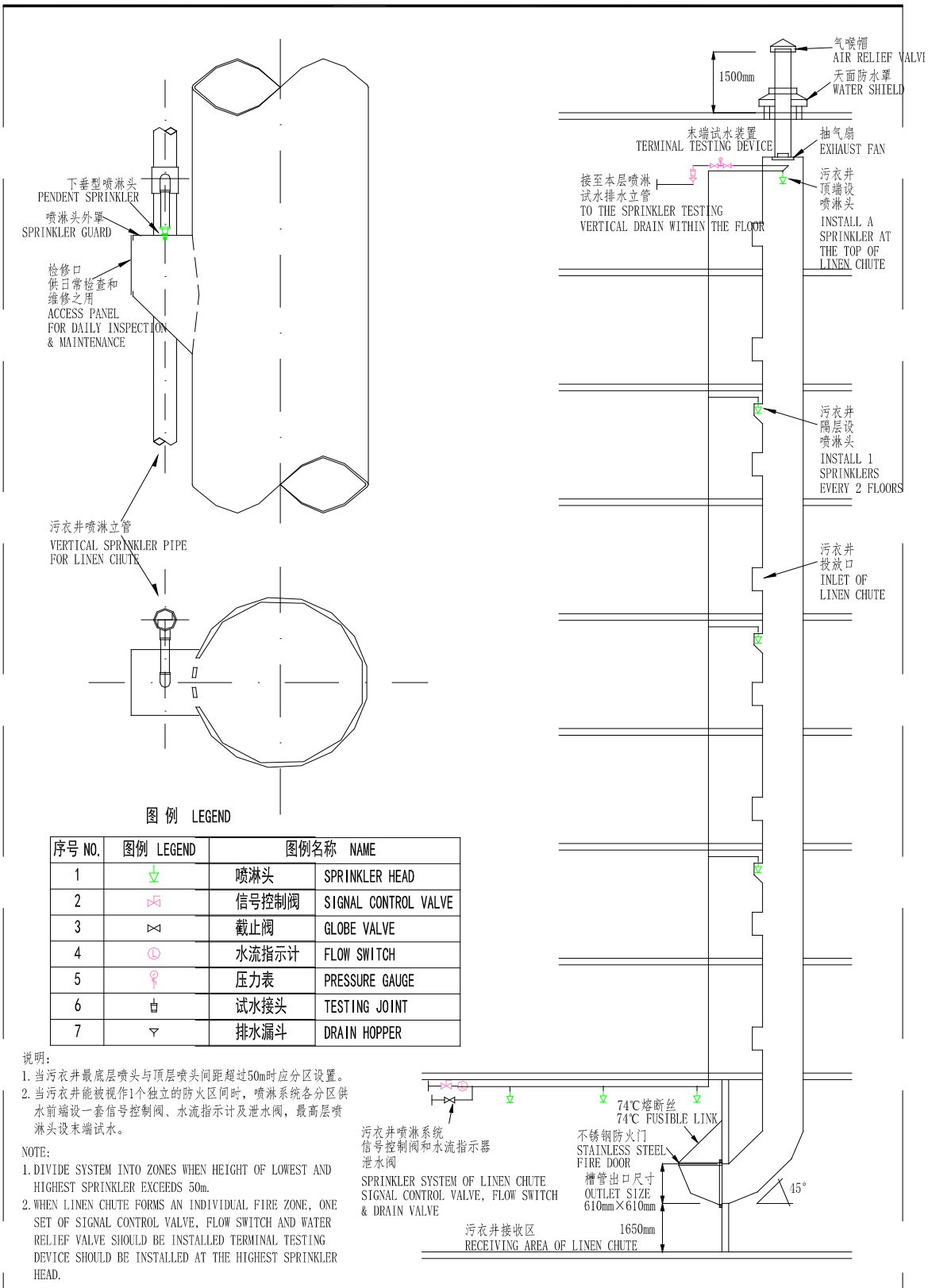


图 例 LEGEND

序号 NO.	图例 LEGEND	图例名称 NAME	
1		喷淋头	SPRINKLER HEAD
2		信号控制阀	SIGNAL CONTROL VALVE
3		截止阀	GLOBE VALVE
4		水流指示计	FLOW SWITCH
5		压力表	PRESSURE GAUGE
6		试水接头	TESTING JOINT
7		排水漏斗	DRAIN HOPPER

说明：
1. 当污衣井最底层喷头与顶层喷头间距超过50m时应分区设置。
2. 当污衣井能被视作1个独立的防火区间时，喷淋系统各分区供水前端设一套信号控制阀、水流指示计及泄水阀，最高层喷淋头设末端试水。

NOTE:
1. DIVIDE SYSTEM INTO ZONES WHEN HEIGHT OF LOWEST AND HIGHEST SPRINKLER EXCEEDS 50m.
2. WHEN LINEN CHUTE FORMS AN INDIVIDUAL FIRE ZONE, ONE SET OF SIGNAL CONTROL VALVE, FLOW SWITCH AND WATER RELIEF VALVE SHOULD BE INSTALLED TERMINAL TESTING DEVICE SHOULD BE INSTALLED AT THE HIGHEST SPRINKLER HEAD.

	图名： 污衣井内喷淋头安装示意图(一) TITLE: INSTALLATION DETAIL FOR SPRINKLERS PROVISION IN LINEN CHUTE (a)	图纸编号:FS-04a DRAWING NO.:FS-04a	专业: FS DOMAIN: FS
		比例: 无 SCALE: NONE	日期: 2013.06.27 DATE: 2013.06.27

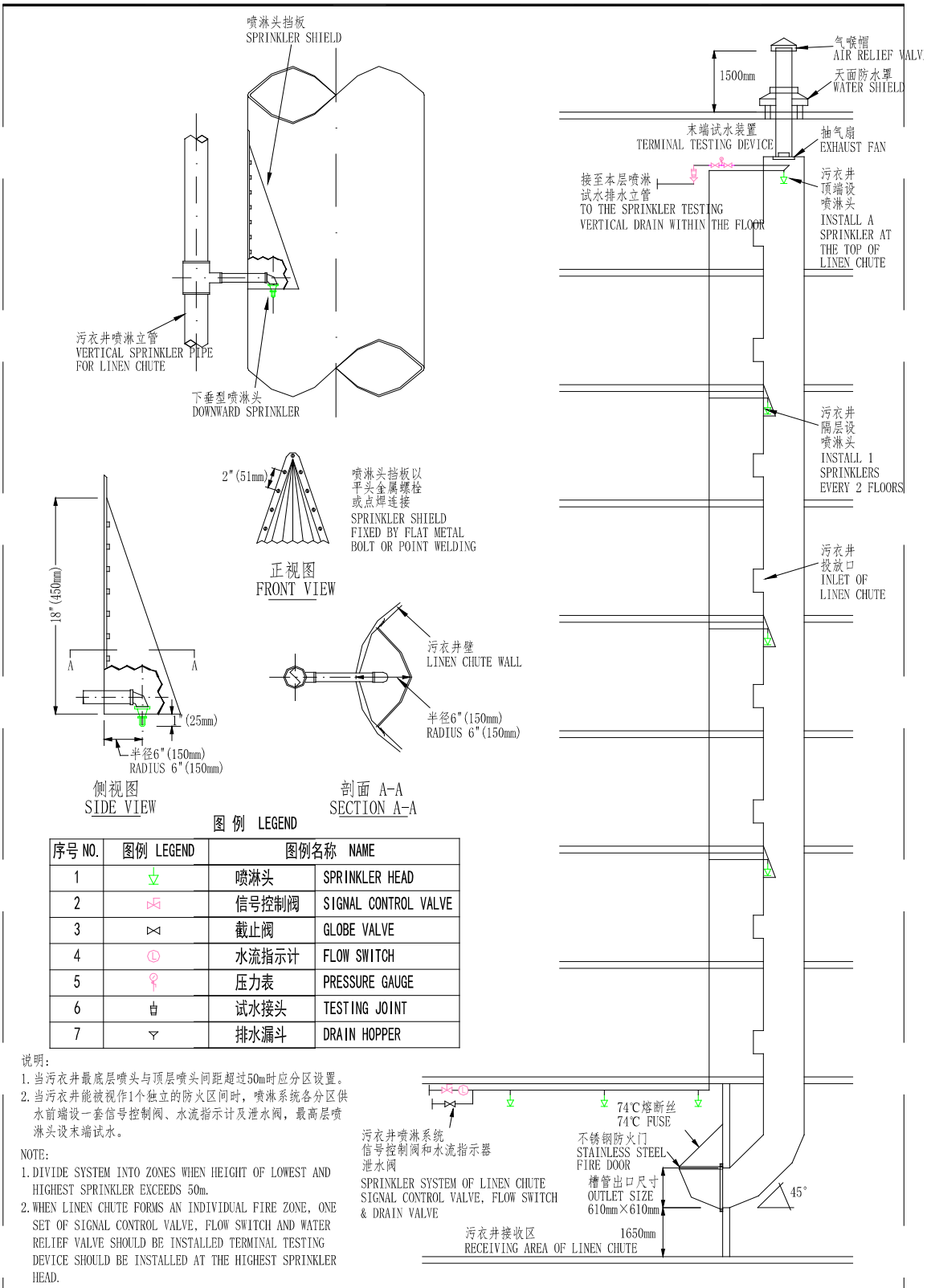


图 例 LEGEND

序号 NO.	图例 LEGEND	图例名称 NAME	
1		喷淋头	SPRINKLER HEAD
2		信号控制阀	SIGNAL CONTROL VALVE
3		截止阀	GLOBE VALVE
4		水流指示计	FLOW SWITCH
5		压力表	PRESSURE GAUGE
6		试水接头	TESTING JOINT
7		排水漏斗	DRAIN HOPPER

说明：

1. 当污衣井最底层喷头与顶层喷头间距超过50m时应分区设置。
2. 当污衣井能被视作1个独立的防火区间时，喷淋系统各分区供水前端设一套信号控制阀、水流指示计及泄水阀，最高层喷淋头设末端试水。

NOTE:

1. DIVIDE SYSTEM INTO ZONES WHEN HEIGHT OF LOWEST AND HIGHEST SPRINKLER EXCEEDS 50m.
2. WHEN LINEN CHUTE FORMS AN INDIVIDUAL FIRE ZONE, ONE SET OF SIGNAL CONTROL VALVE, FLOW SWITCH AND WATER RELIEF VALVE SHOULD BE INSTALLED TERMINAL TESTING DEVICE SHOULD BE INSTALLED AT THE HIGHEST SPRINKLER HEAD.

	图名: 污衣井内喷淋头安装示意图(二) TITLE: INSTALLATION DETAIL FOR SPRINKLERS PROVISION IN LINEN CHUTE (b)	图纸编号: FS-04b DRAWING NO.: FS-04b	专业: FS DOMAIN: FS
		比例: 无 SCALE: NONE	日期: 2013.06.27 DATE: 2013.06.27

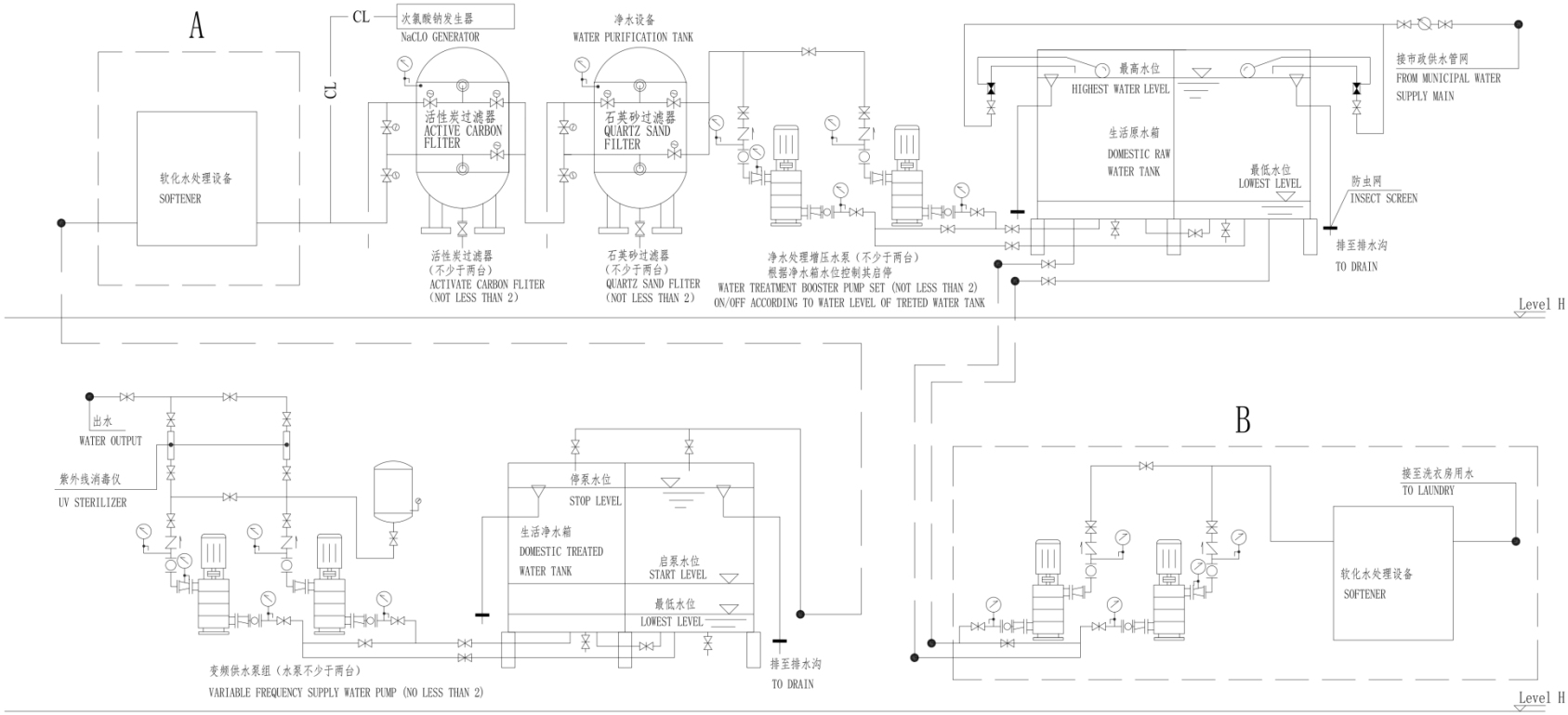


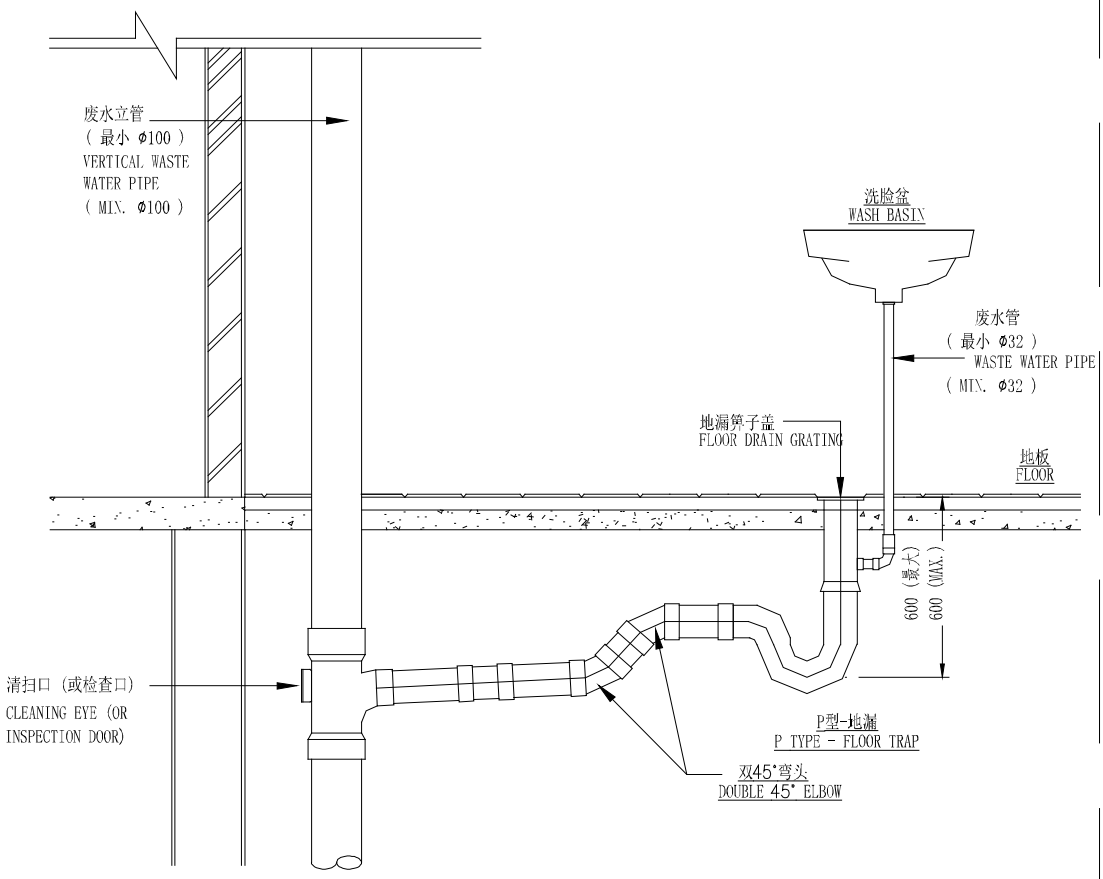
图 例
LAUNDRY

序号 NO.	图例 LEGEND	图例名称 NAME	
1		闸阀	GATE VALVE
2		浮球阀	BALL VALVE
3		流量计	FLOW METER
4		压力表	PRESSURE GAUGE
5		橡胶软接头	RUBBER FLEXIBLE JOINT
6		偏心异径管	ECCENTRIC REDUCER
7		同心异径管	CONCENTRIC REDUCER
8		止回阀	NON-RETURN VALVE
9		温控阀	TEMPERATURE CONTROL VALVE

说明： 1. 当项目市政供水水质硬度大于150ppm时，酒店给水系统需设软化水系统，如图示A区虚线框所示。
2. 当项目市政供水水质硬度大于50ppm时，酒店洗衣房用水需设软化水系统，如图示B区虚线框所示。

NOTE: 1. WHEN HARDNESS OF MUNICIPAL SUPPLY WATER EXCEEDS 150ppm, A SOFTENING SYSTEM IS NEEDED FOR HOTEL WATER SUPPLY SYSTEM, AS SHOWN IN DASHED BOX A.
2. WHEN HARDNESS OF MUNICIPAL SUPPLY WATER EXCEEDS 50ppm, A SOFTENING SYSTEM IS NEEDED FOR LAUNDRY WATER SUPPLY, AS SHOWN IN DASHED BOX B.

HILTON WORLDWIDE	图名： 生活水处理流程示意图 TITLE: SCHEMATIC DIAGRAM FOR DOMESTIC WATER TREATMENT SYSTEM	图纸编号： PD-01 DRAWING NO.: PD-01	专业： PD DOMAIN: PD	比例： 无 SCALE: 无	日期： 2013.06.27 DATE: 2013.06.27



	图名：客房卫生间地漏 防止水封干涸措施示意图 TITLE: INSTALLATION DETAIL FOR PREVENTION OF FLOOR TRAP WATER SEAL DRYING UP IN GUESTROOM TOILET	图纸编号：PD-02 DRAWING NO.：PD-02 比例：无 SCALE: NONE	专业：PD DOMAIN: PD 日期：2013.06.27 DATE: 2013.06.27

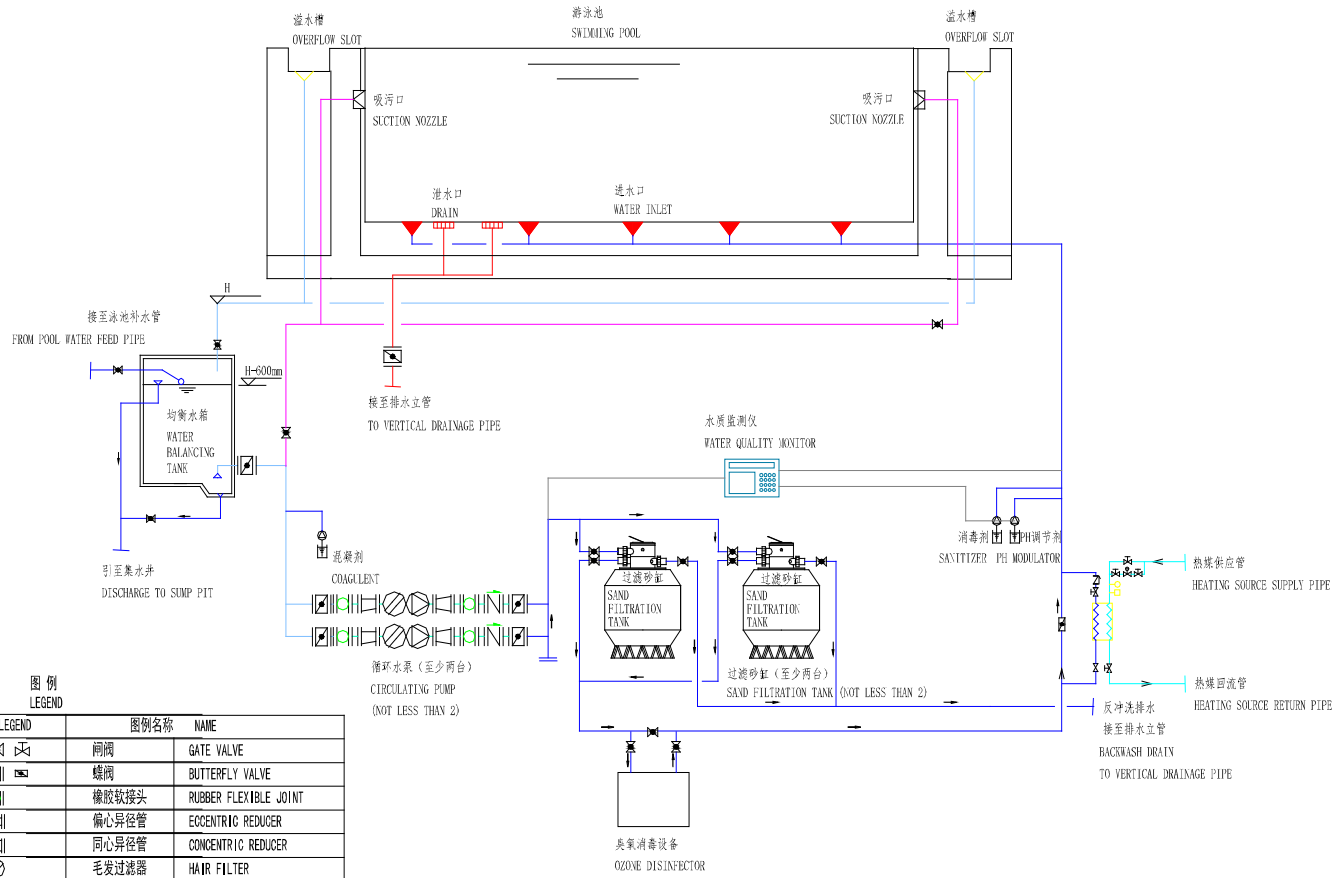


图 例
LEGEND

序号 NO.	图例 LEGEND	图例名称 NAME	
1		闸阀	GATE VALVE
2		蝶阀	BUTTERFLY VALVE
3		橡胶软接头	RUBBER FLEXIBLE JOINT
4		偏心异径管	ECCENTRIC REDUCER
5		同心异径管	CONCENTRIC REDUCER
6		毛发过滤器	HAIR FILTER
7		水泵	WATER PUMP
8		止回阀	NON-RETURN VALVE
9		温控阀	TEMPERATURE CONTROL VALVE

	图名： 室内游泳池（逆流式）水处理流程示意图 TITLE: SCHEMATIC DIAGRAM FOR INDOOR INFINITY POOL COUNTER FLOW FILTRATION & CIRCULATION SYSTEM	图纸编号： PD-03 DRAWING NO.: PD-03	专业： PD DOMAIN: PD	比例： 无 SCALE: NONE	日期： 2013.06.27 DATE: 2013.06.27

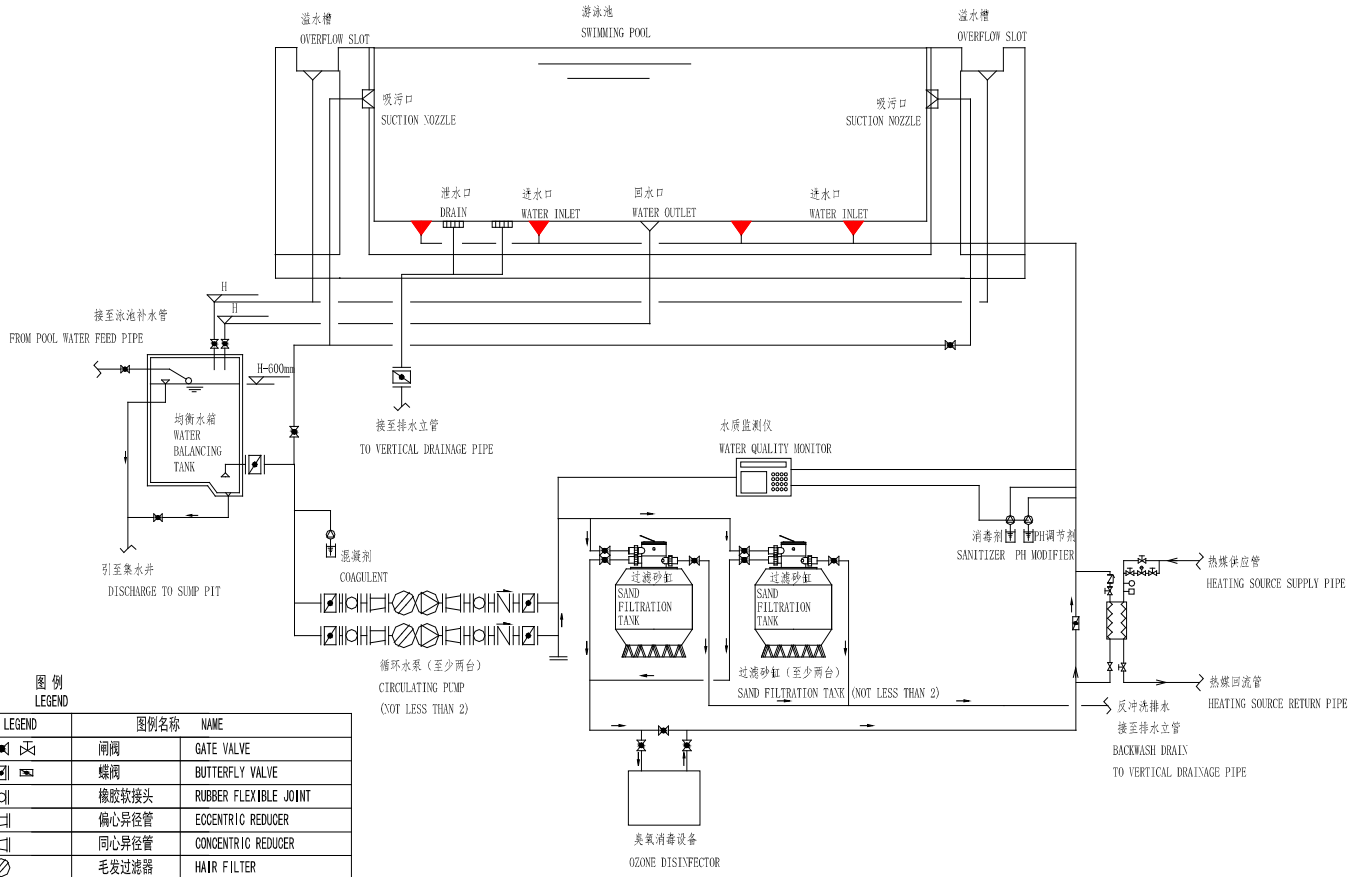
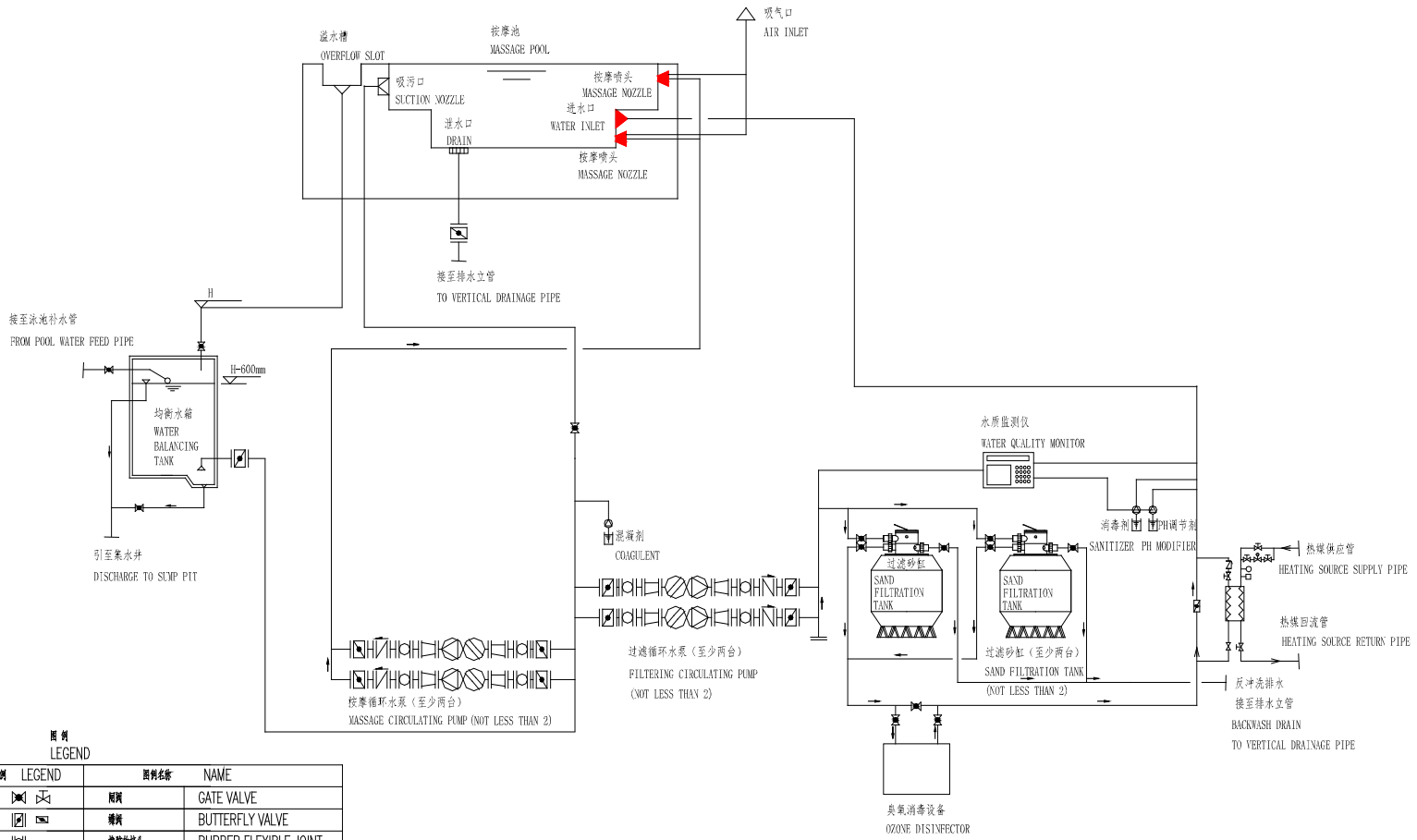


图 例
LEGEND

序号 NO.	图例 LEGEND	图例名称 NAME	
1		闸阀	GATE VALVE
2		蝶阀	BUTTERFLY VALVE
3		橡胶软接头	RUBBER FLEXIBLE JOINT
4		偏心异径管	ECCENTRIC REDUCER
5		同心异径管	CONCENTRIC REDUCER
6		毛发过滤器	HAIR FILTER
7		水泵	WATER PUMP
8		止回阀	NON-RETURN VALVE
9		温控阀	TEMPERATURE CONTROL VALVE

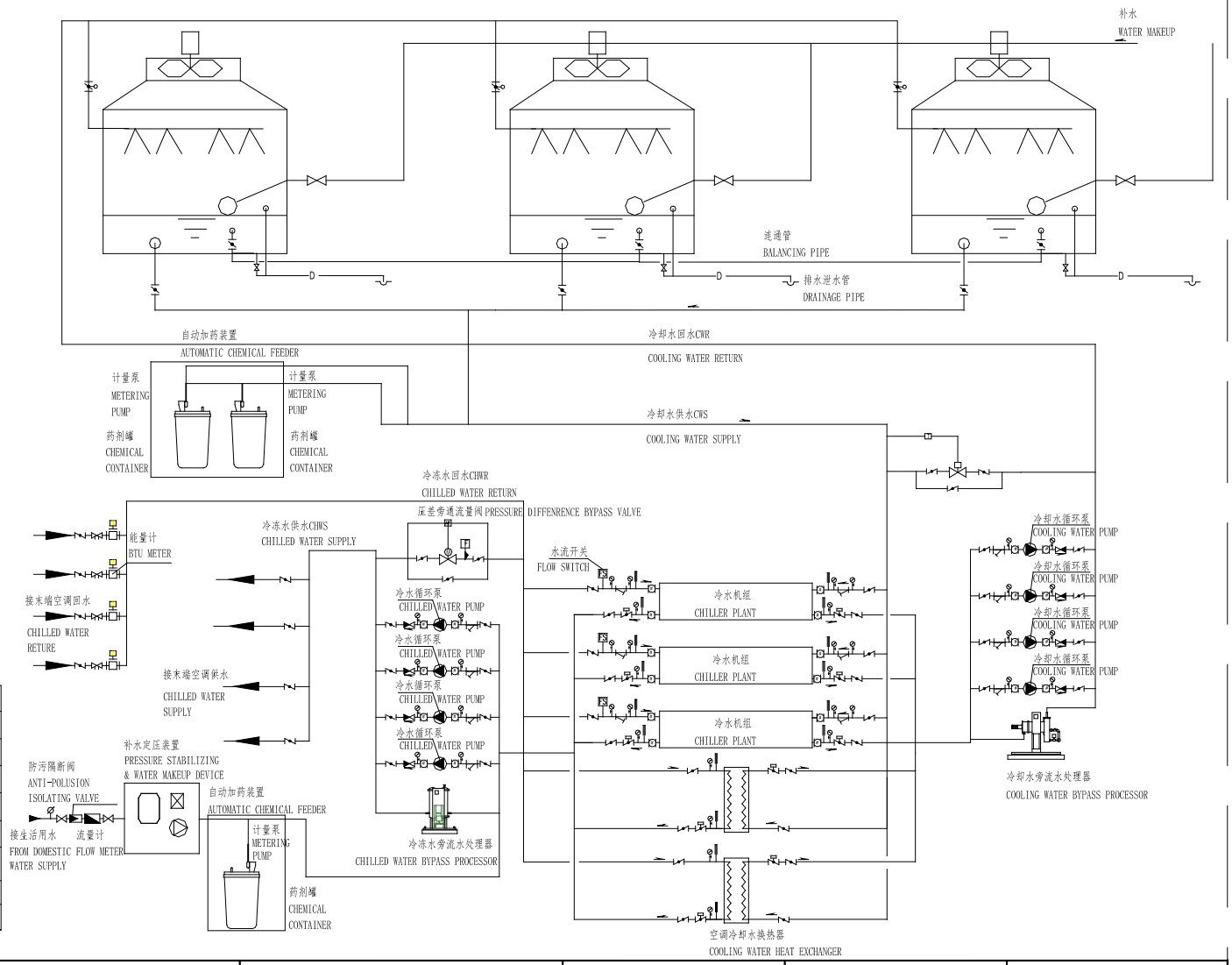
	图名: 室内游泳池（混流式）水处理流程示意图 TITLE: SCHEMATIC DIAGRAM FOR INDOOR SWIMMING POOL MIXED-FLOW FILTRATION AND CIRCULATION SYSTEM	图纸编号: PD-04 DRAWING NO.:PD-04	专业: PD DOMAIN: PD	比例: 无 SCALE: NONE	日期: 2013.06.27 DATE: 2013.06.27



图例
LEGEND

序号 NO.	图例 LEGEND	图例名称	NAME
1		闸阀	GATE VALVE
2		蝶阀	BUTTERFLY VALVE
3		橡胶软接头	RUBBER FLEXIBLE JOINT
4		偏心异径管	ECCENTRIC REDUCER
5		同心异径管	CONCENTRIC REDUCER
6		毛发过滤器	HAIR FILTER
7		水泵	WATER PUMP
8		止回阀	NON-RETURN VALVE
9		温控阀	TEMPERATURE CONTROL VALVE

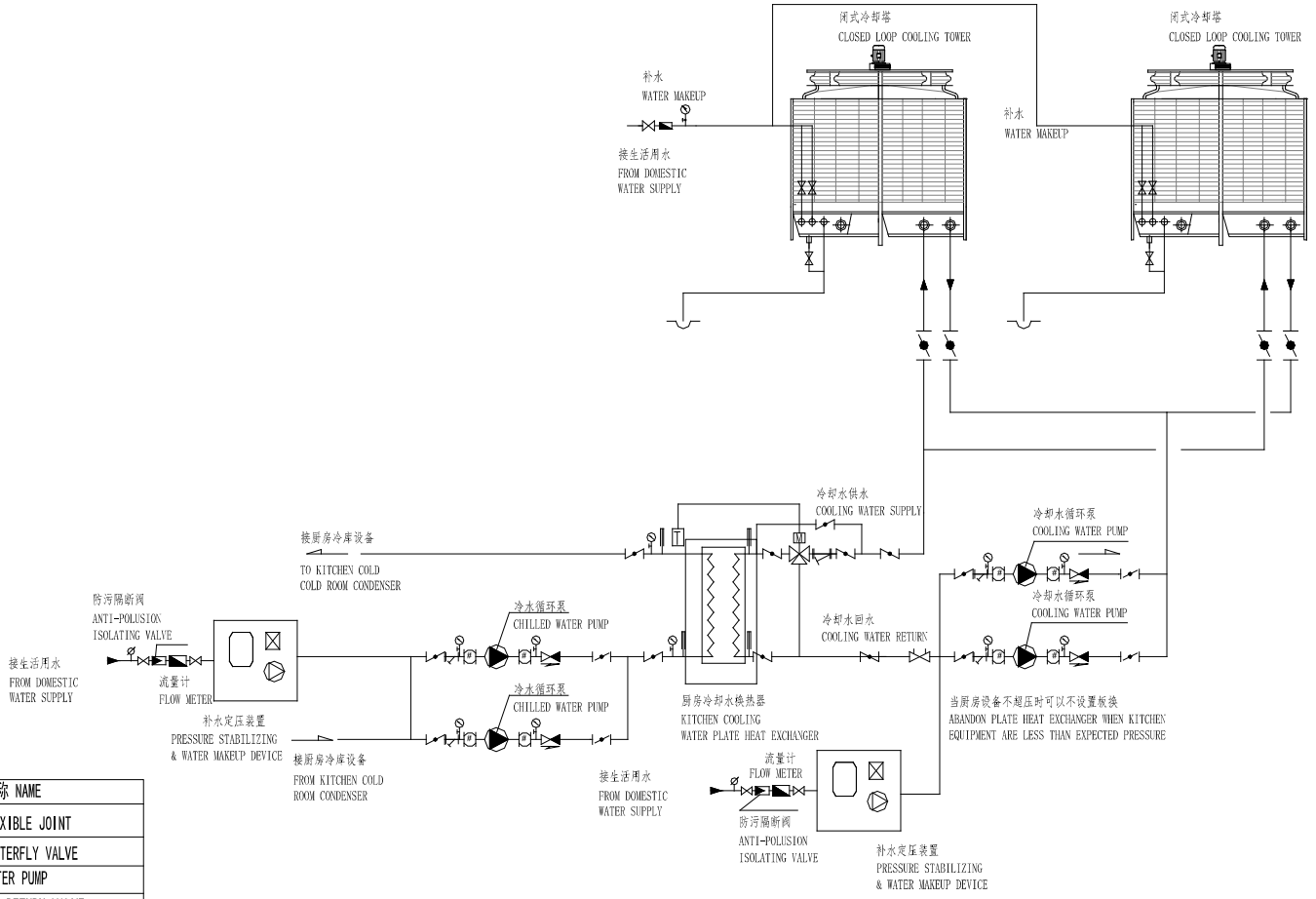
	图名: 涡流池（逆流式）水处理流程示意图 TITLE: SCHEMATIC DIAGRAM FOR SWIMMING POOL COUNTER-FLOW & CIRCULATION SYSTEM	图纸编号: PD-05 DRAWING NO.PD-05	专业: PD DOMAINPD	比例: 无 SCALE: NONE	日期: 2013.06.27 DATE: 2013.06.27



图例
LEGEND

序号 NO.	图例 LEGEND	图例名称 NAME	
1		静态平衡阀	STATIC BALANCING VALVE
2		蝶阀	BUTTERFLY VALVE
3		水泵	PUMP
4		止回阀	NON-RETURN VALVE
5		能量计	BTU METER
6		压差平衡阀	PRESSURE DIFFERENTIAL BALANCING VALVE
7		电动蝶阀	MOTORIZED BUTTERFLY VALVE
8		流量指示器	FLOW SWITCH

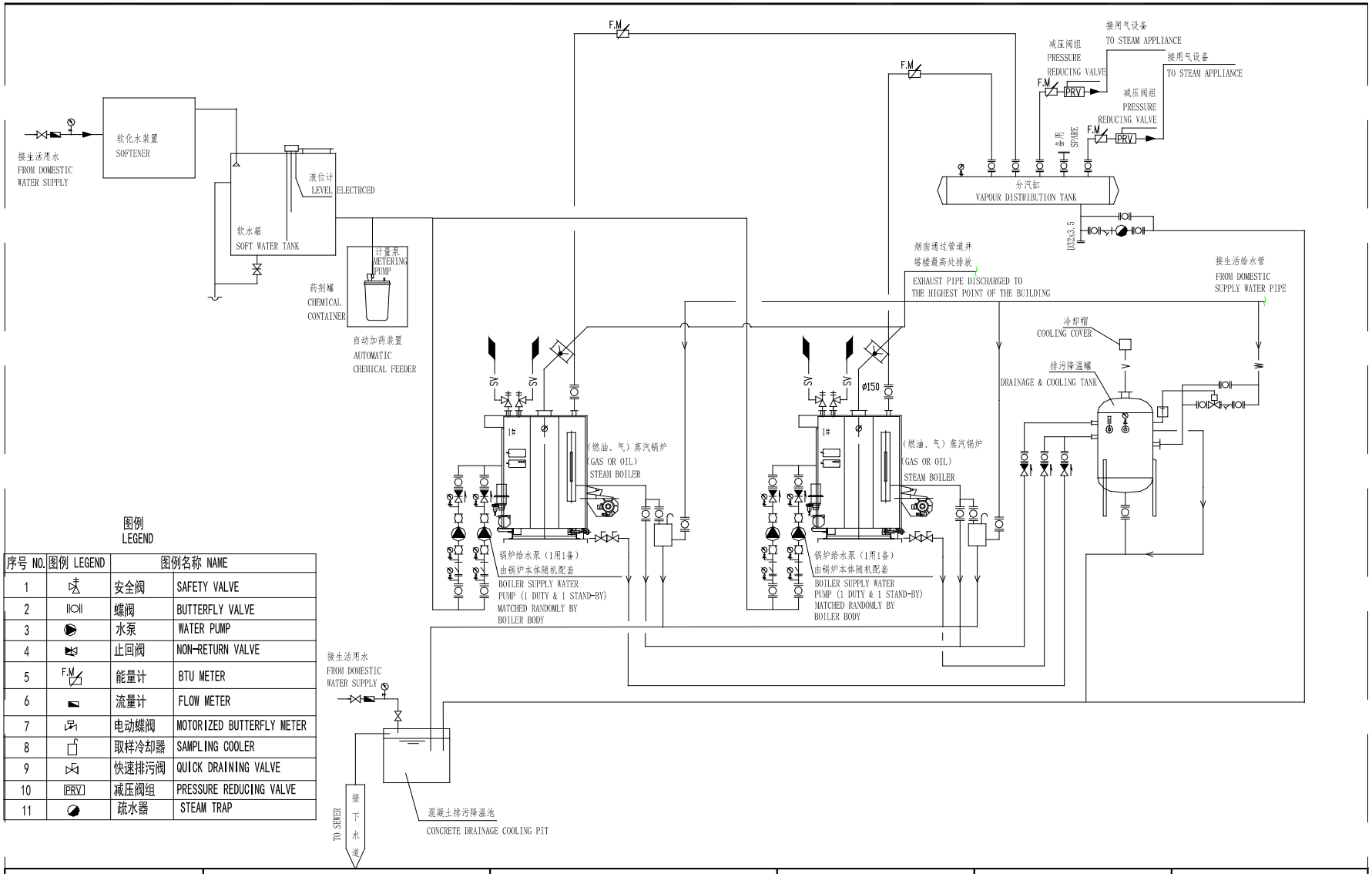
图名: 冷冻机制冷系统原理图 TITLE: SCHEMATIC DIAGRAM FOR CHILLER PLANT	图纸编号: HVAC-01 DRAWING NO.:HVAC-01	专业: HVAC DOMAIN: HVAC	比例: 无 SCALE: NONE	日期: 2013.06.27 DATE: 2013.06.27



图例
LEGEND

序号 NO.	图例 LEGEND	图例名称 NAME	
1		软接头	FLEXIBLE JOINT
2		蝶阀	BUTTERFLY VALVE
3		水泵	WATER PUMP
4		止回阀	NON-RETURN VALVE
5		电动三通阀	ELECTRIC 3-WAY VALVE
6		电动蝶阀	MOTORIZED BUTTERFLY VALVE
7		流量计	FLOW METER

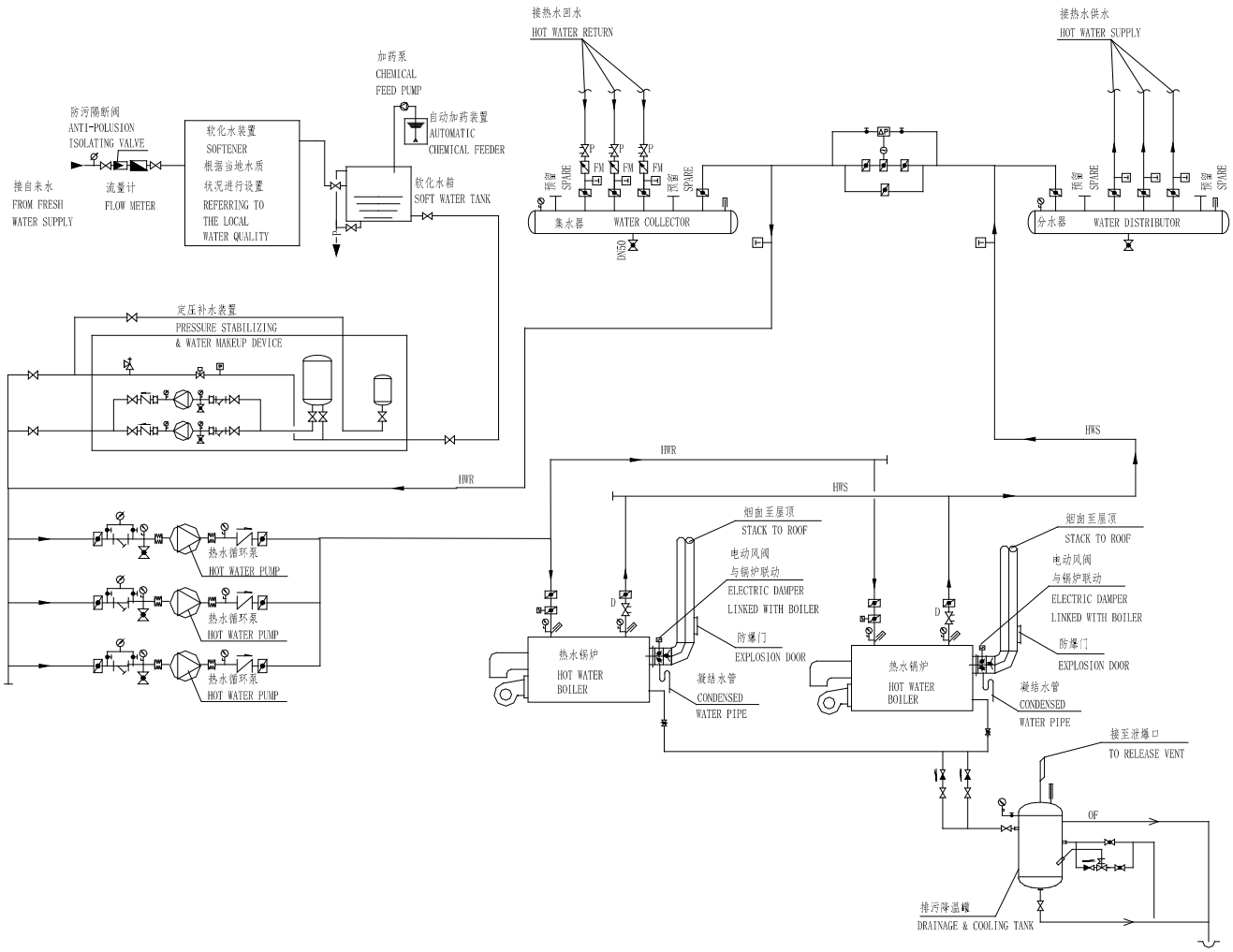
	图名: 厨房冷却水系统图 TITLE: SCHEMATIC DIAGRAM FOR KITCHEN CONDENSER WATER DISTRIBUTION SYSTEM	图纸编号: HVAC-02 DRAWING NO.: HVAC-02	专业: HVAC DOMAIN: HVAC	比例: 无 SCALE: NONE	日期: 2013.06.27 DATE: 2013.06.27



图例
LEGEND

序号 NO.	图例 LEGEND	图例名称 NAME	
1		安全阀	SAFETY VALVE
2		蝶阀	BUTTERFLY VALVE
3		水泵	WATER PUMP
4		止回阀	NON-RETURN VALVE
5	F.M	能量计	BTU METER
6		流量计	FLOW METER
7		电动蝶阀	MOTORIZED BUTTERFLY METER
8		取样冷却器	SAMPLING COOLER
9		快速排污阀	QUICK DRAINING VALVE
10	PRV	减压阀组	PRESSURE REDUCING VALVE
11		疏水器	STEAM TRAP

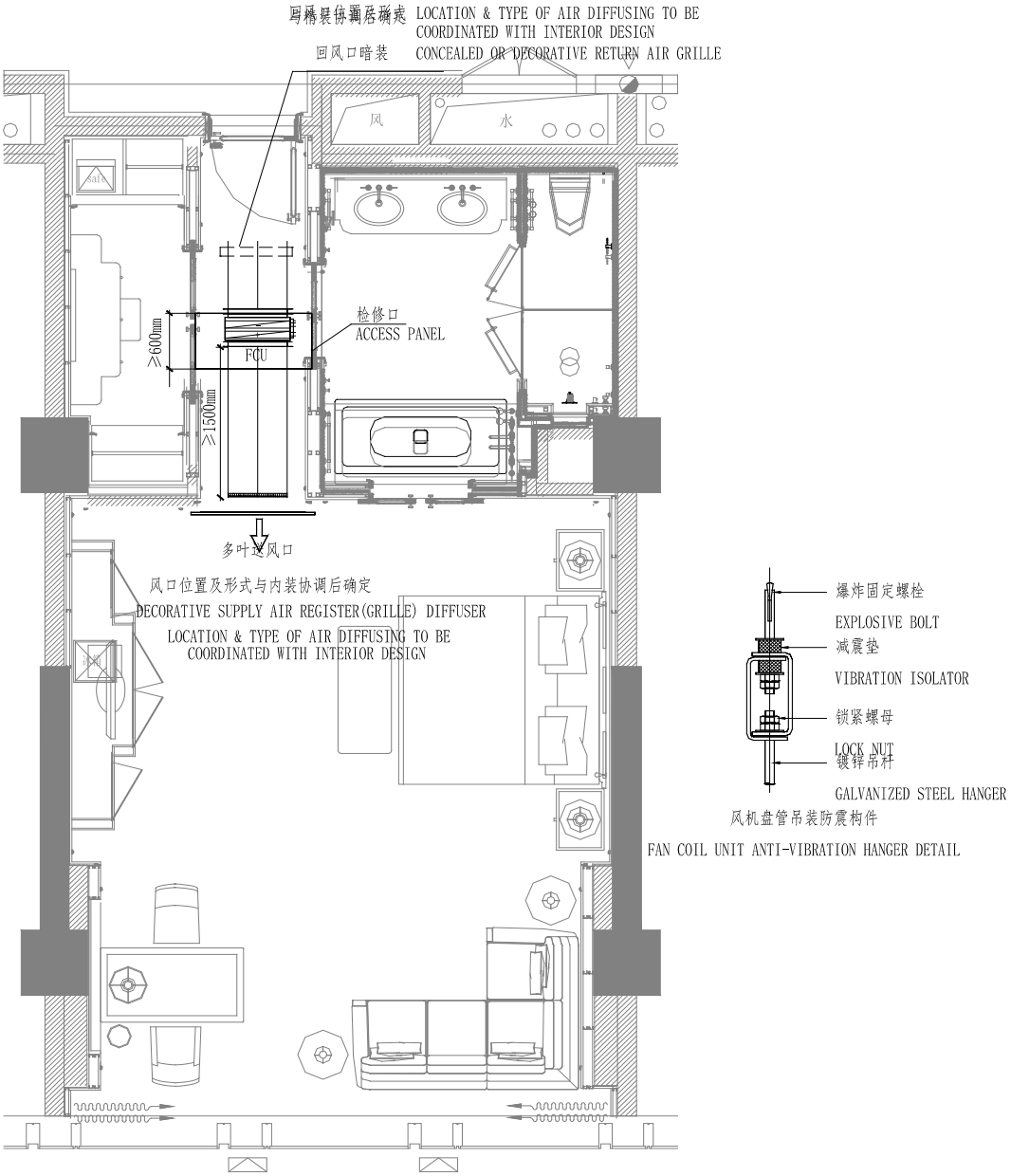
	图名: 蒸汽锅炉供气系统原理图 TITLE: STEAM DIAGRAM FOR STEAM BOILER PLANT	图纸编号: HVAC-03 DRAWING NO.:HVAC-03	专业: HVAC DOMAIN: HVAC	比例: 无 SCALE: NONE	日期: 2013.06.27 DATE: 2013.06.27



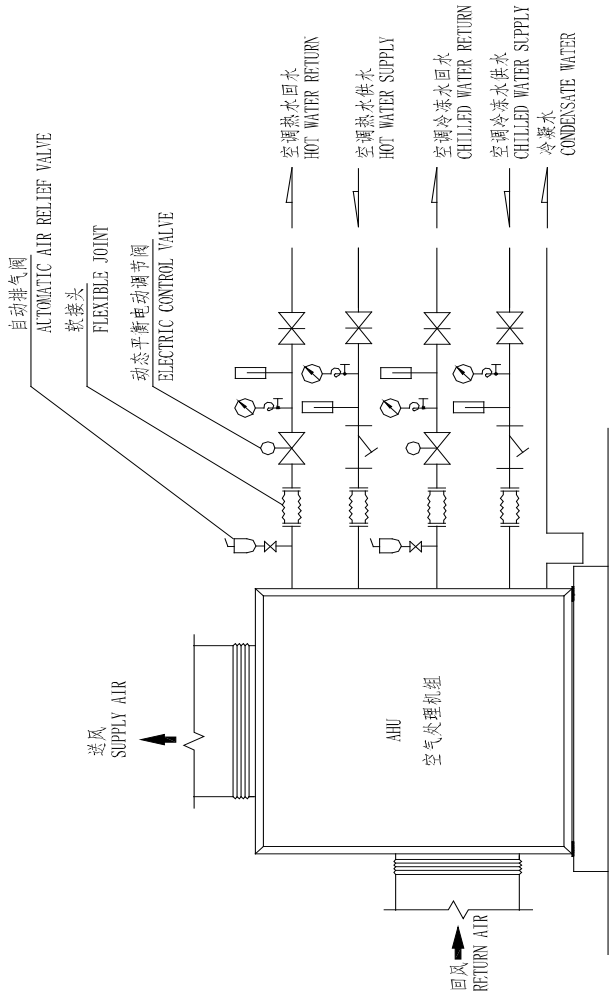
图例
LEGEND

序号 NO.	图例 LEGEND	图例名称 NAME	
1		蝶阀	BUTTERFLY VALVE
2		水泵	WATER PUMP
3		止回阀	NON-RETURN VALVE
4		压差平衡阀	PRESSURE DIFFERENCE BALANCING VALVE
5		电动蝶阀	ELECTRIC BUTTERFLY VALVE
6		流量指示器	FLOW SWITCH
7		流量传感器	PRESSURE SENSOR
8		能量计	BTU METER
9		静态平衡阀	STATIC BALANCING VALVE
10		流量计	FLOW METER

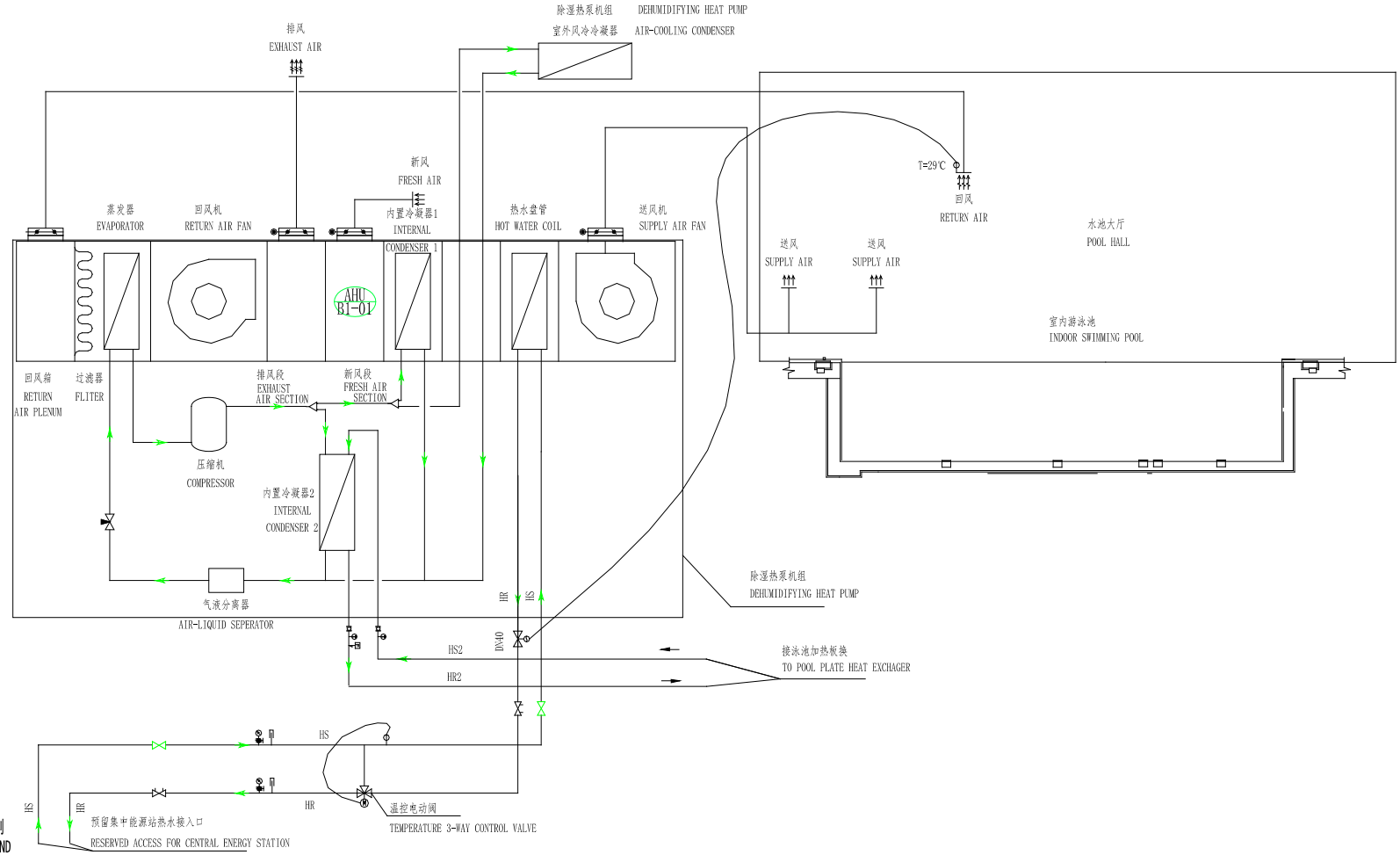
	图名: 热水锅炉供热系统原理图 TITLE: SCHEMATIC OF HOT WATER BOILER PLANT	图纸编号: HVAC-04 DRAWING NO.:HVAC-04	专业: HVAC DOMAIN: HVAC	比例: 无 SCALE: NONE	日期: 2013.06.27 DATE: 2013.06.27



	图名: 客房风机盘管安装示意图 TITLE: INSTALLATIONS DETAIL FOR GUESTROOM FAN COIL UNIT	图纸编号: HVAC-05 ~~DRAWING NO.: HVAC-05~~ 比例: 无 ~~SCALE: NONE~~	专业: HVAC ~~DOMAIN: HVAC~~ 日期: 2013.06.27 ~~DATE: 2013.06.27~~



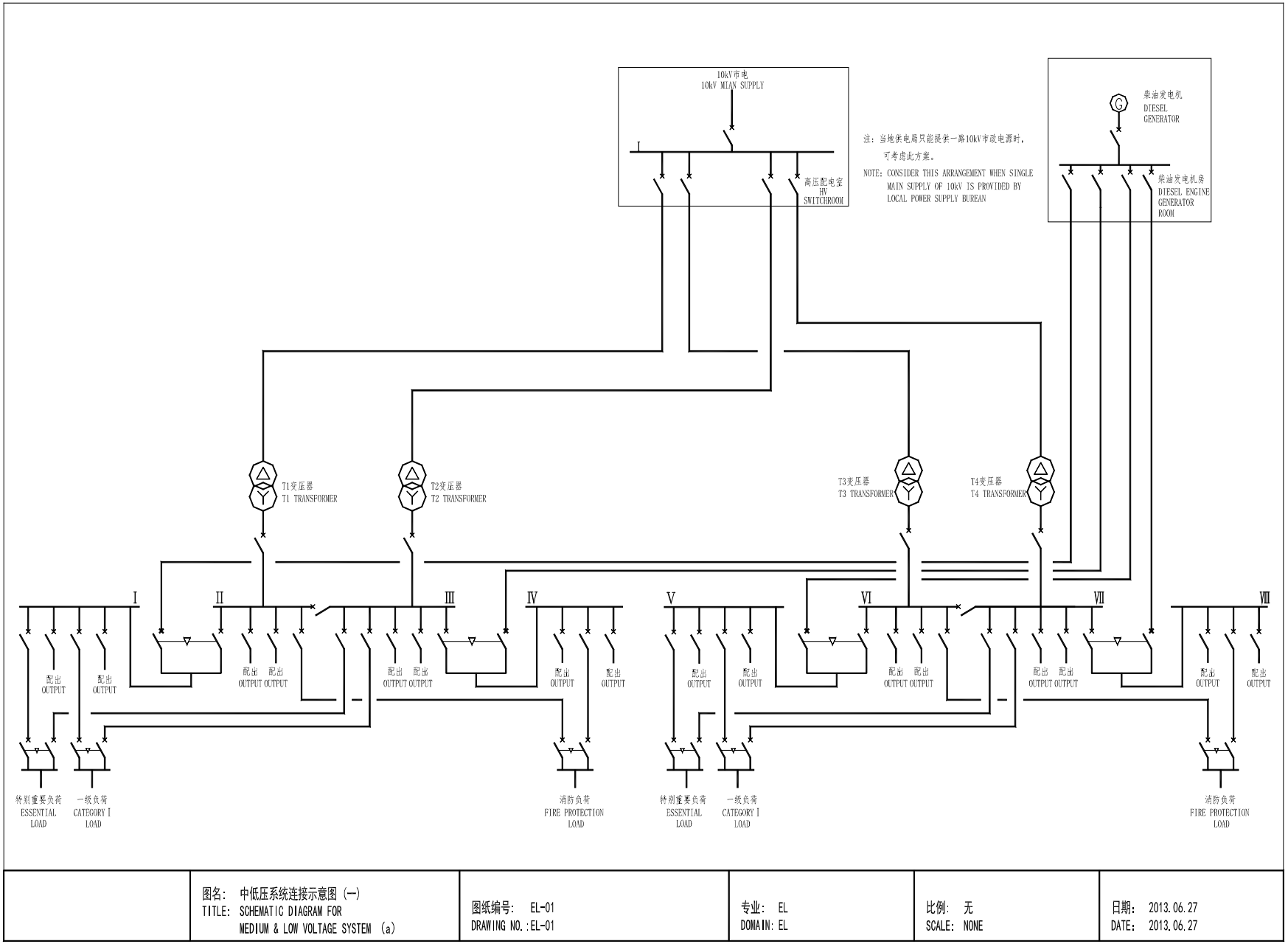
	图名：空气处理机组接管原理图 TITLE: SCHEMATIC DIAGRAM FOR AIR HANDING UNITS	图纸编号：HVAC-07 DRAWING NO.：HVAC-07	专业: HVAC DOMAIN: HVAC
		比例: 无 SCALE: NONE	日期: 2013.06.27 DATE: 2013.06.27



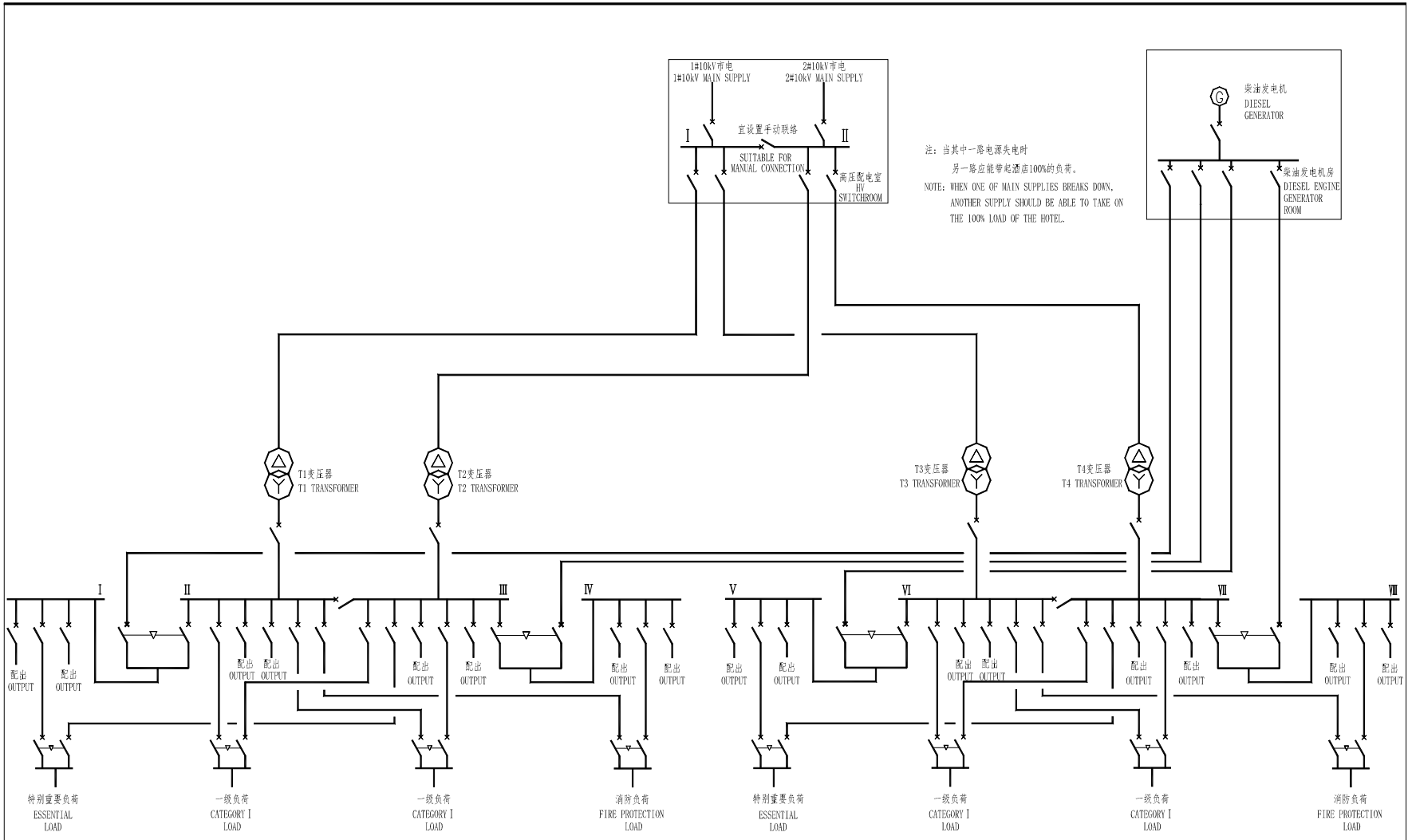
图例 LEGEND

序号 NO.	图例 LEGEND	图例名称 NAME	
1		静态平衡阀	STATIC BALANCING VALVE
2		电动两通调节阀	ELECTRIC 2-WAY CONTROL VALVE
3		温度传感器	TEMPERATURE SENSOR
4		温控电动阀	TEMPERATURE CONTROL VALVE

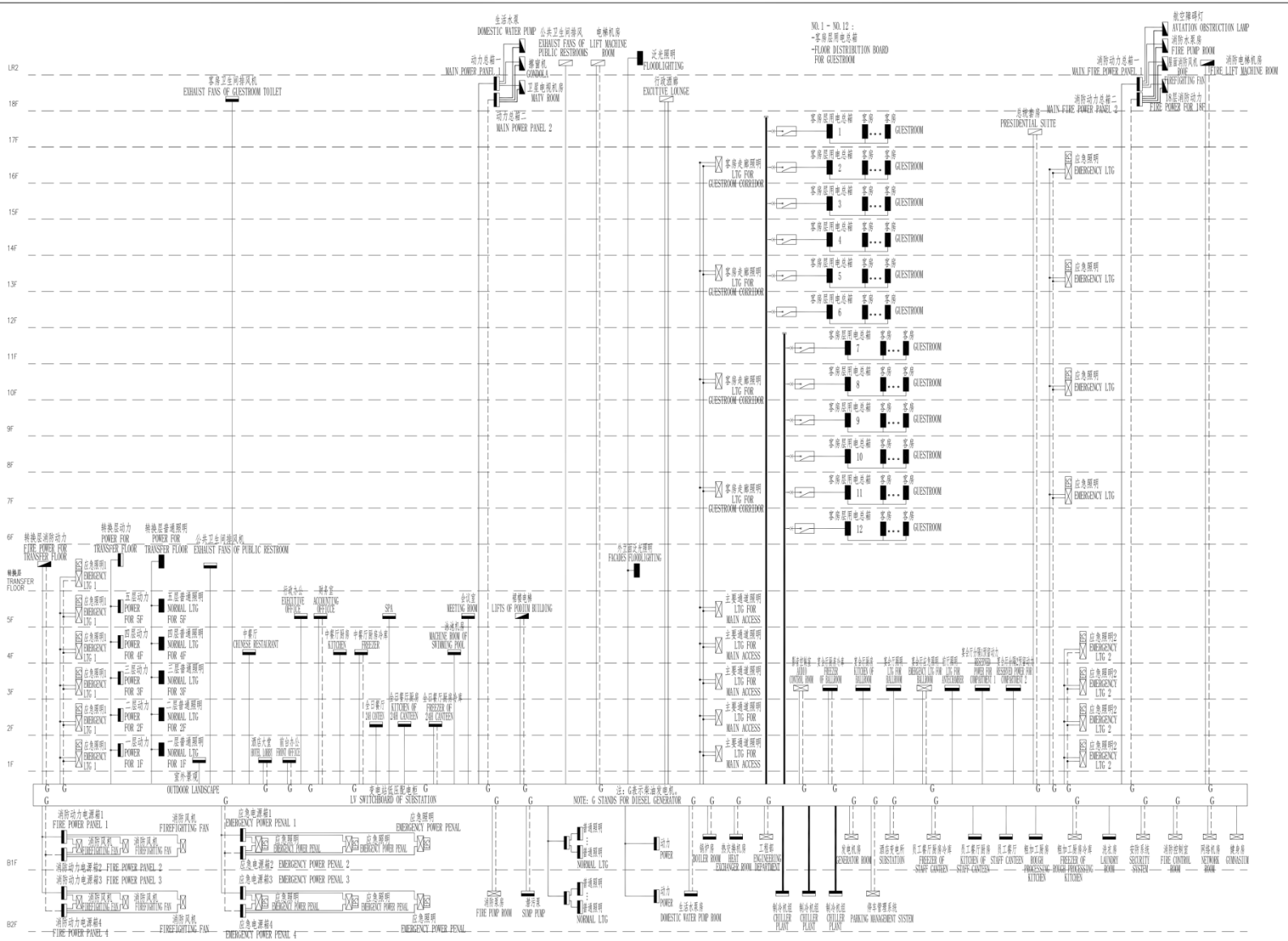
	图名: 泳池三合一除湿热泵系统图 TITLE: SCHEMATIC DIAGRAM FOR SWIMMING POOL HEAT PUMP DEHUMIDIFICATION SYSTEM	图纸编号: HVAC-08 DRAWING NO.:HVAC-08	专业: HVAC DOMAIN: HVAC	比例: 无 SCALE: NONE	日期: 2013.06.27 DATE: 2013.06.27



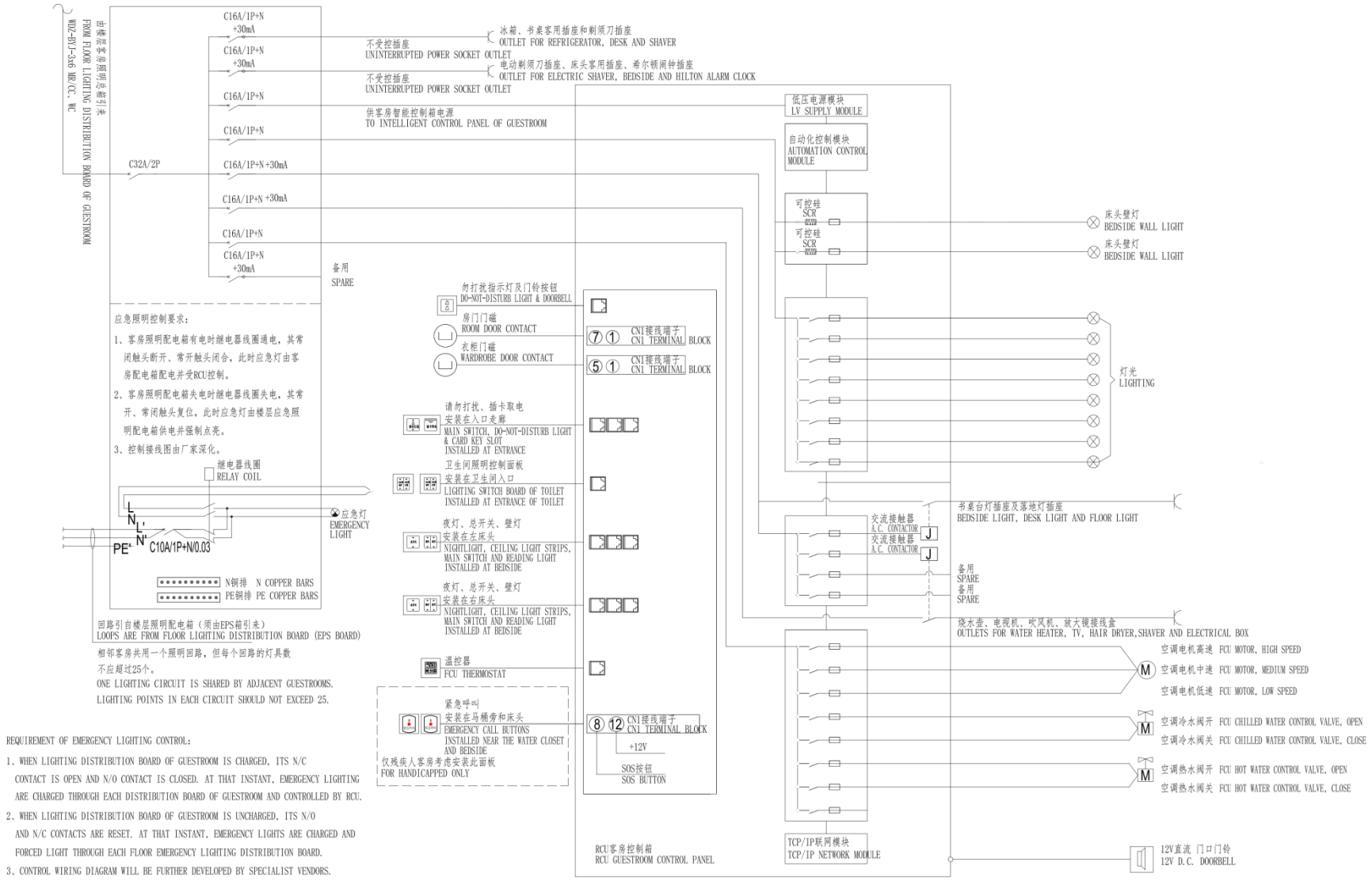
	图名: 中低压系统连接示意图 (一) TITLE: SCHEMATIC DIAGRAM FOR MEDIUM & LOW VOLTAGE SYSTEM (a)	图纸编号: EL-01 DRAWING NO.: EL-01	专业: EL DOMAIN: EL	比例: 无 SCALE: NONE	日期: 2013.06.27 DATE: 2013.06.27



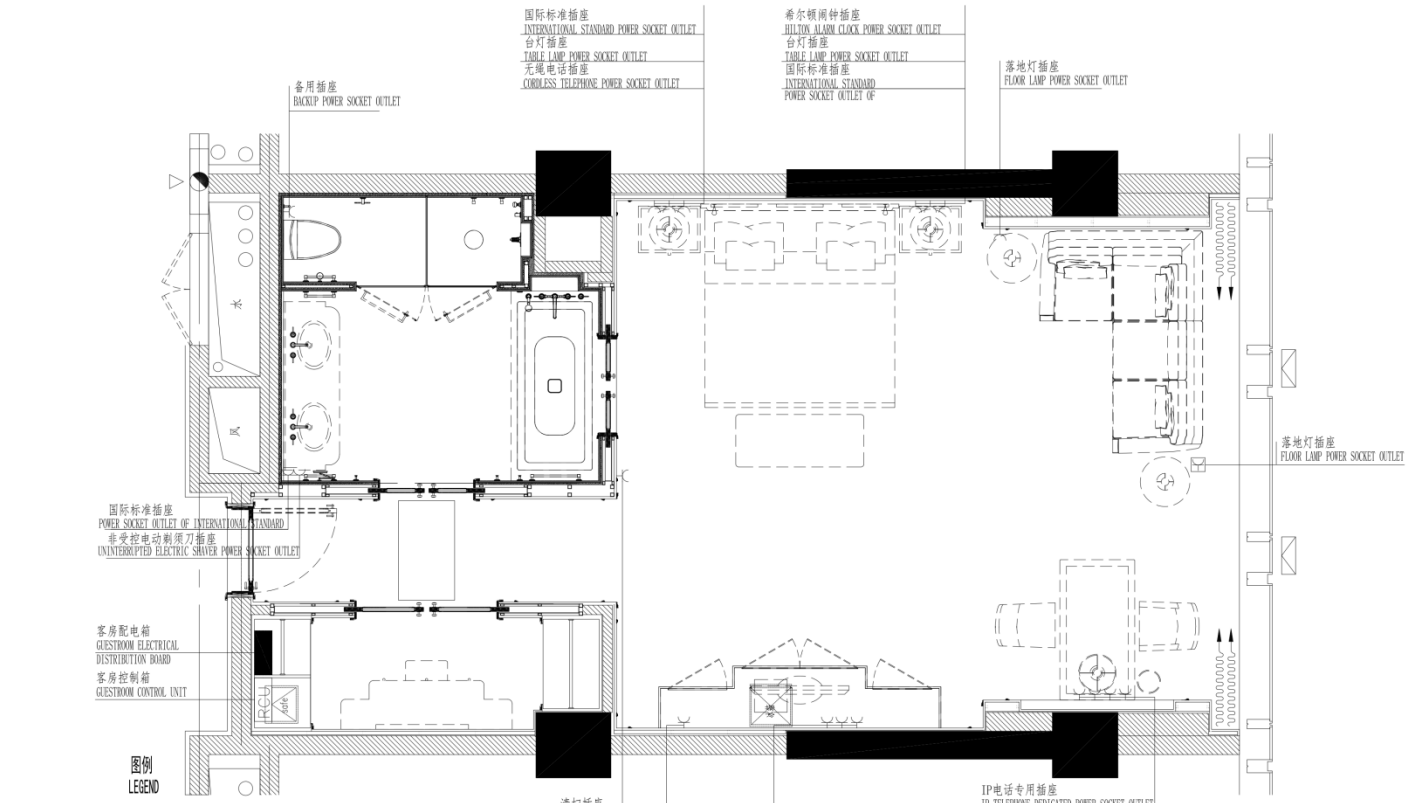
	图名: 中低压系统连接示意图 (二) TITLE: SCHEMATIC DIAGRAM FOR MEDIUM & LOW VOLTAGE SYSTEM (b)	图纸编号: EL-02 DRAWING NO.: EL-02	专业: EL DOMAIN: EL	比例: 无 SCALE: NONE	日期: 2013.06.27 DATE: 2013.06.27



HILTON WORLDWIDE	图名: 竖向干线系统参考图 TITLE: SCHEMATIC DIAGRAM FOR VERTICAL POWER DISTRIBUTION SYSTEM	图纸编号: EL-03 DRAWING NO.: EL-03	专业: EL DOMAIN: EL	比例: 无 SCALE: NONE	日期: 2013.06.27 DATE: 2013.06.27

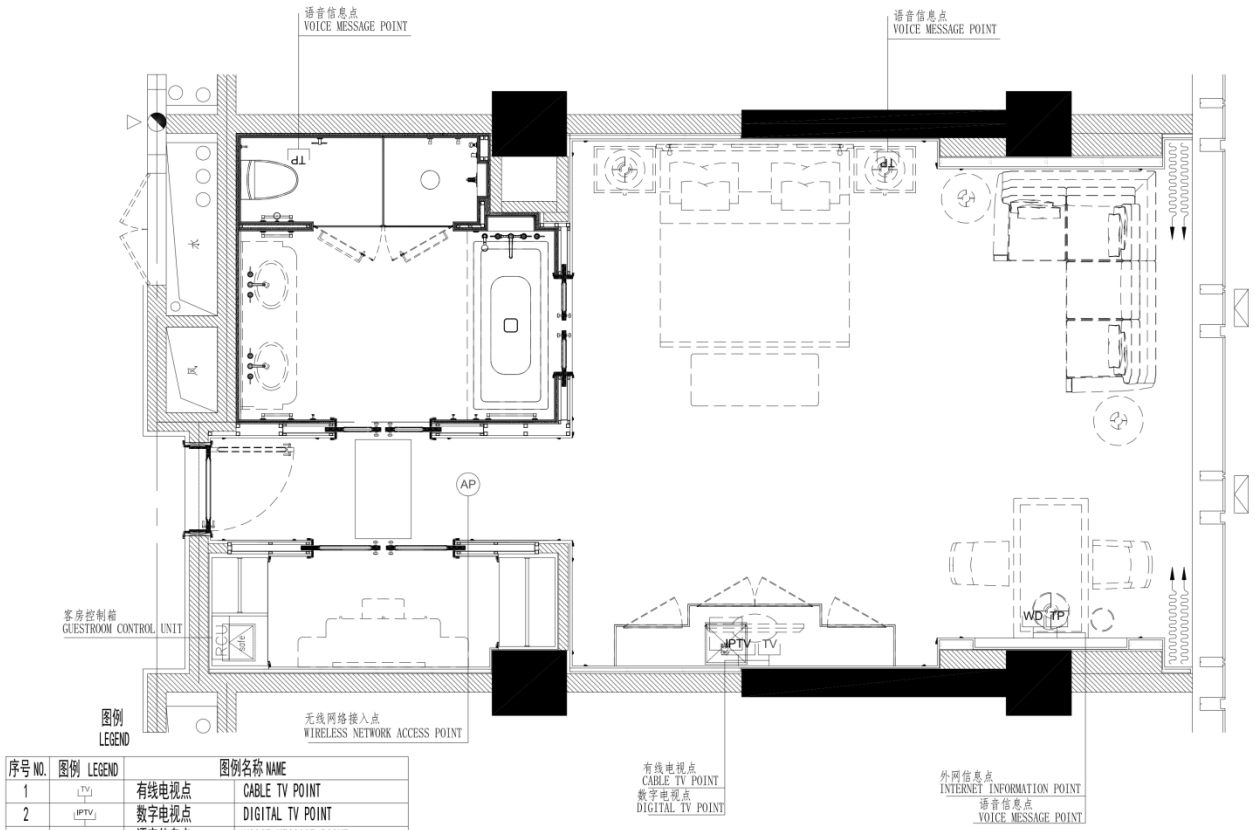


	图名: 标准客房配电系统图 TITLE: SCHEMATIC DIAGRAM FOR GUESTROOM POWER DISTRIBUTION SYSTEM	图纸编号: EL-04 DRAWING NO.: EL-04	专业: EL DOMAIN: EL	比例: 无 SCALE: NONE	日期: 2013.06.27 DATE: 2013.06.27



序号 NO.	图例 LEGEND	图例名称 NAME	
1	■	客房配电箱	GUESTROOM ELECTRICAL DISTRIBUTION BOARD
2	RCU	客房控制箱	GUESTROOM CONTROL UNIT
3	⏚	单相五孔插座（壁装）	SINGLE PHASE POWER SOCKET OUTLET WITH 5 HOLES (WALL MOUNTED)
4	⏚	单相五孔插座（埋地）	SINGLE PHASE POWER SOCKET OUTLET WITH 5 HOLES (UNDERGROUND)

HILTON WORLDWIDE	图名: 标准客房插座布置图 TITLE: STANDARD GUESTROOM POWER SOCKET CUTLETS LAYOUT DRAWING	图纸编号: EL-05 DRAWING NO.: EL-05	专业: EL DOMAIN: EL	比例: 无 SCALE: NONE	日期: 2013.06.27 DATE: 2013.06.27



序号 NO.	图例 LEGEND	图例名称 NAME	
1	TV	有线电视点	CABLE TV POINT
2	IPTV	数字电视点	DIGITAL TV POINT
3	TP	语音信息点	VOICE MESSAGE POINT
4	WD	外网信息点	INTERNET INFORMATION POINT
5	AP	无线网络接入点	WIRELESS NETWORK ACCESS POINT

HILTON WORLDWIDE	图名: 标准客房弱电点位布置图 TITLE: STANDARD GUESTROOM ELV POINTS LAYOUT DRAWINGS	图纸编号: ELV-01 DRAWING NO.: ELV-01	专业: ELV DOMAIN: ELV	比例: 无 SCALE: NONE	日期: 2013.06.27 DATE: 2013.06.27

第二部分:区域设计标准
Part II Space Design Criteria

第11章.室外区
SECTION 11 BUILDING EXTERIOR

11.1. 水景
WATER FEATURES

A. 室外水景补水宜采用市政自来水结合雨水回收水补水。
Compensation water for outdoor water features shall be mixed water of domestic water and recycled rain water.

11.2. 雨水
RAIN WATER DRAINAGE

A. 包括停车场、人行道等在内的所有地区，需设计缓和的坡度，引导雨水进入雨水口或排水沟。
Proper gradient shall be designed for all areas such as carpark and walkway, etc. to lead rain water to rainwater outlet or drain.

B. 地下车库入口处车道需设计雨水排水沟。
Rainwater drain shall be provided near driveway for underground carpark entrance.

C. 当冬季积雪日超过冬季总天数的 5%时，户外露台及主入口处应考虑电热融雪系统。
Electrical snow melting system can be used for outdoor balcony and main entrance area when the day of snow lying is higher than 5% in winter.

D. 屋顶与雨篷的排水管必须通过隐蔽管道连接到雨水排水系统。客人入口附近不允许有外露的雨水排水管，必须将其隐蔽起来。
Rain water pipes for roof and canopy shall be concealed and linked to the rainwater discharge system. Rain water pipes must be concealed for guest entrance area.

E. 雨水滞留/保留区必须与景观设计相结合，不论是在干燥的状态还是正在使用中，其外观必须美观，并且必须在设计上做到不为昆虫提供繁殖场所，或者对酒店客人造成危害。天气条件允许的情况下，宜考虑收集雨水以将其重新用于浇灌系统。
Design for rainwater retention/storage area shall comply with landscape design. The area shall be artistic appearance during wet or dry condition with insect resistance and human safety design. Rainwater shall be collected for irrigation system whenever applicable.

11.3. 排水
SANITATION DRAINAGE

A. 需根据当地的市政排放要求，确定是否可以直接排放或需要设置适当的污水处理设施化（例如粪池、小型生活污水处理站等）处理后排放。若项目所在地没有市政污水排水条件，应考虑设置污水处理系统，处理后排放至当地政府允许的排放口。
Direct discharge or applicable water treatment facilities (such as manure pit and small domestic sewerage treatment station, etc.) shall be provided based on local government requirement. Water treatment system shall be provided if no municipal sewer line is available. The discharge point shall be approved by local authority.

B. 裙房及以上区域排水采用污废分流、厨卫分流，设专用通气立管系统，生活污水经适当处理后排放至室外污水管网，含油废水通过厨具一级隔油和隔油池（室内或室外）二级隔油两次隔油处理后排入室外市政污水管网。
Waste, sewage and kitchen water discharge for podium and upper floors shall be separated,

with independent ventilation system. Domestic sewage water shall be treated before discharge to external sewer line. Primary and secondary grease separation shall be provided for kitchen waste water before discharge to municipal sewer line.

11.4. 燃气 GAS

A. 燃气调压站的选择应符合下列要求：
Selection for gas regulator station shall comply with requirements as below:

1. 调压站宜单独设在室外地面上，四周宜设护栏。
The station shall be stand alone type and located at outdoor ground level with fence protection.

2. 调压站进出口管道上应设置燃气专用阀门；
Dedicated valves shall be installed for inlet and outlet pipes;

3. 燃气调压站与建筑物的间距要求要满足相关规范的要求。
Away distance from gas regulator station to building shall comply with related regulation.

4. 调压站内要有自然通风，满足 2 次换气次数要求。
Natural ventilation shall be provided to comply with 2 air exchange requirement.

5. 每立方米空间应有不小于 0.05m2 的泄压面积。
Each square meter space shall be provided with a minimum 0.05 m² air release area.

6. 并考虑结合市政及景观设计要求。
Municipal and landscape design requirements shall also be considered.

11.5. 电缆 ELECTRICAL CABLE

A. 室外电缆应采取电缆直埋、穿管、电缆沟内敷设等方式，直埋时必须是金属铠装电缆。电缆沟内敷设时可参考项目所在地的国家图集。景观照明配电电缆最小截面应在 4mm2 及以上，灯具的电缆进线孔必须做好防水措施。电力电缆与给水管、排水管、燃气管、电信电缆/管道、建筑物基础等的水平间距或交叉间距须符合国家规范。
Outdoor electrical cable must be buried underground in concealed pipes or in cable trench. Direct buried cables must be with armored protection Cables lay in cable trench shall refer to local national guide. Minimum cross-section area for landscape lighting electrical cable shall be 4mm²; Waterproof treatment shall be provided for cable joint or termination. Horizontal distance and cross distance from electrical cables to supply water pipes, sanitation pipes, gas pipes, telecom cable/pipes and building support, etc. shall comply with National regulation.

11.6. 室外照明/电气 EXTERNAL LIGHTING/ELECTRICAL INSTALLATION

A. 酒店室外泛光照明(包括外立面、雨篷、屋顶和地面)必须控制照射在规定的建筑物表面上。灯光不能照射到建筑表面以外的邻近区域或者天空。
Outdoor flood light illumination area for hotel (including external façade, canopy, roof and

ground, etc) must be within the building surface. No illumination to adjacent area or sky is allowed.

B. 所有客人次入口必须进行良好照明并且易于识别。
All guest side entrances shall be provided with good lighting and easily recognized.

C. 所有室外安装灯具必须符合室外环境，并且应有协调的色温和艺术效果。
All outdoor lighting shall comply with outdoor environment with harmonious color temperature and artistic effect.

D. 提供建筑物泛光照明以增强酒店的标识和辨识度。泛光灯应照射主体建筑，但不得照射到客房窗口。所有灯具应隐藏在建筑元素和景观区域内。
Building flood lights shall be used to improve hotel characteristics and identification. All flood lights must shine on the main building other than guest windows. All light fittings must be concealed in the building and landscape areas.

E. 所有室外现场照明必须采用分区控制，连接至楼宇自控系统实现自动控制。
Building automation control system shall be used for zoning control to all outdoor lightings.

F. 停车场照明
Carpark Lighting

1. 照明应覆盖到整个停车场区域(停车区、景观区、行车道和安防控制区)。
Carpark lighting must cover the entire carpark area including parking lot area, landscape area, driving way and security control area, etc.

2. 停车位和车道照明必须采用立杆安装、高效节能、长寿命的荧光灯、金卤灯或高压钠灯。
High efficiency and long-life fluorescent/Halogen/high-pressure sodium light complete with pole shall be provided for parking lots and driveway.

3. 灯杆的最高高度为 6.0m。必须使用截光型或类似灯具，以防止眩光和视觉干扰。
The light pole (maximum height: 6.0m) shall be equipped with cut-off or similar luminaries to avoid glare or visual disturbance.

4. 对于容易受到车辆撞击的灯杆，需提供至少 900mm 高的混凝土基础或金属防撞栏。
A minimum 900mm concrete base or crush barrier shall be provided for lamp post near crash area.

G. 景观照明
Landscape Lighting

1. 为停车场照明未覆盖的所有人行道提供矮柱灯或蘑菇灯照明。
Bollard or mushroom light shall be provided for uncovered passageways for all carparks.

2. 景观和人行道照明灯具必须严密连接至一个防水接线盒，并固定在混凝土底座上。
Waterproof junction box complete with concrete base shall be provided for landscape and passageway lighting.

3. 紧邻酒店的景观区域和户外活动区必须提供景观照明。
   Landscape lighting shall be provided for hotel adjacent landscape area and outdoor activity area.

4. 景观照明必须采用间接型和装饰性照明。
   Landscape lighting shall be indirect and decorative type.

5. 所有地面景观照明必须布置在种植池或覆盖层中。灯具不能布置在草坪内或者靠近人行道。所有景观照明灯具至少应与路沿石表面保持 900mm 的距离。
   All landscape lightings shall be located in planter box or green area. No lighting is allowed in lawn or near passageway. All landscape lightings shall be at least 900mm away from the roadside.

H. 停车库和停车场应每 20m 的距离提供一个带开关电源插座。
   One switched socket outlet shall be provided for carpark at every 20m.

I. 所有景观照明和插座回路应带有接地故障保护。
   Earth leakage protection shall be provided for all landscape lightings and switched socket outlets.

J. 每个主景观区提供一个防水插座。
   One weatherproof outlet shall be provided for each main landscape area.

第12章.大堂区域
SECTION 12: LOBBY AREA

12.1. 大堂区域 LOBBY AREA

A. 消防/给排水系统
Fire Protection/ Plumbing And Sanitation Systems

1. 大堂内大型吊灯附近应选用动作温度 79°C 的喷头，吊灯内侧采用动作温度 93°C 的喷头。
79°C sprinkler points shall be provided for surrounding areas with large pendant light and 93°C sprinkler points for internal areas.

2. 建筑内净空高度 8-12m 的中庭设计喷淋系统按非仓库类高大净空场所要求，原则上采 用喷淋系统；对于净空高度在 16.8M 以下的空间应采用喷淋系统，如超过此范围应当符合当地消防要求。
Sprinkler system shall be provided for non-storage type high clear height (8 to 12m) areas; Sprinkler system shall be provided for area clear height less than 16.8m. If the clear height is higher than 16.8m, the protection shall comply with local fire protection requirements.

B. 供热通风空调系统
Heating, Ventilation And Air Conditioning System

1. 空调采用全空气系统，考虑过渡季节全新风运行的情况。
AHU system shall be adopted for air conditioning system considering the transitional seasons.

2. 新风量标准按照 30m^3/h.p，排风量按照新风量的 90%~95%，保持前厅正 压。
The fresh air flow rate shall be 30 m^3 / h.p; The exhaust air flow rate shall be 90% to 95% of fresh air flow rate to ensure lobby pressure.

C. 弱电系统
Elv System

1. 大堂入口处的雨棚停车上下客区域，需有摄像机的监视，并清楚记录人员上、下车及车辆情况。
CCTV shall be provided for boarding/alighting area at lobby canopy to record boarding/alighting of personel and vehicle information.

2. 大堂出入口处设置摄像机，对所有人员的出入情况进行监视。
CCTV shall be provided for all lobby doors to record access information.

3. 前台需配备安装摄像机，对业务交易的情况进行监视，但不能让客人看到带有客人信息的安全监视器和电脑监视器。
The front desk shall be provided with to monitor the service transaction. Safety monitor and computer monitor with guest information shall exceed guest's visual range.

4. 在设置 ATM 机处应预留网络数据端口，且配备安装摄像机。
Network port shall be reserved for camera installation at the ATM Machine.

5. 整个大堂应做到无线网络全覆盖；并在合适部位提供 2~3 个上网数据端口。
The entire lobby must be covered by wireless signal with 2 to 3 network ports at suitable locations.

6. 前台的视野范围内，在大堂区域中提供至少 2 部内线电话，供客人使用。
   Minimum 2 nos. of extension phones shall be provided for guests within visual range of front desk in the lobby.

7. 前台每个工作岗位需提供连接酒店管理系统、内线电话、打印机和 POS 机的端口，数量不小于 2 个语音电话端口和 4 个网络数据端口。
   Each workstation of front desk shall be provided with ports for hotel management system, extension phone, printer and POS Machine. Minimum 2 nos. of telephone outlets and 4 nos. of data outlets shall be provided.

8. 在前台的每个工作岗位设置 1 个应急按钮，并连接到安防中心。
   Emergency button shall be provided for each workstation of front desk with signal linked to fire command center.

9. 大堂应设置信息发布显示屏，安装位置及大小需征询希尔顿意见，根据具体装修情况而定。
   Digital signage panel shall be provided for hotel lobby. The location and size shall be based on interior decoration and to be determined by Hilton Worldwide.

10. 大堂的照明应提供可通过手持机控制的智能调光系统，遥控和面板控制灯光场景模式；调光面板应隐藏在客人的视线之外。
    Handset type Intelligence lighting control system shall be provided for lobby lighting. Lighting scene can be controlled by the remote controller or control panel; it shall be out of visual sight from the hotel guest.

D. 供配电系统
   Electrical Distribution System

1. 应给金属探测器或小型 X 射线行李包检查装置等安检设备提供电源连接。
   Power supply shall be provided for safety inspection equipment such as metal detector and mini X-Ray luggage inspector, etc.

2. 必须有 30%的照明由柴油发电机作为备用电源；其中 15%的照明由不间断电源 EPS 配电。
   30% of the lighting shall be backed up by the diesel engine generator; among which 15% of the lighting shall be backed up by EPS.

3. 在整个公共区域和通道区域间隔 15m 以内设置清洁插座，插座中点距装饰地面 350mm 或根据踢脚线的实际情况定。供特殊使用的插座的位置要根据室内及灯光设计要求定。
   Socket outlets shall be provided for the entire common areas and passage ways at interval distance of 15m for cleaning purpose. The socket outlet height shall be installed at 350mm from its center to the floor or depends on floor skirting. Special socket outlet locations shall be determined by interior and lighting design requirements.

4. 前台区域必须有 100%的照明由柴油发电机作为备用电源；其中 15%的照明由不间断电源 EPS 配电。
   100% of the lighting in front desk area shall be backed up by the diesel engine generator; among which 15% of the lighting shall be backed by EPS.

5. 每个工作岗位至少应满足以下要求：
   Each workstation provision shall comply with the following requirements as indicated below:

   a. 配置三个电源插座；
      3 nos. of electrical socket outlets;

   b. 每个配电回路下不能超过 10 个插座；
      Maximum 10 nos. of socket outlets for each circuit;

   c. 前台电源箱应以柴油发电机作为备用电源，且由双回路供电。
      Distribution board for the front desk shall be backed up by the diesel engine generator with dual supply change over.

12.2. 行李房
LUGGAGE ROOM

A. 供热通风空调系统
   Heating, Ventilation And Air Conditioning System

   1. 空调采用风机盘管加新风系统。
      Fan coil unit with fresh air system shall be adopted for air-conditioning system.

   2. 新风量按照排风量的 80%~90%，排风量按照 3 次换气次数计算。室内保持负压。
      Fresh air flow rate shall be 80% to 90% of exhaust air volume to ensure negative indoor air pressure. Exhaust air flow rate shall be 3 air exchange.

B. 弱电系统
   Elv System

   1. 提供 1 个内线电话端口和 1 个连接酒店管理系统的网络数据端口。
      1 no. of extension phone outlet and 1 no. of network data point for hotel management system shall be provided.

   2. 在行李房出入口处安装摄像机，对出入行李房的情况进行监控。
      CCTV shall be provided for luggage room access way for monitoring.

   3. 行李房需安装门禁系统。
      Door Access system shall be provided for luggage room.

C. 供配电系统
   Electrical Distribution System

   1. 倘若在行李房入口附近有 X 光行李检查装置等安检设备，则应提供一个专门的电源插座。
      1 no. of socket outlet shall be provided for Safety inspection equipment such as X-Ray inspector just outside the luggage room if required.

12.3. 保险箱室
SAFE DEPOSIT ROOM

A. 供热通风空调系统
Heating, Ventilation And Air Conditioning System

1. 空调采用风机盘管加新风系统。
Fan coil unit with fresh air system shall be adopted for air-conditioning system.

2. 新风量按照排风量的 80%~90%，排风量按照 3 次换气次数计算。室内保持负压。
Fresh air flow rate shall be 80% to 90% of exhaust air flow rate to ensure negative indoor air pressure. Exhaust air flow rate shall be 3 air exchange.

B. 弱电系统
Elv System

1. 应提供 1 部内线电话端口和 1 个连接酒店管理系统的网络数据端口。
1 no. of extension telephone point and 1 no. of network data point for hotel management system shall be provided.

2. 应在保险箱室内部安装摄像机，摄像机须对准保险箱，在为客人提供合理的隐私空间下，对保险箱和业务交易情况进行监控。
CCTV shall be provided in the safe room with reasonable privacy to the guest for monitoring the safe and the service.

3. 保险箱室的入口门设置门禁系统，客人出入的门应由内部服务人员通过操作门禁按钮实施开启。
Door access control system shall be provided at the safe room entrance. Guest access door shall be controlled by internal service staff with access control authority.

第13章.公共卫生间
SECTION 13: PUBLIC RESTROOM

A. 消防/给排水系统
FIRE PROTECTION/ PLUMBING AND SANITATION SYSTEMS

1. 公共卫生间采用感应式水龙头及皂液器、感应式小便器冲洗阀。
Public toilet shall be provided with sensor type water taps, soap dispensers and sensor type urinals.

2. 公共卫生间的卫生器具应采用节水型卫生器具。
Sanitary wares in public toilet shall be water saving type.

3. 公共卫生间洗手台下设 DN50 地漏，洗手盆排水接入地漏存水弯。
DN50 floor trap shall be provided under the basin in public toilet; the basin water discharge pipe shall be linked to the floor trap.

B. 供热通风空调系统
HEATING, VENTILATION AND AIR CONDITIONING SYSTEM

1. 所有公共卫生间均应设置机械排风系统，并利用相邻区域进行自然补风。排风量按照 12 次换气次数计算，保持卫生间内负压。
Mechanical ventilation must be provided for all public toilets with adjacent fresh air compensation. The toilet shall be maintained negative pressure with 12 air exchange.

2. 酒店公共区卫生间、餐厅卫生间、会议区卫生间应设置空调。
Air-conditioning shall be provided for hotel public toilet, restaurant toilet and meeting area toilet.

C. 弱电系统
ELV SYSTEM

1. 公共残疾人卫生间马桶旁边设置紧急求助按钮，墙面安装声光报警器。
Emergency call button with strobe light alarm shall be provided in water closets for all handicapped toilets.

D. 供配电系统
ELECTRICAL DISTRIBUTION SYSTEM

1. 照明应配备移动传感器或受智能灯光控制系统控制。移动传感器在确定区域最后检测到活动之后，在关闭之前应有 30 分钟的延迟。入口的照明设备不受移动传感器控制，应始终处于打开状态。在受智能灯光控制系统控制时，应考虑不同时间段内的控制要求。
Motion sensor or intelligent lighting control system shall be provided for the lighting system. When controlled by motion sensor, there shall be a 30minutes time delay upon last activation. Entrance lighting shall be always turned on and not to be controlled by the motion sensor. Time scheduling shall be considered when intelligent lighting control system is used.

2. 洗手盆的附近上需安装一个带接地故障保护的电源插座，并注意隐蔽设置。另设置一个额外的清洁插座。
One socket outlet with earth leakage protection shall be provided near the wash basin and

it shall be concealed type. Additional socket outlet shall also be provided for cleaning purpose.

第14章.餐饮区
SECTION 14: FOOD AND BEVERAGE AREA

14.1. 厨房
KITCHEN

A. 消防/给排水系统
Fire Protection/ Plumbing And Sanitation Systems

1. 须在每个厨房内安装 1 个用脚控制的洗眼器。
1 no. of foot controlled eye bath shall be provided for each kitchen.

2. 各餐饮场所，其烹饪操作间的排油烟罩及烹饪部位设置湿式化学灭火系统，并且需同时具备 CCC 认证和 FM 认证。
Fire suppression system with CCC and FM Certification shall be provided for kitchen exhaust hood and cooking location in kitchen of each dining area.

3. 所有步入式冷库需安装干式喷淋头或干式喷淋系统。
All walk-in type cold storage shall be installed with dry type sprinkler head or dry type sprinkler system.

4. 厨房吊顶内高度大于 800MM 时，需安装喷淋。喷头流量系数为 80。
Sprinkler shall be provided if the kitchen suspended ceiling internal height is more than 800mm. The flow coefficient shall be 80.

5. 厨房热厨区采用动作温度为 93°C 的快速反应隐蔽型喷头，其余备餐区等环节温度不高的厨房区域采用动作温度为 68°C 的快速反应隐蔽型喷头。
93°C fast reaction concealed type sprinkler point shall be provided for kitchen hot cooking area and 68°C fast reaction concealed type sprinkler for other areas in kitchen.

6. 每个厨房区域必须配置不少于 1 个 K 型灭火器。
At least 1 no. of K Type fire extinguisher shall be provided for each kitchen.

7. 厨房排油烟管道内，水平管道每 3m 设置 1 个，竖直管道最高处设置 1 个 260°C 高温喷淋头。喷头可就近与喷淋管道相连。喷淋水管在排油烟管道外部，用法兰作活动接口，以保证喷淋支管接入，便于检修。
For kitchen exhaust duct, a 260°C sprinkler point shall be provided at every 3m interval in the horizontal duct and one at the highest of the vertical duct. The sprinkler point can be linked to adjacent sprinkler pipe. The sprinkler pipe outside of the exhaust duct shall be fitted with flange connection e for ease of maintenance.

8. 厨房区域排水在排入市政管道之前，需考虑二级隔油，隔油装置总数量宜按至少两套考虑。
Minimum two sets of grease separators shall be provided for kitchen discharge pipe for grease separation before discharging to municipal sewer line.

9. 厨房排水管及隔油装置的通气管单独设置，不能与公共区域或客房的通气管连接。
Ventilation pipes for kitchen discharge pipes and grease separator shall be independent from ventilation pipes for common area and guestrooms.

10. 餐饮区域排水可采用地沟或地漏，地沟的排出管需要设置水封。
Floor trap or floor drain can be used for dining areas. Water seal shall be provided for floor drain discharge pipes.

11. 对于同一区域有不同水质要求时，仅对对水质有特殊要求的地方设置末端水处理措施，如厨房提供冲洗盘子和玻璃器皿的软水。
With regards to the same areas with different water requirement, water treatment facilities shall be provided at water terminal such as soft water for dish and glass washing.

12. 厨房上方不应布置污/废水管道。
No waste/sewage pipe is allowed above the kitchen.

13. 垃圾收集区应设置给排水点位，以便垃圾收集区冲洗，保持场内安全卫生。排水地漏规格建议不小于 DN100。
Water supply and discharge point shall be provided in garbage collection area for cleaning purpose. Floor trap size shall not be less than DN100.

14. 垃圾收集区冲洗给水管上应设防污隔断阀。
Anti contamination cut off valve shall be provided for flushing water pipes in refuse chute.

15. 垃圾收集区排水应单独排出，以便保洁。
Waste water in refuse chute shall be separately discharged.

B. 供热通风空调系统
Heating, Ventilation And Air Conditioning System

1. 厨房排风系统应独立设置。酒店厨房排风主要包括局部排油烟、厨房全面排风和洗碗间排风。厨房排油烟量及洗碗间排风量应由厨房顾问提资，当初始设计无厨房顾问资料时，可按厨房排油烟量按 60~80 次/小时预留，洗碗间/洗锅间按 2000m3/h 风量预留，但最终深化设计所需参数应由厨房顾问提供。
Kitchen exhaust system shall be independent type including localized exhaust, full exhaust and exhaust for dish washing room. Information for kitchen exhaust and dish washing room exhaust shall be provided by kitchen consultant. In the event of no information available, 60 to 80 times air exchange for kitchen and 2000 CMH for dish washing room/boiler washing room shall be considered. The final information shall be provided by the kitchen consultant.

2. 通风应采用直流式系统。为保证厨房负压，厨房补风量应为厨房总排风量的 80%~90%。补风采用两路系统供给，一路直接向灶台（油烟罩）补充，另一路经新风机组（变频）处理后供厨房内岗位送风系统，岗位送风系统应承担厨房内的冷热负荷，使厨房维持要求的室内参数，新风机组与厨房排油烟系统连锁，油烟罩补风夏季不做处理，冬季预热至 18° C 后补入排烟罩。
Air ventilation shall be direct type; compensation air flow rate shall be 80% to 90% of the exhaust air flow rate to ensure kitchen negative air pressure. The compensation air shall be in two-way: one way for cooking stove (exhaust hood) and the other way for kitchen duty air supply system by fresh air fan (variable frequency). The duty air supply system shall support the kitchen cold & hot loading to ensure indoor parameter. The fresh air fan shall be interlocked with kitchen exhaust system. Kitchen exhaust hood compensation air treatment is not necessary in summer but have to pre-heat to 18°C in winter.

3. 凉菜间、糕点裱花间、巧克力间平时采用风机盘管加新风系统，并应设置分体空调备用。其他餐厅的备餐间采用风机盘管系统，排风量按照两次换气次数计算。
Fan coil unit and fresh air system with split air conditioning backup system shall be

provided for cold dish room, cake decorating room and chocolate room. Other food preparation room shall be provided with fan coil unit system. The exhaust air flow shall be 2 air exchange.

4. 整个厨房风量平衡及运行策略应符合以下要求：
Air balancing and operation for entire kitchen shall comply with the following requirements as below:

5. 忙时：排油烟风机（变频）运行，全面换气排风机关闭/低速运行，补风由油烟罩补风、全面换气补风及邻室（餐厅）渗漏补风承担。
When In use: exhaust air fan (variable frequency) in operation, full air exchange fan closed/low speed operation, compensation air shall be provided by kitchen exhaust hood compensation, overall exchange compensation and leakage compensation air from nearby room (restaurant).

6. 闲时：全面换气排风机运行时，排油烟风机关闭，补风由邻室（餐厅）渗漏补风承担。
Not in use: Kitchen exhaust air fan shall be closed when full air exchange fan in operation. Compensation air shall be provided from leakage air from nearby room (restaurant).

7. 设机械排油烟系统，厨房排油烟罩自带 UV 紫外线灯或运水油烟箱，排油烟风机入口前加装静电式油烟净化处理装置净化处理后排放，油烟净化效率能达到 90%以上，并满足当地环评报告要求。
Mechanical exhaust system shall be provided; kitchen exhaust hood shall be provided with UV light or vent wash exhaust box. Electronic static type exhaust purification facility shall be provided before the exhaust air fan to achieve 90% purify efficiency and meet local environment requirement.

8. 干垃圾房应设置独立的排风和补风系统，换气次数 20 次。
Independent exhaust and fresh air system for dry refuse storage shall be provided with 20 air exchange.

9. 除垃圾冷库外的垃圾处理房内应设置分体空调，一用一备。
Split air conditioning with one duty one standby shall be provided for waste cold storage disposal room.

C. 弱电系统
Elv System

1. 在厨师长办公室内提供电话端口和网络数据端口。
Telephone and network data outlet shall be provided for the chef room.

2. 在厨房区域提供 1 个壁装式内线电话。
1 set of wall mounted extension phone shall be provided in the kitchen area.

3. 在送餐服务间提供 2 部双线的电话，并且带有来电号码显示功能。
2nos wire telephone with incoming call display function shall be provided for food service room.

4. 厨房内需要安装打印机，应预留相应数据端口，数量和摆放位置根据厨房实际布置情况而定。
   Network data outlet for printer shall be provided in the kitchen; the quantity and location shall be according to the kitchen layout requirement.

5. 厨房的出入口结合公共后勤走道走廊设置相应的摄像机，对所有厨房出入人员进行监控。
   CCTV shall be provided for kitchen in/out access and BOH area corridor for monitoring staff movement.

D. 供配电系统
   Electrical Distribution System

1. 采用的嵌入式防潮荧光灯具。
   Recessed type weatherproof fluorescent light shall be used.

2. 所有灯具采用透明塑料外罩或者使用自带防护灯罩的光源。
   All light fittings shall be provided with transparent cover or integrated fluorescent tube protection.

3. 灯具采用就地墙面开关或配电箱上的断路器控制，不使用调光器。
   Light fittings shall be controlled by localized switch or circuit breaker in the distribution board. No dimmer switch shall be used.

4. 必须有 30%的照明由柴油发电机作为备用电源；消防应急照明电源引自最近的 EPS（例如对应的防火分区内的 EPS 箱）。
   30% of the lightings shall be backed up by diesel engine generator; emergency lighting shall be supplied from the nearest EPS(such as from the correspondence fire protection zone EPS panel).

5. 需为安装设备提供相应的电源插座，同时还应提供 8 个额外的通用电源插座。
   All equipment shall be provided with socket outlets with 8nos of additional universal socket outlets.

6. 厨房内所有插座回路应带有接地故障保护，插座及电源连接均需防水汽。
   All electrical socket outlet circuitry for the kitchen shall be provided with earth leakage protection, socket outlets and plugs shall be of weatherproof type.

7. 以下位置应提供合适的插座：
   Socket outlet shall be provided for the following areas listed below:

   a. 宴会厅送餐车停放区。
      Banquet serving cart parking area

   b. 离地 2.1m 高安装的时钟，位于烹饪区和取菜区清晰可见处。
      Clock shall be mounted at 2.1m height and located at visible location in cooking area and food collection area

   c. 为安装 POS 终端设备的客房服务、取菜区、饮料站和/或服务台等点位提供至少四个电源插座。
      At least 4 nos. of electrical socket outlets shall be provided for areas with POS

equipment such as guest service area, food collection area, drinks station and /or service counter, etc.

d. 一般清洁设备。
General cleaning equipments

e. 所有厨房用电设备。
All kitchen electrical equipments

f. 打印机位置
Printers

8. 厨房所有电气设备插座需加装防水盖板。
Splash proof cover shall be provided for all electrical socket outlets in the kitchen.

9. 插座中点一般离装饰地面 1000mm，或由厨房顾问决定。
Socket outlet shall be installed above floor height of 1000mm or to be determined by kitchen consultant.

10. 根据具体的设备选型，为垃圾压实机/集装箱提供电源。
Based on equipment selection, power supply for refuse chamber shall be provided.

14.2. 仓库 STORE ROOM

A. 消防/给排水系统
Fire Protection/ Plumbing And Drainage Systems

1. 仓库内不得布置给排水管道，以免因管道出现渗漏，破裂等问题造成仓库内储物受潮或浸水。
No supply and discharge water pipe is allowed in store room to avoid wetting damage caused by water leakage.

B. 供热通风空调系统
Heating, Ventilation And Air Conditioning System

1. 设置中央空调系统，新风按排风量的 80％设置，排风量按照 4 次换气次数计算。
Central air conditioning system shall be used. The fresh air flow rate shall be 80% of exhaust air flow rate. The exhaust air flow rate shall be 4 times air exchange.

C. 弱电系统
Elv System

1. 酒水储藏室、干货储藏室、冷库、酒店总仓库等位置应配备一部内线电话；
1no of extension telephone point shall be provided for alcohol & beverage store, dry ration store, cold storage and hotel central warehouse.

2. 酒水、干货储藏室应安装摄像机对室内情况进行监控；
Alcohol & beverage store and dry ration store shall be provided with CCTV for monitoring.

3. 酒水储藏室、干货储藏室仓库需设置门禁系统。
Alcohol & beverage store and dry ration store shall be provided with door access system.

D. 供配电系统
Electrical Distribution System

1. 冷库压缩机或压缩机组合式机组应采用专门的回路供电，并且不通过插座而是直接接线至配电盘。
Power supply for cold storage compressor or combined compressor shall be independent type with direct cable connection other than via socket outlet.

2. 每面墙上应按 6m 的插座中心距离至少安装 1 个通用插座，并在储藏区的入口安装 1 个通用插座。
General power point shall be provided at every 6m interval on each wall. One general power shall be provided near the storage entrance.

14.3. 餐厅
RESTAURANT

A. 消防/给排水系统
Fire Protection/ Plumbing And Drainage Systems

1. 餐厅吊顶内高度大于 800mm 时，需安装喷淋。喷头流量系数为 80。
Sprinkler shall be provided if the restaurant suspended ceiling internal height is more than 800mm. The flow coefficient shall be 80.

2. 餐厅上方不应布置污/废水管道。
No waste/sewage pipe is allowed above the restaurant.

B. 供热通风空调系统
Heating, Ventilation And Air Conditioning System

1. 新风量标准按照 30m3/h•p，排风量按照新风量的 105%~110%，保持餐厅负压。
The fresh air flow rate shall be based on 30 m^3 / h•p; the exhaust air flow rate shall be 105% to 110% of fresh air flow rate to ensure negative air pressure in restaurant.

2. 应设置独立变频排风机（或采用双风机空气处理机组）。
Independent variable frequency exhaust air fan shall be provided (or double fan air handling unit)

3. 包房内设置风机盘管加新风系统，包房及包房卫生间设置相应的排风系统，包房排风量由包房内排风及卫生间排风共同承担。
Fan coil unit with fresh air system shall be provided for the private room . Exhaust air system shall be provided for the private room and its toilet.

C. 弱电系统
ELV System

1. 每个接待台处应有 1 部内线电话，且提供连接酒店管理系统的网络数据端口。
1no of extension telephone point and network data point for hotel management system shall be provided for each reception counter.

2. 每个收银台处提供连接酒店管理系统、内线电话、打印机和 POS 机等的端口，数量不少于 2 个语音电话端口和 2 个网络数据端口。
   The cashier shall be provided with communication ports for hotel management system, extension phone, printer and POS Machine. Minimum 2 nos. of telephone points and 2 nos. of network data points shall also be provided.

3. 在收银台的每个工作岗位设置 1 个应急按钮，且需安装摄像机对业务交易情况进行监控。
   1 no. of emergency button shall be provided for each workstation of cashier with CCTV to monitor the service transaction.

4. 餐厅内部服务台需设置 1 个电话端口及 1 个数据端口。
   The restaurant internal service counter shall be provided with 1 no. of telephone point and 1 no. of network data point.

5. 餐厅客区应有无线网络全覆盖。
   The restaurant guest area shall be covered by wireless signal.

6. 餐厅区域应设置有线电视端口和 IPTV 数据端口，数量和位置根据餐厅实际布置情况而定。
   CATV point and IPTV data point shall be provided in the restaurant. The actual quantity and location shall be determined by the actual arrangement.

7. 所有餐厅包房应设置有线电视端口和 IPTV 数据端口
   All restaurant compartments shall be provided with CATV points and IPTV data points.

8. 在餐厅区域内应考虑设置摄像机，对餐厅内部情况进行一般性监控。
   CCTV shall be provided for general monitoring in the restaurant.

9. 餐厅照明应提供手持机编程控制的智能调光系统，通过遥控和面板控制灯光场景模式，调光面板应隐藏在客人的视线之外。
   Handset remote intelligence lighting control system shall be provided for lighting control together with remote controller and control panel for different scene mode selection. The control panel shall be concealed type.

10. 员工餐厅应设置 2 个刷卡机的数据端口。
    2 nos. of network data points for card reader shall be provided for the staff canteen.

11. 员工餐厅应根据后勤区域的布局设置有线电视端口和 IPTV 数据端口。
    CATV point and IPTV data point shall be provided for staff canteen based on backup area layout arrangement.

12. 员工上网区需要设置网络数据端口及内线电话。
    Network data point and extension telephone point shall be provided for the staff internet surfing area.

D. 供配电系统
   Electrical Distribution System

1. 必须有 30%的回路照明由柴油发电机作为备用电源，其中 15%的回路照明由不间断电源 EPS 配电。

30% of the circuitry lighting shall be backed up by the diesel engine generator; 15% of which shall be provided by EPS.

2. 每个服务台提供四个电源插座。
   4 nos. of electrical socket outlets shall be provided for each service counter.
   接待台必须提供 1 个电源插座。

3. 1 no. of electrical socket outlet shall be provided for the reception counter.
   间隔 15m 以内设置 16A 的清洁插座，并设置独立的配电回路。

4. 16A socket outlet with independent circuit shall be provided at every 15m interval for cleaning purpose.
   插座中点离装饰地面 350mm 处，或根据踢脚线的实际情况定。
   The socket outlet center point shall be 350mm away from floor finish level and be determined by the floor skirting.

5. 收银机等收银系统的设备必须设置 UPS 不间断电源。
   UPS shall be provided for cashier equipment.

14.4. 酒吧 BAR

A. 消防/给排水系统
Fire Protection/ Plumbing And Sanitation Systems

1. 酒吧吊顶内高度大于 800mm 时，需安装喷淋。喷头流量系数为 80。
   Sprinkler shall be provided if the bar suspended ceiling internal height is more than 800mm. The flow coefficient shall be 80.

2. 酒吧吧台应设洗涤用给排水点位。
   Supply and discharge water point shall be provided for cleaning purpose at the bar counter.

3. 酒吧上方不应布置污/废水管道。
   No waste/sewage pipe is allowed above the bar.

B. 供热通风空调系统
Heating, Ventilation And Air Conditioning System

1. 空调采用风机盘管加新风系统。
   Fan coil unit with fresh air system shall be used for air conditioning provision.

2. 新风量标准按照 30m3/h•p，排风量按照新风量的 105% ~110%，保持酒吧内负压。
   The fresh air flow rate shall be based on 30 m^3 / h.p; the exhaust air flow rate shall be 105% to 110% of fresh air flow rate to ensure negative air pressure in the bar.

C. 弱电系统
Elv System

1. 收银台应有连接酒店管理系统、内线电话、打印机和 POS 机等的端口，可设置 2 个语音电话端口和 2 个网络数据端口。
   The cashier shall be provided with communication ports for hotel management system,

extension phone, printer and POS Machine. Minimum 2 nos. of telephone points and 2 nos. of network data points shall also be provided.

2. 收银台每个工作岗位应有 1 个应急按钮，且需安装摄像机对业务交易情况进行监控。
Each service workstation of the cashier counter shall be provided with 1 no. of emergency button and with CCTV to monitor the service transaction.

3. 酒吧内部应有无线网络的覆盖。
The bar internal area shall be covered by wireless signal.

4. 酒吧区域应设置有线电视端口和 IPTV 数据端口，数量和位置可根据酒吧装饰风格而定。
CATV point and IPTV data point shall be provided for the bar. The actual quantity and location shall be determined by the bar interior design.

5. 在酒吧内部可设置摄像机，对酒吧内部情况进行监控。
CCTV shall be installed for monitoring in the bar.

6. 酒吧照明应提供手持机编程控制的智能调光系统，可通过遥控和面板控制灯光场景模式，调光面板应隐藏在客人的视线之外。
Handset remote intelligence lighting control system shall be provided for lighting control together with remote controller and control panel for different scene mode selection. The control panel shall be concealed type.

D. 供配电系统
Electrical Distribution System

1. 必须有 30%的回路照明由柴油发电机作为备用电源，其中 15%的回路照明由不间断电源 EPS 配电。
30% of the circuitry lighting shall be backed up by the diesel engine generator; 15% of which shall be provided by EPS.

2. 提供客人取电的方便插座。
To provide socket outlet for guest convenience usage.

3. 酒保和/或服务生的取酒台位置应配置 POS 终端。
POS terminal shall be provided at the barkeeper and/or waiter at the wine service counter.

4. 为每个 POS 终端位置提供 4 个采用专用回路供电的电源插座，以及 1 个额外的插座。POS 机需配置 UPS 不间断电源。
4 nos. of electrical socket outlets with separate circuits and 1 no. of spare socket outlet shall be provided for each POS Terminal. The POS Machine shall be provided with UPS.

5. 每个鸡尾酒台的挡水板上方提供 1 个电源插座。
1 no. of electrical socket outlet shall be provided at each cocktail counter on top of the baffle board.

6. 所有电气设备例如咖啡机等，都需要配置带接地保护的断路器。
Earth leakage protection circuit breakers shall be provided for all electrical equipments such as coffee machine, etc.

7. 间隔 15.0m 以内设置 16A 的清洁插座，并设置独立的配电回路。
   16A switched socket outlets with independent circuit shall be provided every 15m for general cleaning purpose.

14.5. 咖啡厅
CAFÉ

A. 消防/给排水系统
Fire Protection/ Plumbing And Sanitation Systems

1. 咖啡厅吊顶内高度大于 800mm 时，需安装喷淋。喷头流量系数为 80。
   Sprinkler shall be provided if the coffee shop suspended ceiling internal height is more than 800mm. The flow coefficient shall be 80.

2. 咖啡厅备餐区应设洗涤用给排水点位。
   Supply and discharge water point shall be provided for washing in food preparation room of the coffee shop

3. 咖啡厅备餐区上方不应布置污/废水管道。
   No waste/sewage pipe is allowed above the food preparation room of coffee shop.

B. 供热通风空调系统
Heating, Ventilation And Air Conditioning System

1. 空调采用风机盘管加新风系统。
   Fan coil unit with fresh air system shall be adopted.

2. 新风量标准按照 30m3/h•p，排风量按照新风量的 105% ~110%，保持室内负压。
   The fresh air flow rate shall be 30 m^3 / h•p; the exhaust air flow rate shall be 105% to 110% of fresh air flow rate to ensure negative indoor air pressure.

C. 弱电系统
Elv System

1. 收银台应有连接酒店管理系统、内线电话、打印机和 POS 机等的端口，可设置 2 个语音电话端口和 2 个网络数据端口。
   The cashier shall be provided with communication ports for hotel management system, extension phone, printer and POS Machine. Minimum 2 nos. of telephone points and 2 nos. of network data points shall also be provided.

2. 收银台每个工作岗位设置 1 个应急按钮，且需安装摄像机对业务交易情况进行监控。
   Each service workstation of the cashier counter shall be provided with 1 no. of emergency button and with CCTV to monitor the service transaction.

3. 咖啡厅内部应有无线网络的覆盖。
   Coffee shop internal area shall be covered by wireless signal.

4. 咖啡厅区域应预留客用网络数据端口。
   Network data points shall be provided for guests in the coffee shop.

5. 咖啡厅区域宜设置有线电视端口和 IPTV 数据端口，数量和位置根据具体装饰设计而定。
   CATV point and IPTV data point shall be provided for the coffee shop. The actual quantity and location shall be determined by the interior design.

6. 咖啡厅照明应提供手持机编程控制的智能调光系统，可通过遥控和面板控制灯光场景模式，调光面板应隐藏在客人的视线之外。
   Handset remote intelligence lighting control system shall be provided for lighting control together with remote controller and control panel for different scene mode selection. The control panel shall be concealed type.

D. 供配电系统
   Electrical Distribution System

1. 必须有 30%的回路照明由柴油发电机作为备用电源；其中 15%的回路照明由不间断电源 EPS 配电。
   30% of the circuitry lighting shall be backed up by the diesel engine generator; 15% of which shall be provided by EPS.

2. 为固定座位区提供客人取电用的方便插座。
   Socket outlets shall be provided for fixed sitting area.

3. 每个服务台提供四个电源插座。
   4 nos. of electrical socket outlets shall be provided for each service counter.

4. 接待台必须提供 1 个电源插座。
   One electrical socket outlet shall be provided for the reception counter.

5. 间隔 15m 以内设置 16A 的清洁插座，并设置独立的配电回路。
   16A switched socket outlets with independent circuit shall be provided at every 15m interval for general cleaning purpose.

6. 插座中点离装饰地面 350mm 处，或根据踢脚线的实际情况定。
   The socket outlet center point shall be 350mm from the floor finished level or to be determined by the floor skirting.

7. 收银机等收银系统的设备必须设置 UPS 不间断电源。
   UPS shall be provided for cahier equipment.

8. 所有电气设备例如咖啡机等均需设置接地故障保护断路器。
   Earth leakage protection circuit breakers shall be provided for all electrical equipments such as coffee machine, etc.

14.6. 全日餐厅
ALL DAY DINING

A. 消防/给排水系统
   Fire Protection/ Plumbing And Sanitation Systems

1. 自助餐厅吊顶内高度大于 800mm 时，需安装喷淋。喷头流量系数为 80。
   Sprinkler shall be provided if the self-service restaurant suspended ceiling internal height is more than 800mm. The flow coefficient shall be 80.

2. 自助餐厅上方不应布置污/废水管道。
   No waste/sewage pipe is allowed above the self-service restaurant.

B. 供热通风空调系统
   Heating, Ventilation And Air Conditioning System

1. 空调采用全空气系统，考虑过渡季节全新风运行的情况，空调机组及排风机均采用变频控制。
   AHU system shall be provided for air conditioning system with consideration of the transitional seasons. Variable frequency control shall be used for air-con plant and exhaust fans.

2. 新风量标准按照 30m3/h•p，排风量按照新风量的 105% ~110%，保持室内负压。
   The fresh air flow rate shall be based on 30 m^3 / h•p; the exhaust air flow rate shall be 105% to 110% of fresh air flow rate to ensure negative indoor air pressure.

C. 弱电系统
   Elv System

1. 接待台应有 1 部内线电话，且提供连接酒店管理系统的网络数据端口。
   1no of extension telephone point and network data point with hotel management system network port shall be provided for the reception counter.

2. 收银台应有连接酒店管理系统、内线电话、打印机和 POS 机等的端口，可设置 2 个语音电话端口和 2 个网络数据端口。
   The cashier shall be provided with communication ports for hotel management system, extension phone, printer and POS Machine. Minimum 2 nos. of telephone points and 2 nos. of network data points shall also be provided.

3. 餐厅收银台每个工作岗位应安装应急按钮，且需安装摄像机对业务交易情况进行监控。
   Each service workstation of the cashier counter shall be provided with 1 no. of emergency button and with CCTV to monitor the service transaction.

4. 餐厅内部服务台应设置 1 个电话端口及 1 个数据端口。
   1 no. of telephone point and 1 no. of network data point shall be provided for the restaurant internal service counter.

5. 餐厅内部应有无线网络的覆盖。
   The restaurant internal area shall be covered by wireless signal.

6. 应设置有线电视端口和 IPTV 数据端口，数量和位置根据装饰设计而定。
   CATV point and IPTV data point shall be provided. The actual quantity and location shall be determined by the interior design.

7. 在餐厅区域可设置摄像机，对餐厅内部情况进行一般性监控。
   CCTV shall be provided for general monitoring in the restaurant.

8. 全日制餐厅照明应提供手持机编程控制的智能调光系统，可通过遥控和面板控制灯光场景模式，调光面板应隐藏在客人的视线之外。
   Handset remote intelligence lighting control system shall be provided for lighting control together with remote controller and control panel for different scene mode selection. The control panel shall be concealed type.

D. 供配电系统
   Electrical Distribution System

1. 必须有 30%的回路照明由柴油发电机作为备用电源，其中 5%的回路照明由不间断电源 EPS 配电。
   30% of the circuitry lighting shall be backed up by the diesel engine generator; 5% of which shall be provided by EPS.

2. 所有插座回路必须提供接地故障保护。
   All socket outlet circuits shall be provided with earth leakage protection.

3. 自助餐台必须配置 1 个独立配电箱或者在展示台位置安装适当大小的就地开关。
   For the self-service restaurant counter, 1 no. of independent electrical distribution board or localized switch at the display counter shall be provided.

4. 间隔 15m 以内设置 16A 的清洁插座，并设置独立的配电回路。
   16A switched socket outlets with independent circuit shall be provided at every 15m interval for general cleaning purpose.

14.7. 特色餐厅
SPECIALTY RESTAURANT

A. 消防/给排水系统
   Fire Protection/ Plumbing And Sanitation Systems

1. 特色餐厅吊顶内高度大于 800mm 时，需安装喷淋。喷头流量系数为 80。
   Sprinkler shall be provided if the characteristic restaurant suspended ceiling internal height is more than 800mm. The flow coefficient shall be 80.

2. 特色餐厅上方不应布置污/废水管道。
   No waste/sewage pipe is allowed above the characteristic restaurant.

B. 供热通风空调系统
   Heating, Ventilation And Air Conditioning System

1. 空调采用全空气系统，考虑过渡季节全新风运行的情况，空调机组及排风机均采用变频控制。
   AHU system shall be adopted for air conditioning system with consideration of the transitional seasons. Variable frequency control shall be used for air-con plant and exhaust fans.

2. 新风量标准按照 30m3/h•p，排风量按照新风量的 105% ~110%，保持室内负压。
   The fresh air flow rate shall be basd on 30 m^3 / h p; the exhaust air flow rate shall be 105% to 110% of fresh air flow rate to ensure negative indoor air pressure.

C. 弱电系统
ELV System

1. 接待台应有 1 部内线电话，且提供连接酒店管理系统的网络数据端口。
1no of extension telephone point and 1no network data point with hotel management system shall be provided for the reception counter.

2. 收银台应提供连接酒店管理系统、内线电话、打印机和 POS 机等的端口，可设置 2 个语音电话端口和 2 个网络数据端口。
The cashier shall be provided with communication ports for hotel management system, extension phone, printer and POS Machine. Minimum 2 nos. of telephone points and 2 nos. of network data points shall also be provided.

3. 在收银台的每个工作岗位设置 1 个应急按钮，且需安装摄像机对业务交易情况进行监控。
Each service workstation of the cashier counter shall be provided with 1 no. of emergency button and with CCTV to monitor the service transaction.

4. 餐厅内部服务台应设置 1 个电话端口及 1 个数据端口。
1 no. of telephone point and 1 no. of network data point shall be provided for the restaurant internal service counter.

5. 餐厅内部应有无线网络的覆盖。
The restaurant internal area shall be covered by wireless signal.

6. 餐厅区域应设置有线电视端口和 IPTV 数据端口，数量和位置根据装饰设计而定。
CATV point and IPTV data point shall be provided for the restaurant. The actual quantity and location shall be determined by the interior design.

7. 每个餐厅包房应设置有线电视端口和 IPTV 数据端口。
CATV point and IPTV data point shall be provided for each compartment.

8. 在餐厅区域应设置摄像机，对餐厅内部情况进行一般性监控。
CCTV shall be provided for general monitoring in the restaurant.

9. 特色餐厅照明应提供手持机编程控制的智能调光系统，可通过遥控和面板控制灯光场景模式，调光面板应隐藏在客人的视线之外。
Handset remote intelligence lighting control system shall be provided for lighting control together with remote controller and control panel for different scene mode selection. The control panel shall be concealed type.

D. 供配电系统
Electrical Distribution System

1. 必须有 30%的回路照明由柴油发电机作为备用电源；其中 15%的回路照明由不间断电源 EPS 配电。
30% of the circuitry lighting shall be backed up by the diesel engine generator; 15% of which shall be provided by EPS.

2. 应为所有厨房设备提供电源插座，同时提供一定数量的通用插座。
Electrical socket outlets shall be provided for all kitchen equipments. General socket outlet shall also be provided.

3. 所有插座回路必须提供接地故障保护。
All socket outlet circuits shall be provided with earth leakage protection.

4. 餐台必须配置 1 个独立配电箱或者在展示台位置安装适当大小的就地开关。
Restaurant counter shall be provided with1 no. of independent electrical distribution board or localized switch at the display counter.

5. 所有展示台(无论加热型还是制冷型)均必须配置就地开关，并且应在台柜内安装 1 个数字控制器/显示屏(冷热模式)或温度控制器(加热型)，柜门应安装反弹器以防止损坏。
Every display counter(no matter heating or cooling type) shall be provided with localized switch and 1 no. of digital controller/display screen (cold and hot mode) or temperature controller (heating type). Door stopper shall be provided to avoid damage.

6. 间隔 15m 以内设置 16A 的清洁插座，并设置独立的配电回路。
16A switched socket outlets with independent circuit shall be provided at every 15m interval for general cleaning purpose.

14.8. 行政酒廊
EXECUTIVE LOUNGE

A. 消防/给排水系统
Fire Protection/ Plumbing And Sanitation Systems

1. 行政酒廊吊顶内高度大于 800mm 时，需安装喷淋。喷头流量系数为 80。
Sprinkler shall be provided if the executive lounge suspended ceiling internal height is more than 800mm. The flow coefficient shall be 80.

2. 行政酒廊吧台应设洗涤用给排水点位。
Supply and discharge water point shall be provided for executive lounge bar.

3. 行政酒廊上方不应布置污/废水管道。
No waste/sewage pipe is allowed above the executive lounge.

B. 供热通风空调系统
Heating, Ventilation And Air Conditioning System

1. 根据具体情况和空间大小设置全空气系统或者风机盘管加新风系统，如果采用全空气系统考虑过渡季节全新风运行的情况，空调机组及排风机均采用变频控制。
Selection for AHU system or fan coil unit with fresh air system shall be determined by actual situation and space size. All-air system shall be provided for air conditioning system considering the transitional seasons. Variable frequency control shall be used for air-con plant and exhaust fans.

2. 新风量标准按照 30m3/h•p，排风量按照新风量的 105% ~110%，保持室内负压。
The fresh air flow rate shall be based on 30 m^3 / h.p; the exhaust air flow rate shall be 105% to 110% of fresh air flow rate to ensure negative indoor air pressure.

C. 弱电系统
Elv System

1. 前厅服务台应有连接酒店管理系统、内线电话、打印机和 POS 机等的端口，可设置 2 个语音电话端口和 4 个网络数据端口。
Each workstation of cashier shall be provided with communication ports for hotel management system, extension phone, printer and POS Machine. Minimum 2 nos. of telephone points and 4 nos. of network data points shall also be provided.

2. 服务台每个工作岗位应设置 1 个应急按钮，且需安装摄像机对业务交易情况进行监控。
Each service counter workstation shall be provided with 1 no. of emergency button and with CCTV to monitor the service transaction.

3. 行政酒廊打印室应设置至少 2 个打印机端口和 1 个传真机端口。
At least 2 nos. of printer ports and 1 no. of fax machine port shall be provided for executive lounge printing room.

4. 应为酒店管理系统提供两条 CAT6/FIOS 预留线。
Two CAT6/FIOS wires shall be provided for hotel management system.

5. 在行政酒廊四周墙上或地面应预留客用网络端口，具体数量及位置根据装饰设计而定。
Network data points shall be provided on the surrounding walls or floor of the executive lounge. The actual quantity and location shall be determined by the interior design.

6. 行政酒廊区域应无线网络全覆盖。
Executive lounge area shall be covered by wireless signal.

7. 备餐间设置 1 部内线电话。
1 set of extension telephone point shall be provided for food preparation room

8. 应设置至少 2 个有线电视端口和 IPTV 数据端口，数量和位置根据内部装修布局而定。
At least 2 nos. of CATV point and IPTV data point shall be provided. The actual quantity and location shall be determined by the interior design.

9. 应在出入口处设置摄像机，对人员的出入情况进行监控，可结合公共走道摄像机设计。
CCTV shall be provided at the entrance for monitoring with location coordinated with common corridor camera.

10. 照明应提供通过手持机编程的智能调光系统，可通过遥控和面板控制灯光场景模式，调光面板应隐藏在客人的视线之外。
Handset remote intelligence lighting control system shall be provided for lighting control together with remote controller and control panel for different scene mode selection. The control panel shall be concealed type.

11. 行政酒廊出入口的门需要安装电子门锁。
Electronic lock shall be provided for executive lounge access door.

D. 供配电系统
Electrical Distribution System

1. 必须有 30%的回路照明由柴油发电机作为备用电源；其中 15%的回路照明由不间断电源 EPS 配电。
30% of the circuitry lighting shall be backed up by the diesel engine generator; 15% of which shall be provided by EPS.

2. 在迎宾/礼宾台位置设置三个电源插座。
3 nos. of electrical socket outlets shall be provided for reception counter.

3. 为客用电脑工作站提供 2 个电源插座。
2 nos. of electrical socket outlets shall be provided for guest computer workstation.

4. 插座中点离装饰地面 350mm，插座位置要和家具布置相协调。整个座位区域，都要设置插座以方便客人使用笔记本电脑和其他便携式设备。
Socket outlet center point shall be 350mm from floor finished level and be coordinated with furniture arrangement. Socket outlets shall be provided for the entire sitting area for lap tops and other portable equipments.

5. 出口处设置安全出口标示灯，以小于 16m 的间距设置疏散指示灯，应有垂直指向出口处的方向指示。端头指示灯距墙应小于 8m。
Exit light shall be provided for exit door. Exit signs with vertical indication shall be provided at every 16m interval. Indication light shall be 8m away from the wall.

第15章.商业设施
SECTION 15: COMMERCIAL FACILITIES

15.1. 零售商店
RETAIL STORE

A. 供热通风空调系统
Heating, Ventilation And Air Conditioning System

1. 空调采用风机盘管加新风系统。
Fan coil unit with fresh air system shall be adopted for air conditioning provision.

2. 新风量标准按照 30m3/h•p，排风量与新风量相同。室内压力保持平衡。
Fresh air flow rate shall be standard 30m3/h•p and the same with exhaust air flow rate to ensure balanced indoor air pressure.

B. 弱电系统
ELV System

1. 收银台应有连接酒店管理系统、电话、打印机和 POS 机等的端口，设置数量不小于 2 个语音电话端口和 2 个网络数据端口；
Each workstation of cashier shall be provided with commmunication ports for hotel management system, extension phone, printer and POS Machine. Minimum 2 nos. of telephone points and 2 nos. of network data points shall also be provided.

2. 收银台需安装摄像机对业务交易情况进行监控。
CCTV shall be provided for cashier to monitor the service transaction.

3. 收银台需设置报警按钮
Emergency alarm button shall be provided for the cashier.

C. 供配电系统
Electrical Distribution System

1. 消防应急照明电源引自最近的 EPS（例如对应的防火分区内的 EPS 箱）。
Power supply for fire protection emergency lighting shall be provided from the nearest EPS (such as EPS Panel of correspondent fire protection zone)

2. 为 POS 系统提供 4 个电源插座及 1 个额外的电源插座。
The POS system shall be provided with 4 nos. of electrical socket outlets and 1 no. of spare electrical socket outlet.

第16章.会议设施
SECTION 16: MEETING FACILITIES

16.1. 宴会厅 BALLROOM

A. 消防/给排水系统
Fire Protection/ Plumbing And Sanitation Systems

1. 建筑内净空高度 8~12m 的宴会厅设计喷淋系统按非仓库类高大净空场所要求，原则上采用喷淋系统.
Sprinkler system shall be provided for non-storage type high clear height (8 to 12m) areas.

2. 宴会厅内大型吊灯附近应选用动作温度 79°C 的喷头。吊灯内侧采用动作温度 93°C 的喷头。
79°C sprinkler points shall be provided for surrounding areas with large pendant light and 93°C sprinkler points for internal areas.

B. 供热通风空调系统
Heating, Ventilation And Air Conditioning System

1. 空调采用全空气系统，考虑过渡季节全新风运行的情况，空调机组及排风机均采用变频控制。
AHU system shall be provided for air conditioning system with consideration of the transitional seasons. Variable frequency control shall be used for air-con plant and exhaust fans.

2. 新风量标准按照 30m3/h•p，排风量按照新风量计算，保持室内压力平衡。
Fresh air flow rate shall be standard 30m3/h•p and exhaust air flow rate to be the same to ensure balanced indoor air pressure.

3. 设有活动隔断时，应对每个隔断区设置独立的全空气系统。宴会厅为高大空间时宜采用上送下回或侧送下回的气流组织，合理设计宴会厅气流组织。
AHU system shall be provided for each divided zone of the banquet. For high volume area, the supply diffuser shall be from the top down/side and return will be at low level.

4. 在严寒或者寒冷地区靠外墙部分（离外墙 5m 区域内）可设置低温地板采暖。
In cold and severe cold areas, floor heating system can be considered(for area 5m away from external wall)

C. 弱电系统
ELV System

1. 应提供语音及数据插座，其数量取决于宴会厅的大小与分配能力；按照每个分隔区域的墙壁都应设置信息，数量应保证有 2 个语音电话端口和 2 个网络数据端。
Telephone point and network data point shall be provided in the banquet hall. At least two (2) telephone point and two (2) network data points shall be provided on the partition wall of banquet hall.

2. 按照每个分隔区域应提供 1 个有线电视端口及 1 个 IPTV 数据端口。
1 no. of CATV point and 1 no. of IPTV data point shall be provided for each zone.

3. 宴会厅应有无线网络全覆盖。
The entire banquet shall be covered by wireless signal.

4. 按每个分隔后的区域，每个宴会厅出入口应安装信息发布显示屏。
   Digital signage panel shall be provided for each banquet access.

5. 宴会厅每个备餐间设置 1 个内线电话端口和 1 个网络数据端口。
   1 no. of extension telephone point and 1 no. of network data point shall be provided for each banquet food preparation room.

6. 照明需提供手持机编程控制的智能调光系统，可通过遥控和面板控制灯光场景模式，其中调光器面板应提供分隔和组合功能，每个分隔区域的面板可控制本区域的灯光，当所有的分隔区域合并为 1 个大厅时可控制整个大厅所有的灯光；调光面板应隐藏在客人的视线之外。
   Handset remote intelligence lighting control system shall be provided for lighting control together with remote controller and control panel for different scene mode selection. Lighting control panel with separate and combine functions shall be provided for Meeting room with different zones as well as localized control. The control panel shall be concealed type.

7. 宴会厅通往服务通道的出入口应设置门禁系统。
   Ballroom service corridor access shall be provided with door access control system.

D. 供配电系统
   Electrical Distribution System

1. 宴会厅必须有 30%的回路照明由柴油发电机作为备用电源，其中 15%的回路照明由不间断电源 EPS 配电。
   30% of the circuitry lighting shall be backed up by the diesel engine generator; 15% of which shall be provided by EPS.

2. 分别设置独立的普通照明箱、应急照明箱、AV 电源箱和舞台预留电源箱。
   To provide Standalone general lighting panel, emergency lighting panel, AV power panel and platform power panel.

3. 每 56m2 提供四个电源地插。
   4 nos. of floor mounted electrical socket outlets shall be provided for every 56m² area.

4. 为临时照明展示提供带铰链盖的天花安装电源插座。
   Ceiling socket outlet with hinge cover shall be provided for temporary lighting.

5. 在宴会厅四周的墙面预留清洁插座，要求插座之间的距离不超过 6m，清扫插座需单独回路配电。
   Socket outlets with independent circuit shall be provided on each wall of the banquet for cleaning purpose with in-between distance not more than 6m.

6. 宴会厅至少需按 100W/m2 预留舞台活动电源。
   A minimum 100W/m2 power supply shall be considered for banquet platform . mobile equipment.

16.2. 宴会前厅
PRE-FUNCTION OF BALLROOM

A. 供热通风空调系统
Heating, Ventilation And Air Conditioning System

1. 空调采用全空气系统，考虑过渡季节全新风运行的情况，空调机组及排风机均采用变频控制。
AHU system shall be provided for air conditioning system with consideration of the transitional seasons. Variable frequency control shall be used for air-con plant and exhaust fans.

2. 新风量标准按照 30m3/h•p，排风量按照新风量计算，保持室内压力平衡。
Fresh air flow rate shall be standard 30m3/h•p and exhaust air flow rate to be the same to ensure balanced indoor air pressure.

B. 弱电系统
Elv System

1. 宴会厅前厅应设置摄像机，对出入宴会厅的人员情况进行监控；
CCTV shall be provided for banquet lobby for monitoring.

2. 宴会前厅应有无线网络全覆盖；
The banquet lobby shall be covered by wireless signal.

3. 宴会前厅休息区应设置方便客人使用的网络数据插座和电话插座；
Network data points and telephone points shall be provided for guests in the banquet lobby lounge area.

C. 供配电系统
Electrical Distribution System

1. 宴会前厅必须有 30%的回路照明由柴油发电机作为备用电源，其中 15%的回路照明由不间断电源 EPS 配电。
30% of the circuitry lighting shall be backed up by the diesel engine generator; 15% of which shall be provided by EPS.

2. 每 15m 的中心距提供 1 个 16A 的清洁插座。
16A Socket outlet shall be provided at every 15m interval for cleaning purpose.

3. 插座中点离装饰地面 350mm 处，或根据踢脚线的实际情况定。
The socket outlet center point shall be 350mm away from floor finish level or to be determined by the floor skirting

16.3. 会议室和多功能厅
MEETING AND MULTI-PURPOSE ROOM

A. 供热通风空调系统
Heating, Ventilation And Air Conditioning System

1. 面积超过 200 m2 会议室空调采用全空气空调，考虑过渡季节全新风运行的情况，空调机组及排风机均采用变频控制。
AHU system shall be provided for meeting room larger than 200 m² with consideration of

transitional seasons. Variable frequency control shall be used for air-con plant and exhaust fans.

2. 面积小于 200 m2 会议室空调系统采用风机盘管加新风系统。
For meeting room smaller than 200m², fan coil unit with fresh air system shall be provided.

3. 新风量标准按照 40m3/h•p，排风量按照新风量计算，保持室内压力平衡。
Fresh air flow rate shall be standard 40m3/h•p and the same with exhaust air flow rate to ensure balanced indoor air pressure.

B. 弱电系统
ELV System

1. 会议室前厅每个接待台应设置 1 个语音电话端口和 1 个数据端口。
1 no. of telephone point and 1 no. of network data point shall be provided for each reception counter at the meeting room lobby.

2. 对于大型会议室，按照每个分隔区域的墙壁都应设置信息端口，数量应保证有 1 个语音电话端口和 1 个网络数据端口。
At least 1 no. of telephone point and 1 no. of network data point shall be provided for each wall of every zone in the big meeting room.

3. 在每个会议室分隔的区域应提供 1 个有线电视端口和 1 个 IPTV 数据端口。
1 no. of CATV point and 1 no. of IPTV data point shall be provided for each meeting room separated area.

4. 每个会议室应有无线网络的全覆盖。
Each meeting room shall be covered by wireless signal.

5. 按每个分隔后的区域，会议室的门口应安装信息发布显示屏。
Digital signage panel shall be provided for each meeting room entrance.

6. 照明应提供手持机编程控制的智能调光系统，可通过遥控和面板控制灯光场景模式；其中大型有分区的会议室，调光器面板应提供分隔和组合功能，每个分隔区域的面板可控制本区域的灯光，当所有的分隔区域合并为 1 个大会议室时可控制整个会议室所有的灯光，调光面板应隐藏在客人的视线之外。
Handset remote intelligence lighting control system shall be provided for lighting control together with remote controller and control panel for different scene mode selection. Lighting control panel with separate and combine functions shall be provided for Meeting room with different zones as well as localized control. The control panel shall be concealed type.

7. 会议室的出入口门应安装电子门锁，其中服务通道的出入口应设置门禁系统。
Electronic lock shall be provided for meeting room access door. Door access system shall be provided for service corridor access.

8. 董事会议室应提供 1 部可以直接拨打到始终有人值守的商务中心或办公区的内线电话。
1no of extension telephone point with connection to business center or office area shall be provided in the board room.

9. 董事会议桌应提供 1 个语音电话端口、1 个传真机端口和 2 个网络数据端口。
Board room meeting table shall be provided with 1 no. of telephone point, 1 no. fax point for fax machine and 2 nos. of network data points.

C. 供配电系统
Electrical Distribution System

1. 必须有 30%的回路照明由柴油发电机作为备用电源，其中 15%的回路照明由不间断电源 EPS 配电。
30% of the circuitry lighting shall be backed up by the diesel engine generator; 15% of which shall be provided by EPS.

16.4. 备餐间
PANTRY

A. 消防/给排水系统
Fire Protection/ Plumbing And Sanitation Systems

1. 备餐间上方不应布置污/废水管道。
No waste/sewage pipe is allowed above the food preparation room.

2. 备餐间宜设洗涤用给排水点位。
Supply and discharge water point shall be provided for cleaning in the food preparation room.

B. 供热通风空调系统
Heating, Ventilation And Air Conditioning System

1. 备餐间保持室内负压，排风按照 2 次换气次数计算，靠渗透补风。
Air pressure shall be negative for the food preparation room. Air exchange shall be 2 times with leakage air compensation.

C. 弱电系统
ELV System

1. 备餐间应设置 1 部内线电话端口和 1 个网络数据端口。
1 set of extension telephone point and 1 no. of network data point shall be provided for food preparation room.

D. 供配电系统
Electrical Distribution System

1. 至少为宴会厅手推车提供 2 个电源插座，采用单独回路供电，安装高度为离地 1.37m。
At least 2 nos. of electrical socket outlets with independent circuit shall be provided for banquet trolleys. The installation height shall be 1.37m.

2. 在台面上方为小型电器至少提供 2 个电源插座。
At least 2 nos. of electrical socket outlets shall be provided on top of the counter for small equipment.

3. 备餐间内所有开关、插座等均需采用不锈钢面板。
   All switches and socket outlets in the food preparation room shall be stainless steel type.

第17章.康乐设施
SECTION 17: RECREATIONAL FACILITIES

17.1. 健身中心
FITNESS CENTRE

A. 供热通风空调系统
Heating, Ventilation And Air Conditioning System

1. 空调采用风机盘管加新风系统。
The air conditioning system shall adopt fan coil unit with fresh air type.

2. 新风量标准按照 40m3/h•p，排风量按照新风量的 105%~110%计算，保持室内负压。
The fresh air flow rate standard shall base on 40m3/h•p. Exhaust air shall be 105%~110% of the fresh air in order to maintain negative indoor pressure.

B. 弱电系统
ELV System

1. 接待中心处应有连接酒店管理系统、电话、打印机和 POS 机等的端口，设置 2 个语音电话端口和 2 个网络数据端口。
Reception center shall be provided with communication ports which are connected to the hotel management system, telephone, printer, and POS machine. Two (2) telephone points and two (2) network data points shall be provided.

2. 在接待中心的每个工作岗位设置 1 个应急按钮，且需安装摄像机对业务交易情况进行监控。
One (1) emergency button shall be provided at each work station in the reception center, and CCTV shall be installed to monitor the business transactions.

3. 在健身中心应配备紧急电话。紧急电话应安装在地板完成面以上最高 1.2m 处，该电话应为红色的外壳，可以直接拨打用户交换机/总机（除非当地管辖机构另有其它要求）。
Emergency telephone shall be provided in the gym centre. Emergency telephone shall be installed at maximum 1.2m above the finished floor level. The telephone shall be in red casing and the phone shall be able to dial to the PBX/ operator directly (unless there are other requirements by local authorities).

4. 应设置有线电视端口和 IPTV 数据端口，具体数量可根据健身中心的大小和布局来考虑。
CATV port and IPTV data points shall be provided. The quantity shall be based on the size and the layout of the gym centre.

5. 每个跑步机应预留 1 个有线电视端口和 1 个网络数据端口。
One (1) CATV point and one (1) network data point shall be provided for each running machine.

6. 健身中心的出入口应设置摄像机，对人员出入情况进行的监控。
CCTV shall be provided at the entrance/ exit of the gym centre to monitor the access condition.

7. 健身中心的入口门应安装电子门锁。
Electronic door lock shall be provided at the entrance of the gym center.

C. 供配电系统
Electrical Distribution System

1. 必须有 30%的回路照明由柴油发电机作为备用电源，其中 15%的回路照明由不间断电源 EPS 配电。
Minimum 30% of the circuitry lighting shall be backed up by diesel engine generator, 15% of which shall by backed up by uninterrupted power supply EPS.

2. 每台有氧训练设备均需提供 1 个电源插座，并且每个回路所带插座个数不应超过 8 个。
Each of aerobic training equipment shall be provided one (1) socket outlet and each circuit shall not have more than 8 outlets.

3. 所有电缆需隐蔽敷设。
All cables shall be concealed.

4. 每台跑步机应采用一条专用的回路供电。 .
Each running machine shall have one dedicated circuit of power supply.

5. 所有不邻墙的设备必须采用地插进行供电。
All equipment not adjacent to the wall shall use floor mounted type of power socket outlet .

6. 提供插座配电至伸展和专项区域的壁挂式平板电视。
Extendable power socket outlet shall be provided for suspended mounted flat TV at some special areas.

17.2. 水疗中心
SPA

A. 供热通风空调系统
Heating, Ventilation And Air Conditioning System

1. SPA 区域空调采用风机盘管加新风系统。
The air conditioning system in the SPA area shall adopt fan coil unit with fresh air type.

2. 新风量标准按照 60m3/h•p，排风量按照新风量的 105%~110%计算，保持室内负压。
The fresh air flow rate standard shall base on 60m3/h•p. Exhaust air shall be 105%~110% of the fresh air in order to maintain negative indoor pressure.

3. SPA 洗浴区宜辅助低温地板采暖系统。
Low-temperature floor radiant heating is recommended in the SPA bath area.

B. 弱电系统
ELV System

1. 收银台应有连接酒店管理系统、电话、打印机和 POS 机等的端口，可设置 2 个语音电话端口和 2 个网络数据端口。
Cashier shall be provided with communication ports which are connected to the hotel

management system, telephone, printer, and POS machine. Two (2) telephone points and two (2) network data points shall be provided.

2. 收银台每个工作岗位设置 1 个应急按钮，且需安装摄像机对业务交易情况进行监控。
One (1) emergency button shall be provided at each work station in the cashier, and CCTV shall be installed to monitor the business transactions.

3. 每个 SPA 包房内部应设置 1 个语音端口。
One (1) telephone point shall be provided in each SPA room.

4. 每个 SPA 包房、SPA 休息区等需要有有线电视端口和 IPTV 数据端口。
CATV point and IPTV data point shall be provided in each SPA room and SPA resting area.

5. SPA 区域的出入口需要安装摄像机，对进出人员的情况进行监控。
CCTV shall be provided at the entrance/ exit of the SPA area to monitor the access condition.

6. 在水疗室、更衣室提供 1 部拿起听筒直接拨打用户交换机 /总机的紧急电话。
One (1) emergency phone which can directly dial to the PBX/ operator shall be provided in the SPA room and changing room.

7. 若有 SPA 中心经理办公室，应提供 2 个电话端口及 2 个数据端口连接到酒店系统的电话、电脑和打印机。
If there is a SPA center manager office, two (2) telephone points and two (2) data points with connection to hotel management system computer and printer shall be provided.

C. 供配电系统
Electrical Distribution System

1. 吸顶安装的灯具和送风口不允许直接安装在按摩台的正上方。
Recessed lighting and supply air outlet shall not be installed directly above the massage table.

2. 理疗室应提供非直接型的可调光灯具。
Physiotherapy room shall be provided with indirect adjustable lighting.

3. 提供上照式壁灯，并且在整个水疗区域内由调光开关单独控制。不允许采用荧光灯照明。
Wall-mounted up light shall be provided, and the entire spa area shall be controlled by the dimmer switch only. No fluorescent lighting is allowed.

4. 在干理疗室内为按摩床提供 1 个地插。
One (1) floor mounted power socket outlet shall be provided for the massages bed in the dry physiotherapy room.

5. 在湿理疗室内为水疗床提供 1 个带接地故障保护的墙装插座。
One (1) wall mounted socket outlet with earth leakage protection shall be provided for the spa bed in the wet physiotherapy room.

6. 必须有 30%的回路照明由柴油发电机作为备用电源，其中 15%的回路照明由不间断电源 EPS 配电。

Minimum 30% of the lighting circuitry shall be backed up by diesel engine generator, 15% of which shall by backed up by uninterrupted power supply EPS.

17.3. 游泳池 SWIMMING POOL

A. 消防/给排水系统
Fire Protection/ Plumbing And Drainage Systems

1. 泳池机房内安装 1 个由足部控制的洗眼器。
One (1) eye bath which is controlled by foot shall be installed in the swimming pool plant room.

2. 室内游泳池休息区上方需安装喷淋头，室内游泳池水池上方宜设置喷头。所采用的喷头应为带防腐涂层(镀铬)的快速响应喷头
Sprinkler shall be installed above the indoor swimming pool rest area. Sprinkler is recommended to be installed above the indoor swimming pool. The sprinkler shall be quick response sprinkler with anti-corrosion coating (chrome plated).

3. 应考虑泳池区的地面冲洗用水接驳口，冲洗水应能有组织排放，不应流向池内。
Water tap connection for pool area floor washing shall be considered. Washing water discharge shall be controlled and shall not flow to the pool.

4. 应在泳池区配套设置不少于 2 个淋浴，在泳池区域入口进处设置浸脚池，上方应设强制冲淋，淋浴及浸脚池应提供冷热水供应，排水应接入生活污废水系统，不能接入泳池循环系统。
Minimum two (2) showers shall be provided in the pool area. Foot bath shall be provided at the entrance of the swimming pool area with mandatory shower above. Shower and foot bath shall be provided with hot and cold water supply. Drainage shall be connected to the domestic sewage wastewater system, not to the pool circulation system.

5. 泳池机房内应设置循环水处理设备的反冲洗废水和均衡水箱溢水 2 个排水点。
Two (2) drainage points for backwash wastewater and balance water tank overflow water shall be provided for the circulation water treatment equipment in the pool plant room.

B. 供热通风空调系统
Heating, Ventilation And Air Conditioning System

1. 空调采用泳池专用除湿热泵机组，机组应为双风机。
Air conditioning shall use dedicated pool dehumidification heat pump with double fans unit.

2. 新风量标准按照 9m3/h.m2 计算，排风量按照 10m3/h.m2 计算，保持室内负压。
The fresh air low rate standard shall base on 9m3/h•p and the exhaust air shall be based on 10m3/h•p in order to maintain negative indoor pressure.

3. 通过调节热泵机组新风比，可实现在冬季最小新风量及夏季全新风的不同工况下，依靠室外新风进行有效的泳池除湿及降温，以达到节能的目的。
By adjusting the heat pump fresh air ratio, the outdoor fresh air can be used to dehumidify

and cool the pool effectively under different working conditions such as minimum fresh air in winter and full fresh air in summer, so as to achieve the purpose of energy saving.

4. 机组回收热量应优先加热室内空气，其次用于加热池水，最后由室外冷凝器排掉，为了在除湿热回收热量不足的情况下机组正常使用，机组内须有一套备用热盘管利用外部热源保证室内空气温度。
   Priority is to use the recycled heat for heating the indoor air, secondly the pool water, before draining out by the outdoor condenser. In order to maintain normal operation under insufficient heat recovery from the dehumidification, there shall be one set of spare hot coil using external heat source to ensure the indoor air temperature.

5. 出风口应能吹到玻璃幕墙及天窗，防止冷凝水的生成。
   The outlet shall be located such that the air can be blown to the glass curtain wall and the skylight to prevent condensation.

6. 整个岸区均宜设置地板采暖系统。
   The whole deck is recommended to provide floor heating system.

C. 弱电系统
   ELV System

1. 泳池区域应有无线网络的全覆盖。
   Pool area shall have WIFI coverage.

2. 在泳池区域应安装紧急报警按钮或紧急电话（除非当地管辖机构另有其它要求）；紧急按钮应安装于地板完成面以上最高 0.9m 的位置，并且与消防安保中心的警铃相连接；紧急电话应安装在地板完成面以上最高 1.2m 处，该电话应为红色的外壳，可以直接拨打用户交换机/总机。
   Emergency telephone shall be installed in the dressing room area (unless there are other requirements by local authorities). Emergency telephone shall be installed at maximum 1.2m above the finished floor level. The telephone shall be in red casing and the phone shall be able to dial to the PBX/operator directly.

3. 泳池更衣室出入口和泳池的出入口应设置摄像机的监视。
   CCTV shall be provided at the entrance/ exit of the changing room and the pool.

D. 供配电系统
   Electrical Distribution System

1. 泳池区内和周边安装的所有电气回路必须配置带接地故障保护的断路器。
   All the electrical circuits inside and surrounded the swimming pool area shall be provided with circuit breaker with earth leakage protection.

2. 每个泳池至少应安装 2 个、按摩池安装 1 个适用于水下的湿壁龛型潜水灯具，其应通过 UL 认证并且在黑暗状态下必须点亮。灯具必须无需泳池排水即可更换。
   Every pool shall install minimum two (2) and massage pool shall install one (1) underwater wet niche type diving lighting. It shall be UL certified and shall turn on in dark condition. The lamps shall be able to be replaced without draining the pool water.

3. 灯具不允许安装在水面上方。
   No lighting shall be installed above the water.

4. 泳池机房必须有 30%的回路照明由柴油发电机作为备用电源，其中 15%的回路照明由不间断电源 EPS 配电。
   Minimum 30% of the circuitry lighting shall be backed up by diesel engine generator, 15% of which shall be backed up by uninterrupted power supply EPS.

5. 必须采用防水插座，并且不能安装在地面上。
   Waterproof outlet shall be used, and shall not be installed on the floor.

6. 提供 1 个 20 分钟的定时开关控制按摩池的喷水器。
   One (1) 20 minutes timer switch shall be provided to control the water jet of the massage pool.

7. 按摩池的附近位置应安装 1 个带有标识的紧急设备停止开关/按钮，可关断所有喷射泵/循环水泵。
   One (1) emergency equipment stop switch/ button shall be installed near the massage pool, which can shut off the entire injector pump/ water circulating pump.

17.4. 更衣室
CHANGING ROOM

A. 消防/给排水系统
   Fire Protection/ Plumbing And Drainage Systems

1. 更衣室多于 3 个淋浴器的热水配水管道，宜成环布置，以保证淋浴器出水温度稳定。
   If there are more than three (3) showers in the changing room, it is recommended to use ring arrangement to ensure stable shower water temperature.

B. 供热通风空调系统
   Heating, Ventilation And Air Conditioning System

1. 空调采用风机盘管加新风系统。
   The air conditioning system shall adopt fan coil unit with fresh air type.

2. 新风量标准按照排风量的 80%~90%计算，排风量按照 8 次换气次数计算，保持室内负压。
   The fresh air shall be 80%~90% of the exhaust air. Exhaust air shall be based on 8 air changes in order to maintain negative indoor pressure.

3. 冬季辅助低温地板辐射采暖。
   Use low-temperature floor radiant heating in winter.

C. 弱电系统
   ELV System

1. 在更衣室区域应安装紧急电话（除非当地管辖机构另有其它要求）；紧急电话应安装在地板完成面以上最高 1.2m 处，该电话应为红色的外壳，可以直接拨打用户交换机/总机。

Emergency telephone shall be installed in the dressing room area (unless there are other requirements by local authorities). Emergency telephone shall be installed at maximum 1.2m above the finished floor level. The telephone shall be in red casing and the phone shall be able to dial to the PBX/operator directly.

D. 供配电系统
Electrical Distribution System

1. 在盥洗台附近位置安装 1 个带接地故障保护的电源插座，供烘手器使用。
One (1) socket outlet with earth leakage protection shall be installed near the basin, for the use of hand dryer.

17.5. 桑拿
SAUNA

A. 消防/给排水系统
Fire Protection/ Plumbing And Drainage Systems

1. 桑拿房/干蒸房采用带防腐涂层(镀铬)的快速响应喷头，动作温度 141° C。
Sauna room/dry steam room shall use quick response sprinkler with anti-corrosion coating (chrome plated) and activation temperature of 141°C.

B. 弱电系统
ELV System

1. 桑拿房（包括干蒸室和湿蒸室）应安装防潮紧急报警按钮（除非当地管辖机构另有其它要求）；紧急按钮应安装于地板完成面以上最高 0.9m 的位置，并且与消防安保中心的警报铃连接。
Sauna room (including dry steam room and steam room) shall be installed with moisture proof emergency alarm button (unless there are other requirements by local authorities). Emergency button shall be installed at maximum 0.9 m from the finished floor level and connected with the fire and security centre alarm.

C. 供配电系统
Electrical Distribution System

1. 桑拿房内的灯具必须采用防碎安全灯罩，并且基于安全考虑应保持常亮。
Lighting in the sauna room shall use shatterproof lampshade, and shall be normally switched on for safety consideration.

2. 提供整体式防水蒸气的照明灯具。
Integrated water vapor proof lighting shall be provided.

第18章.人员交通
SECTION 18: CIRCULATION

18.1. 电梯厅
LIFT LOBBY

A. 供热通风空调系统
Heating, Ventilation And Air Conditioning System

1. 设置风机盘管加新风系统。
The air conditioning system shall adopt fan coil unit with fresh air type.

2. 新风量标准按照 30m3/h•p，不设置排风，靠渗透排风。
The fresh air flow rate standard shall be based on 30m3/h•p, no exhaust air, but through ex-filtration air.

B. 弱电系统
ELV System

1. 电梯厅应设置摄像机，应处于全天视频监视之下；
Elevator lobby shall be provided with CCTV and shall be under 24hr surveillance.

2. 客用电梯厅的台桌上应提供 1 部内线电话。
One (1) extension telephone shall be provided on the table of the guest elevator lobby.

3. 在车库内的每个电梯大厅，应提供连接到酒店的用户交换机/总机或有工作人员值守的保安办公室的紧急电话。
Every elevator lobby in the car park shall be provided with emergency phone with connection to the hotel PBX/ operator or on-duty security office.

C. 供配电系统
Electrical Distribution System

1. 必须有 30%的回路照明由柴油发电机作为备用电源，其中 15%的回路照明由不间断电源 EPS 配电。
Minimum 30% of the circuitry lighting shall be backed up by diesel engine generator, 15% of which shall by backed up by uninterrupted power supply EPS.

2. 设置 16A 清洁插座。
16A socket outlet shall be provided for cleaning purpose.

18.2. 走廊
CORRIDOR

A. 供热通风空调系统
Heating, Ventilation And Air Conditioning System

1. 设置风机盘管加新风系统。
The air conditioning system shall adopt fan coil unit with fresh air type.

2. 新风量标准按照 20m3/h•p，不设置排风，靠渗透排风。
The fresh air flow rate standard shall base on 20m3/h•p, no exhaust air, but through ex-filtration air.

B. 弱电系统
ELV System

1. 公共走廊应设置摄像机，结合楼梯口、各区域的出入口来合理布置摄像机；
CCTV shall be provided in the common corridor. Camera location shall be arranged with consideration of the combination of staircase, entrance/ exit in each area.

2. 宴会厅服务走廊应提供 1 个壁挂式内线电话。
One (1) wall mounted extension telephone shall be provided in the banquet hall service corridor.

C. 供配电系统
Electrical Distribution System

1. 客房走廊须有 30%的回路照明由柴油发电机作为备用电源；其中 15%的回路照明由不间断电源 EPS 配电。
Minimum 30% of the lighting circuitry shall be backed up by diesel engine generator, 15% of which shall be backed up by uninterrupted power supply EPS.

2. 客房走廊至少每隔 15.0m 应设置 1 个清洁插座。
16A socket outlet shall be provided at every 15 m interval along the guest corridor for cleaning purpose.

3. 客房走廊插座中点距装饰地面 350mm，或者根据踢脚线等实际情况定。
The center point of the outlet at the guest corridor shall be 350mm from the finished floor or determined by the skirting line or other factors.

4. 服务通道走廊至少每隔 20m 中心距设置 1 个墙装通用电源插座。
One (1) wall-mounted general purpose socket outlet shall be provided at every minimum 20 m distance interval along the service corridor.

5. 宴会厅服务走廊照明控制应采用非酒店工作人员不能控制的方式，例如利用在照明配电箱内进行控制。
Banquet service corridor lighting control shall be in such a way that it shall not be controlled by non-hotel staff. For example, use lighting distribution box to control.

18.3. 出口楼梯 STAIRCASE

A. 消防/给排水系统
Fire Protection/ Plumbing And Drainage Systems

1. 所有疏散楼梯间的顶部和底部需安装喷淋系统，并且地上和地下部分应分开设置。
The top and bottom of all the evacuation staircases shall be provided with sprinkler system. Aboveground and underground shall be installed separately..

B. 弱电系统
ELV System

1. 所有首层通往室外的出口楼梯需设置摄像机。
   CCTV shall be provided at all the 1st storey exit staircase which is leading to external.

C. 供配电系统
   Electrical Distribution System

1. 灯具不得采用就地开关控制。
   No localized lighting switch shall be provided.

2. 每层须设置楼层号指示灯，电源引自火灾应急照明箱。
   Floor indicator shall be provided for each floor. The power supply shall take from emergency lighting distribution board.

第19章.客房区
SECTION 19: GUESTROOM/SUITES

19.1. 标准客房
STANDARD GUESTROOM

A. 消防/给排水系统
Fire Protection/ Plumbing And Drainage Systems

1. 在卧室内安装消防广播和带有蜂鸣器的感烟探测器，要求在床头位置的报警音量不小于 75db。残疾人房还需设置频闪的声光报警器。
Emergency voice broadcasting and smoke detector with buzzer shall be provided in the guest rooms. The alarm volume at the bed head shall not be less than 75db. Guest rooms for handicapped shall be provided with audible and visual flashing alarm.

2. 客房卧室宜采用流量系数为 115 的快速反应扩展覆盖边墙型喷头或隐蔽式下喷。
Guest bedroom is recommended to install quick response extended coverage sidewall sprinkler with a flow coefficient of 115 or concealed sprinkler.

3. 客房淋浴间地漏规格不小于 DN75 或者设置 2 个 DN50。
Guest shower room floor drain standard shall not be less than DN75 or to provide two (2) DN50.

4. 客房卫生间的地面排水应有防止水封干枯的措施，可通过先将洗手盆排水排至地漏存水弯前接入，同时为避免双水封洗脸盆下方可不设存水弯。
Guest room toilet floor trap shall be designed to prevent from dry water seal, it can be avoided by connecting the sink drain before the floor trap. Trap is not required below the sink to avoid double traps.

5. 客房淋浴间的热水应考虑安装恒温控制装置。
The hot water for the guest shower room shall consider installing temperature control device.

B. 供热通风空调系统
Heating, Ventilation And Air Conditioning System

1. 空调采用风机盘管加新风的空调形式。
The air conditioning system shall adopt the fan coil unit with fresh air type.

2. 新风量标准按照 50m3/h•p 计算，新风经过中央新风处理机组处理后，由竖向管道输配至每层各客房，每层新风主管负担该层走廊新风，新风风管应直接送入客房，不允许接入风机盘管回风箱。
The fresh air flow rate standard shall base on 50m3/h•p. After pressurized by the central fresh air handling unit, fresh air will be distributed to the rooms on each floor via vertical risers. Each floor fresh air main duct shall serve fresh air to the corridor on that particular floor. Fresh air duct shall be directly sent to guest rooms and shall not be connected to the fan coil unit return air plenum.

3. 客房卫生间设置集中机械排风系统，排风量为客房新风量的 80%~90%。
Guest room toilet shall be provided with centralized mechanical ventilation system. The exhaust air flow rate shall be 80%~90% of the fresh air.

4. 为了更好控制排风量和新风量，在每个接入每间客房的新风管及排风管处设置定风量阀。

In order to have better control the exhaust air and fresh air flow rate, constant air volume valve shall be provided at the fresh air duct and exhaust air duct connected to each guest room.

5. 风机盘管宜采用直流无刷超低静音风机盘管。
FCU is recommended to use brushless DC ultra quiet type.

6. 寒冷及严寒地区靠外墙的卫生间考虑采暖。
In cold and severe cold areas, the toilet next to the external wall shall consider heating.

7. 客房电梯厅设置风机盘管加新风系统。
Guest elevator lobby shall provide FCU with fresh air system.

8. 客房走道应设置预处理新风，对于靠外墙、外窗的客房走道设置风机盘管。
Guest room corridors shall be provided with pre-cooled fresh air. FCU shall be provided for the guest corridors next to the external wall and window.

9. 应对客房楼层进行风量平衡核算，保证客房相对走道、客房卫生间均为正压。
Air volume balance calculation shall be done for each guest room floor to ensure positive pressure in the corridors and guest room toilets.

C. 弱电系统
ELV System

1. 提供门铃以及从门内激活的“请勿打扰”功能灯，“请勿打扰”显示器可与门铃、房号集成。
Door bell and "Do Not Disturb" light which is activated from the inside of the room shall be provided. "Do Not Disturb" display can be integrated with the doorbell and room number.

2. 电话：
Telephone:

   a. 每间客房应在床头柜提供 1 个语音电话端口；
   One (1) telephone point shall be provided at the bedside table in each guest room.

   b. 卫生间坐便器旁应提供 1 个语音电话端口；所使用的电话应有预设的拨号按钮，其中包括 1 个应急备用线路按钮；
   One (1) telephone point shall be provided next to the toilet seat. The telephone shall be provided with preset button, including one emergency standby line button.

   c. 书桌提供 1 个语音端口，电话插座应安装在客人视线以外的标准规范高度处。
   One (1) telephone point shall be provided at the desk. The telephone outlet shall be installed below the sight of the guest and the height shall comply with the standard requirements.

3. 网络
Network

a. 在书桌处应提供 1 个供客人上网用的网络数据端口。
One (1) network data point shall be provided at the desk for guest to access the Internet.

b. 电视机应设置有线电视端口和 IPTV 数据端口。
CATV point and IPTV data point shall be provided for the TV.

c. 每间客房都应设置无线网络系统，实现无线网络的全覆盖。
Each guest room shall be provided with wireless network system and shall achieve full coverage of wireless network.

4. 书桌上方宜安装 1 个多媒体面板，允许客人连接个人媒体装置，包括 HDMI & USB、AV、VGA & 3.5mm 音频接口，多媒体面板与电视距离不宜超过 5m。
One (1) multimedia panel is recommended to be installed at the desk to allow the guest to connect personal media devices, including HDMI & USB, AV, and VGA & 3.5 mm audio interface. The distance between the multimedia panel and TV shall not be more than 5 m.

5. 若卫生间没有安装镜面电视机时，应把电视机的音源引入至卫生间扬声器，并配置音量开关。
If there is no mirror TV in the toilet, the TV audio source shall be connected to the toilet speaker and volume switch shall be provided.

6. 客房控制：
Guest room control:-

a. 客房应设置客房智能控制系统，对照明、插座、空调、窗帘、服务信息等进行智能控制，为客人提供舒适的居住环境，通过智能化控制节约能源；
Guest room shall have intelligent control system to control the lighting, outlets, air conditioning, curtain, service information, etc. As such, it provides the guests with a comfortable living environment and saves energy through the intelligent control.

b. 可采用插卡取电或红外+门磁的方式取电；
Electricity can be turned on/off by inserting the card or infrared + door magnetic.

c. 进门区和床头应设置总开关，可打开和关闭所有的灯，但夜灯除外。
The main switch shall be provided at the entrance and bed head side to control all lighting except for the night light.

7. 无障碍人士客房的床头、卫生间应安装紧急求助按钮。
Emergency button shall be installed at the bed head and in the toilet for all handicapped guest rooms.

8. 每间客房入口门应安装电子门锁。
Electronic door lock shall be provided at the entrance of each guest room.

9. 每个客房层布草间需要设置 1 个内线电话，布草间的门需要安装电子门锁。
One (1) extension telephone point shall be provided in the linen room of each floor. Electronic door lock shall be provided for linen rooms.

D. 供配电系统
Electrical Distribution System

1. 卧室区入口处门廊要设置天花嵌入式灯具。在客房盥洗室，需在装饰镜两边各安装 1 个壁灯；同时，在台盆上天花中间位置安装 1 个嵌入式筒灯。需在浴缸或淋浴房上面增加防蒸汽的嵌入式筒灯，以保证达到最低照明要求。壁橱板条架的下面或前沿，安装 1 个暗藏条形荧光灯，从上而下照亮壁橱内所挂衣服，以及从下而上照亮壁橱内的帽架区域。
   The corridor at the bedroom entrance shall be provided with ceiling recessed lighting. In the bathroom of the guest room, one (1) wall lamp shall be installed at each side of the decorative mirror. One (1) recessed down light shall be installed in the middle of ceiling above the basin. Steam-proof recessed down light shall be provided above the bathtub or shower room in order to ensure the minimum lighting requirements. One (1) concealed fluorescent tube shall be installed under or at the front edge of the closet frame to light up the clothes from the top and the hat rack from the bottom.

2. 所有灯具均应考虑使用节能光源及 LED。
   All the lamps shall use energy saving light source and LED.

3. 照明灯具应符合照明设计师的设计理念。所有移动式灯具的底座均需配置毡垫类保护垫。所有不同功率的灯具型号均须通过 3C 认证。必须使用节能、长寿命的光源。气体放电灯需自带无功补偿装置，要求补偿后功率因数在 0.9 以上。
   The lightings shall comply with the lighting consultants design concept. All portable lamps shall be provided with felt mat protection at the base. All the lamp models with different wattage shall have 3C certification. Energy saving, long life span light source shall be used. The gas discharge lamp shall have built-in reactive power compensation device with power factor above 0.9.

4. 工作台灯
   Desk Lamp

   a. 台灯高度(除去顶部造型)必须在 560mm-650mm 之间，并根据底座和灯罩的形式而有所不同。工作面和灯罩顶部间应至少保持 350mm 的间距。
      The desk lamp height (excluding the top design) shall be between 560 mm to 650 mm which varies from different styles of the base and lampshade. Working surface and the lampshade shall have minimum 350 mm spacing in between.

5. 床头灯
   Bedside Lamp

   a. 每个床头柜上或其上方需要一盏床头灯。
      A bedside lamp shall be provided on or above the bedside table.

   b. 灯具底座样式必须考虑床头柜表面有足够的空间放置其它设备（电话、时钟、收音机等）。
      The type of the lamp base shall consider enough space at the bedside table surface to place other devices (such as telephone, clock, radio, etc.).

   c. 对于两张床之间共用的灯具应安装 2 个灯泡，既可单独开关又可同时开关。
      For shared lamp between two beds, there shall be two (2) bulbs which can be controlled individually or simultaneously.

   d. 床头灯可以安装到墙壁或床头板上。
      Bedside lamp can be installed on the wall or headboard.

e. 床头壁灯不允许在床头侧有电源插座。
The bedside wall-mounted lamp shall not have socket outlet at the head of the bed.

f. 床头灯必须带有墙装调光开关。
Bedside lamp shall be controlled by wall mounted dimmer switch.

g. 灯具高度必须在床头柜上方 650mm-800mm 之间(不包括灯具顶饰)，并且根据灯具底座和灯罩的样式和形状而定。床头柜面和灯罩底部之间的空间以满足为床头区域提供充足的光线为准。
The height of the lamps shall be between 650 mm to 800 mm above the bedside table (not including the lamp top design), and it shall be determined based on the type and shape of the lamp base and lampshade. The space between the bedside table surface and the bottom of the lampshade shall be designed to provide sufficient light for areas of the head of the bed.

6. 床头设置小型 LED 阅读灯。
Small LED reading lamp shall be provided at the head of the bed.

7. 落地灯
Floor Lamp

a. 所有休闲椅的旁边需提供一盏落地灯。
A floor standing lamp shall be provided next to the leisure chair.

b. 落地灯灯罩底部必须具有遮光片以防止客人看见暴露的灯泡。
At the bottom of the floor standing lampshade, a cover shall be provided to prevent the guests from seeing the exposed bulb.

c. 落地灯需连接至客房的主控开关，并与进门处的灯一同控制，
Floor lamp shall be connected to the master switch of guest room, and controlled together with the light at the entrance door.

第20章.后场区
SECTION 20: BACK OF HOUSE

20.1. 办公室
OFFICE

A. 供热通风空调系统
Heating, Ventilation And Air Conditioning System

1. 采用风机盘管加新风的空调形式。
The air conditioning system shall adopt fan coil unit with fresh air type.

2. 新风量标准按照 30m3/h•p 计算，排风量与新风量相等，保持室内压力平衡。
The fresh air flow rate standard shall base on 30m3/h•p. Exhaust air shall be equal to the new air in order to maintain the indoor pressure balance.

B. 弱电系统
ELV System

1. 每个普通员工办公位置应设置 1 个语音电话端口和 1 个网络数据端口。
Each general staff office shall be provided with one (1) telephone point and one (1) network data point.

2. 经理、总监以上级别，每个办公位置设置 2 个语音电话端口和 2 个网络数据端口。
For manager, director or higher level, each office shall be provided with two (2) telephone points and two (2) network data points.

3. 总经理办公室应另外提供 1 部外部直线电话。
General manager office shall be provided with one (1) additional telephone for external line.

4. 每个打印、传真区应设置 1 个语音电话端口和 2 个网络数据端口。
Each print, fax area shall be provided with one (1) telephone point and two (2) network data points.

5. 财务办公室安装门禁系统，办公室的出入口应安装摄像机，出纳办公室应设置紧急求助按钮。
Financial office shall install access control system. CCTV shall be installed at the office entrance/ exit. Cashiers office shall be provided with emergency panic button.

6. 人力资源办公室应设置紧急报警按钮，并且连接到消控中心。
Human resources office shall be provided with emergency alarm button which is connected to the fire control center.

7. 员工出入口需要给考勤机预留 2 个数据端口及电源插座，并且需安装摄像机。
Staff entrances shall be provided with two (2) data points and socket outlets for the attendance machine, and CCTV shall be installed.

C. 供配电系统
Electrical Distribution System

1. 每个咖啡台提供 2 个电源插座(1 个台上，1 个台下)。
Every coffee table shall be provided with two (2) socket outlets (one on the table and one below the table).

2. 在邮件分拣台的台面上方离地 1.2m 位置提供 1 个电源插座。
One (1) socket outlet shall be provided above the mail sorting table at 1.2m from the floor level.

3. 必须有 30%的回路照明由柴油发电机作为备用电源，消防应急照明引自所在防火分区内的 EPS。
30% of the circuitry lighting shall be backed up by diesel engine generator. Emergency lighting shall take power supply from EPS in its fire zone.

4. 所有办公室照明必须采用就地开关。
All office lighting shall be localized switch control.

5. 每个写字台至少应配置 3 个电源插座。所有插座必须带有接地保护孔。
Three (3) socket outlets shall be provided for each working desk. All socket outlets shall be provided with earth leakage protection.

6. 每面墙上应至少提供 1 个通用插座，并且插座间的中心距离不超过 6m。
Minimum one (1) general socket outlet shall be provided for each wall. The distance between the center points of the outlet shall not be more than 6 m.

7. 为复印机提供 1 个单独的配电回路。
A separate distribution circuit shall be provided for copy machine.

8. 客房部办公室主要采用荧光灯照明，必须采用就地开关。
Guest room department office shall mainly use fluorescent lighting. Localized switch control shall be used.

9. 必须有 20%的回路照明由柴油发电机作为备用电源；消防应急照明引自所在防火分区内的 EPS。
20% of the circuitry lighting shall be backed up by diesel engine generator. Emergency lighting shall take power supply from EPS in its fire zone.

10. 在客房部经理的办公桌上安装一台装有酒店管理系统的终端工作站和报告打印机。
A terminal station which installed with the hotel management system and a printer shall be provided at the guest room department manager's desk.

11. 在制服分发台上方提供 1 个电源插座。
One (1) socket outlet shall be provided on each uniform distribution table.

12. 在客房部与办公室内的每一面墙至少安装 1 个电源插座，并且插座中心线间距不超过 6.0m。
Each side wall of the guest room department and the office shall install minimum one (1) socket outlet, and the distance between the center points of the outlets shall not be more than 6.0 m.

20.2. 工程部
ENGINEERING OFFICE

A. 供热通风空调系统
Heating, Ventilation And Air Conditioning System

1. 空调整体采用风机盘管加新风的空调形式。
   The air conditioning system shall adopt fan coil unit with fresh air type.

2. 新风量标准按照 25m3/h•p 计算，排风量按照新风量的 105%~110%计算，保持室内负压。
   The fresh air flow rate standard shall be based on 25m3/h•p. Exhaust air shall be 105%~110% of the fresh air in order to maintain negative indoor pressure.

B. 弱电系统
   ELV System

1. 每个工程师的办公桌应设置 1 个语音电话端口和 1 个网络数据端口；
   Each engineer office table shall be provided with one (1) telephone point and one (1) network data point.

2. 经理、总监以上级别，每个办公位置设置 2 个语音电话端口和 2 个网络数据端口；
   For manager, director or higher level, each office shall be provided with two (2) telephone points and two (2) network data points.

3. 每个打印、传真区应设置 1 个语音电话端口和 2 个网络数据端口。
   Each print, fax area shall be provided with one (1) telephone point and two (2) network data points.

C. 供配电系统
   Electrical Distribution System

1. 必须有 20%的回路照明由柴油发电机作为备用电源；消防应急照明引自所在防火分区内的 EPS。
   20% of the circuitry lighting shall be backed up by diesel engine generator. Emergency lighting shall take power supply from EPS in its fire zone.

2. 在工作台中心 900mm 高度和每面墙上以不超过 6.0m 的中心距安装 1 个 2 电源插座。
   One (1) twin socket outlet shall be provided at 900mm above of the center of the workbench and each wall with a distance of not more than 6.0m apart.

3. 应至少提供 2 个由单独回路配电的 20A 插座，用于为固定式电动工具供电。 .
   Minimum two (2) 20A socket outlets with separate distribution circuit shall be provided for fixed electric tools.

4. 工作台至少应提供 1 个三相的插座。
   Minimum one (1) three phase socket outlet shall be provided for workbench.

5. 在工程师的办公桌处提供一台与酒店管理系统连接的电脑。
   A computer shall be provided at the engineer's desk with connection to the hotel management system.

20.3. 变配电室
SWITCHGEAR ROOM

A. 消防/给排水系统
Fire Protection/ Plumbing And Drainage Systems

1. 变配电机房需设置气体灭火系统，宜采用 FM200 灭火系统。如采用其它气体灭火系统需经希尔顿确认后方可实施。变配电机房值班室或办公室应设置喷淋系统。
Switchgear room shall be provided with gas suppression system, preferably FM200. If other gas suppression system is selected, it shall be reviewed and approved by Hilton. Sprinkler system shall be provided for switchgear duty room or office.

B. 供热通风空调系统
Heating, Ventilation And Air Conditioning System

1. 变配电室散热量需经过计算确定，消除余热可以通过专用空调。
Switchgear room heat dissipation shall be calculated. Residual heat can be eliminated by a dedicated air-conditioning.

C. 弱电系统
ELV System

1. 值班室应有 1 个语音电话端口和 1 个网络数据端口；无值班室则设置 1 个语音端口，安装壁挂电话。
One (1) telephone point and one (1) network data point shall be provided in the duty room. One (1) telephone point shall be provided in the non-duty room with wall mounted telephone.

2. 机房的出入口应结合走廊区域安装摄像机。并记录人员进出情况。
CCTV shall be provided at the entrance/ exit of the plant room and integrated with the corridor area. Staff access shall be recorded.

D. 供配电系统
Electrical Distribution System

1. 必须有 100%的回路照明由柴油发电机作为备用电源。
100% of the lighting circuitry shall be backed up by diesel engine generator.

20.4. 制冷机房
CHILLER PLANT ROOM

A. 消防/给排水系统
Fire Protection/ Plumbing And Drainage Systems

1. 制冷机房内应设排水点，以便保洁。
Drainage point shall be provided in the chiller pump room for ease of cleaning.

B. 供热通风空调系统
Heating, Ventilation And Air Conditioning System

1. 平时通风按照 6 次换气次数计算，需根据不同制冷剂类型设置相应制冷剂泄漏探测装置（除 R134A 制冷剂外），事故通风量通过计算确定但不得小于 12 换气次数，机械补风的补风量为排风量的 90%。

Normal ventilation shall be based on 6 air changes. Refrigerant leakage detection device shall be provided according to different refrigerant types (except R134A refrigerant). Emergency ventilation air flow rate shall be determined by calculation but shall not be less than 12 air changes. Mechanical make-up air shall be 90% of the exhaust air.

2. 排风机及补风机采用双速风机。
Exhaust fan and make-up air fan shall use two-speed fan.

3. 值班室设置独立的分体空调。
Dedicated air con split unit shall be provided for duty room.

C. 弱电系统
ELV System

1. 值班室应有 1 个语音电话端口和 1 个网络数据端口；无值班室则设置 1 个语音端口，安装壁挂电话。
One (1) telephone point and one (1) network data point shall be provided in the duty room. One (1) telephone point shall be provided in the non-duty room with wall mounted telephone.

2. 机房的出入口应结合走廊区域安装摄像机。
CCTV shall be provided at the entrance/ exit of the plant room and integrated with the corridor area.

D. 供配电系统
Electrical Distribution System

1. 必须有 30%的回路照明由柴油发电机作为备用电源。
30% of the circuitry lighting shall be backed up by diesel engine generator.

2. 每面墙上至少设置 1 个插座，供设备检修用。
Minimum one (1) socket outlet shall be provided for each wall for equipment maintenance.

20.5. 锅炉房
BOILER ROOM

A. 消防/给排水系统
Fire Protection/ Plumbing And Drainage Systems

1. 燃油/燃气锅炉房宜采用自动喷水灭火系统。
Automatic sprinkler system shall be provided for fuel/ gas boiler room.

2. 热水锅炉房用水硬度不超过 30ppm。蒸汽锅炉用水硬度为 0ppm。
Hot water boiler water density shall not be more than 30PPM. Steam boiler water hardness shall be 0PPM.

3. 锅炉房内应设排水点，以便保洁。
Drainage point shall be provided in the boiler room for ease of cleaning.

B. 供热通风空调系统
Heating, Ventilation And Air Conditioning System

1. 平时排风按照 6 次换气次数确定，事故排风按照 12 次换气次数确定，排风机防爆，补风量按照排风量的 110%确定（包括锅炉燃烧所需空气量），事故通风补风量按照排风量的 90%计算。
   Normal ventilation shall be based on 6 air changes. Emergency ventilation shall be based on 12 air changes. The exhaust fan shall be explosion-proof. Make-up air shall be based on 110% of the exhaust air (including the boiler combustion air volume). Emergency ventilation air flow rate shall base on 90% of the exhaust air.

2. 值班室设置独立的分体空调。
   Dedicated air con split unit shall be provided for duty room.

C. 弱电系统
   ELV System

1. 值班室应有 1 个语音电话端口和 1 个网络数据端口；无值班室则设置 1 个语音端口，安装壁挂电话。
   One (1) telephone point and one (1) network data point shall be provided in the duty room. One (1) telephone point shall be provided in the non-duty room with wall mounted telephone.

2. 锅炉房的出入口应结合走廊区域安装摄像机。
   CCTV shall be provided at the entrance/ exit of the boiler room and integrated with the corridor area.

D. 供配电系统
   Electrical Distribution System

1. 必须有 100%的回路照明由柴油发电机作为备用电源。
   100% of the circuitry lighting shall be backed up by diesel engine generator.

2. 每面墙上至少设置 1 个插座，供设备检修用。
   Minimum one (1) socket outlet shall be provided for each wall for equipment maintenance.

20.6. 水泵房
WATER PUMP ROOM

A. 消防/给排水系统
   Fire Protection/ Plumbing And Drainage Systems

1. 储水箱上方不应布置污/废水管道。
   No sewage/ waste water pipeline shall be located above the water tank.

2. 水泵房内应设排水点，以便保洁。
   Drainage point shall be provided in the pump room for ease of cleaning.

B. 供热通风空调系统
   Heating, Ventilation And Air Conditioning System

1. 水泵房按照 6 次换气次数设置通风系统。
   Ventilation in the pump room shall be based on 6 air changes.

2. 补风量按照排风量 90%计算，保持室内负压。
   Make-up air shall be based on 90% of the exhaust air in order to maintain negative indoor pressure.

C. 弱电系统
   ELV System

1. 设置 1 个语音电话端口。
   One (1) telephone point shall be provided.

2. 水泵房的出入口应结合走廊区域安装摄像机。
   CCTV shall be provided at the entrance/ exit of the water pump room and integrated with the corridor area.

D. 供配电系统
   Electrical Distribution System

1. 必须有 100%的回路照明由柴油发电机作为备用电源。
   100% of the lighting circuitry shall be backed up by diesel engine generator.

2. 每面墙上至少设置 1 个插座，供设备检修用。
   Minimum one (1) socket outlet shall be provided for each wall for equipment maintenance.

3. 在储水箱上方检修口附近设置照明灯具，供检修用
   Lighting shall be provided above the access opening of the water tank, for ease of maintenance purposes.

20.7. 计算机房/电信机房 COMPUTER ROOM/MDF ROOM

A. 消防/给排水系统
   Fire Protection/ Plumbing And Drainage System

1. 计算机房/电信机房需设置气体灭火。
   Gas suppression system shall be provided for computer room and MDF room.

B. 供热通风空调系统
   Heating, Ventilation And Air Conditioning System

1. 根据设置 5 次换气数的机械通风，兼顾平时和气体灭火后通风，设置机房空调。
   Mechanical ventilation shall be based on 5 air changes, including normal ventilation and ventilation after activation of the gas suppression system. Air conditioning for the plant rooms shall be provided.

C. 弱电系统
   ELV System

1. 应设置至少 4 个语音电话端口和 12 个网络数据端口。
   Minimum four (4) telephone points and twelve (12) network data points shall be provided.

2. 计算机网络中心机房的出入口应结合走廊区域安装摄像机。
   CCTV shall be provided at the entrance/ exit of the computer network room and integrated with the corridor area.

3. 计算机网络中心机房入口门应安装电子门锁。
   Electronic lock shall be provided for the entrance of the computer network room.

D. 供配电系统
   Electrical Distribution System

1. 照明开关必须设置在进门附近。
   All lighting switches shall be located near the door.

2. 必须有 100%的回路照明由柴油发电机作为备用电源。
   100% of the circuitry lighting shall be backed up by diesel engine generator.

3. 机架附近至少提供 4 个专用电源插座。所有插座必须具有接地线。
   Minimum four (4) dedicated socket outlets shall be provided near the rack. All socket outlets shall be provided with earth leakage protection.

4. 机房内所有电脑、服务器等弱电设备均由柴油发电机和 UPS 作为备用电源。
   All computers, servers and other ELV equipment in the plant room shall be backed up by diesel engine generator and UPS.

20.8. 消防控制室
FIRE COMMAND CENTER

A. 消防/给排水系统
   Fire Protection/ Plumbing And Drainage Systems

1. 消防控制室灭火系统应符合当地主管部门要求。
   Fire suppression system in fire command center shall meet the requirement of local authority.

B. 供热通风空调系统
   Heating, Ventilation And Air Conditioning System

1. 消防控制室空调采用分体空调。
   Air conditioning in the fire control center shall use split unit.

2. 通风采用 1~2 次换气次数。
   The ventilation shall adopt 1~2 air changes.

C. 弱电系统
   ELV System

1. 应设置 4 个语音电话端口和 4 个网络数据端口。
   Four (4) telephone points and four (4) network data points shall be provided.

2. 消防控制室内应安装摄像机，出入口处应结合走廊区域安装摄像机。
CCTV shall be provided inside the fire control center and at the entrance/ exit which shall be integrated with the corridor area.

3. 消防控制室出入口应设置门禁系统。
Access control shall be provided for the entrance/ exit of the fire control center.

D. 供配电系统
Electrical Distribution System

1. 100%照明均以柴油发电机作为备用电源。
100% of the circuitry lighting shall be backed up by diesel engine generator.

2. 机房内所有消防设备和安防设备均由柴油发电机和 UPS 作为备用电源。
All fire equipment and security equipment in the plant room shall be backed up by diesel engine generator and UPS.

20.9. 有线电视机房/卫星电视机房
CABLE TV/ MATV ROOM

A. 供热通风空调系统
Heating, Ventilation And Air Conditioning System

1. 空调采用分体空调。
Air conditioning system shall use split unit.

2. 通风采用 3 次换气次数，补风量为排风量 90%。
Ventilation shall be based on 3 air changes. Make-up air shall be 90% of the exhaust air.

B. 供配电系统
Electrical Distribution System

1. 有线电视机房/卫星电视机房必须有 100%的回路照明由柴油发电机作为备用电源。
100% of the circuitry lighting in the CATV and satellite TV plant room shall be backed up by diesel engine generator.

2. 有线电视机房/卫星电视机房至少设置 1 个检修插座，机房内所有弱电设备均由柴油发电机和 UPS 作为备用电源。
Minimum one (1) maintenance socket outlet shall be provided for the CATV and satellite TV plant room. All ELV equipment in the plant room shall be backed up by diesel engine generator and UPS.

20.10. 洗衣房
LAUNDRY

A. 消防/给排水系统
Fire Protection/ Plumbing And Drainage Systems

1. 洗衣房采用动作温度为 93°C 的快速反应隐蔽型喷头。
   Quick response concealed sprinkler with activation temperature of 93°C shall be provided in the laundry.

2. 污衣槽等需按以下要求安装喷淋头：
   Laundry chute sprinkler shall be provided as per requirements below:-

   a. 污衣槽喷淋头应采用平板隐藏式喷头，需要布置在顶部、底部和隔层布置。
      Flat concealed sprinkler shall be provided at the top, bottom and alternative floor of the laundry chute.

   b. 槽门需带熔丝弹簧，熔丝为 60°C 熔断后槽盖将自动关闭槽门。
      Chute door shall be provided with spring fuse which will automatically close the door if temperature reaches 60°C.

   c. 污衣槽自动喷淋系统需要设置独立的垂直立管，以及相应的控制阀和水流指示器。试水阀和泄水阀设置在水流指示器后。
      Laundry chute automatic sprinkler system shall be provided with independent vertical riser, relevant control valve and flow indicator. Water testing valve and drain valve shall be provided after the water flow indicator.

   d. 污衣槽高度超过 50m，可分段设置立管和水流指示器。
      If the height of the laundry is more than 50m, sections of vertical riser and water flow indicator can be provided.

3. 污衣井顶部须设置感烟探测器。
   Smoke detector shall be provided at the top of the laundry chute.

4. 洗衣房用水总硬度不超过 50PPM。由于水质原因洗衣房热水应独立供应。
   Laundry water total water density shall not be more than 50PPM. Due to the water quality reason, independent hot water supply shall be provided for laundry.

B. 供热通风空调系统
   Heating, Ventilation And Air Conditioning System

1. 设置独立的机械送排风系统，排风量按照 15~20 次换气次数计算，补风量按照 排风量的 80%~90%计算。
   Dedicated MV system shall be provided. Exhaust air shall be based on 15~20 air changes. Make-up air shall be based on 80%~90% of the exhaust air.

2. 应设置岗位送风系统，岗位送风由新风机组承担。
   Spot air supply system shall be provided and it shall be supplied by the fresh air unit.

C. 弱电系统
   ELV System

1. 应设置 1 部内线电话，可以自动拨号到用户交换机/总机，另应有连接酒店管理系统的网络数据端口。
   One (1) extension telephone line shall be provided which can automatically dial to the PBX/ operator. Network data point which is connected to the hotel management system shall also be provided.

2. 洗衣房内部办公室应设置 2 个语音电话端口和 2 个网络数据端口。
   Two (2) telephone points and two (2) network data points shall be provided in the laundry office.

3. 在洗衣房中，为洗衣房经理办公室的电话提供 1 个带灯的分铃。
   In the laundry room, the laundry room manager office phone shall be equipped with one (1) additional bell with light s.

D. 供配电系统
   Electrical Distribution System

1. 根据要求为洗衣脱水机、烘干机和烫衣机提供电源。
   Power supply shall be provided for washing machine, dryer and ironing machine as per requirements.

2. 必须有 30%的回路照明由柴油发电机作为备用电源，消防应急照明引自所在防火分区内的 EPS。
   30% of the circuitry lighting shall be backed up by diesel engine generator. Emergency lighting shall take power supply from EPS in its fire zone.

3. 在洗衣房内安装 1 个带有闪灯的铃声增强器，用以对洗衣房经理办公室内电话机铃声进行增强。
   One (1) ring enhancer with flash shall be installed in the laundry room, to enhance the telephone ring in the laundry manager office.

4. 每台洗衣机的背面需提供 1 个带接地故障保护的电源插座，用于设备检修和清洁剂分配器电源。
   One (1) socket outlet with earth leakage protection shall be provided behind each washing machine, for equipment maintenance and power supply to the detergent dispenser.

5. 烘干机的背面提供 1 个带接地故障保护的电源插座，用于设备检修。
   One (1) socket outlet with earth leakage protection shall be provided behind the dryer, for equipment maintenance.

6. 烫衣机附近的墙或柱上提供 1 个带接地故障保护的电源插座，用于设备检修。
   One (1) socket outlet with earth leakage protection shall be provided at the wall or column near the ironing machine for equipment maintenance.

7. 插座中点一般距装饰地面 1.0m，或根据洗衣房顾问建议确定。
   Usually the distance from the center point of the outlet to the finished floor is 1m, or to be determined by laundry consultant.

20.11. 其他区域 OTHER AREA

A. 供热通风空调系统
   Heating, Ventilation And Air Conditioning System

1. 客房部空调整体采用风机盘管加新风的空调形式。
   Guest room department air conditioning system shall adopt fan coil unit with fresh air type.

2. 员工餐厅/休息室新风量标准按照 30m3/h•p 计算，排风量按照新风量的 105%~11%计算，保持室内负压。
   The fresh air flow rate standard for staff canteen/ lounge shall be based on 30m3/h•p. Exhaust air shall be 105%~110% of the fresh air in order to maintain negative indoor pressure.

3. 员工淋浴间新风取排风量的 80%~90%，排风量按照 10 次换气次数计算。
   Staff shower fresh air shall be 80%~90% of the exhaust air. Exhaust air shall be based on 10 air changes.

4. 员工更衣室新风取排风量的 80%~90%，排风量按照 8 次换气次数计算。
   Staff changing room fresh air shall be 80%~90% of the exhaust air. Exhaust air shall be based on 8 air changes.

5. 员工培训室和娱乐室新风量标准按照 30m3/h•p 计算，排风量与新风量相等，保持室内压力平衡。
   The fresh air standard for staff training room and recreation room shall be based on 30m3/h•p. Exhaust air shall be equal to the fresh air in order to maintain the indoor pressure balance.

6. 制服间新风取排风量的 90%~95%，排风量按照 4 次换气次数计算。
   Uniform room fresh air shall be 90%~95% of the exhaust air. Exhaust air shall be based on 4 air changes.

B. 供配电系统
   Electrical Distribution System

1. 客房部办公室主要采用荧光灯照明，必须采用就地开关。
   Guest room department office shall mainly use fluorescent lighting. Localized switch control shall be used.

2. 必须有 20%的回路照明由柴油发电机作为备用电源；消防应急照明引自所在防火分区内的 EPS。
   20% of the circuitry lighting shall be backed up by diesel engine generator. Emergency lighting shall take power supply from EPS in its fire zone.

3. 在客房部经理的办公桌上安装一台装有酒店管理系统的终端工作站和报告打印机。
   A terminal station which installed with the hotel management system and a printer shall be provided at the guest room department manager's desk.

4. 在制服分发台上方提供一个电源插座。
   One (1) socket outlet shall be provided on each uniform distribution table.

5. 在客房部与办公室内的每一面墙至少安装一个电源插座，并且插座中心线间距不超过 6.0m。
   Each side wall of the guest room department and the office shall install minimum one (1) socket outlet, and the distance between the centerline of the outlets shall not be more than 6.0m.