VIESMANN

VITOFLEX 300-RF

Solid fuel boiler 150 to 540 kW

Technical guide

VITOFLEX 300-RF

Fully automatic solid fuel boiler with rotation combustion
for the combustion of dry woodchips and wood pellets

5682422 GB 5/2019

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1.1 Principles of wood combustion for generating heat

General principles

Net calorific value of wood biomass as a function of moisture content

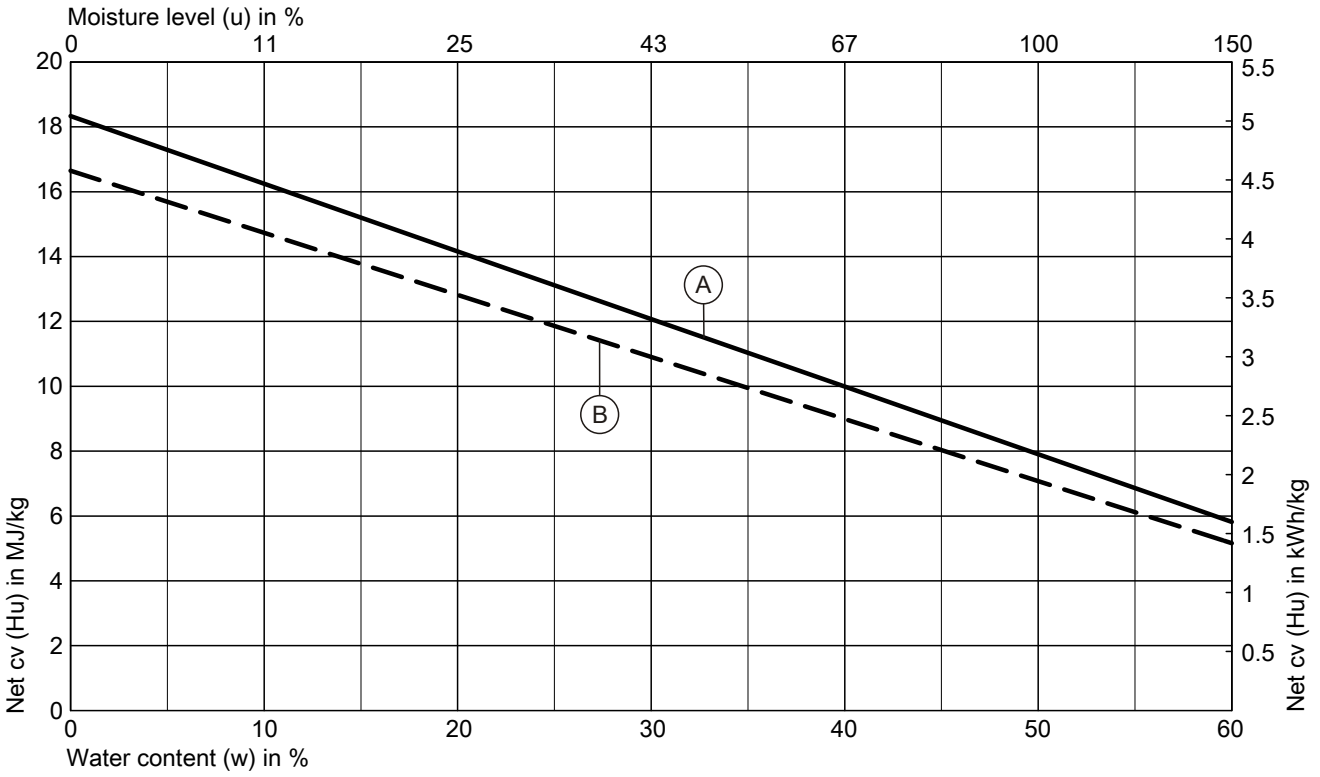
The energy content of wood is given as the net calorific value H_u. The net calorific value is the energy that can be obtained from burning one kilogram of damp wood. The water contained in the flue gas is present in the form of water vapour. The gross calorific value H_o additionally takes account of the latent heat of condensation in the water vapour, which is released as it cools back down to the initial temperature.

The moisture content of a fuel charge is the main factor that influences combustion. It determines the energy content and therefore the energy conversion that can be achieved during combustion. In practice, the net calorific value of fuels is between 5.0 kWh/kg (18 MJ/kg) at a moisture content of 5 % and 1.5 kWh/kg (5.4 MJ/kg) at a moisture content of 60 %. This net calorific value depends on the type of wood and, more importantly, on the moisture content or moisture level in the wood. The moisture content is crucial for controllability at partial load and the emissions performance of the system.

Determining the moisture content

The moisture content is determined with the drying cabinet method on which the CEN (European Committee for Standardisation) standard is based. As part of this, a fuel sample is weighed when wet, dried in a drying cabinet at approx. 105 °C for several hours, and then weighed again. The proportion of water in the fuel is given as the moisture content (M).

Net calorific value of wood in relation to moisture content (M)



Ⓐ Softwood
Ⓑ Hardwood

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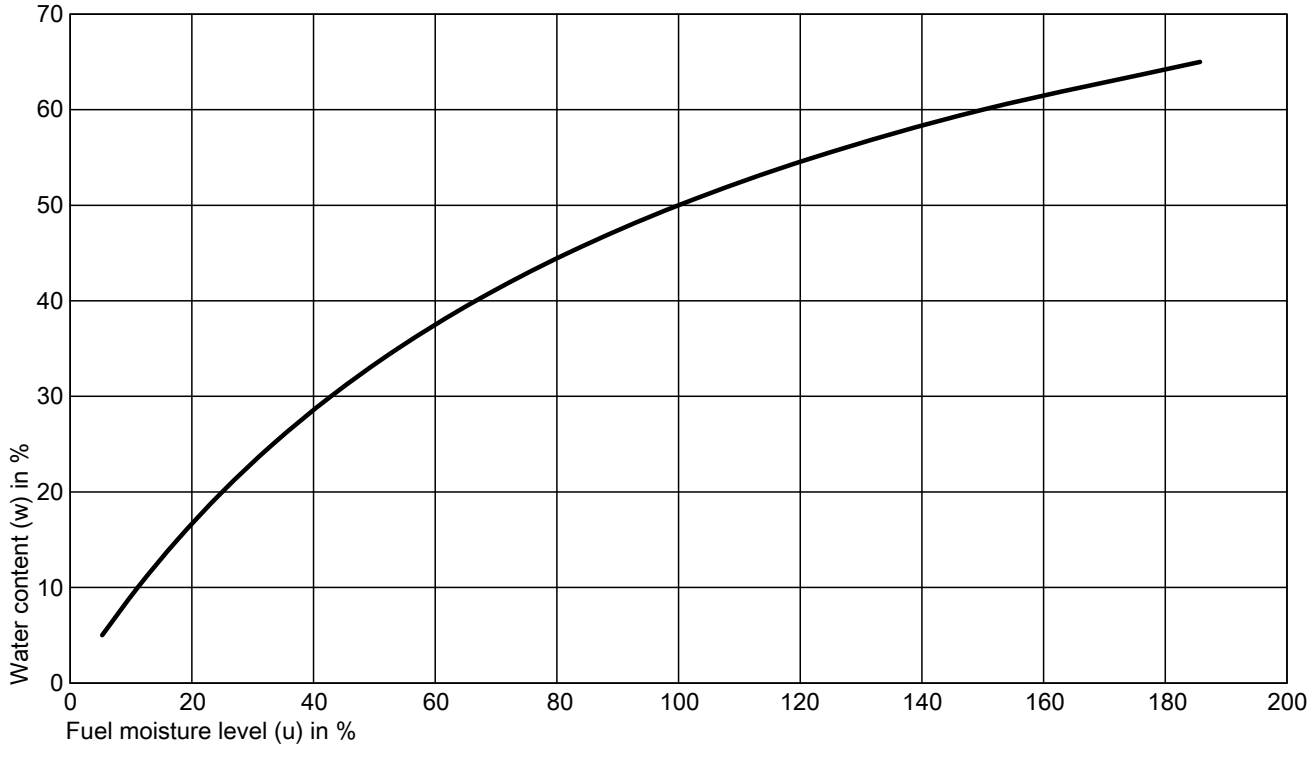
Net calorific value for various types of wood, source: Technologie- und Förderzentrum (Technology and Support Centre) (TFZ) Straubing, Bavaria, Germany

Water content in %		0	10	20	30	40	50
Type of tree	Unit of measurement						
Spruce	kWh/kg	5.20	4.64	4.05	3.44	2.86	2.27
	kWh/smt	2245	2020	1979	1863	1805	1726
	kWh/stcm	1249	1177	1096	1039	1005	958
	kWh/tcm	925	872	812	770	745	709
Scots pine	kWh/kg	5.33	4.75	4.14	3.53	2.94	2.33
	kWh/smt	2613	2441	2239	2170	2114	2009
	kWh/stcm	1454	1354	1243	1209	1170	1116
	kWh/tcm	1077	1003	921	895	867	827
Beech	kWh/kg	11.00	4.53	3.97	3.39	2.81	2.22
	kWh/smt	3475	3187	2899	2704	2609	2482
	kWh/stcm	1757	1613	1458	1361	1315	1252
	kWh/tcm	1432	1314	1188	1109	1072	1020
Oak	kWh/kg	5.00	4.50	3.92	3.33	2.66	2.19
	kWh/smt	3336	3091	2836	2760	2576	2543
	kWh/stcm	1687	1557	1432	1396	1349	1283
	kWh/tcm	1375	1269	1166	1138	1099	1045

Relation of moisture content (w) to moisture level in fuel (u)
The proportion of water in woodchips and wood pellets is given as either the moisture content or the fuel moisture level. The moisture content (in %) is relative to the moist fuel mass or the fresh substance (FS); the fuel moisture level is relative to the absolutely dry fuel mass (TS).

Example:
If 100 kg of fuel contains 50 kg of water, the fuel has a moisture content of 50 % (w50) and a fuel moisture level of 100 % (u = 100).

$$u\,[\%] = \frac{w\,[\%]}{100 - w\,[\%]} \times 100$$



Determining the amount of fuel required

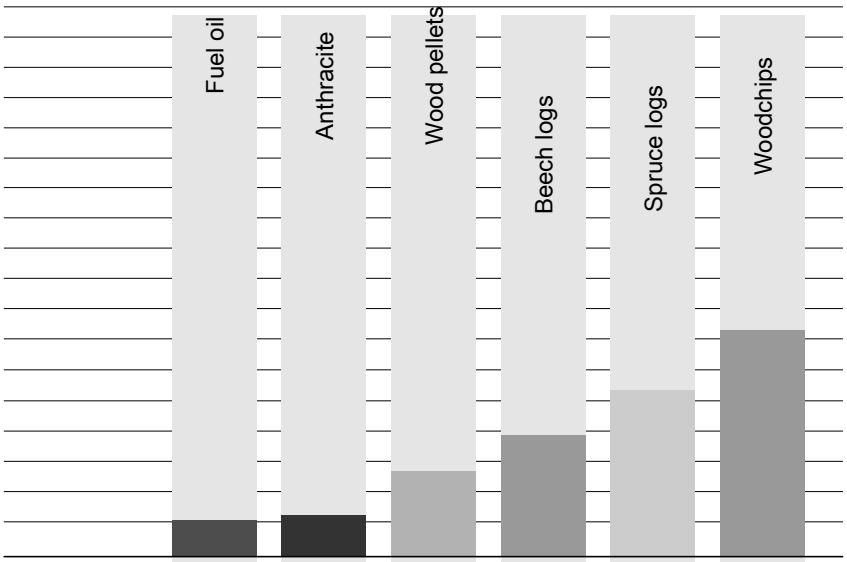
The amount of fuel required can be calculated on the basis of the net calorific value and the required rated heating output. Significant influencing factors for this are the moisture content of the fuel and the efficiency of the system.

$$B = \frac{Q_N}{H_u \times \eta}$$

B Amount of fuel required in kg/h
Q_N Required rated heating output in kW
H_u Net calorific value in kWh/kg
η System efficiency in %

1

Energy density of various fuel types compared with fuel oil (standard values)



	Fuel oil	Anthracite	Wood pellets	Beech logs	Spruce logs	Woodchips
Tip/ Stack density	840 kg/m³	860 kg/t.m³	650 kg/t.m³	459 kg/t.m³	297 kg/t.m³	217 kg/t. m³
Fuel oil equivalent kilogram	0.84 kg	1.28 kg	2.16 kg	2.35 kg	2.30 kg	2.25 kg
Fuel oil equivalent litre	1.00 l	1.49 l	3.33 l	5.11 l	7.73 l	10.36 l

1.2 Principles of wood pellet combustion for generating heat

What are wood pellets?

Wood pellets are made from 100 percent natural wood remnants. This raw material is waste matter created by the wood industry in large volumes through planing or sawing. Wood remnants are compressed under high pressure and formed into pellets, i.e. pressed into a cylindrical shape.
The raw material is stored and transported under completely dry conditions. System users should also ensure completely dry storage conditions. This is the only way to guarantee optimum and effective combustion.

Pellet requirements

For heat generation, use wood pellets that have the following properties:
- Diameter of 6 mm
- Length of 3.15 to 40 mm (1 % up to 45 mm)
- Max. moisture content of 10 %

The wood pellets used for combustion in the solid fuel boiler must correspond to the requirements of EN ISO 17225-2.

Requirement	ENplus-A1		EN ISO 17225-2 quality A1
Diameter	mm	6 ± 1	D06
Length	mm	A maximum of 1 % may be longer than 40 mm, but no longer than 45 mm.	3.15 to 40
Bulk density in the delivered condition	kg/m³	600 to 750	BD600
Net calorific value in the delivered condition	MJ/kg kWh/kg	≥ 16.5 ≥ 4.6	Q16.5 Q4.6
Water content in the delivered condition	m-%	≤ 10	M10
Fines content in the delivered condition	m-%	≤ 1	F1.0
Mechanical strength in the delivered condition	m-%	≥ 97.5	DU 97.5
Ash content, free from water	%	≤ 0.7	A0.7

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Requirement	ENplus-A1		EN ISO 17225-2 quality A1
Ash softening temperature This value is only binding for pellets certified to ENplus. It indicates the temperature at which the wood ash is deformed and can therefore cause fusions in the combustion chamber.	°C	≥ 1200	–
Chlorine content, free from water	m-%	≤ 0.02	Cl0.2
Sulphur content, free from water	m-%	≤ 0.04	S0.04
Nitrogen content, free from water	m-%	≤ 0.3	N0.03

m-% = percentage by mass

Note
EN 14961-2 was superseded by the new standard EN ISO 17225-2 in September 2014. It describes the essential properties of wood pellets.

Pellet quality characteristics

Good wood pellets:
- Smooth, shiny surface
- Uniform length
- Low proportion of dust
- Sink in water

Low quality wood pellets:
- Cracked rough surface
- Widely varying length
- High proportion of dust
- Float in water

Types of pellet delivery

In their loose form, wood pellets are transported by silo tanker and pumped into the storage room via a hose system.

Careful handling of wood pellets ensures a low proportion of dust, trouble-free boiler charging and a constant heating output by the solid fuel boiler.

1.3 Principles of woodchip combustion for generating heat

What are woodchips?

Woodchips are made from 100 percent natural wood from forests and plantations. This raw material comes from tree trunks or branches.

The wood is then processed with high speed cutting tools in accordance with EN ISO 17225.

Definition of woodchip size classes according to EN ISO 17225-4

Size class	Main percentage (at least 60 % of the mass), a) Size in mm	Fine fraction (≤ 3.15 mm) In % of the mass	Coarse fraction (in brackets particle length) In % of the mass	Maximum particle length, b) in mm	Maximum cross-section area of the coarse fraction, b) c) In cm^2
P16S	3.15 to 16	≤ 15 %	≤ 6 (> 31.5 mm)	≤ 45	≤ 2
P31S	3.15 to 31.5	≤ 10 %	≤ 6 (> 45 mm)	≤ 150	≤ 4
P45S	3.15 to 45	≤ 10 %	≤ 10 (> 63 mm)	≤ 200	≤ 6

a) The number in the size class refers to the maximum particle size in the main percentage. The particles have to pass through a strainer with a circular mesh (ISO 17827-1 standard), in which the sieve apertures are of the specified size for the size class. The lowest possible property class should be specified.
b) Only determine the length and cross-sectional area of particles in the coarse fraction. In a sample of about 10 l 2 pieces at the most can exceed the maximum length if the cross-sectional area is < 0.5 cm^2.
c) To measure the cross-sectional area, you are advised to use a transparent set square, arrange the particles at right angles behind the set square and use a cm^2 grid to estimate the maximum cross-sectional area of these particles.

Woodchip requirements

For combustion in the solid fuel boiler, use woodchips of size class P31S that have the following properties:
- Max. coarse fraction of 6 % (> 45 mm)
- Max. cross-section of 4 cm^2
- Max. length of 15 cm (1 % up to 45 mm)
- Moisture content (see product description)

Bulk density of woodchips

Bulk densities of woodchips as defined by water content, according to EN ISO 17225-4

Water content based on moisture mass	% of the mass	8 to 18	18 to 25	25 to 35	35 to 45
Bulk density for coniferous species	kg/m³	160 to 180	180 to 200	200 to 225	225 to 270
	Property class	BD150	BD150	BD200	BD200
Bulk density for deciduous species	kg/m³	225 to 250	250 to 280	280 to 320	320 to 380
	Property class	BD200	BD250	BD250	BD300

Woodchip quality characteristics

Good woodchips:
- Low, homogeneous water content, no moisture pockets or mould
- Low proportion of needles, leaves, fine branches and bark
- Low proportion of fine wood material (hardly any particles < 3 mm)
- No contamination from mineral soil and foreign matter or impurities
- Uniform particle size (no excess length)
- Smooth edges, no fraying

Low quality woodchips:
- High proportion of fraying surfaces or edges
- High proportion of needles, leaves, fine branches and bark
- Contamination from mineral soil and foreign matter or impurities
- Heterogeneous particle size
- High fine fraction and water content

Substances

When buying wood for combustion, it is important to ensure that the following foreign matter is avoided:
- Stones
- Metal particles
- Masonry remnants
- Plastics

Foreign matter changes the composition of the fuel and therefore the critical parameters of the combustion process.

Observe the following limits per kg of dry fuel or dry matter content of non-combustible constituents. The limits for ash were determined at an analysis temperature of 815 °C. If the specifications are observed, the minimum temperature at which ash sintering starts is 1000 °C.

		Limit	Comparison with natural wood from forests
Chlorine Cl	mg/kg	Max. 300	10
Sulphur S	mg/kg	Max. 1000	120
Total Cl, S	mg/kg	Max. 1000	130
Ash content, total	g/kg	Max. 15.0	5.0
Sum of alkali oxides in the ash (K_2O and Na_2O)	g/kg	Max. 1.0	0.35
Start of ash sintering (SB)	°C	min. 1000	approx. 1200

Note

Avoid foreign matter, such as nails and iron particles, as such foreign bodies increase the wear of system parts.
It is imperative that light metals are avoided, as these will melt in the combustion chamber and lead to faults in the grate area.

Exceeding the above limits will shorten the service life of the combustion chamber and the solid fuel boiler. This also means a greater amount of maintenance work and shorter service intervals.

Non-wood biomass fuels

Non-wood biomass fuels such as needles, leaves, cereals, straw, husks, fruit stones, etc. are unsuitable as fuels for trouble-free operation, and are therefore not permitted.

In some cases, the fuel properties (elemental composition, ash sintering point, etc.) differ considerably from those of wood. Combustion of such fuels in a solid fuel boiler can lead to an impairment of the combustion characteristics. The fireclay lining and the heat exchanger surfaces will be subject to increased stress. Warranty claims can therefore only be asserted when using approved fuels.

1.4 German Immissions Ordinance (1st BImSchV)

Contents of the 1st BImSchV

The German Immissions Order (1st BImSchV) regulates the following for small and medium-scale biomass combustion systems which do not require approval:

- The conditions under which small and medium-scale biomass combustion systems may be installed and operated.
- Establishing the emission limits of small and medium-scale systems
- How often and to what extent a system must be monitored in order to protect the environment from emissions.

Update of the 1st BImSchV – Tightening of the emission limits

The update of the 1st BImSchV, which contains the following essential new points, came into force from 22 March 2010 onwards:

- Control of the emission limits for solid fuel boilers with a rated heating output of 4 to 1000 kW
- Verification of the required emission limits **in the form of periodic on-site measurements** to be carried out by the flue gas inspector when commissioning new systems (with subsequent periodic checks every 2 years)
- Emission limits tightened to 20 mg/m³ for dust and to 400 mg/m³ for CO in the 1st BImSchV, stage 2
- After a transitional period, emission limits will also apply to old systems.
- Design of the heating water buffer cylinder in **hand charged systems**: Min. 12 litres per litre fuel hopper or 55 litres/kW rated boiler heating output
- Design of the heating water buffer cylinder in **automatically charged systems**: Min. 20 litres/kW rated boiler heating output

Emission limits for dust and carbon monoxide (CO) according to 1st BImSchV, stage 2 (Article 5)

Note
Emission limits in periodic on-site measurements (relative to 13 % oxygen)

Fuel according to Article 3, paragraph 1	For new systems installed	Rated heating output in kW	Dust in mg/m³	CO in mg/m³	Solid fuel boilers affected
Pellets	From 1 January 2015	≥ 4 to ≤ 1000	≤ 20	≤ 400	Vitoligno 300-C Vitoligno 300-H Vitoflex 300-RF Vitoflex 300-UF
Woodchips	From 1 January 2015	≥ 4 to ≤ 1000	≤ 20	≤ 400	Vitoligno 300-H Vitoflex 300-RF Vitoflex 300-UF
Natural non-bulky pieces of wood (sawdust, shavings, sanding dust), wood briquettes	From 1 January 2015	≥ 4 to ≤ 1000	≤ 20	≤ 400	Vitoligno 250-S Vitoligno 300-S Vitoflex 300-RF Vitoflex 300-UF
Logs	From 1 January 2017	≥ 4 to ≤ 1000	≤ 20	≤ 400	Vitoligno 150-S Vitoligno 200-S Vitoligno 250-S Vitoligno 300-S

Note on dust emission limits

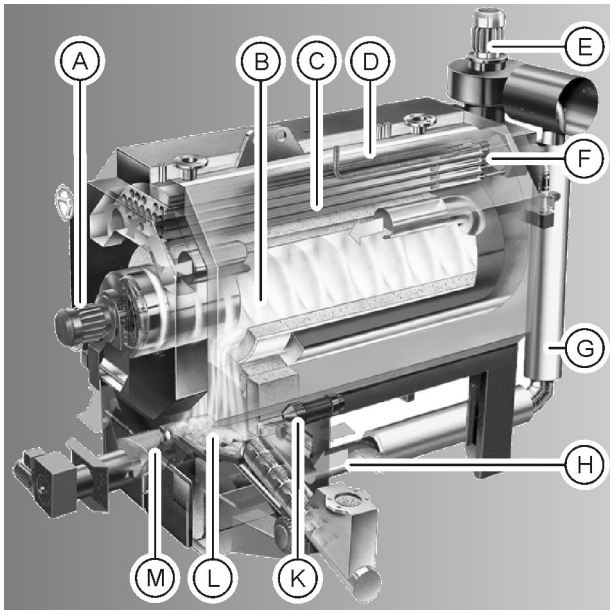
Depending on both the type of fuel used, e.g. wood pellets or woodchips, and fuel quality (according to EN ISO 17225) additional emission reduction measures may be required in order to adhere to the dust emission limits demanded by the 1st BImSchV.

These are secondary measures, such as a fine-dust filter (e.g. an electrostatic filter) or tertiary measures in the form of the support of a Viessmann engineer when measuring. Viessmann should be consulted on this.

VDI 4207, Sheet 2 (Emission measurements at small firing installations)

VDI 4207, Sheet 2 (Emission measurements at small firing installations) specifies the requirements for the initial and periodic testing and measurement of dust emissions in accordance with the 1st BImSchV or the Kehr- und Überprüfungsordnung (KÜO - sweeping and inspection regulation) when using solid fuels. Also described are the system and operation-related measures that need to be implemented in advance in order to ensure that the emissions measurements are carried out correctly.

2.1 Product description



Ⓐ Controlled secondary air with rotary fan
Ⓑ Rotation combustion chamber
Ⓒ Boiler heat exchanger
Ⓓ Safety heat exchanger
Ⓔ Flue gas fan with Lambda probe and temperature sensor
Ⓕ Pneumatic cleaning
Ⓖ Flue gas recirculation, controllable
Ⓗ Regulated primary air
Ⓚ Ignition fan
Ⓛ Fully moving grate
Ⓜ Ash removal

With its rotation combustion system, the Vitoflex 300-RF solid fuel boiler represents state of the art wood combustion. A feed screw conveyor continuously guides the fuel onto a moving grate, on which the fuel combustion takes place. Continuous gasification occurs under air starvation. A rotary fan is used to mix rising combustion gases with the secondary air displaced in a rotary motion. This ensures thorough mixing with the combustion gases.

Clean and efficient combustion
The proven combustion technology of the Vitoflex 300-RF achieves similar emission values to those of a modern gas combustion system and keeps the release of CO, NO_X and dust particles to a minimum, subject to fuel type. The combination of combustion technology and digital modulating output control enables efficiency levels of up to 94 %.

Mobile heating centre in container
Vitoflex 300-RF solid fuel boilers are available as containerised complete solutions for applications where there are no boiler houses available or where on-site building costs have to be reduced to a minimum. This complete solution comprises the pre-assembled solid fuel boiler inside a special container, plus all auxiliary appliances. In addition to finished container solutions, individual versions can be specially matched to your needs.

Benefits at a glance

- High efficiency and low emissions (up to 94 %) due to controlled primary and secondary air supply, and low particle combustion
- Two-pass heat exchanger and modulating output control (4:1 control range)
- Automatic ignition precludes the need for firebed maintenance and saves fuel.
- Easy to maintain thanks to fully automatic ash removal, optional pneumatic cleaning system and flue gas dust extractor
- Highly developed safety equipment ensures safe and reliable operation.
- Individual design of your system by our team of experts
- Available as a complete, ready-to-use containerised solution

Delivered condition

- Fully assembled steel boiler for wood pellets and woodchips, incl.
  - Combustion chamber door
  - Ash doors
  - Ash pans
  - Displacer rods (1 set)
  - Cleaning equipment
- Automatic ignition system
- Flue gas fan
- Flue gas recirculation
- Feed screw conveyor with barrier layer, including
  - Extinguishing valve with dirt trap
  - Extinguishing water container incl. retainer

Standard delivery, sensors:
- Sensors on the combustion block and in the flue outlet (installation on site)
  - Infrared light barriers, fuel level monitoring in combustion chamber
  - Zirconium dioxide probe with measured value transducer (Lambda probe)
  - Pt1000 flue gas temperature sensor with 1/2" x 280 mm sensor well
- Sensors and switches installed at top of boiler
  - Pt1000 boiler water temperature sensor in flow connector
  - Pt1000 return temperature sensor in return connector
  - High limit safety cut-out (STB)

Vitoflex 300-RF (cont.)

- Sensors and switches installed on the feed screw conveyor
  - Infrared light barrier, level monitoring of barrier layer for the feed screw conveyor
  - Safety limit switch on inspection cover of feed screw conveyor
  - Pt1000 contact temperature sensor on the feed screw conveyor
- Sensors and switches on the combustion block, the combustion system and in the flue outlet (installation on site)
  - Infrared light barriers, fuel level monitoring in combustion chamber
  - Zirconium dioxide probe with measured value transducer (Lambda probe)
  - Pt1000 flue gas temperature sensor
- Sensor in the low loss header (installation on site):
  - Pt1000 system sensor with sensor well 1/2" x 280 mm (B28.1)

2.2 Specification

Specification

Rated heating output	**kW**	**150**	**220**	**300**	**400**	**540**
Min. heat transfer	kW	45	60	80	100	140
Fuel efficiency	kW	162	239	326	435	587
Performance data						
Rated heating output with standard fuel M35 *1	kW	150	220	300	400	540
Continuous output with standard woodchip fuel M35 *2	kW	125	185	250	340	455
Continuous output with standard pellet fuel M10 *3	kW	135	200	270	360	480
Minimum heating output Q_{min} *4	kW	45	60	80	100	140
Heating data						
Flow temperature						
– Permissible *5 (safety temperature)	°C	100	100	100	100	100
– Maximum *6	°C	95	95	95	95	95
– Minimum *6	°C	75	75	75	75	75
Minimum return temperature	°C	65	65	65	65	65
Permiss. operating pressure						
Boiler	bar	3	3	3	3	3
	MPa	0.3	0.3	0.3	0.3	0.3
Test pressure	bar	5	5	5	5	5
	MPa	0.5	0.5	0.5	0.5	0.5
Safety heat exchanger	bar	3 - 6	3 - 6	3 - 6	3 - 6	3 - 6
	MPa	0.3 - 0.6	0.3 - 0.6	0.3 - 0.6	0.3 - 0.6	0.3 - 0.6
Thermally activated safety valve	l/h	-	-	-	-	-
Water flow rate						
Flow rate (10 K diff.)	m³/h	12.90	18.92	25.80	34.40	46.44
Flow rate (15 K diff.)	m³/h	8.60	12.61	17.20	22.93	30.96
Flow rate (20 K diff.)	m³/h	6.45	9.46	12.90	17.20	23.22
Boiler pressure drop on the water side						
Pressure drop on the water side (10 K diff.)	Pa	5274	2100	3905	2434	4437
Pressure drop on the water side (15 K diff.)	Pa	2344	933	1736	1081	1972
Pressure drop on the water side (20 K diff.)	Pa	1318	525	976	609	1109
Heating surface	m^2	10.78	16.4	20.72	25.42	39.36
Total dimensions						
Total length (with door open)	mm	3120	3424	3780	4004	4232
Total width	mm	1050	1330	1330	1570	1570
Total width (with feed screw conveyor)	mm	2180	2350	2350	2590	2590
Total height	mm	1825	2084	2084	2422	2492
Total height (with flue gas fan)	mm	2266	2526	2534	2832	2902
Minimum transport dimensions						
Length	mm	2450	2475	2825	2865	3100
Width	mm	950	1220	1220	1460	1460
Height	mm	1160	1420	1420	1600	1600
Weight						
Boiler *7	kg	1451	2119	2441	3235	3671
Combustion block	kg	477	581	641	778	937
Displacer rods	kg	87	141	163	220	289
Flue gas fan	kg	40	40	45	62	62
Feed screw conveyor	kg	143	143	143	143	149
Total weight						
Total dry weight *8	kg	2198	3024	3433	4438	5108
Total wet weight	kg	2630	3818	4336	5764	6618

**1 With a clean boiler and combustion system, boiler equipped with pneumatic boiler cleaning and a runtime (time between 2 boiler cleaning operations) of 80 hours.*

**2 Levelled output when boiler is used as base load boiler in continuous operation, equipped with pneumatic boiler cleaning and a runtime (time between 2 boiler cleaning operations) of 160 hours*

**3 Levelled output when boiler is used as base load boiler in continuous operation, equipped with pneumatic boiler cleaning and a runtime (time between 2 boiler cleaning operations) of 160 hours*

**4 $Q \geq Q_{min}$: Output operation modulating control (variable output control)*
$Q \leq Q_{min}$: Low load with ON Q_{min}/ OFF (stop and go operation)

**5 Shutdown temperature of the high limit safety cut-out*

**6 Temperature adjustable at the control unit*

**7 Incl. door and refractory concrete lining*

**8 Incl. displacer rods*

Rated heating output	**kW**	**150**	**220**	**300**	**400**	**540**
Capacity						
Boiler water	l	432	794	903	1326	1510
Content on hot gas side	l	374	744	883	1340	1613
Ash box, grate ash	l	32	45	55	75	91
Ash box, flue gas dust extractor	l	90	90	90	90	90
Max. power consumption						
– During ignition	W	1600	1600	1600	1600	1600
– Electrical connections (total)	W	2670	2850	3600	3980	3630
– Feed screw conveyor	W	370	550	1100	1100	750
– Rotary fan	W	120	120	120	120	120
– Flue gas fan	W	550	550	750	1100	1100
– Grate drive	W	30	30	30	60	60
– Electrical power consumption at Q_N	W	1032	1108	1521	1868	1753
– Electrical power consumption at Q_{min}	W	355	369	434	480	460
Boiler connections						
Boiler flow	Rp	2	DN80 PN6	DN80 PN6	DN100 PN6	DN100 PN6
Boiler return	Rp	2	DN80 PN6	DN80 PN6	DN100 PN6	DN100 PN6
Extinguishing water connection	R	¾	¾	¾	¾	¾
Boiler drain valve	Rp	1 ½	1 ½	1 ½	1 ½	1 ½
Safety heat exchanger						
Cold water	R	½	½	½	½	½
DHW	R	½	½	½	½	½
Sensor well for thermally activated safety valve (TS)	Rp	½	½	½	½	½
Flue gas[*9]						
Average temperature (gross)[*10]						
Average flue gas temperature at Q_N[*11]	°C	160	160	160	160	160
Average flue gas temperature at Q_{min}	°C	130	130	130	130	130
Mass flow rate						
Q_N, M5, O_2 6 %	g/s	86.3	126.6	172.6	230.2	310.8
Q_N, M35, O_2 8 %	g/s	111.1	162.9	222.2	296.2	399.9
Flow rate						
Q_N, M5, O_2 6 %, 150 °C	m^3/s	0.10	0.15	0.20	0.27	0.37
Q_N, M35, O_2 8 %, 150 °C	m^3/s	0.14	0.20	0.27	0.36	0.49
Flue outlet	∅ mm	250	250	300	350	350
Required draught						
– Required at full load	Pa	5	5	5	5	5
	mbar	0.05	0.05	0.05	0.05	0.05
Max. permissible draught[*12]	Pa	10	10	10	10	10
	mbar	0.1	0.1	0.1	0.1	0.1
Efficiency						
– Full load	%	91.7	92.2	93.1	93.6	94.1
– Partial load	%	92.9	92.7	92.5	92.2	93.7
CE designation in accordance with the Machinery Directive		CE	CE	CE	CE	CE
Boiler category to EN 303-5		5	5	5	5	5

*[*9] Values for calculating the size of the flue system to EN 13384, based on 12 % O_2.*

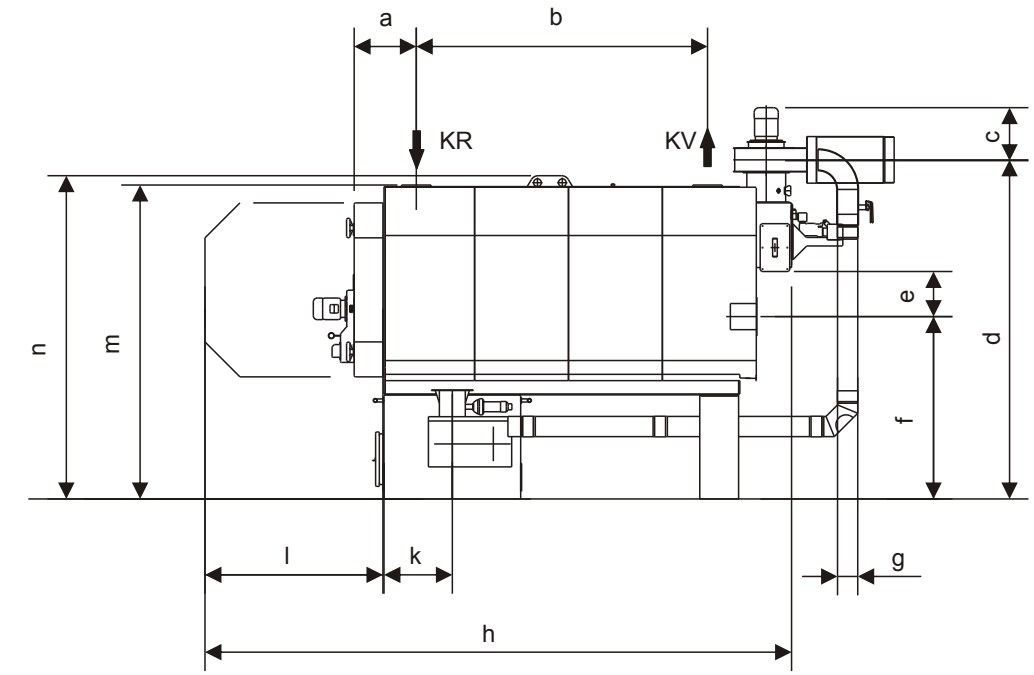
*[*10] Actual flue gas temperature as average gross value in line with EN 304 at 20 °C combustion air temperature, based on 12 % O_2.*

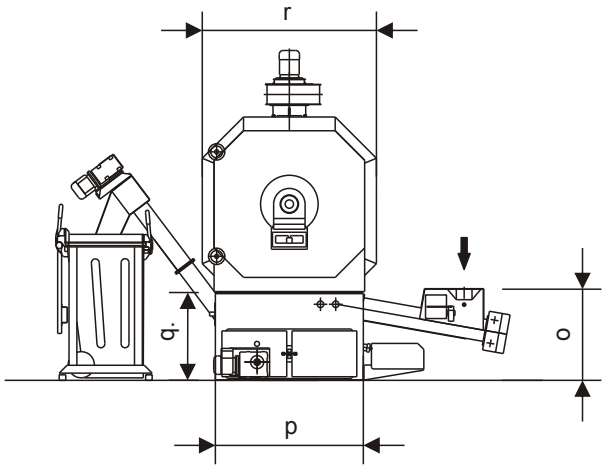
*[*11] Flue gas temperature: Increase possible by removing the displacer rods (Q_N +30 °C, Q_{min} +10 °C)*

*[*12] In chimneys with a draught (chimney draught) above 0.15 mbar, a secondary air device (draught limiter) must be installed.*

Vitoflex 300-RF (cont.)

Dimensions





CR Boiler return
KV Boiler flow

Dimensions

Rated heating output	kW	150	220	300	400	540
a	mm	392	406	406	466	466
b	mm	1541	1525	1875	1800	2030
c	mm	358	358	352	375	375
d	mm	1908	2168	2182	2457	2527
e	mm	303	316	316	319	319
f	mm	1093	1179	1179	1219	1219
g	mm	DN 80	DN 80	DN 125	DN 125	DN 125
h	mm	3120	3424	3780	4004	4232
k	mm	370	370	440	480	548
l	mm	870	1150	1150	1390	1390
m	mm	1765	2024	2024	2262	2262
n	mm	1825	2084	2084	2422	2492
o	mm	700	700	700	700	742
p	mm	870	1150	1150	1390	1390
q	mm	673	673	673	673	750
r	mm	1050	1330	1330	1570	1570

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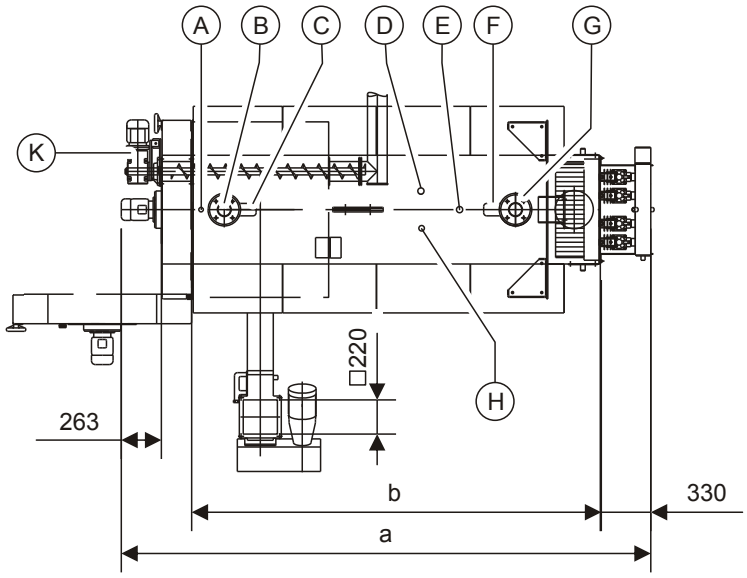
Dimensions and overview of actuators and sensors



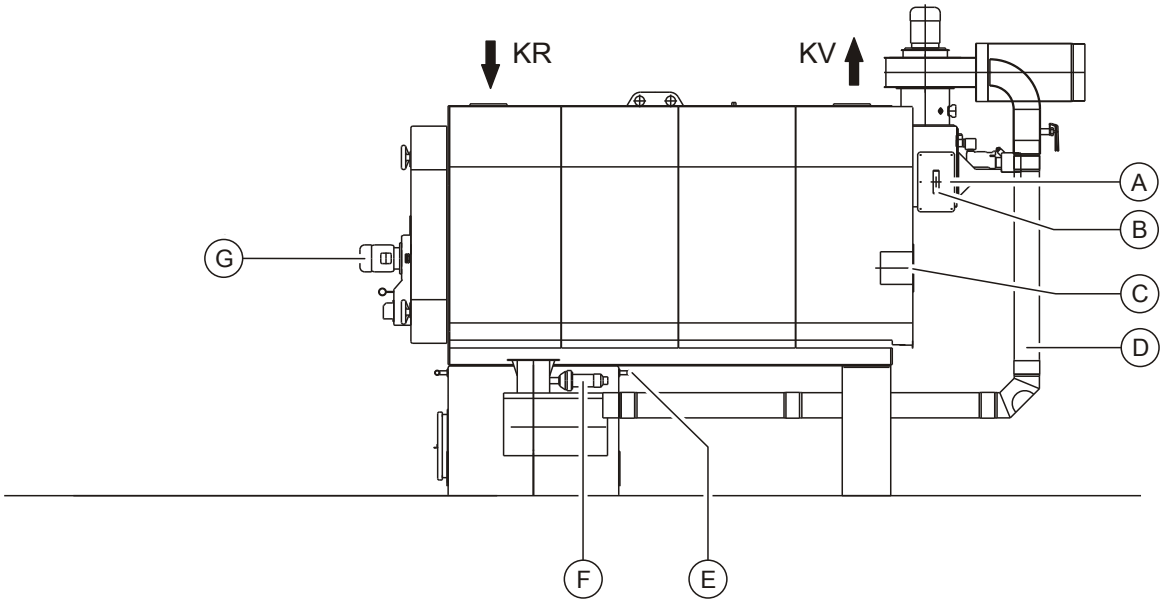
Ⓐ Sensor well for thermally activated safety valve (TAS)
Ⓑ Boiler return
Ⓒ Return temperature sensor
Ⓓ Safety heat exchanger
Ⓔ High limit safety cut-out (STB)
Ⓕ Boiler water temperature sensor
Ⓖ Boiler flow
Ⓗ Safety heat exchanger
Ⓚ Ash removal, combustion block

Dimensions for boiler length

Rated heating output	kW	150	220	300	400	540
a	mm	3035	3059	3415	3457	3685
b	mm	2250	2274	2630	2614	2842

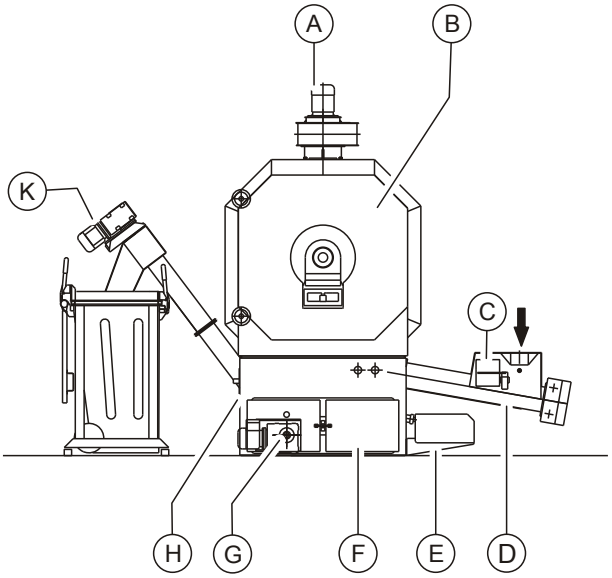
Vitoflex 300-RF (cont.)

Overview



Ⓐ Pneumatic cleaning
Ⓑ Cleaning cover, flue gas collector
Ⓒ Cover with sight glass (standard version), flange for connecting the burner changeover panel
Ⓓ Recirculation gas line, line routing variable
Ⓔ Boiler drain valve
Ⓕ Ignition unit
Ⓖ Rotary fan
KV Boiler flow
CR Boiler return

Overview



Ⓐ Flue gas fan
Ⓑ Boiler door with rotary fan
Ⓒ Extinguishing water connection
Ⓓ Feed screw conveyor
Ⓔ Drive, infeed grate
Ⓕ Ash doors of the grate ash container (2 pce)
Ⓖ Drive, ash removal
Ⓗ Maintenance cover, combustion block
Ⓚ Ash removal, steeply inclined screw conveyor

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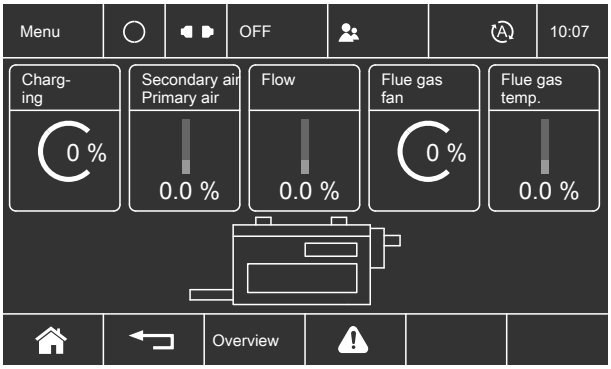
3.1 Ecocontrol specification

Description

For part no., see pricelist
Wood combustion system control including activation of equipment for fuel charging according to the articles listed separately.
- The heating output is modulated to match the heat consumption.
- The control circuit for combustion optimisation with a Lambda probe overlaps the output control circuit.
- With regard to fire safety and personal safety, the highest possible quality criteria are fulfilled.
- Weather-compensated heating circuit control unit for up to 8 heating circuits.



Ecocontrol function

- Automatic ignition system
- Output control circuit with modulating output operation (25 - 100 %)
  - Air-controlled with variable speed flue gas fan subject to boiler output
  - Exact fuel supply via the feed screw conveyor from dosing hopper with barrier layer
  - Topping up of the dosing hopper by means of level monitoring
  - Limiting and distribution of the burning mass in the combustion chamber by means of level monitoring in the combustion chamber and movement of the infeed grate
- Emissions-optimised control circuit: Optimisation of the air supply through motorised air dampers with Lambda probe measurement to ensure optimum combustion
- Keeping up the return temperature with the boiler mixer ensures a long boiler service life
- Controller for the pressure-jet oil burner on the Vitoflex 300-RF
- Safety functions for:
  - Excess temperature
  - Burn-back
  - Opening of a fuel charging cover
  - Forced heat transfer
- Input terminals in the control panel for:
  - 2 high limit safety cut-outs (STB)
  - 2 low water indicators
  - 2 positive pressure limiters (water)
  - Emergency stop (external)
  - CO/CO_2 monitoring (external, to TRVB H118)
- Floating contacts
  - Operating message
  - Fault message (important)
  - Fault message (warning)
  - Transfer excess heat
  - Service message

Operation

Operation is via a touchscreen. All operating data can be read from the display. The set values of all important parameters can be entered easily. Fault messages are displayed in plain text and issued in the sequence of occurrence.

Touchscreen:
For operating the heating system.
The touchscreen integrated into the control panel door enables visualisation and graphic evaluation of the system.

Standard delivery package for Ecocontrol

- Compact control panel
  - Powder coated surface
  - Version as per ÖVE/VDE guidelines, fully wired to terminal strips
  - Feed 3 × 400 V, 50 Hz, control voltage 230 V or 24 V
  - Control panel temperature monitoring
  - Freely programmable control unit
  - Hybrid motor starter for all drives priced separately
  - Inverter for fan motors
- In the control panel door
  - 4-pole mains isolator
  - Graphics-capable touchscreen
  - Control panel fan (incl. Pt1000 control panel sensor)
  - Documentation incl. fixed wiring diagram, terminal connection diagram, operating instructions, installation instructions in the guide folder
- Integral LAN interface (touchscreen)

Note
The control panel must be installed on site.
For the standard delivery package for the sensors, see "Boiler delivered condition".
If extending the heating circuits, the information in the chapter "Accessories for Ecocontrol function extension" must be observed.

3.2 Accessories for Ecocontrol

External drive switching without light barrier

For part no., see pricelist
Activation of an external conveyor drive or a rotary lock valve without reversing (changing the rotational direction).
The motors are protected against overload.

Standard delivery:
- Hybrid motor starter for the drive motor integrated into the control panel
- Input in control panel (safety limit switch on maintenance cover)
- Output in control panel (external conveyor drive)

Note
- *The electrical output data of the existing conveyor device (kW, amps, volts) must be stated.*
- *The customer is responsible for delivery and installation of the safety switches of the external conveyor drive.*
- *Only with a defined limited material supply (upstream screw conveyor).*

External drive switching with light barrier

For part no., see pricelist
Activation of an external conveyor drive without reversing (changing the rotational direction).
If there is a risk of overfilling in the charging system, the integral light barrier interrupts the upstream charging.
The motors are protected against overload.

Standard delivery:
- Hybrid motor starter for the drive motor integrated into the control panel
- Input in control panel (safety limit switch on maintenance cover)
- Output in control panel (external conveyor drive)
- Infrared light barrier (screw conveyor inlet)

Note
- *The electrical output data of the existing conveyor device (kW, amps, volts) must be stated.*
- *The customer is responsible for delivery and installation of the safety switches.*
- *For the activation of a screw conveyor with external motor downstream of the external discharge.*

3.3 Accessories for Ecocontrol output management

Additional heat generator demand (peak load heat generator)

For part no., see pricelist

Function:
With the "enable signal" (floating contact), an on-site peak load heat generator (oil or gas boiler) is activated when the cylinder temperature falls below a certain value. The temperature of start and stop points can be selected freely on the controller.

Standard delivery:
- Floating contact
- Submenu on touchscreen

Note
The controller and control unit for the oil or gas boiler is not included in the standard delivery.

Only possible in combination with 5-sensor cylinder management (QM).

Cylinder management with 5 sensors (QM)

For part no., see pricelist
The solid fuel boiler's modulating output operation is optimised with the use of a heating water buffer cylinder. Short term heat demand peaks are also covered. The temperature sensors record the heating of the heating water buffer cylinder. The specification of the charging level of the heating water buffer cylinder is weather-compensated and carried out via the outside temperature sensor. The combustion heating output is matched to the average heating water buffer cylinder temperature.

Standard delivery:
- 5 Pt1000 sensors with connecting cable
- 5 sensor wells, R1/2 x 280 mm
- 1 Pt1000 outside temperature sensor

Note
No 0—10 V output signals possible.

External demand ON/OFF

For part no., see pricelist
A potential-free input is provided in the control panel for external ON/OFF control.

Note
ON/OFF control via an external N/O contact.

Output signal 0-10 V

For part no., see pricelist
Issuing of boiler output as voltage signal and a connection to receive a maximum boiler output limit included in standard delivery.

Functions:
- Issue of the output signals
- Receipt and processing of an external output restriction

Note
The installation of "Output signals 0–10 V" according to QM-Holzheizwerke is possible irrespective of additional control modules used.
No "5-sensor cylinder management (QM)" possible.

Processing of the 0-10 V output signals

without "External demand ON/OFF"	**from**	**to**	**Unit**
Boiler "OFF"	0.0	2.0	V
Output operation "lower output limit"	2.1	Parameter "Minimum speed flue gas fan"/10	V
Output operation "upper output limit"	Parameter "Minimum speed flue gas fan"/10	Parameter "Maximum speed flue gas fan"/10	V

with "External demand ON/OFF"	**from**	**to**	**Unit**
Boiler "OFF"	0.0	Parameter "Minimum speed flue gas fan"/10	V
Output operation	Parameter "Minimum speed flue gas fan"/10	Parameter "Maximum speed flue gas fan"/10	V

3.4 Accessories for Ecocontrol remote transfer/remote monitoring

Analogue fault message device with battery

For part no., see pricelist
Transmits the boiler system text messages as a phone message. 4 different text messages are possible, as the fault message modem has 4 independent digital inputs.

Standard delivery:
- Analogue modem for wall mounting
- Rechargeable battery pack (also works in the event of a power failure)
- Plug-in power supply unit

To be carried out by the customer:
- Installation of fault message device
- Electrical connection of the fault message device
- Connection of phone line
- Configuration in accordance with the documentation

Note
The fault message device can only send voice messages.

Exporting operating data via Modbus TCP/IP

For part no., see pricelist
Output of relevant boiler system operating data and fault messages via Ethernet to an on-site, higher ranking control system. On request, the flow temperature can be specified by the on-site, higher ranking control system. The number of data points depends on the supplied system.

Standard delivery:
- Ethernet interface on touchscreen
- Software module
- Modbus TCP/IP
- Data point list (on request)

External visualisation (hardwired)

For part no., see pricelist
Pack for the transmission of relevant data to an EDP workstation (internal and/or external) for visualisation, remote maintenance and operating data archiving of the boiler system. Hardware and software are integrated into the Ecocontrol control unit. All adjustable parameters can be changed from the IT workstation.

Standard delivery:
- Industrial PC with interfaces for screen, keyboard and PC mouse for IT workstation close to boiler room
- Windows operating system, remote maintenance software (Team Viewer) and visualisation/archiving software installed on the industrial PC

Images on the screen:
- Cross-sectional image of boiler, 3D with display fields
- Table of parameters (with change option)

To be carried out by the customer:
- IT workstation for remote maintenance, installation of remote maintenance software
- Network connection for remote maintenance purposes

Note
Option of additional fault message device, analogue with rechargeable battery pack – for part no., see pricelist.

3.5 Accessories for Ecocontrol function extension

Controller module

For part no., see pricelist
For extending the functionality of the Ecocontrol with up to 4 functions.

Standard delivery:
- Controller module in a plastic enclosure for wall mounting
  Width 325 mm, height 195 mm, depth 75 mm

Note
A data cable (7522616) is also required for the controller module.

Overview of controller module connection options

Function	Abbreviation of function	Number of required functions
Heating circuit	HC	1
DHW heating	TWE	1
DHW circulation pump	ZP	1
Solar circuit	SOL	On request
Heat pipeline	WFL	On request
Heating water buffer cylinder as substation (satellite buffer)	SAT	On request

Note
Accessories required for function extension (not in standard delivery)
- *Contact temperature sensors (7528121) required for heating circuits*
- *Immersion temperature sensors (7528122) and R 1/2 200 mm sensor wells (7819693) required for DHW heating*
- *Room temperature sensor (option)*

Data cable 10 m long

For part no., see pricelist
To connect the boiler control unit and controller module.

Standard delivery:
- Prefabricated data cable CAN bus LiYCY 2 x 2 x 0.34 mm²

Note
The total length of all cables must not exceed 300 m.

Temperature sensor for heating circuit

For part no., see pricelist
For recording the flow temperature of a heating circuit.

Standard delivery:
- Pt1000 contact temperature sensor

Charging control panel without boiler sequence control

For part no., see pricelist
This charging control panel is used to activate the shared discharging and conveying equipment of a twin boiler system without boiler sequence control.
Boiler sequence control incl. buffer management is carried out by an on-site higher ranking control system (e.g. building management system).

Note
Required for each boiler system:
- *Output signals 0-10 V*
- *External demand ON/OFF*

Required for each drive (e.g. discharge, screw conveyors):
- *External drive switching (with or without light barrier)*

Charging control panel with boiler sequence control

For part no., see pricelist
This charging control panel is used to activate the shared discharging and conveying equipment of a twin boiler system with boiler sequence control, incl. buffer controller.

Note
Required for each drive (e.g. discharge, screw conveyors):
- *External drive switching (with or without light barrier)*

Buffer controller with boiler sequence control

For part no., see pricelist
This buffer controller is used to control buffer management in twin boiler systems.
The Ecocontrol regulates buffer management incl. boiler sequence control.

Note
The boiler systems each have their own fuel charging system (discharge and conveying equipment).

4.1 Boiler accessories

Pneumatic cleaning

For part no., see pricelist
The whole tubular heat exchanger is cleaned with periodic blasts of compressed air during operation. The actual process of cleaning is carried out by consecutive blasting of the individual sections with compressed air. Ash is removed from the heat exchanger pipes by means of a very short but extremely intensive pressure pulse.
The device is installed on the back of the boiler.
The number of cleaning processes within a unit of time (e.g. per hour) is matched to the boiler load. An individual, complete cleaning process comprises a sequence of pressure pulses across all sections of the heat exchanger.

Standard delivery:
- Nozzle part integrated in the flue gas collector; incl. connectors with heat deflection discs
- Compressed air distributor with container and valves, connected to the nozzle part with heat-resistant hoses
- Compressor (rotation compressor) for municipal applications, incl. pressure regulator and pressure switch
- Compressed air hose up to max. 4.0 m in length
- Valves fully wired to terminal strip
- Software module in the controller
- Output terminals in control panel for power supply to the compressor (rotation compressor)

To be arranged by the customer:
- Provision of a socket 400 V / 16 A
- Plug for compressor 400 V / 16 A

Compressor specification

Supply output	l/min	160
Cylinder	l	90
Max. pressure	bar	10
	MPa	1
Output	kW	1.5
Speed	rpm	1450
Voltage	V	3 x 400
Sound level	dB (A)	64

Note
The compressor (rotation compressor) should be installed in a cool place in the boiler room.
Pneumatic cleaning is also available without compressor – see pricelist.

Specification for pneumatic cleaning

Rated boiler heating output	**kW**	**150**	**220**	**300**	**400**	**540**
Number of zones/valves	pce	4	4	4	5	6
Size of valves	G	1	1	1	1	1
Max. air consumption under full load	l/h	1300	2500	2500	3300	4500

Feed screw conveyor, 2-stage

For part no., see pricelist
The version with two-stage feed screw conveyor enables operation to be matched to the fuel being used. It is optimised for shavings/ woodchips (high level) on the one side and for wood pellets (low level) on the other.

Standard delivery:
- Feed screw conveyor geared motor, pole-changing (drive speed of the geared motor: 750/3000 rpm)
- Motor starter for geared motor
- Software module in the controller

Thermally insulating the flue gas recirculation line

For part no., see pricelist
High temperature-resistant thermal insulation, 35 mm thick, made from mineral wool with aluminium lamination and side adhesive strips for straight elements of the flue gas recirculation line. Aluminium foil adhesive strips for the faces are also supplied.

Designation
Thermal insulation, flue gas recirculation line, per m, **DN 80**
Thermal insulation, flue gas recirculation line, per m, **DN 125**

Note
Thermal insulation of the flue gas recirculation line is essential. It can also be carried out on site.

4.2 Boiler accessories, safety equipment

Note
Observe the information contained in the chapter "Safety equipment to EN 12828". See page 104.

Thermally activated safety valve 100 °C

For part no., see pricelist
Standard version for fixed response temperature approx. 100 °C, connection G ¾

Water supply requirements:
- Cold water inlet DN 15 R ½
- Permanently connected with a metal pipe
- Min. 2.5 bar, max. 3.5 bar
- Drain pipe R ¾

Standard delivery:
- Thermally activated safety valve incl. sensor well

Note
We recommend using the thermally activated safety valve even if it is not required by local safety regulations.
2 pce required for boilers with output of 720 kW and higher.

Safety valves

For part no., see pricelist
The safety valve is installed at the highest point of the solid fuel boiler. Alternatively, the safety valve can also be fitted to a line that is connected to the highest point.
It must not be possible to shut off the line between the boiler and the safety valve. Pumps, fittings or constrictions must not be present in the line. The discharge pipe must be designed in such a way that no pressure increase is possible. Any expelled heating water must be drained off safely. The outlet point of the discharge pipe must be arranged in such a way that any water expelled from the safety valve can be drained off safely and visibly.

Available safety valves:
- Safety valve 3 bar (0.3 MPa)

Water level limiter

For part no., see pricelist
- For use as a low water indicator
- With valid component identification
- Installation in the heating flow outside the boiler
- Safety equipment to EN 12828

Maximum pressure limiter 0 to 6 bar

For part no., see pricelist
- With valid component identification
- Safety equipment to EN 12828

Note
Required for every boiler in multi boiler systems.

Minimum pressure limiter 0 to 6 bar

For part no., see pricelist
- For use as a replacement low water indicator
- With valid component identification
- Safety equipment to EN 12828

Fitting assembly with pressure gauge

For part no., see pricelist
For fitting a maximum pressure limiter and a minimum pressure limiter (2 free connections).

Flash trap replacement set

For part no., see pricelist

Standard delivery:
- High limit safety cut-out
- Safety pressure limiter (maximum pressure limiter 0 to 6 bar positive pressure)
- With valid component identification
- Sensor well G 1/2 x 150 mm

4.3 Heat distribution accessories

Motorised three-way valve (return temperature raising facility)

For part no., see pricelist

Overview

Rated heating output [kW]	Designation	DN [mm]	Kvs [m^3/h]	Servomotor 230 V	Incl. complete fittings
150 and 220	Motorised three-way valve, DN 50	50	40	SQK 33	Mating flanges, gaskets
300	Motorised three-way valve, DN 65	65	63	SAL 31	Mating flanges, gaskets
400 and 540	Motorised three-way valve, DN 80	80	100	SAL 31	Mating flanges, gaskets

Note
Not available separately: Only supplied as part of an overall system.

Circulation pumps

For part no., see pricelist

Wilo Stratos high efficiency circulation pumps:
- EC motor and automatic output matching
- Thermal insulation as standard for heating applications
- Pump body with cataphoresis coating to prevent corrosion due to the formation of condensate
- System extension by retrofitting communication modules LON, CAN, PLR, etc.
- Remote control via infrared interface (IR module/IR monitor)
- **Energy efficiency class A**
- **ErP ready**
- System temperature from -10 to +110 °C (no icing up)
- 1 × 230 V~, 50/60 Hz
- IP rating IP 44

Rated heating output [kW]	Designation	DN [mm]	Installed length [mm]	Nominal pressure
150	Wilo Stratos 50/1-8	50	240	PN 6/10
220	Wilo Stratos 50/1-9	50	280	PN 6/10
300	Wilo Stratos 65/1-9	65	280	PN 6/10
400	Wilo Stratos 65/1-12	65	340	PN 6/10
540	Wilo Stratos 80/1-12	80	360	PN 6

Note
- *Not available separately. Only supplied as part of an overall system.*
- *We reserve the right to select the pump manufacturers and types.*

Pump selected according to:
- *Minimum requirements (see also Specification, page 14)*
- *Requirements of the relevant application*

4.4 Accessories for flue gas dust extraction

Flue gas dust extractor with ash container

For part no., see pricelist

Flue gas dust extractor
The flue gas dust extractor minimises dust emissions and is designed as a multi cyclone with axial function. The dust extractor is fully insulated and has 3 covers for cleaning.
The raw gas space is cleaned via the side cleaning cover. The clean gas space is cleaned via the upper or back cleaning cover (unused fan connection).

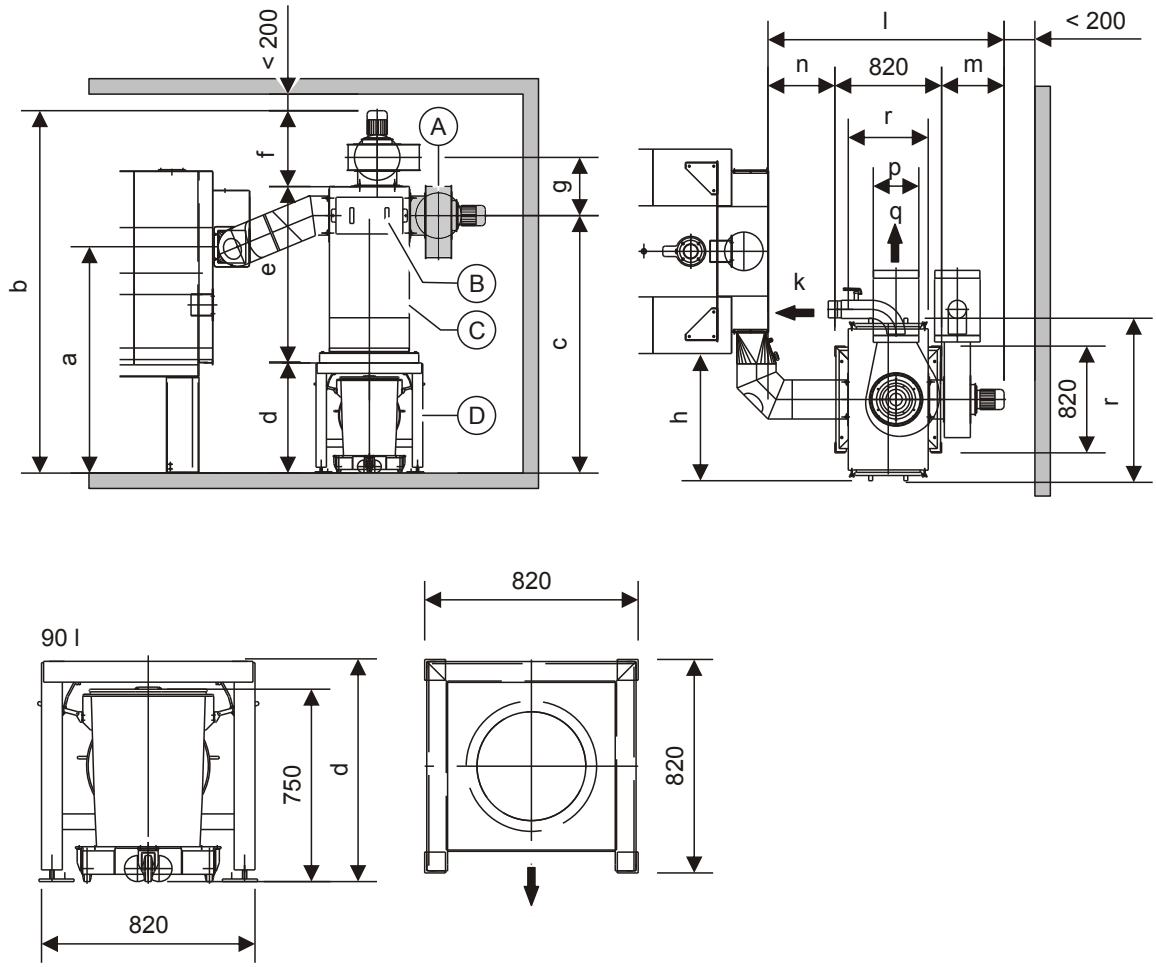
Ash container
The ash container is equipped with an ash cart and is connected to the dust extractor by quick-action fasteners. It can easily be pulled out for emptying. The fan can be installed either on the side or the top.

Standard delivery:
- 1 flue gas dust extractor
- 1 ash container, chamber volume 90 l

Note
The flue gas dust extractor is required for fuels with an increased percentage of fines.
(Percentage of fines > 4 %.)

Installation accessories (cont.)

Flue gas dust extractor diagram



Positioning in 4 x 90° possible (ash container removal)

Ⓐ Flue gas fan (with variable rotation)
- Either at the top or side
- Unused connection as cleaning cover, clean gas space

Ⓑ Cleaning cover (raw gas space)
Ⓒ Dust extractor (axial cyclone)
Ⓓ Ash station
k Recirculation gas to boiler
q Flue gas to chimney

Installation accessories (cont.)

Dimensions of flue gas dust extractor with 90 l ash container

Rated heating output	kW	150	220 and 300	400	540
Dimensions					
a	mm	1521	1628	1671	1741
b	mm	2285	2552	2702	2776
c	mm	1518	1775	1875	1949
d	mm	846	846	846	920
e	mm	899	1156	1256	1256
f	mm	540	550	600	600
g	mm	430	424	447	447
h	mm	545	530	977	977
l	mm	1640	1440	1790	1790
m	mm	414	414	480	480
n	mm	280	370	370	370
o	mm	614	614	620	620
r	mm	780	780	1260	1260
Weight					
Weight with flue gas fan	kg	295	315	350	350
Weight without flue gas fan	kg	258	270	310	288

Available ash containers, reserve

For part no., see pricelist
- Ash bin 90 l, reserve
- Ash container 240 l, reserve
- Ash container 800 l, reserve

4.5 Accessories for flue gas routing

Note
When designing the flue gas routing, observe the information in the chapter "Connection on the flue gas side". See page 110.

Flue bend 0 - 90°

For part no., see pricelist
Version: Black, without thermal insulation

Available flue bends:
- 200 mm diameter
- 250 mm diameter
- 300 mm diameter
- 350 mm diameter

Flue pipe, L = 1000 mm

For part no., see pricelist
Version: Black, without thermal insulation

Available flue pipes:
- 200 mm diameter
- 250 mm diameter
- 300 mm diameter
- 350 mm diameter

4.6 Accessories for sound insulation measures

Note
Observe the design information on "sound insulation". See page 110.

Anti-vibration fittings

Supports
For part no., see pricelist
To avoid the transmission of structure-borne noise during the operation of the fuel transportation equipment, the braces and the anchors of the relevant conveyor device are placed on high quality Sylomer bases (plastic anti-vibration mounts for noise attenuation) or anchored with a Sylomer support and a chipboard plate in the building structure. The anchor points with heavy load anchors are separated from the supports with Sylomer washers.

Standard delivery:
- Sylomer washer
- Sylomer pad
- Sylomer base
- Chipboard plate for the supports of the respective equipment

Available supports for:
- Discharge screw conveyor
- Screw conveyor
- Feed
- Flexible agitator discharge
- Horizontal discharge
- Ash removal
- Flue gas dust extractor

Note
- *One anti-vibration fitting should be used for each means of fuel transport, e.g. 1 pce AH + 1 pce anti-vibration fitting AH-AS*
- *Installation room characteristics relating to the physical building structure largely determine the transmission of structure-borne noise in the building. It is important to note that the specified measures cannot provide complete noise and vibration isolation.*
- *Building related measures (wall openings, fire barriers, floating screeds, etc.) must be coordinated with structural engineers and architects and are not included in the standard delivery and therefore not within our area of responsibility.*

4.7 Accessories for ash removal

Ash removal into an ash container

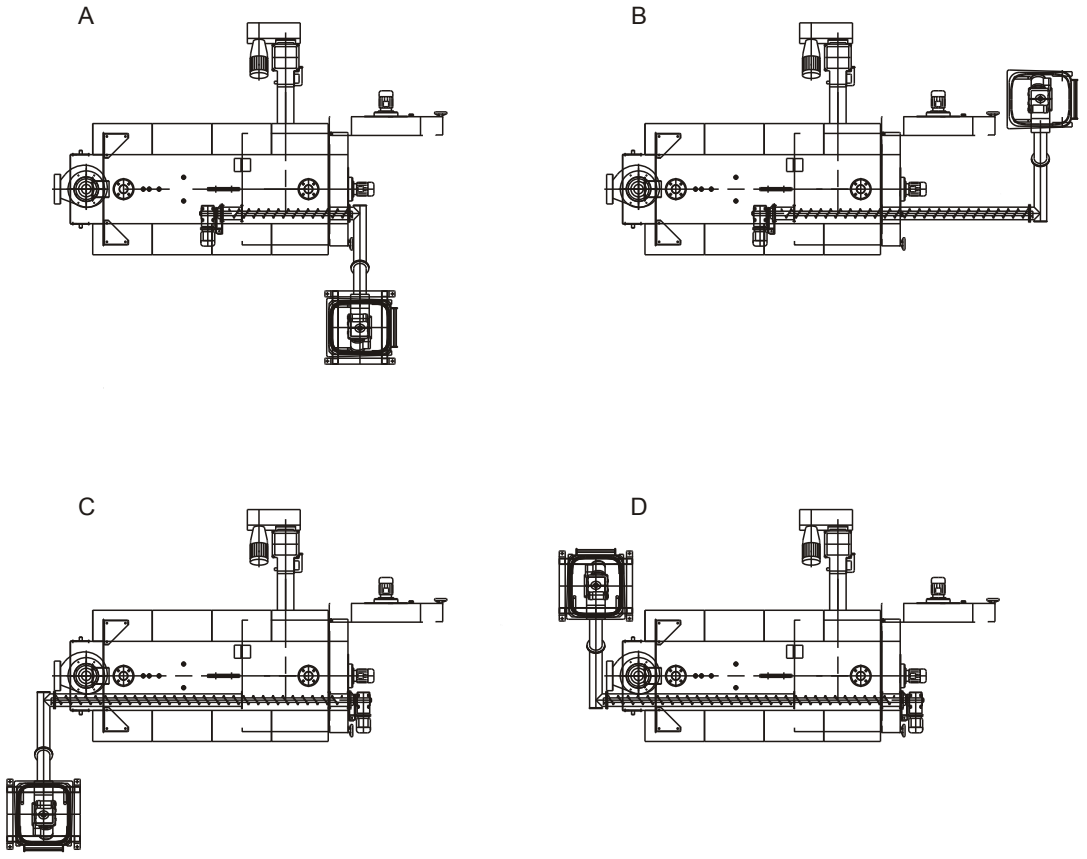
Complete screw conveyor ash removal from the ash chamber of the combustion block into an external, mobile and zinc-plated ash container. The light barrier control keeps the ash level constant via the screw conveyor. In this way, the ash can cool down in the ash chamber under the combustion system. In standard mode, only cooled ash is fed into the container. For cleaning purposes, ash removal can be switched to continuous operation in the event of a boiler standstill.

Standard delivery:
- Boiler ash pan made from heat-resistant steel
- Combustion chamber screw conveyor made from heat-resistant steel
- Steeply inclined screw conveyor as a pipe conveyor with direct transfer from the ash removal screw conveyor
  Drive via geared screw conveyor motor
- Docking point with mobile ash container (240 l)
- Activation of the screw conveyor drives
- Infrared light barrier for monitoring the level of ash in the combustion chamber

Available ash removal systems with ash container:
- In 240 l ash container
- In 800 l ash container

Note
Additional ash containers must be ordered separately.

System variants for ash removal into ash container



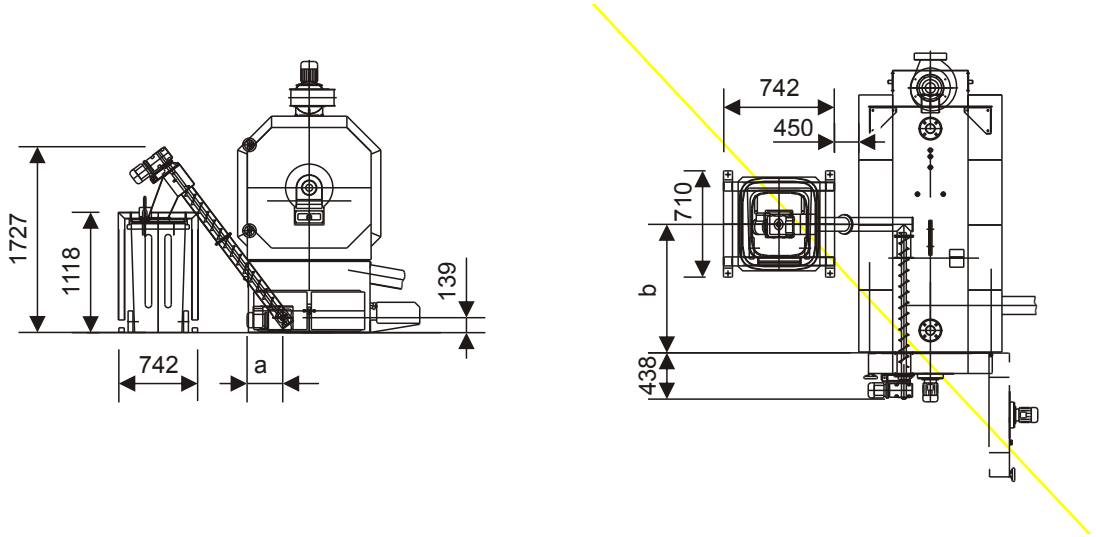
Standard versions (B also possible as mirror image)

Docking point with mobile ash container can be installed at an angle of 90° in each case. It is possible to select the direction in which the ash container is pulled out.

Note
Special solutions on request
The extension for the ash removal screw conveyor must be ordered separately.

Installation accessories (cont.)

Ash removal into 240 l ash container
For part no., see pricelist

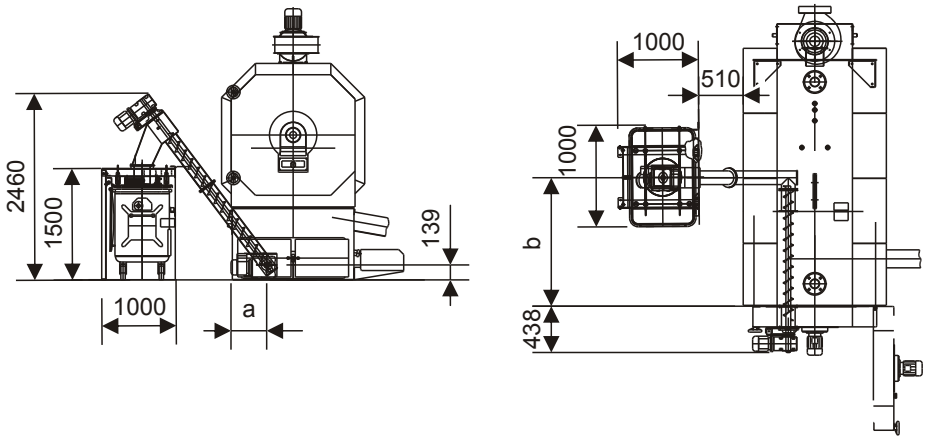


Ash removal into an ash container with a volume of 240 l

Dimensions

Rated heating output	kW	150	220	300	400	540
a	mm	249	319	319	301	301
b	mm	1023	1023	1193	1273	1408

Ash removal into 800 l ash container
For part no., see pricelist



Ash removal into an ash container with a volume of 800 l

Dimensions

Rated heating output	kW	150	220	300	400	540
a	mm	249	319	319	301	301
b	mm	1023	1023	1193	1273	1408

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Extension for ash removal screw conveyor

For part no., see pricelist

Note
Per metre
Up to 2 extensions are permissible

Extension for steeply inclined screw conveyor

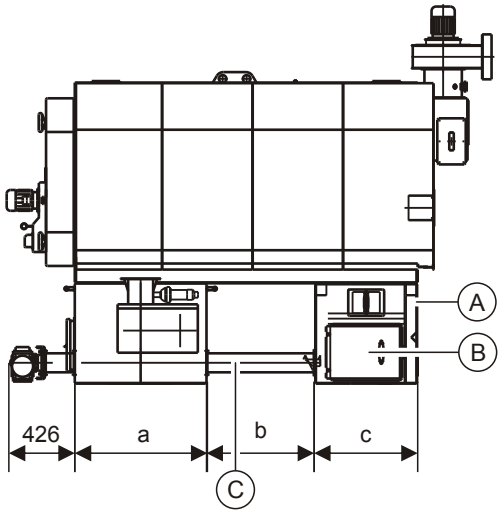
For part no., see pricelist

Note
Per metre
Up to 2 extensions are permissible

Ash removal to base container

For part no., see pricelist
Complete screw conveyor ash removal from the combustion block ash chamber into the base container located under the boiler with maximum capacity. The light barrier control keeps the ash level constant via the screw conveyor. In this way, the ash can cool down in the ash trough under the combustion system and only cooled ash is fed into the box in standard mode. The large base container ensures maximum maintenance-free intervals (runtimes).

Standard delivery:
- Boiler ash trough with ash level control and ash removal screw conveyor made from heat-resistant steel Drive via geared screw conveyor motor
- Base container with a maximum capacity and two maintenance doors for the removal of ash with a vacuum cleaner or stoking device
- Control of ash removal with light barrier



Ⓐ Base container
Ⓑ Boiler ash trough door
Ⓒ Ash removal screw conveyor

Dimensions for base container by volume

Rated heating output	**kW**	**150**	**220**	**300**	**400**	**540**
Base container volume	**l**	**240**	**360**	**380**	**600**	**700**
a	mm	740	740	880	960	1096
b	mm	450	513	787	456	551
c	mm	593	680	680	800	800
Additional weight to the boiler	kg	320	340	360	380	400

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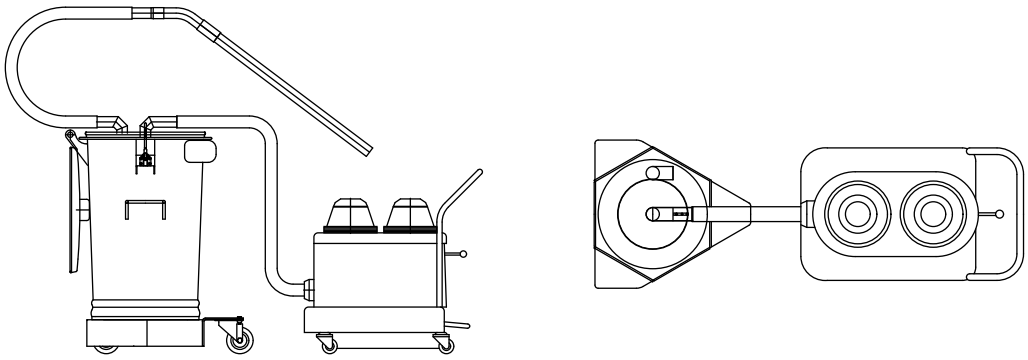
4.8 Mobile cleaning equipment accessories

Cleaning set with ash vacuum cleaner, 90 l

Boiler cleaning set

For part no., see pricelist



Standard delivery
- WSZ 2210 ash vacuum cleaner
- Ash container, 90 l capacity
- Cyclone cover for 90 l ash container
- Trolley with toggle fastener
- Metal hose 2 m
- Metal hose 3 m
- Vacuum gun, DN 50

Cleaning set with ash vacuum cleaner, 240 l

Boiler cleaning set

For part no., see pricelist

Standard delivery
- WSZ 2210 ash vacuum cleaner
- Ash container 240 l capacity
- Cyclone cover for 240 l ash container
- Metal hose 2 m
- Metal hose 3 m
- Vacuum gun, DN 50

Available ash vacuum cleaner accessories:

Boiler room cleaning accessory set:
- The room cleaning accessory set is offered as a complement to the ash vacuum cleaners.
  See page 36.

Ash container:
- Ash bin 90 l, reserve
- Ash container 240 l, reserve
- 800 l ash container, with cover
  See page 36.

Ash vacuum cleaner

WS ash vacuum cleaner

For part no., see pricelist
Ash vacuum cleaner with body made from GRP and with low filter loading on the cell filter. Motors are cooled separately.

DS ash vacuum cleaner

For part no., see pricelist
Ash vacuum cleaner with body made from GRP and with low filter loading on the cell filter. Motors are cooled separately.

Specification

Ash vacuum cleaner		WSZ 2210 Only available as cleaning set	WS	DS
Power consumption	W	2 x 1000	1 x 3600	1 x 7500
Rated voltage	V	230	230	400
Weight	kg	46	49	114
Vacuum	mm WC	1950	2100	3300
Air flow rate	m³/h	270	430	490
Filter surface area	m²	1.0	1.0	2.6
Sound level	dB(A)	64	69	78
Maximum total length of permanently installed pipework for the flue gas extraction system	m	Permanently installed pipework is not permissible	20	100

Installation accessories (cont.)

Ash vacuum cleaner		WSZ 2210 Only available as cleaning set	WS	DS
Nominal diameter of permanently installed pipework for the flue gas extraction system from the ash vacuum cleaner to the pre-separator	NW	Permanently installed pipework is not permissible	76	76
Nominal diameter of permanently installed pipework for the flue gas extraction system from the pre-separator to the suction point	NW	Permanently installed pipework is not permissible	76	76
Max. height differential from the suction point to the pre-separator	m	Permanently installed pipework is not permissible	5	10

Ash vacuum cleaner accessories

Vacuum gun, DN 50

For part no., see pricelist
The vacuum gun is connected with the metal hose. It is used to clean the heat exchanger pipes. For this purpose, the cleaning brush is attached to the vacuum gun, and the vacuum gun to the heat exchanger pipe. Movement of the cleaning brush cleans the surfaces, whilst the dirt is removed by the ash vacuum cleaner.

Vacuum hose, plastic, DN 50
The vacuum hose can be used for general cleaning. It is **unsuitable** for hot ash.

For part no., see pricelist

Available vacuum hoses
- Vacuum hose, plastic, 3 m long
- Vacuum hose, plastic, 5 m long

Vacuum hose, metal, DN 50
The vacuum hose can be used for general cleaning and to clean the boiler.

For part no., see pricelist

Available vacuum hoses
- Vacuum hose, metal, 2 m long
- Vacuum hose, metal, 3 m long
- Vacuum hose, metal, 5 m long

Boiler room cleaning accessory set
For part no., see pricelist

Standard delivery
- Vacuum hose, plastic, DN 50, 3 m, including connection
- Bent mouth piece, DN 50
- Hand-held pipe, 1 m
- Terminal piece for industrial floors, 500 mm with rubber strip
- Coarse suction nozzle
- Crevice nozzle, 500 mm, metal
- Circular brush, 100 mm, V2A

Pipe, DN 76 for permanent installation of the flue gas extraction system
For part no., see pricelist
Pack for permanently installed pipework (9 m) for the flue gas extraction system, including installation materials.

Note
The pipe can also be provided on site. This requires a connection set.

Standard delivery
- 9 m pipe, DN 76
- 3 pce 90° bend
- 8 pce pipe joiner
- Installation materials for fixing (every 2 to 3 m)

Connection set for pipe connections

For part no., see pricelist

Standard delivery
- 1 pce coupling for pipe terminal, DN 50
- 1 pce coupling for pipe terminal, DN 76
- 2 pce coupling for pipe start, DN 76
- 1 pce pipe reducer from DN 76 to DN 50
- 1 pce vacuum hose connection piece, DN 50
- 3 pce vacuum hose connection piece, DN 76
- 3 pce vacuum hose, metal, DN 70, 2 m long

Accessories for mobile cleaning equipment, ash containers

Ash container 90 l, reserve
For part no., see pricelist

Ash container 240 l, reserve
For part no., see pricelist

Cyclone cover for 240 l ash container
For part no., see pricelist
The cyclone cover is intended for the connection of the ash vacuum cleaner hoses to the ash container. It is equipped with a spark arrestor [sieve]. Ventilation air and extract air connections, DN 76

800 l ash container with cover
For part no., see pricelist

Standard delivery
- 800 l zinc-plated ash container with hinged cover
- Cover gasket
- Ventilation air and extract air connection to the cover (DN 76)
- Spark arrestor [sieve]

4.9 Burn-back protection devices (RSE)

Note
In wood processing operations, 2 burn-back protection devices connected in series are required.
For example 2 rotary lock valves or 1 rotary lock valve in combination with a shut-off gate valve.

Rotary lock valve

For part no., see pricelist
Rotary lock valve for fire-safe separation of the combustion system from the fuel store with positive pressure, and with simultaneous material transportation for installation in a drop section. The rotary valve is made entirely from steel and is permissible as fire protection between the combustion system and woodchip silos in wood processing operations with positive pressure. The drive device is a spur geared motor with sprung torque support. If the woodchips are extremely coarse, reversing the direction of rotation of the rotary lock valve avoids jamming.
Fire safety: RSE to TRVB H-118

Application

MZ 190:
- Use only with wood pellets or a conveyor device with a diameter of 120 mm

MZ 260:
- Use only with fuels up to max. P16S to EN ISO 17225-4 and a conveyor device with a diameter of 150 mm or 190 mm

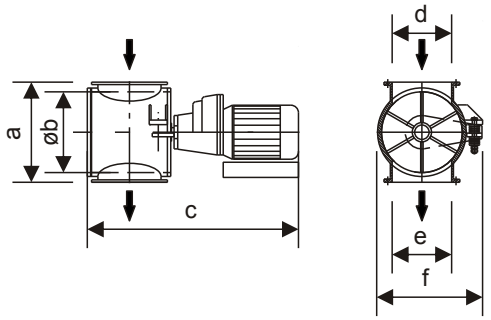
MZ 340:
- Use only with fuels up to max. P31S to EN ISO 17225-4 and a conveyor device with a diameter of 190 mm or 250 mm

Max. permissible positive pressure in the fuel store: + 500 Pa
Max. permissible negative pressure in the fuel store: ± 0 Pa

Standard delivery:
- Rotary lock valve as per order data
- Activation of spur geared motor for both rotational directions according to boiler control unit

Positioning:
- Directly above the feed screw conveyor
- Exception for funnel discharge: Directly at the discharge

Dimensions of rotary lock valve



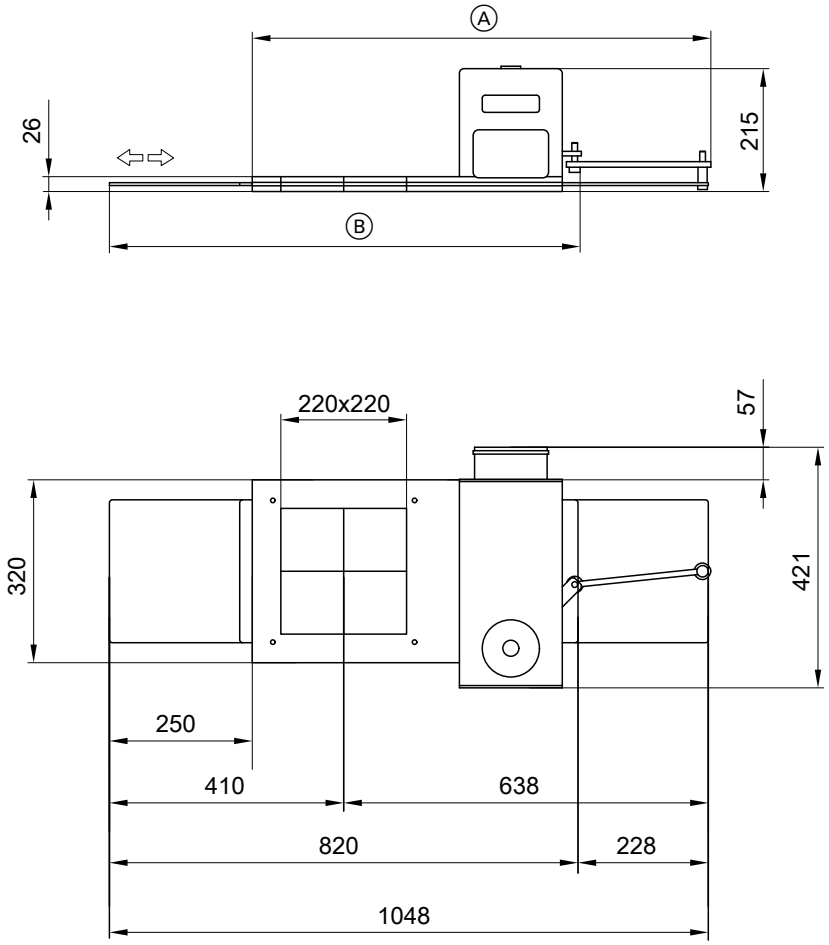
Trade name		Rotary lock valve		
Type		MZ 190	MZ 260	MZ 340
a	mm	260	330	412
b	mm	∅ 193	∅ 264	∅ 340
c	mm	662	709	689
d (Di)	mm	150	202	204
d (Da)	mm	200	250	250
e (Di)	mm	150	202	222
e (Da)	mm	200	250	272
f	mm	274	346	434
Drive rating	kW	0.75	0.75	0.75
Drive speed	rpm	25	25	25

Shut-off gate valve MA 220

For part no., see pricelist
Fire safety-tested device for installation in a drop section, for mechanical separation of combustion system from unpressurised fuel store. The shut-off gate valve is opened by a motor and closed by spring balancer with zero current in the event of burnout, risk of burn-back or power failure.
Material: Steel
Drive: Spring return motor
Fire safety: RSE to TRVB H-118

Standard delivery:
- Shut-off gate valve as per order data
- Activation of shut-off gate valve according to boiler control unit
- Spring return motor (torque 30 Nm)

Note
In wood processing operations, 2 burn-back protection devices connected in series are required (e.g. 2 rotary lock valves or one rotary lock valve in combination with a shut-off gate valve).



Ⓐ Shut-off gate valve closed
Ⓑ Shut-off gate valve open

Drop chute L = 1.0 m

For part no., see pricelist
Connection of a drop section between the discharge system or conveyor device and an onward conveyor device by means of a drop chute.

Note
The drop chute is 1 m long.
The design (diameter, profile) of the drop chute is matched to the relevant project at the factory.

Special adaptor

For part no., see pricelist
Connection of a drop section between the external discharge system and an onward conveyor device by means of a special adaptor.

Note
The design (diameter, profile) of the special adaptor is matched to the relevant project at the factory.

Note
The existing on-site flange must be described (dimensions, hole pattern) when ordering.

5.1 Application options for extraction systems by fuel

Overview

Extraction system	Page	Pellets according to EN ISO 17225-2	Woodchips according to ÖNORM M 7133		Woodchips according to EN ISO 17225-4		
			G 30	G 50	P16S	P31S	P45S
Changeover unit, automatic	From p. 40	X					
Pellet extraction screw conveyor	From p. 42	X					
Flexible agitator discharge AF	From p. 44	X	X	X	X	X	
Horizontal discharge AH	From p. 46	X	X	X	X	X	
Funnel discharge	From p. 54	X	X	X	X	X	
Pushrod discharge	From p. 56	X	X	X	X	X	

5.2 Fuel discharge with automatic changeover unit

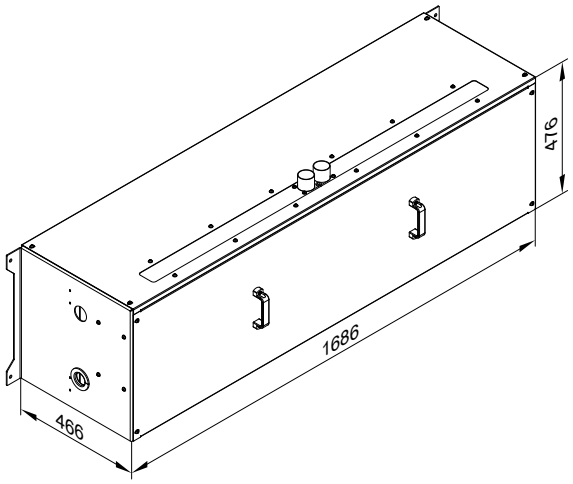
Changeover of the suction wands is automatically regulated by the control system at specific time intervals.

Automatic changeover unit (12-way)

Part no. ZK04681

Standard delivery
- Fire safety pack
- Suction wands (12 pce)
- Hose bracket
- Casing
- Fixing brackets for wall mounting

Note
With the 12-way automatic changeover unit the fire safety pack is included in the standard delivery.

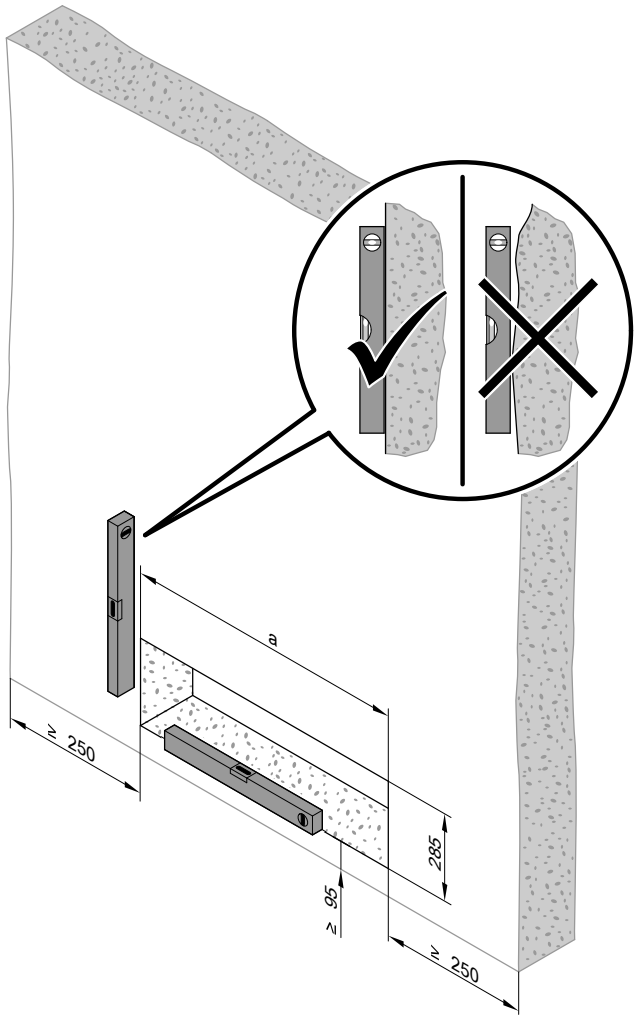


Information on fire safety conditions
The changeover unit can be fitted inside a fire sector. No additional fire protection measures are required.
No steel pipes or similar may be passed through fire sector boundary walls (fire wall between two rooms). When installing the changeover unit, please note that only hoses with a fire barrier may be passed through fire sector boundary walls.

Fuel discharge (cont.)

Required wall openings for automatic changeover units

12-way changeover unit



Dimensions

a	mm	1395
b	mm	285

5

5.3 Fuel extraction with screw conveyor

Pellet extraction screw conveyor, D = 120 mm

For part no., see pricelist
The discharge screw conveyor is used to transport wood pellets from a rectangular fuel store. The wood pellets trickle via a tilted intermediate floor into the screw conveyor channel. The screw conveyor located in this channel transports the wood pellets to the outlet.

Standard delivery:
■ Pellet discharge screw conveyor as per project drawing

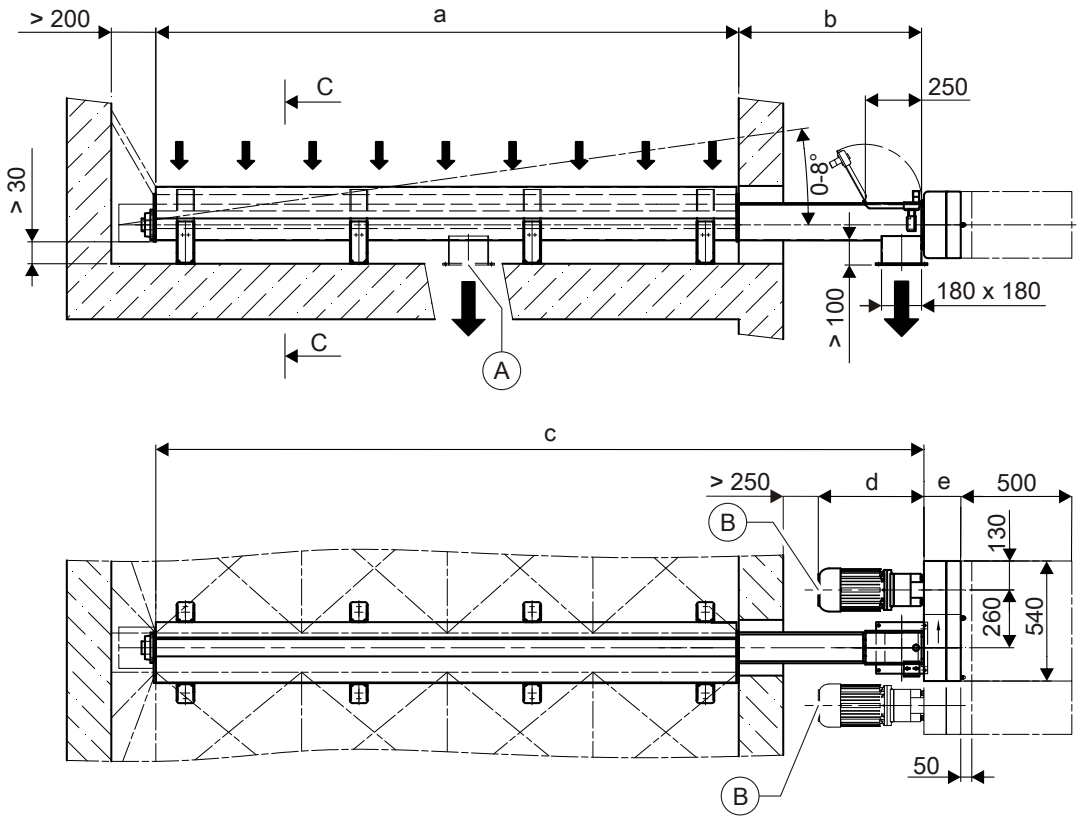
To be carried out by the customer:
Delivery and installation of the intermediate floor (preferably made of wood) incl. static calculation and design. The forces resulting from the weight of the combustion material (approx. 650 kg/m³) should be transferred through the floor of the fuel store and not through the discharge screw conveyor. Observe this when designing the intermediate floor.

Note
Article price per m
Total length in m = length of conveyor channel (a + b)
Max. conveyor channel length = 10 m

Note
For inclines of 0° to 8°
Exclusively for wood pellets
Boiler output up to 1250 kW

Specification

Pellet discharge screw conveyor		D = 120 mm
a	mm	< 9250
b	mm	> 750
c	mm	< 10,000
d	mm	approx. 500
e	mm	166



Ⓐ Possible outlet in the fuel store
Ⓑ Drive, either on the left or right

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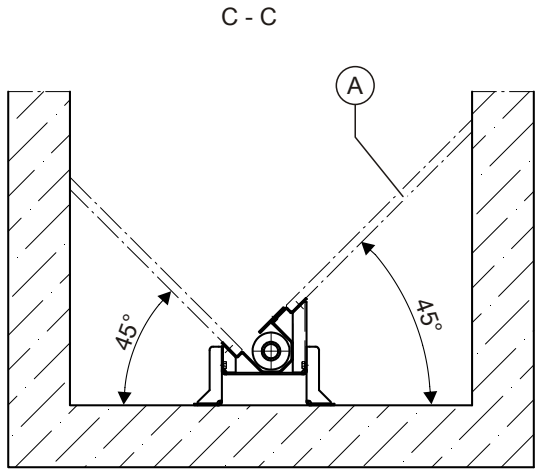
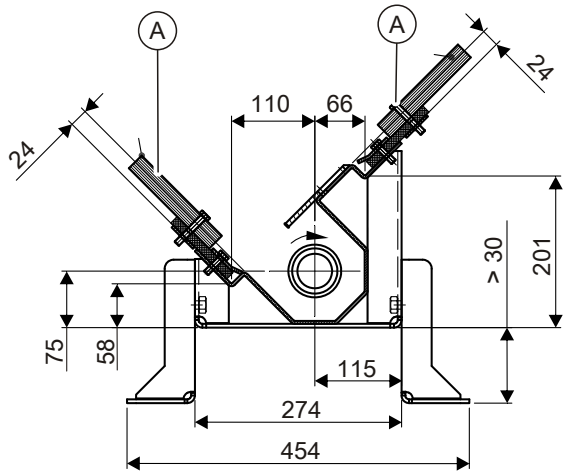
Fuel discharge (cont.)

Standard version



Ⓐ Intermediate floor (on site)

Version with sound insulation



Ⓐ Intermediate floor with sound insulation (on site)

Pellet discharge screw conveyor drive

For part no., see pricelist
The system is driven by a spur geared motor and a chain with a dust-proof chain guard. The geared motors are sized at the factory.

Standard delivery:
- Drive unit
- Spur geared motor matched to boiler size and pump rate
- Switching the spur geared motor 3 x 400 V
- Discharge with inspection cover, safety limit switch and drop chute/ adaptor for the following conveyor device

5

5.4 Fuel extraction with agitators

Flexible agitator discharge AF

For part no., see pricelist
- Flexible agitator discharge up to 3.5 m diameter
- Flexible agitator discharge up to 4.5 m diameter

Fuel store discharge with bottom agitator in a lightweight design, especially suitable for smaller volumes and/or lower boiler outputs. The flexible agitator discharge is suitable for round, square and rectangular spaces.
The fuel is conveyed via a bottom agitator with 2 leaf spring arms. These fill a screw conveyor channel set into the floor (or intermediate floor). When the fuel store is full, the leaf spring arms come to rest against the top-hat disc. The system is driven by a geared screw conveyor motor to the discharge screw conveyor and via an angular gear to the agitator.

Standard delivery:
- Flexible agitator discharge according to project drawing
- Bottom agitator with 2 leaf spring arms
- Drive unit with geared screw conveyor motor 3 x 400 V
- Control by the boiler control unit, enabled by the following conveyor device
  - Speed/output: Project specific and subject to boiler output and fuel
- Outlet with inspection cover and safety limit switch

To be arranged by the customer:
- Installation of an intermediate floor required (preferably made from wooden boards)

Note
The discharge screw conveyor must be ordered separately.
Speed/output of the drives: Sizing by Viessmann

Specification

Max. rated heating output as a function of angle of inclination and fuel

Flexible agitator discharge AF			
Angle of inclination (d)		0°	15°
Max. rated heating output with BD650 wood pellets as fuel	kW	540	300
Max. rated heating output with BD200 woodchips as fuel	kW	300	220
Max. rated heating output with BD100 wood shavings as fuel	kW	220	150

Max. fill heights for flexible agitator discharge

Flexible agitator discharge AF		**AF 3.5 m** **AF 4.5 m**
BD650 pellets	m	2.7
BD200 woodchips	m	5.0

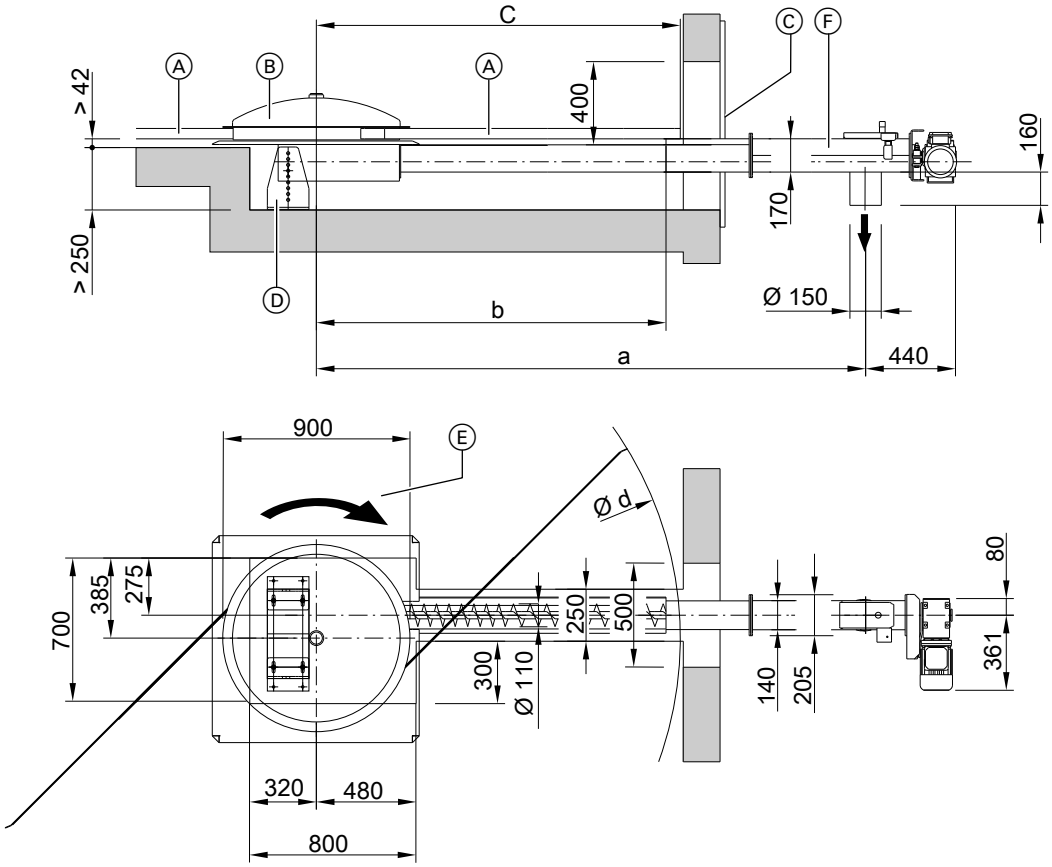
Max. dumping heights

Flexible agitator discharge AF		**AF 3.5 m** **AF 4.5 m**
BD650 pellets	m	2.7
BD350 woodchips	m	5.0

Fuel discharge (cont.)

Design

Installation position, horizontal



Ⓐ Leaf spring
Ⓑ Top-hat disc
Ⓒ Installation aperture (seal with fire-retardant panel)
Ⓓ Base (height-adjustable)
Ⓔ Rotational direction
Ⓕ Discharge screw conveyor

Flexible agitator discharge AF			AF 3.5 m	AF 4.5 m
a	Max. discharge screw conveyor length	m	5.87	5.87
b	Max. open area of the discharge screw conveyor	m	1.77	2.27
c	Maximum length of the leaf springs	m	1.75	2.25
d	Diameter of discharge circle	m	3.5	4.5

Note

1. *Installation preferably in concrete with recess for screw conveyor and gear unit of agitator centre*
2. *Suitable for woodchips up to P31S*
3. *Not suitable for wood briquettes and shredded matter from used or residual wood*
4. *Speed/output: Project specific and subject to boiler output and fuel*
   Sizing by Viessmann.

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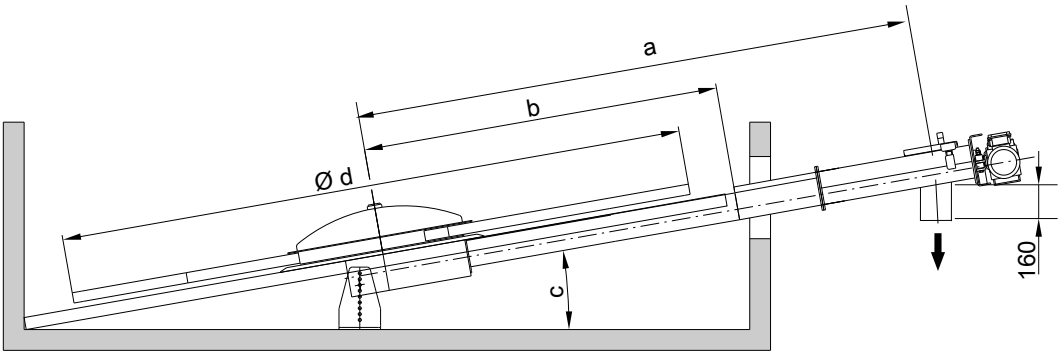
Fuel discharge (cont.)

Installation position, angled



Flexible agitator discharge AF			AF 3.5 m	AF 4.5 m
a	Max. discharge screw conveyor length	m	5.87	5.87
b	Max. open area of the discharge screw conveyor	m	1.77	2.27
c	Angle of inclination		0 - 15°	0 - 15°
d	Diameter of discharge circle	m	3.5	4.5

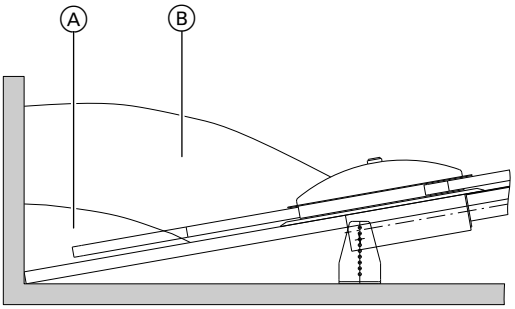
Note

1. *Installation exclusively with intermediate floor, preferably made from wood*
2. *Suitable for woodchips up to P31S*
3. *Not suitable for wood briquettes and shredded matter from used or residual wood*
4. *Speed/output: Project specific and subject to boiler output and fuel*
   Sizing by Viessmann.

Note

1. *An inclined installation position reduces the discharge rate and the level of emptying. For each degree of inclination, the discharge rate reduces by approx. 2.3 %.*
2. *Speed/output: Project specific and subject to boiler output and fuel*
   Sizing by Viessmann.

Level of emptying, subject to installation position



Ⓐ Remnants, shavings
Ⓑ Remnants, wood pellets

AF discharge screw conveyor to flexible agitator discharge

For part no., see pricelist

The fuel is moved by the flexible agitator discharge arms into the open conveyor channel in the fuel store. Outside the fuel store, the screw conveyor channel is sealed.

Standard delivery:

- Conveyor channel with specially adapted discharge screw conveyor

Note

Article price per m; always round up to whole numbers
Max. discharge screw conveyor length AF = 6 m
Total price = total length c in m x unit price

Horizontal discharge AH

For part no., see pricelist

- Horizontal discharge up to 5.0 m diameter
- Horizontal discharge up to 6.0 m diameter

Fuel discharge (cont.)

Horizontal discharge with bottom agitator as a heavy-duty version, especially for larger volumes and/or high boiler outputs. The two agitator arms each comprise one or two (depending on size) articulated arms and an externally fitted leaf spring package. The agitator is driven subject to the fill level of the discharge screw conveyor (control via light barrier).
The discharge screw conveyor itself functions independently of the agitator by a separate drive unit in accordance with boiler demand. The result is trouble-free operation and a long service life. In wood pellet applications, a cover panel is required over the screw conveyor channel. Maximum fill level and maximum slope must be observed.

Standard delivery:
- Horizontal discharge as per project drawing
- Bottom agitator with two arms and external drive with shaft routed to inside
- Bottom agitator drive 3 x 400 V, with geared screw conveyor motor and torque support
  - Switching by the boiler control unit with enabling of the discharge screw conveyor
- Drive unit for discharge screw conveyor with spur geared motor 3 x 400 V and chain drive
  - Switching by the boiler control unit with enabling of the following conveyor device
  - Speed/output: project-related and subject to boiler output and fuel
- Light barrier for monitoring the fill level in the sealed screw conveyor channel
- Outlet with inspection cover and safety limit switch

To be carried out by the customer:
- Installation of an intermediate floor required (preferably made from wooden boards)

Note
The discharge screw conveyor must be ordered separately.
Speed/output of the drives: sizing by Viessmann

Specification

Max. fill level		
BD650 wood pellets	m	4.5
BD350 briquettes	m	6.0
BD350 woodchips	m	8.0

Max boiler output		
BD650 wood pellets	kW	2000
BD350 briquettes	kW	1250
BD250 woodchips	kW	1250
BD350 woodchips*13	kW	1250
BD450 woodchips*13	kW	1250

Horizontal discharge AH		**AH up to 5 m**			**AH up to 6 m**	
Discharge circle f	m	3.8	4.5	5.0	5.5	6.0
Weight excluding conveyor channel	kg	480	480	480	500	500
Torque of the drives						
At agitator centre Ⓓ	Nm	approx. 2900	approx. 2900	approx. 2900	approx. 2900	approx. 2900
At discharge centre Ⓑ	Nm	approx. 800	approx. 800	approx. 800	approx. 800	approx. 800

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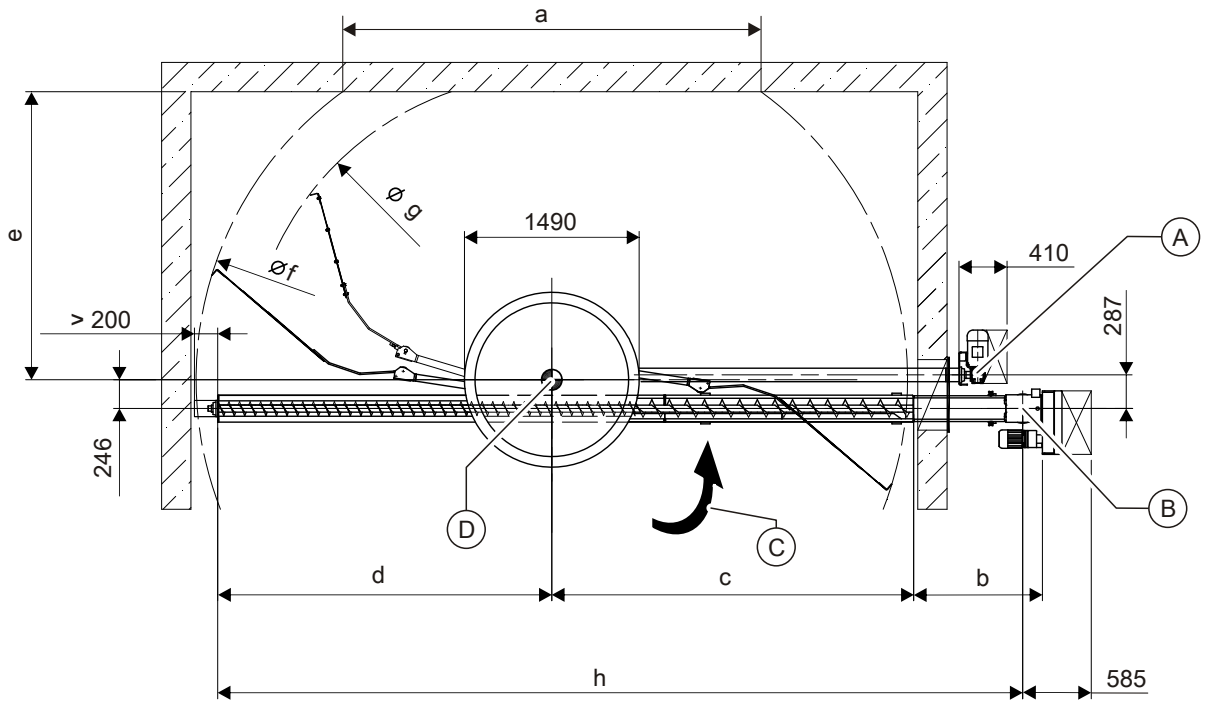
*13 *If the fuel is approved for the boiler*

Fuel discharge (cont.)



Ⓐ Agitator axis
Ⓑ Screw conveyor axis
Ⓒ Rotational direction
Ⓓ Agitator centre

5

Sizing of the horizontal discharge AH with agitator and discharge screw conveyor	
a	Min. length of protective panel for fuel store walls
b	Sealed channel
c	Open conveyor channel downstream of agitator centre
d	Open conveyor channel upstream of agitator centre, max 2.8 m
e	Wall clearance to centre
f	Discharge circle from 3.9 to 6.1 m subject to situation of fuel store
g	Effective scope 0.8 to 0.95 x f
h	Max. discharge screw conveyor length 10 m

Note

Sizing is influenced by several factors:

- *Fuel*
- *Installation position*
- *Compression, etc.*

Sizing is determined individually for each system by Viessmann.

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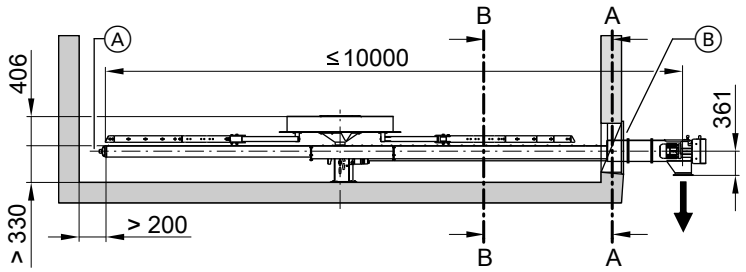
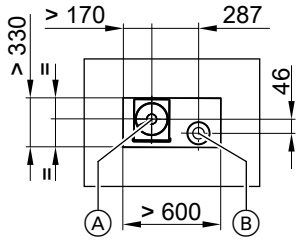
Fuel discharge (cont.)

Installation position, horizontal



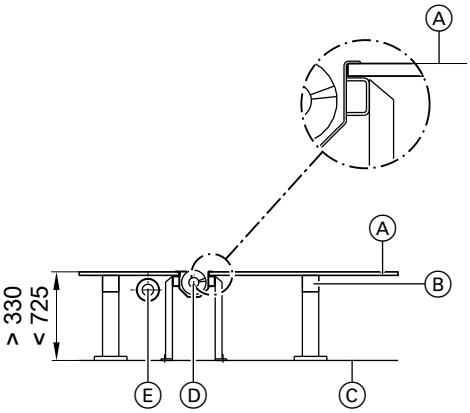
Ⓐ Finished floor
Ⓑ Installation opening; seal with fire blocking/fire-retardant panel.

Section A - A



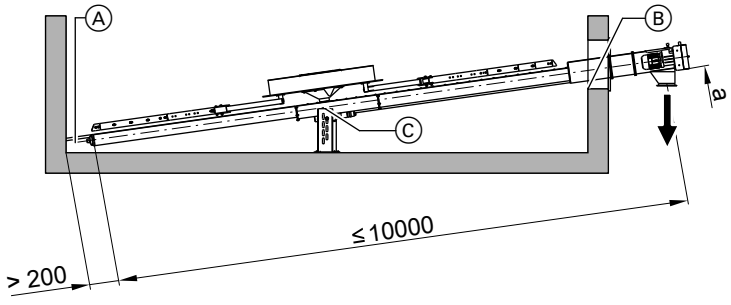
Ⓐ Screw conveyor axis
Ⓑ Agitator axis

Section B - B



Ⓐ Finished floor
Ⓑ Substructure
Ⓒ Building floor
Ⓓ Screw conveyor axis
Ⓔ Agitator axis

Installation position, angled



Ⓐ Finished floor
Ⓑ Installation opening; seal with fire blocking/fire-retardant panel.
Ⓒ Height-adjustable base

Max. angle of inclination a subject to fuel	
BD650 wood pellets	6°
BD350 briquettes	8°
BD350 woodchips	15°

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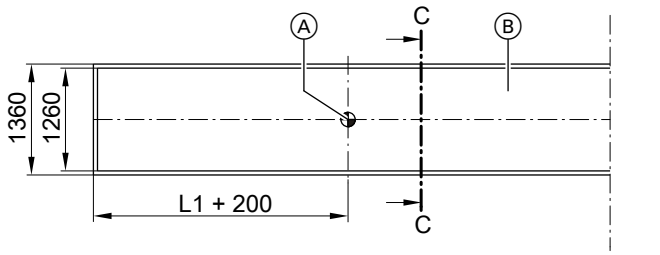
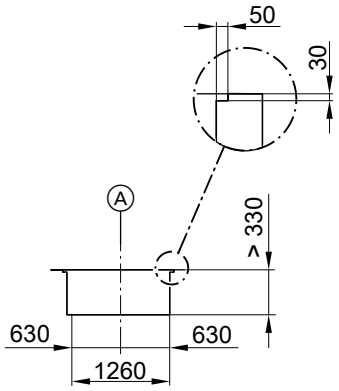
Fuel discharge (cont.)

Detailed view of concrete-lined finished floor



Ⓐ Agitator centre
Ⓑ Concrete block out (for recessed installation)

Section C - C



Ⓐ Agitator centre

Installation information for intermediate floors

- Design the support structure of the intermediate floor to ensure that the weight of the fuel does not bear on the screw trough.
- Build the intermediate floor after installing the discharge.
- Ensure that the intermediate floor incl. substructure is at the same level as the screw trough.
- The leaf spring bundles must be able to rotate without touching the intermediate floor. Observe the minimum clearance.
- Take into account any hatches required for maintenance and inspection.

5

Discharge screw conveyor AH to horizontal discharge AH

For part no., see pricelist
The arms of the horizontal discharge move the fuel into the conveyor channel inside the fuel store. The conveyor channel is open inside the fuel store and sealed outside the fuel store.

Standard delivery:

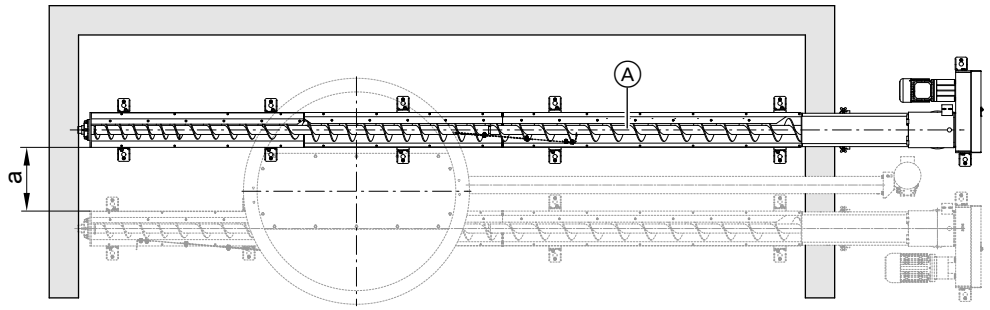
- Conveyor channel running through the entire system with specially adapted discharge screw conveyor

Note
Article price per m
Max. discharge screw conveyor AH length = 10 m
Total price = total length h in m x unit price

Additional discharge screw conveyor AH, per m

For part no., see pricelist
For two-boiler discharge systems with a total system output of up to 1440 kW. Extension possible up to 10 m. Conveyor channel running through the entire system with specially adapted discharge screw conveyor.

Fuel discharge (cont.)



Ⓐ Additional discharge screw conveyor AH

Design/engineering information for additional discharge screw conveyor AH

- A round discharge device and additional discharge screw conveyor must be installed at the same angle, otherwise there is a risk of the agitator colliding with the additional discharge screw conveyor.
- The additional discharge screw conveyor should be positioned in the area below the agitator.
- If the screw conveyors are installed in parallel, maintain a minimum clearance (a) of 650 mm between the two discharge screw conveyors.
- Ensure there is enough space between the screw conveyors to fit the support feet.
- Ensure there is enough space between the additional discharge screw conveyor and the angular gear of the agitator, as well as between the profiled channels, to fit the support feet.
- Max. boiler output for agitator: 1440 kW (for woodchips)
- Max. boiler output for additional discharge screw conveyor: 720 kW (for woodchips)
- In two-boiler systems where the boilers have different rated heating outputs, provide fuel to the boiler with the lower rated heating output via the additional discharge screw conveyor.

Standard delivery:

- Additional discharge screw conveyor for two-boiler system

Note

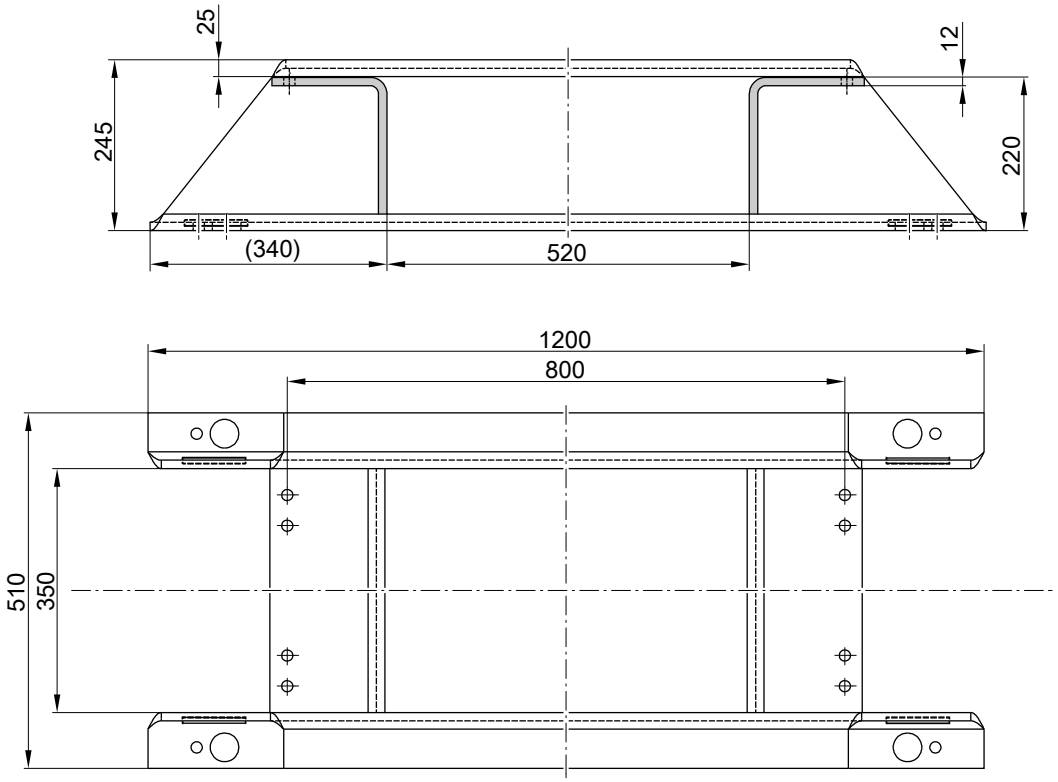
Article price per m
Max. length of discharge screw conveyor AH = 10 m
Total price = total length h in m x unit price

5

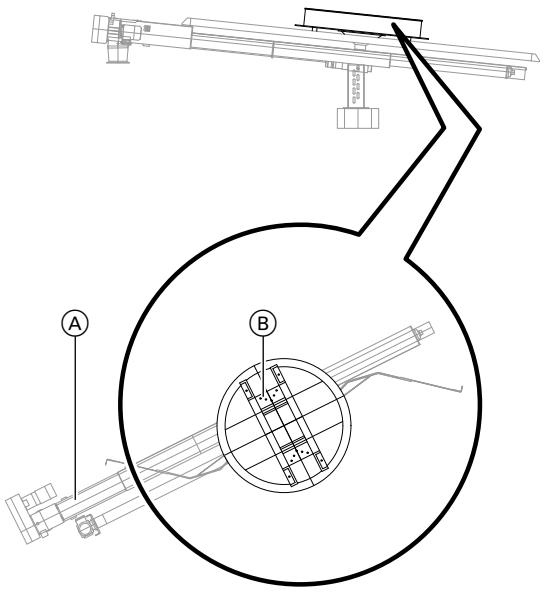
Substructure AH

For part no., see pricelist
Substructure for horizontal discharge, for installation in a fuel store with no concrete plinth

Dimensions



Substructure AH installation position



Ⓐ Horizontal discharge AH
Ⓑ Substructure AH

Protective panel AH for the fuel store wall

For part no., see pricelist
Metal cover to protect the fuel store wall from damage by the agitator arms. The protective panel is attached to the straight internal fuel store wall.

Standard delivery:
- 2 - 4 protective panels, painted, dimensions 1000 x 250 x 4 mm
- Rawl plugs and screws

Cover panel AH for wood pellets

For part no., see pricelist
Metal cover of the open screw conveyor area to reduce the inlet cross-section

Note
When changing the fuel, observe the following:
- *Changeover from wood pellets to woodchips: remove the cover panels above the discharge screw conveyor before filling the fuel store with woodchips.*
- *Changeover from woodchips to pellets: install the cover panels above the discharge screw conveyor before filling the fuel store with wood pellets.*

Standard delivery
- Cover panel, painted
  Length and number matched to the project
- Screws

5.5 Fuel extraction with funnel discharge

Funnel discharge AP

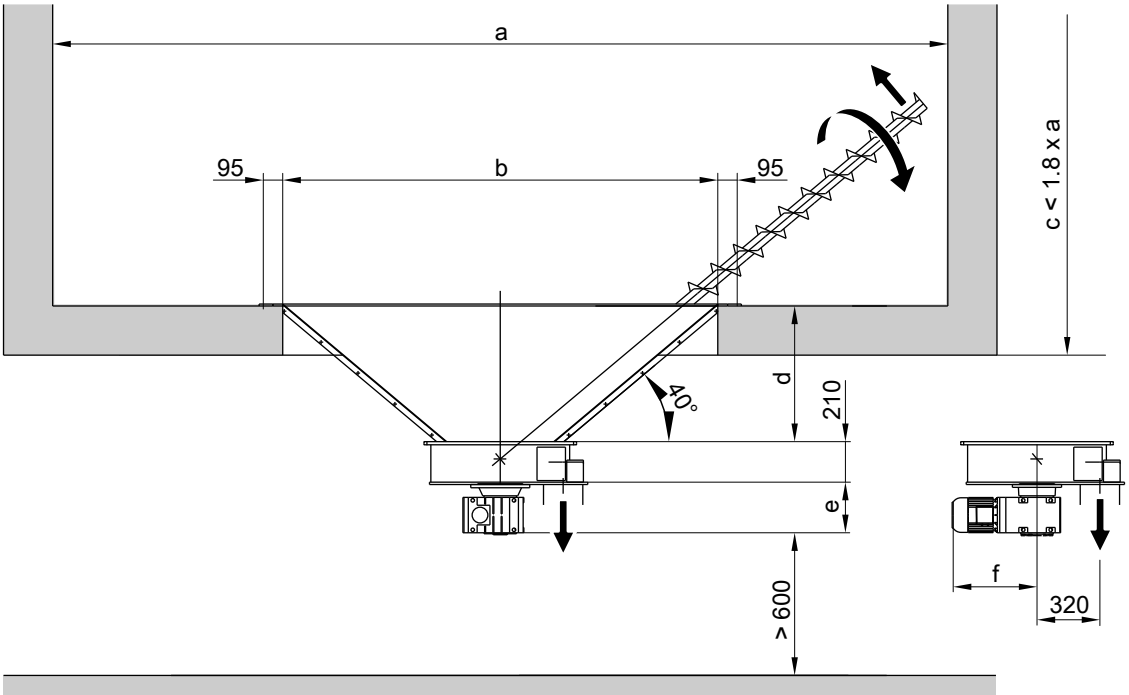
For part no., see pricelist
- Funnel discharge up to 6.0 m diameter
- Funnel discharge up to 7.5 m diameter

Fuel discharge by means of an agitator installed underneath a funnel In its centre, the discharge screw conveyor is driven via a solid universal joint. When the fuel store is full, the screw conveyor inclines towards a vertical position. The funnel limits the angle of the screw conveyor when the fuel store is empty. The agitator is driven via a spur geared screw conveyor motor. In the case of fuel compression in the discharge casing as a result of increased drive power consumption, the supply direction of the screw conveyor is changed for a period set at the factory. This releases the compression, preventing a fault.

Standard delivery:
- Funnel discharge with drive unit 3 x 400 V
- Automatic switching of the drive for the spur geared screw conveyor motor for both rotational directions
- Safety limit switch installed on inspection cover of discharge casing

Specification

Funnel discharge		AP up to 6 m	AP up to 7.5 m
Max. diameter of discharge circle	m	6.0	7.5*14
Max. possible fill level	m	10.8	13.5
Boiler outputs with			
BD650 wood pellets	kW	3000	3000
BD200 woodchips	kW	1250	1250
BD100 shavings	kW	1250	1250
Screw conveyor output	kW	1.1	2.2



Dimensions

Funnel discharge			AP up to 6 m	AP up to 7.5 m
a	Discharge circle	m	Up to 6.0	Up to 7.5
b	Funnel diameter	mm	2205	2205/3005
c	Max. possible fill level	m	10.8	13.5
d		mm	708	708/1030
e		mm	282	310
f		mm	431	469

*14 *For fuel store diameters > 6 m, the large funnel **must** be ordered.*

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Fuel discharge (cont.)

Additional outlet flange AP

For part no., see pricelist
Additional connection option for conveyor devices on discharge casing for two-boiler systems

Funnel, large

For part no., see pricelist
The standard delivery of the funnel discharge includes a funnel with a diameter of 2200 mm. For fuel store diameters > 6 m, the large funnel **must** be ordered for the funnel discharge.

5.6 Fuel extraction with hydraulic push floor discharge system

Specification for push floor discharge

Pushrod discharge

The fuel discharge with pushrods is suitable for rectangular fuel stores of various dimensions.
The forward and return strokes of the pushrods cause the vanes to discharge the fuel from the fuel store and push it into a further conveyor device (push floor screw conveyor). The forward and return strokes are achieved with a hydraulic drive.
The number of pushrods is subject to the fuel store width and the required dumping height. Subject to fuel weight and fuel store length, pushrods of different width are used. The pushrod vanes are welded to the pushrod during installation. Retaining profiles fixed to the floor are attached between the pushrod vanes. The drive cylinder is anchored in the foundation with a special cylinder retainer.

Note
This version of fuel discharge can result in large forces acting on the building (see chapter "Forces on the building").

Maximum dumping heights

Number and length of the pushrods

Applies to pushrod discharge with
- Pushrod drive, individual
- Pushrod drive, twin

Note
Drive-over pushrod discharge:
A drive-over pushrod discharge requires a material cover of at least 40 cm.

Maximum permissible dumping heights

The max. permissible dumping heights are stated as a function of pushrod width and length and the fuel.

A distinction is made between the following fuels:
- With a poured weight ≥ 200 kg/m³ (BD200)
- With a poured weight ≥ 350 kg/m³ (BD350)
- With a poured weight ≥ 450 kg/m³ (BD450)
- With a poured weight ≥ 650 kg/m³ (BD650)

Max. permissible dumping height for BD200 fuel

Width	m	2.5	2.25	2.0	1.75	1.5	1.25	1.0
Length 12 m	m	3.1	3.6	4.0	4.6	5.4	6.4	8.0
Length 10 m	m	3.9	4.3	4.9	5.6	6.5	7.8	9.8
Length 8 m	m	5.0	5.5	6.2	7.2	8.3	10.0	12.5
Length 6 m	m	6.9	7.7	8.6	9.9	11.5	13.8	17.3

Max. permissible dumping height for BD350 fuel

Width	m	2.5	2.25	2.0	1.75	1.5	1.25	1.0
Length 10 m	m	2.7	3.0	3.5	3.9	4.6	5.5	6.8
Length 8 m	m	3.5	3.9	4.4	5.0	5.8	7.0	8.7
Length 6 m	m	4.9	5.4	6.0	6.9	8.0	9.7	12.0

Max. permissible dumping height for BD450 fuel

Width	m	2.5	2.25	2.0	1.75	1.5	1.25	1.0
Length 10 m	m	2.1	2.4	2.7	3.0	3.5	4.25	5.3
Length 8 m	m	2.7	3.0	3.4	3.9	4.5	5.43	6.79
Length 6 m	m	3.8	4.2	4.7	5.4	6.3	7.52	9.40

Max. permissible dumping height for BD650 fuel

Width	m	2.5	2.25	2.0	1.75	1.5	1.25	1.0
Length 12 m	m	1.2	1.3	1.4	1.7	2.0	2.4	3.0
Length 10 m	m	1.5	1.7	1.8	2.1	2.5	3.0	3.7
Length 8 m	m	1.9	2.1	2.4	2.7	3.2	3.8	4.7
Length 6 m	m	2.6	2.9	3.3	3.8	4.3	5.2	6.5

Pushrod drive specification

Trade name		**Pushrod drive**	
Type		**Single**	**Twin**
Piston diameter	mm	180	180
Piston rod diameter	mm	90	90
Lift	mm	600	600
Test pressure	bar (MPa)	240 (24)	240 (24)
Pressure force at 190 bar (19 MPa) FZD	kN	484	484
Pressure force at 190 bar (19 MPa) FZZ	kN	362	362
Length from centre of cylinder – piston boss	mm	Type K: 1080	Type L: 1230

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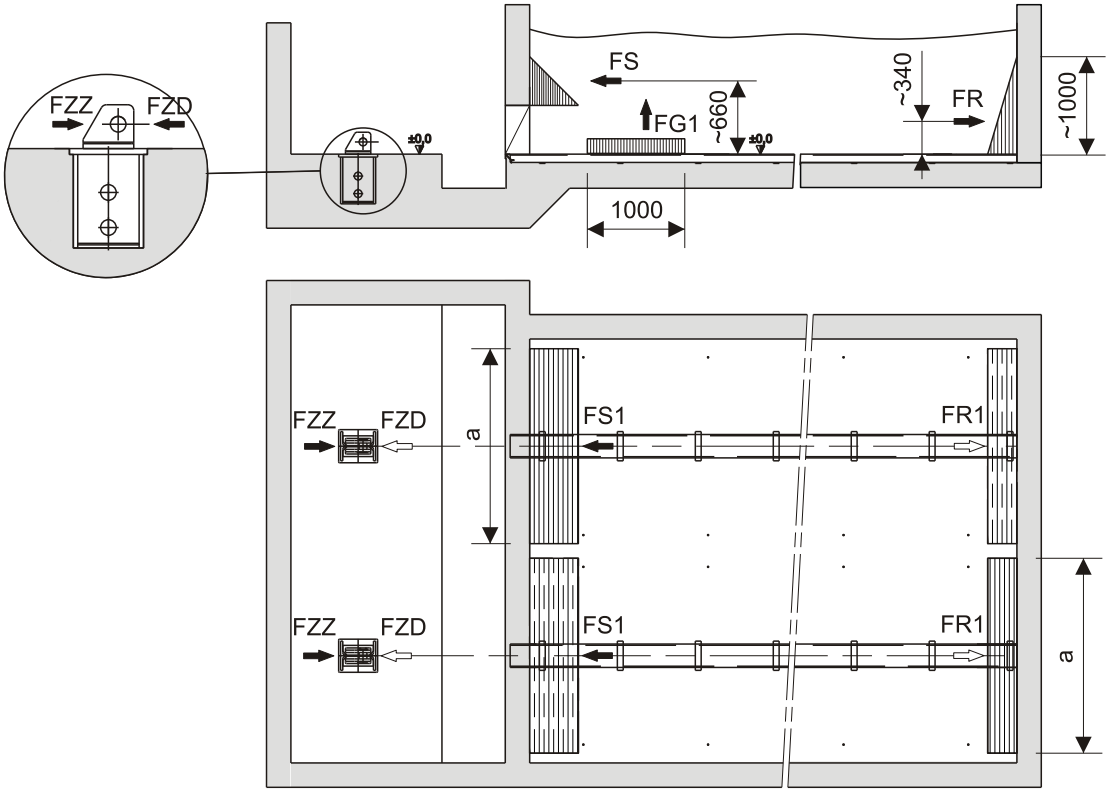
Forces on the building

If the pushrod discharge comprises multiple pushrods, they move in opposite directions. This means: cylinder 1 pulls, cylinder 2 pushes, cylinder 3 pulls, etc. The pushrod with the least resistance moves to its end position first, then the next one.
When all pushrods are in the end position, the pressure diverter valve switches to the opposite direction. The pressure diverter valve is factory set to 190 bar (19 MPa).

Note
The forces to be taken into consideration vary from project to project. Consequently, Viessmann should be consulted on this matter.



FG1 Maximum tensile force on the weld base of the fuel store upwards per metre length
FS Total normal forces on the front panel (slot discharge)
FR Total normal forces on the back panel
FR1 Normal force of a pushrod on the back panel
FS1 Normal force of a pushrod on the front panel
FZD Maximum pressure force on the weld base for the pushrod drive
FZZ Maximum tensile force on the weld base for the pushrod drive
FM1 Normal force of a pushrod on the centre discharge cover

Number of pushrods		1	2	3
FS	mm	1 x FS1	1 x FS1	2 x FS1
FR	mm	1 x FR1	1 x FR1	2 x FR1

	FS1	FR1	FZZ	FZD	FG1	FM1
Standard version	160 kN	130 kN	362 kN	484 kN	12 kN	100 kN

Applications of push floor discharge

Slot discharge for pulling

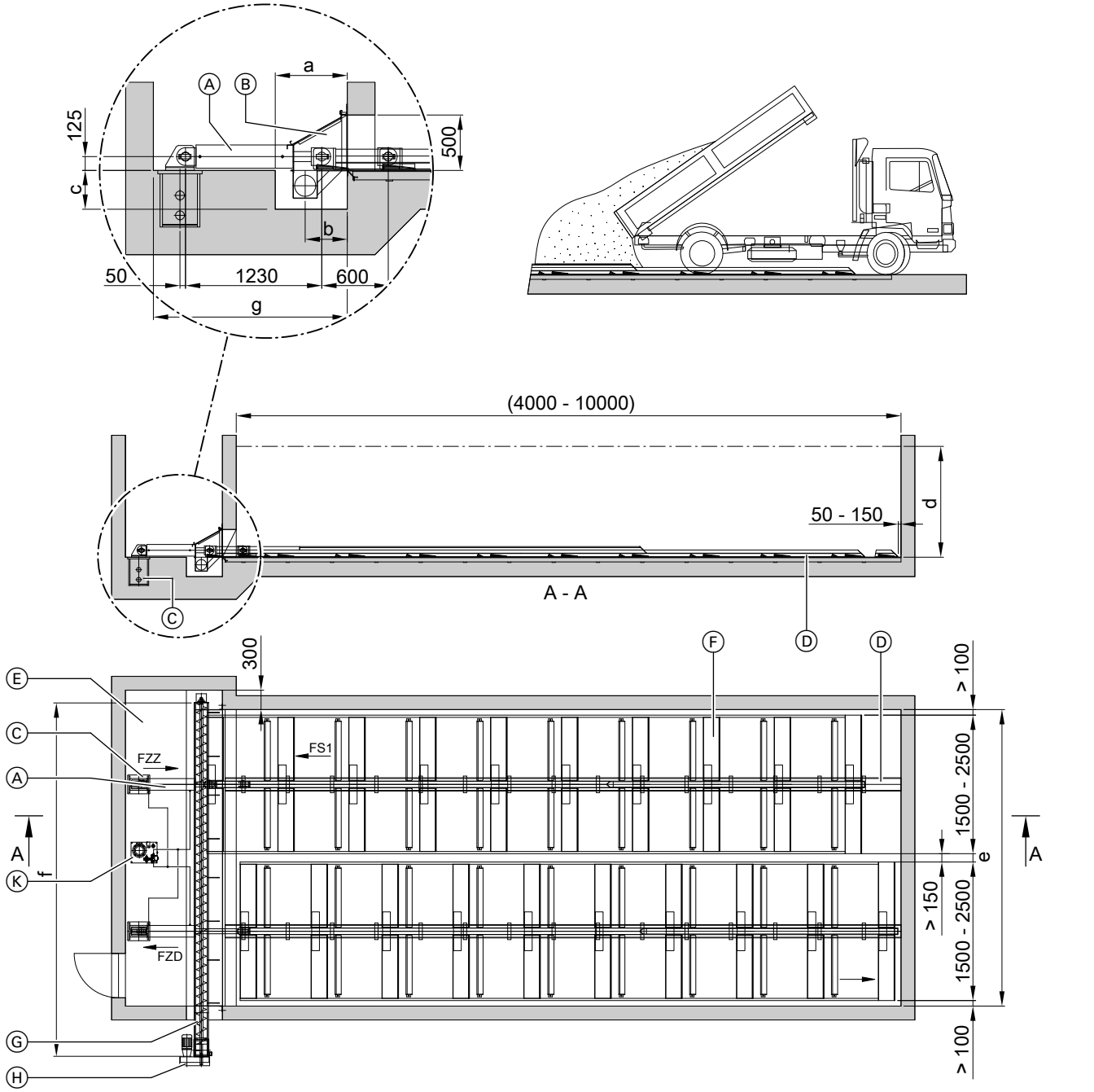
The drawing below is a schematic diagram. A project-specific drawing must be produced for construction design.

Note
Only original Viessmann weld bases are permitted for the pushrod drive.

Fuel discharge (cont.)

Specification

Slot discharge, for pulling		Screw conveyor D = 190 mm	Screw conveyor D = 250 mm
a	mm	700	800
b	mm	380	480
c	mm	350	400
d Max. dumping height*15			
e	mm	> 1200	> 1200
f	mm	> 1500	> 1500
g	mm	> 1750	> 2050



Note

For a drive-over system, a minimum material cover of 40 cm is required.

*15 See chapter "Maximum dumping heights"

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Required order data for the above example:

Position	Quantity	Unit	Description
Ⓐ	2	pce	Pushrod drive AS single with hydraulic cylinder type L
Ⓑ	1	pce	Cover for push floor screw conveyor (optional)
Ⓒ	2	pce	Weld base, pushrod drive, individual
Ⓓ	2	pce	Weld base, bunker
Ⓔ			Hydraulic compartment
Ⓕ	2	pce	Pushrod (incl. stop wedges)
Ⓖ	1	pce	Push floor screw conveyor
Ⓗ			Version and drive, AQ standard
Ⓚ	1	pce	Hydraulic drive, ASH single

Centre discharge

The drawing below is a schematic diagram. A project-specific drawing must be produced for construction design.

Note

Only original Viessmann weld bases are permitted for the pushrod drive.

Specification

Centre discharge			Screw conveyor D = 190 mm	Screw conveyor D = 250 mm
a		mm	350	400
b		mm	270	360
c	Max. dumping height*16			
d			In the middle third of the fuel store	In the middle third of the fuel store
e		mm	> 1200	> 1200

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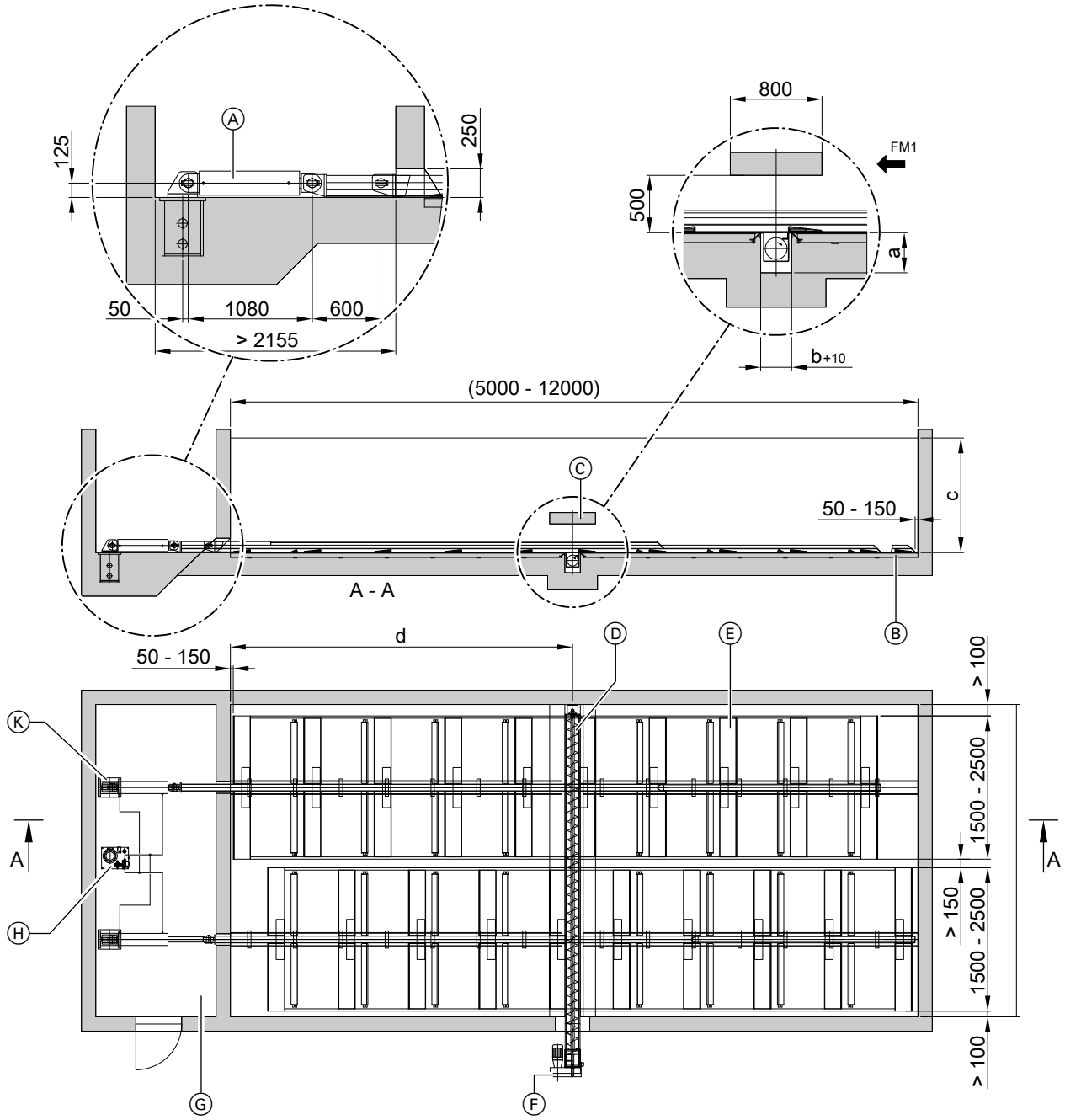
*16 See chapter "Maximum dumping heights"

Fuel discharge (cont.)



Required order data for the above example:

Position	Quantity	Unit	Description
Ⓐ	2	pce	AS single pushrod drive with hydraulic cylinder type K
Ⓑ	2	pce	Weld base, bunker
Ⓒ			Centre discharge cover (on site)
Ⓓ	1	pce	Push floor screw conveyor
Ⓔ	4	pce	Pushrod (incl. stop wedges)
Ⓕ			Version and drive, AQ standard
Ⓖ			Hydraulic compartment
Ⓗ	1	pce	Hydraulic drive, ASH single
Ⓚ	2	pce	Weld base, AS single

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Slot discharge with fill function

The drawing below is a schematic diagram. A project-specific drawing must be produced for construction design.

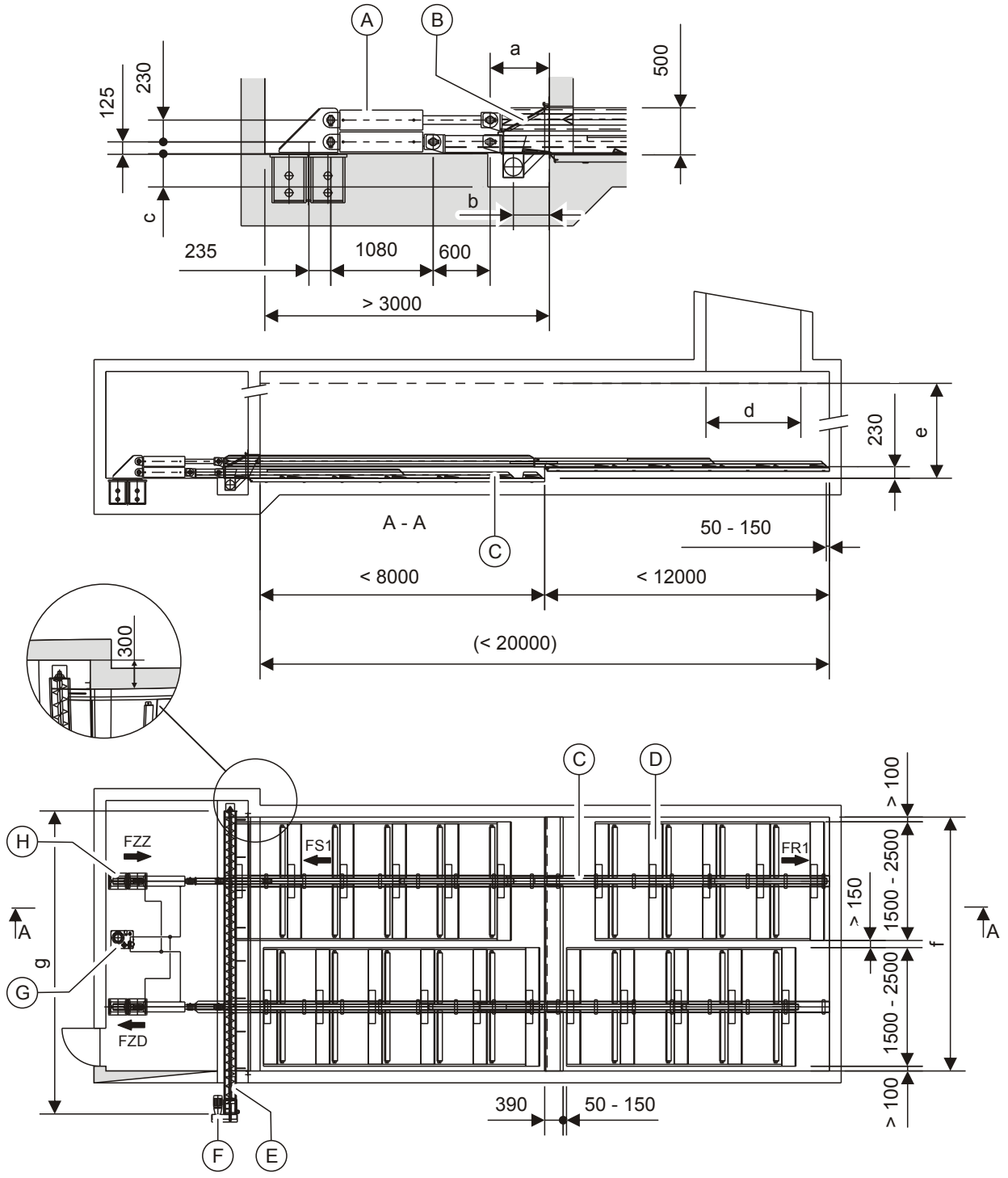
Note

Only original Viessmann weld bases are permitted for the pushrod drive.

Specification

Slot discharge with fill function			Screw conveyor D = 190 mm	Screw conveyor D = 250 mm
a		mm	700	800
b		mm	380	430
c		mm	350	400
d	Charging chute			
e	Max. dumping height*17			
f		mm	> 1200	> 1200

*17 See chapter "Maximum dumping heights"


A
B
a
500
125
230
c
b
235
1080
600
> 3000
d
230
e
A - A
C
50 - 150
< 8000
< 12000
(< 20000)
300
C
D
> 100
H
FZZ
FS1
FR1
> 150
1500 - 2500
A
A
g
f
G
FZD
1500 - 2500
> 100
390
50 - 150
F
E

Required order data for the above example:

Position	Quantity	Unit	Description
Ⓐ	2	pce	AS twin pushrod drive with hydraulic cylinder type K
Ⓑ	1	pce	Cover for push floor screw conveyor (optional)
Ⓒ	2	pce	Weld base, bunker
Ⓓ	2	pce	Pushrod (incl. stop wedges)
Ⓔ	1	pce	Push floor screw conveyor
Ⓕ			Version and drive, AQ standard
Ⓖ	1	pce	Hydraulic drive, ASH twin
Ⓗ	2	pce	Weld base, AS twin

Hydraulic assemblies for push floor discharge

Pushrod

For part no., see pricelist
Pushrod in solid design with:
- Crosswise-mounted transport wedges
- Side connecting profiles
- Stop wedges
- Guide elements

Standard delivery:
- Pushrod dismantled into rod, transport wedges and guide elements (welded during installation)
- Retaining wedges incl. fixing materials

Available pushrods:

Pushrod:
- Width: 1.0; per m
- Width: 1.25; per m
- Width: 1.50; per m
- Width: 1.75; per m
- Width: 2.0; per m
- Width: 2.25; per m
- Width: 2.5; per m

Note
Article price per m
Total price = length in m x article price
Max. length, see chapter "Maximum dumping heights"

Pushrod drive, individual

For part no., see pricelist
The hydraulic cylinder moves the pushrod back and forth. The pushrod is fitted with transport wedges and stop wedges fixed to the floor. The forward and return strokes dispense the fuel from the fuel store and transport it into the trough of the push floor screw conveyor.

Standard delivery:
- Bearing block with hinge lug connection for the cylinder
- Hydraulic cylinder each with 2 HP ball valves and 2 hydraulic hoses
- Pushrod up to fuel store wall with hinge lug connection
- Material for complete hydraulic pipework

Weld base, pushrod drive, individual

For part no., see pricelist
The weld base is for securing the pushrod drive. The solid steel structure has been structurally tested. It permanently withstands the dynamic stress. This is conditional on the structure being embedded in concrete as prescribed.

Standard delivery:
- 1 weld base per pushrod drive

To be carried out by the customer:
- Location, positioning and connecting of the weld base with the steel reinforcement on site
- Embedding the weld base in concrete
- Structural analysis and sizing of steel reinforcement on site

Note
Only original Viessmann weld bases are permitted for the pushrod drive.

Pushrod drive, twin

For part no., see pricelist
The hydraulic cylinder moves the pushrod back and forth. The pushrod is fitted with transport wedges and stop wedges fixed to the floor. The forward and return strokes dispense the fuel from the fuel store and transport it into the trough of the push floor screw conveyor.
In the case of a twin pushrod drive, each longitudinal section of the fuel store is moved with two pushrods working independently of one another.
- Charging pushrod for quick removal of the fuel filled at the end in the direction of the centre
- Discharge pushrod for controlled discharge of the fuel into the trough of the push floor screw conveyor

The two pushrod drives are located one above the other. They are supported by a common bearing block.

Standard delivery:
- Bearing block for two cylinders, each with a hinge lug connection
- 2 hydraulic cylinders, each with 2 HP ball valves and 2 hydraulic hoses
- Discharge pushrod up to fuel store wall with hinge lug connection
- Charging pushrod up to start of fill function level with hinge lug connection
- Material for complete hydraulic pipework

Fuel discharge (cont.)

Weld base, pushrod drive, twin

For part no., see pricelist
The weld base is for securing the pushrod drive. The solid steel structure has been structurally tested. It permanently withstands the dynamic stress. This is conditional on the structure being embedded in concrete as prescribed.

Standard delivery:
- 1 weld base per pushrod drive

To be carried out by the customer:
- Location, positioning and connecting of the weld base with the steel reinforcement on site
- Embedding the weld base in concrete
- Structural analysis and sizing of steel reinforcement on site

Note
Only original Viessmann weld bases are permitted for the pushrod drive.

Bunker weld base (fuel store)

For part no., see pricelist
The steel sections are used for welding the pushrod guide elements and the trough of the push floor screw conveyor. The weld base in the fuel store is also the slide rail for the pushrod.

Standard delivery:
- UNP 240 rolled profiles with anchoring irons per pushrod over the entire length
- 50/50/5 angle profiles with anchoring irons over the entire width of the push floor for the push floor screw conveyor

To be carried out by the customer:
- Production of the concrete floor
- Installation of the profiles level with the concrete floor (max. deviation of 5 mm over 10 m)

Note
Article price per m
Total price is calculated as follows:
For pushrod drive, single: (Pushrod drives in pce x length of fuel store in m) + (1 x width of fuel store in m) x article price
For pushrod drive, twin: (Pushrod drives in pce x length of fuel store in m) + (2 x width of fuel store in m) x article price

Hydraulic unit, AS single

For part no., see pricelist
Hydraulic unit for actuating single pushrod drives with discharge function. When the required fill level of the push floor screw conveyor is reached, the discharge function switches off.
- Hydraulic unit, comprising:
  - Gear pump 3 x 400 V
  - Oil container
  - Non-return valve
  - Pressure limiter valve
  - Pressure diverter valve
  - Return filter
  - Oil level indicator
  - Pressure gauge
  - Shut-off valve
  - Oil filling
  - Hydraulic hoses
  - Wall mounting supports
- Switching:
  By boiler control unit, protected by temperature and level switches in the oil container

Use of the hydraulic units (drives plus rods)

Hydraulic unit, AS single		V9	V18	V40
Rated heating output of the boiler(s)	**kW**	**100 - 720**	**750 - 1250**	**1250 - 2500**
Gear pump rating	kW	4	4	7.5
Supply volume	l/min	9	9	20
Stage 1				
Draught	bar (MPa)	200 (20)	200 (20)	200 (20)
Stage 1				
Supply volume	l/min	—	18	40
Stage 2				
Draught	bar (MPa)	—	100 (10)	100 (10)
Stage 2				
Oil content	l	30	55	80
Max. number of pushrods*18	pce	3	3 (4)	3 (4)

Note
Additional equipment is possible for driving hydraulically actuated fuel store covers.

**18 Values in brackets: option only in coordination with project management at the factory*

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Note
Gear pump function: with a two-stage gear pump, the pump runs in standard mode at stage 2. This means that the pushrods move quickly. The pump only switches to stage 1 when the resistance increases.

Hydraulic drive, AS twin

For part no., see pricelist
Hydraulic unit for the actuation of the twin pushrod drives with discharge and fill function. When the required fill level of the push floor screw conveyor is reached, the discharge function switches off.
If there is free space above the discharge push floor to accommodate top-up fuel, the top rear pushrod carries out the fill function. When the heating system requires fuel, the control unit interrupts the fill function and the discharge function is switched to the bottom front pushrod.

- Hydraulic unit, comprising:
  - Gear pump 3 x 400 V
  - Oil container
  - 4/2-way solenoid valve
  - Non-return valve
  - Pressure limiter valve
  - Pressure diverter valve
  - Return filter
  - Oil level indicator
  - Pressure gauge
  - Shut-off valve
  - Oil filling
  - Hydraulic hoses
  - Wall mounting supports
- 2 infrared light barriers for fuel store level monitoring
- Discharge function activation:
  by boiler control unit, protected by temperature and level switches in the oil container
- Activation of fill function:
  by activation of the light barrier in the fuel store

Use of the hydraulic units (drives plus rods)

Hydraulic drive, AS twin		**V18**	**V40**
Rated heating output of the boiler(s)	**kW**	**100 - 1250**	**1250 - 2500**
Gear pump rating	kW	4	7.5
Supply volume Stage 1	l/min	9	20
Draught Stage 1	bar (MPa)	200 (20)	200 (20)
Supply volume Stage 2	l/min	18	40
Draught Stage 2	bar (MPa)	100 (10)	100 (10)
Oil content	l	55	80
Max. number of pushrods*19	pce	3 (4)	3 (4)

Note
Additional equipment is possible for driving hydraulically actuated fuel store covers.

Note
Gear pump function: with a two-stage gear pump, the pump runs in standard mode at stage 2. This means that the pushrods move quickly. The pump only switches to stage 1 when the resistance increases.

Push floor screw conveyor, D = 190 mm

For part no., see pricelist
In order to remove the fuel discharged by the pushrods, the push floor screw conveyor extends over the entire push floor width as an open trough screw conveyor. For further transportation, the push floor screw conveyor is designed, depending on the transfer situation, as a sealed trough or a pipe.

Standard delivery:
- Push floor screw conveyor as per project drawing

Note
Article price per m

*19 Values in brackets: option only in coordination with project management at the factory

Push floor screw conveyor, D = 250 mm

For part no., see pricelist
In order to remove the fuel discharged by the pushrods, the push floor screw conveyor extends over the entire push floor width as an open trough screw conveyor. For further transportation, the push floor screw conveyor is designed, depending on the transfer situation, as a sealed trough or a pipe.

Standard delivery:
- Push floor screw conveyor as per project drawing

Note
Article price per m

Push floor screw conveyor drive, standard

For part no., see pricelist
Standard version for the push floor screw conveyor with pulling drive and discharge into a drop section. The system is driven by a spur geared motor and chain with a dust-proof chain guard.

Standard delivery:
- Drive unit with spur geared motor 400 V and chain drive
- Light barrier across the entire open area for monitoring the fill level (overfill protection)
- Discharge with inspection cover, safety limit switch and drop chute/ adaptor for the following conveyor device (not required in pushing version)

Standard push floor screw conveyor drive		
Screw conveyor torque	Nm	approx. 800
Push floor screw conveyor	Type	AQ-L190
Push floor screw conveyor, function		Pulling
Push floor screw conveyor, max. length	m	10
Max. boiler output with woodchips	kW	1250

Drive, push floor screw conveyor, high power

For part no., see pricelist
Special powerful version of the push floor screw conveyor for more difficult applications (high pump rate and/or pushing function).

The following are reinforced:
- Spur geared motor
- Bearings
- Chain with dust-proof chain guard

Standard delivery:
- Drive unit in a robust design with additional axial bearing for pushing function with spur geared motor 400 V and chain drive
  – Matching and switching on a project-specific basis
- Light barrier across the entire open area for monitoring the fill level (overfill protection)
- Discharge with inspection cover, safety limit switch and drop chute/ adaptor for the following conveyor device (not required in pushing version)

Push floor screw conveyor drive, high power				
Screw conveyor torque	Nm	approx. 1200	approx. 1200	approx. 1200
Push floor screw conveyor	Type	AQ-L190	AQ-L250	AQ-L250
Push floor screw conveyor, function		Pulling	Pushing	Pulling
Push floor screw conveyor, max. length	m	10	8	10
Max. boiler output with woodchips	kW	1500	2500	2500

Push floor screw conveyor cover

For part no., see pricelist

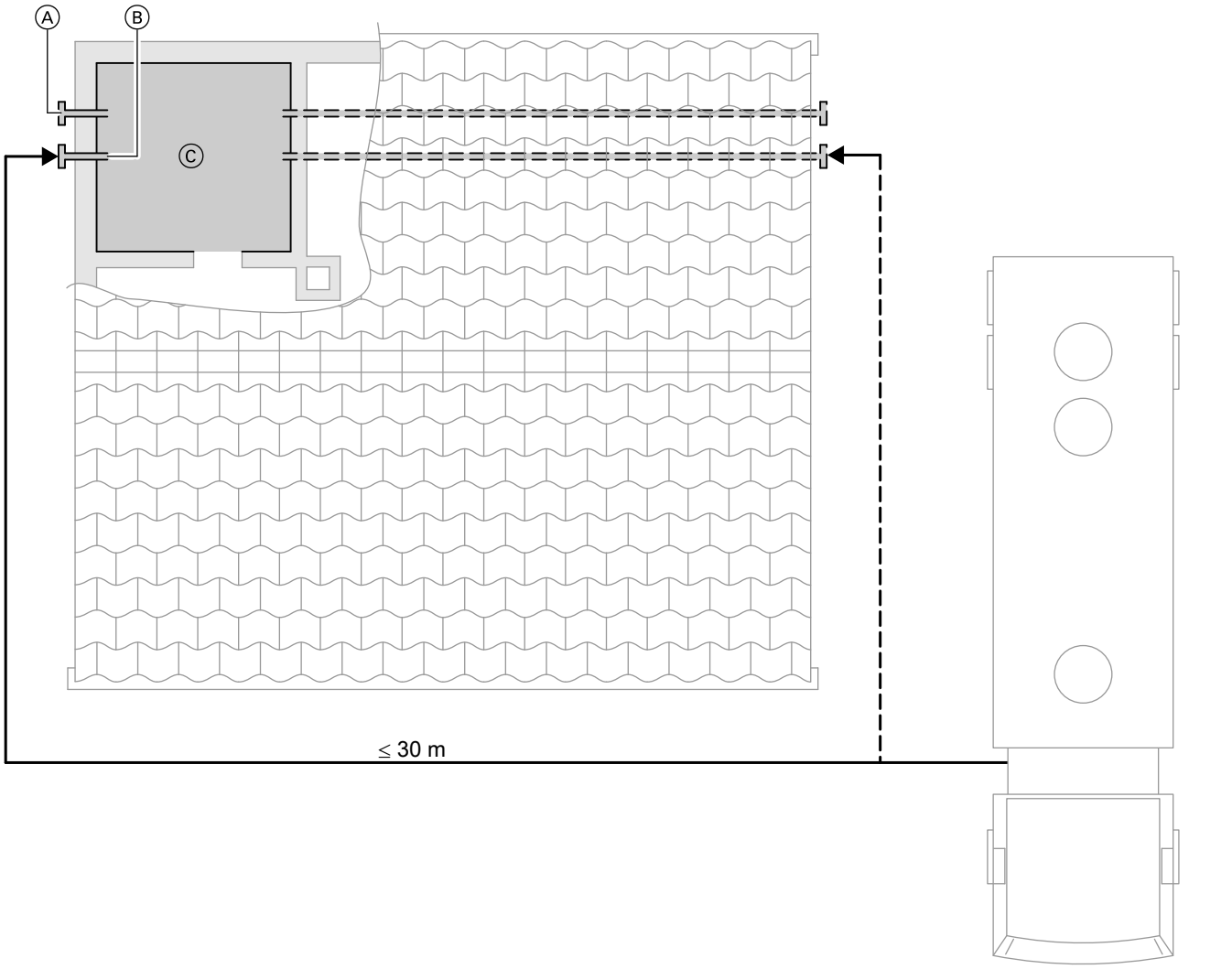
Cover for:
- Open trough of the push floor screw conveyor
- Open slot of the fuel store

The cover is mounted on the front panel of the fuel store. It is opened via a hinge and serves as a touch guard for maintenance personnel.

Standard delivery:
- Cover of the push floor screw conveyor with wall mounting support and hinge as per project drawing
- Limit switch for emergency stop of the push floor and the push floor screw conveyor when opening the cover

Note
Article price per m
Total price = fuel store width in m x article price

6.1 Information on the bulk delivery of pellets by tanker



Ⓐ Return air connector
Ⓑ Fill connector
Ⓒ Pellet storage room

Pellets are delivered in a tanker when bought in bulk. The size of the delivery tanker must be taken into consideration when planning access.
These vehicles generally weigh in excess of 15 t and can be between 3.7 m and 3.9 m high. Access could therefore be affected by weight and/or height restrictions, narrow or steep access routes, tight bends or a lack of turning space.
Pellet storage rooms should, where possible, be located alongside an external wall to leave the fill hoses as short as possible. Because of fluctuating air volumes, handling with fill hoses in excess of 30 m becomes difficult. Delivery tankers are equipped with a pump fan, i.e. pellets are blown into the storage room at a positive pressure of 0.3 to 0.5 bar (40 to 50 kPa). The positive pressure is then reduced in the storage room by a vacuum fan and a filter system. This requires a power connection with 230 V~ and at least 10 A.

Note
For more information regarding the delivery of wood pellets, please see VDI 3464 "Requirements with regard to health and safety for storage, manufacturing and delivery of pellets".

6.2 Application options for transport systems by fuel

Overview

Transport system	Page	Pellets according to EN ISO 17225-2	Woodchips according to ÖNORM M 7133		Woodchips according to EN ISO 17225-4		
			G 30	G 50	P16S	P31S	P45S*20
Trough screw conveyors	From p. 69						
Trough screw conveyor D = 150 mm		X	X		X	X	
Trough screw conveyor D = 190 mm		X	X	X	X	X	X
Trough screw conveyor D = 250 mm		X	X	X	X	X	X
Pipe screw conveyors	From p. 70						
Pipe screw conveyor D = 120 mm		X					
Pipe screw conveyor D = 190 mm		X	X	X	X	X	X
Pipe screw conveyor D = 250 mm		X	X	X	X	X	X

*20 *With coarse fraction limitation (< 1 %) to 125 mm.*

6.3 Fuel transport with screw conveyor

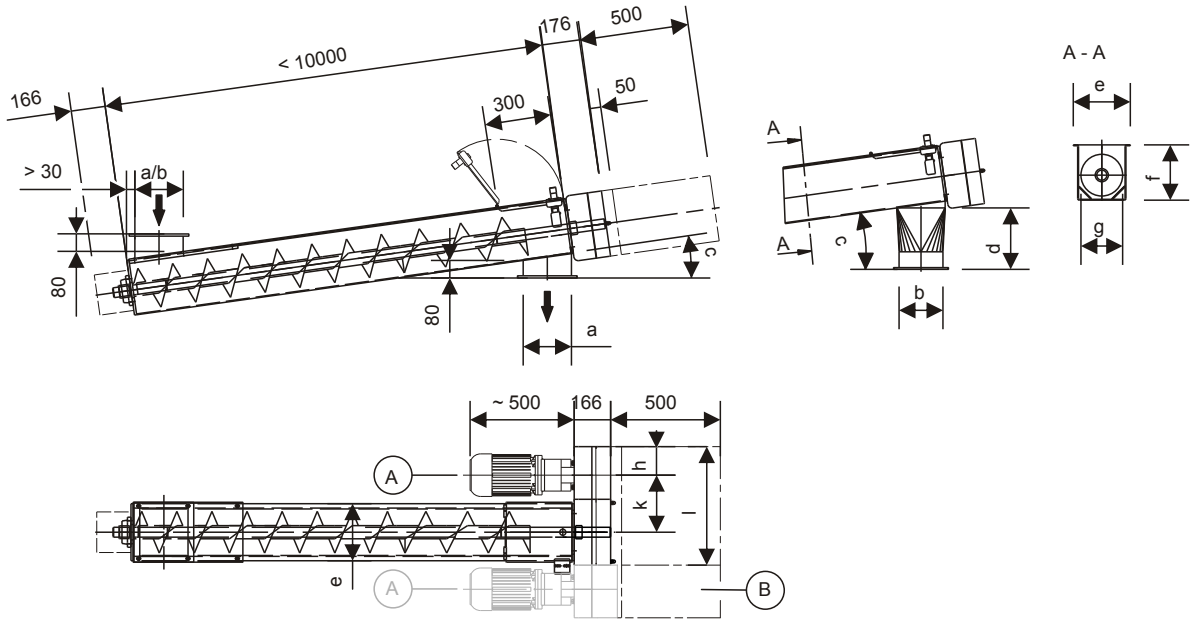
Trough screw conveyor

For part no., see pricelist
- For trough screw conveyor with 150 mm diameter
- For trough screw conveyor with 190 mm diameter
- For trough screw conveyor with 250 mm diameter

The trough screw conveyor is a very reliable means of transportation for all granulated fuels. Observe the restriction on the angle of inclination.

Standard delivery:
- Trough screw conveyor as per project drawing

Note
Article price per m
Total price: length L in m x article price



Ⓐ Drive (optionally left or right)
Ⓑ Inspection clearance

Trade name		Trough screw conveyor		
Type		**MF 150**	**MF 190**	**MF 250**
a	mm	180 x 180	220 x 220	280 x 280
b = transition diameter	mm	180	200	200
c (woodchips)		45°	45°	45°
c (wood pellets)		20°	20°	20°
d	mm	140	280	380
e	mm	220	260	352
f	mm	216	256	317
g	mm	150	190	250
h	mm	130	130	154
k	mm	260	260	350
l	mm	540	540	665

Standard trough screw conveyor drive

For part no., see pricelist
Proven version for the trough screw conveyor with pulling drive and discharge into a drop section. The system is driven by a spur geared motor and a chain with a dust-proof chain guard.

Standard delivery:
- Drive unit with spur geared motor 3 x 400 V and chain drive
- Inlet with light barrier for monitoring the fill level (overfill protection)
- Discharge with inspection cover, safety limit switch and drop chute/ adaptor for the following conveyor device

Trade name		Trough screw conveyor drive		
Screw conveyor torque	Nm	approx. 800	approx. 800	approx. 800
Screw conveyor diameter	mm	150	190	250
Function		Pulling	Pulling	Pulling
Max. length	m	10	10	8
Max. boiler output (wood pellets)	kW	2000	3200	—
Max. boiler output (woodchips)	kW	600	1500	2500

Pipe screw conveyor

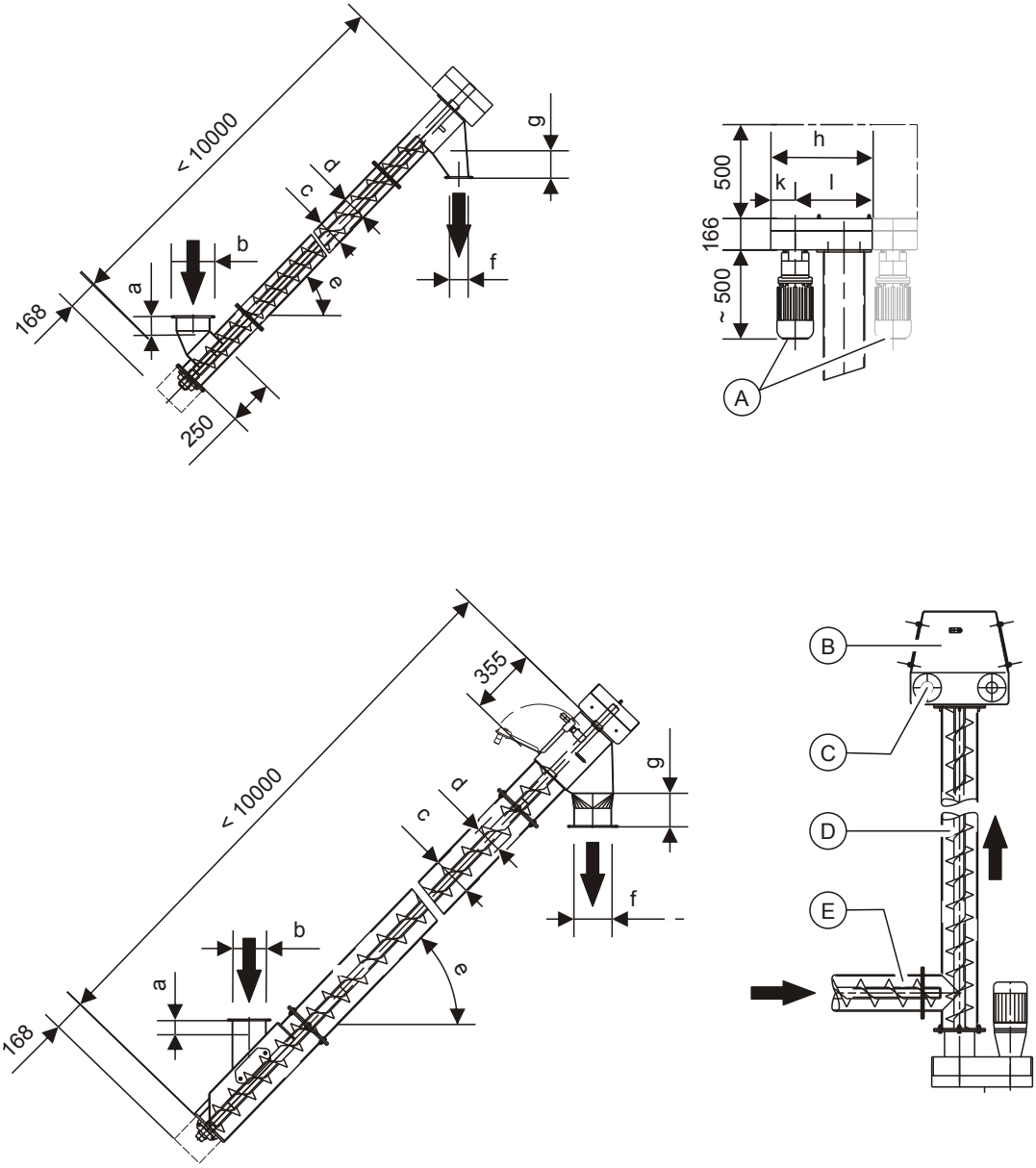
For part no., see pricelist
- For pipe screw conveyor with 120 mm diameter
- For pipe screw conveyor with 190 mm diameter
- For pipe screw conveyor with 250 mm diameter

The pipe screw conveyor is ideal for conveying pourable fuel and/or in the case of steep inclines.

Standard delivery:
- Pipe screw conveyor as per project drawing

Note
Article price per m
Total price: Length L in m x article price
The pipe screw conveyor with 120 mm diameter is only suitable for wood pellets.

Trade name		Pipe screw conveyor		
Max. screw conveyor diameter	mm	120	190	250
a	mm	140	280	380
b	mm	150 x 150	220 x 220	280 x 280
c	mm	140	220	324
d	mm	120	190	250
Max. angle of inclination with pushing screw conveyor				
e		—	90°	90°
Max. angle of inclination with pulling screw conveyor				
e		50°	50°	50°
f	mm	∅ 150	∅ 200	∅ 200
g	mm	140	280	380
h	mm	540	540	665
k	mm	130	130	154
l	mm	260	260	350



Ⓐ Drive (optionally left or right)
Ⓑ Distributing container
Ⓒ Distributing screw conveyor
Ⓓ Vertical pipe screw conveyor, pushing
Ⓔ Horizontal pipe screw conveyor, pushing

Pipe screw conveyor drive, pellets

For part no., see pricelist
Simple design pipe screw conveyor with 120 mm diameter with pulling or pushing drive. It is only approved for wood pellets. The system is driven by a spur geared motor and a chain with a dust-proof chain guard.

Standard delivery:
- Drive unit with spur geared motor 3 x 400 V and chain drive
- Inlet/discharge in simple design for wood pellets
  – Incl. drop chute/adaptor for the following conveyor devices

Trade name		Pipe screw conveyor drive, pellets
Max. screw conveyor diameter	mm	120
Screw conveyor torque	Nm	approx. 800
Function		Pulling
Max. screw conveyor length	m	10
Max boiler output	kW	1250

Pipe screw conveyor drive, standard

For part no., see pricelist
Standard version for pipe screw conveyor with pulling drive and discharge into a drop section. The system is driven by a spur geared motor and a chain with a dust-proof chain guard.

Standard delivery:
- Drive unit with spur geared motor 3 x 400 V and chain drive
- Inlet with light barrier for monitoring the fill level (overfill protection)
- Discharge with inspection cover, safety limit switch and drop chute/ adaptor for the following conveyor device (not required in pushing version)

Trade name		Pipe screw conveyor drive, standard	
Max. screw conveyor diameter	mm	120	190
Screw conveyor torque	Nm	approx. 800	approx. 800
Function		Pulling/pushing	Pulling/pushing
Max. screw conveyor length	m	10	10
Max. boiler output (wood pellets)	kW	1250	3200
Max. boiler output (woodchips)	kW	—	1250

Pipe screw conveyor drive, high power

For part no., see pricelist
Special, powerful version of the pipe screw conveyor for more difficult applications (high pump rate and/or pushing function).

The following are reinforced:
- Spur geared motor
- Bearings
- Chain with dust-proof chain guard

Note
This drive is required for a direct transition (forced transfer).

Standard delivery:
- Drive unit in a robust design with additional axial bearing for pushing function with spur geared motor 3 x 400 V and chain drive
- Inlet with light barrier for monitoring the fill level
- Discharge with inspection cover, safety limit switch and drop chute/ adaptor for the following conveyor device

Trade name		Pipe screw conveyor drive, high power		
Max. screw conveyor diameter	mm	190	250	250
Screw conveyor torque	Nm	approx. 1100	approx. 1100	approx. 1100
Function		Pulling/pushing	Pushing	Pulling
Max. screw conveyor length	m	10	8	10
Max. boiler output (woodchips)	kW	1500	2500	2500

7.1 Fuel storage in on-site pellet store

Sizing the pellet storage room

The storage room should ideally be rectangular and large enough to accommodate a year's supply of fuel. This reduces the number of deliveries. The size of the storage room depends on heat load of the building, which in turn depends on the building's heat demand. However, the floor area of the pellet storage room should not be less than 2 x 3 m.

To calculate the annual fuel demand in pellets in m^3, as defined by the heat load of a building, use the following **rule of thumb** according to the ÖNORM M 7137.

Calculating the annual fuel demand in pellets, as defined by the heat load of a building:

Annual fuel demand [m^3] = heat load of a building [kW] x factor 0.6 [m^3/kW]

Storage rooms without sloping floor

- The volume for the annual fuel demand [m^3] corresponds to the volume of the storage room [m^3].
- Volume of a storage room without sloping floor [m^3] = volume for annual fuel demand[m^3]

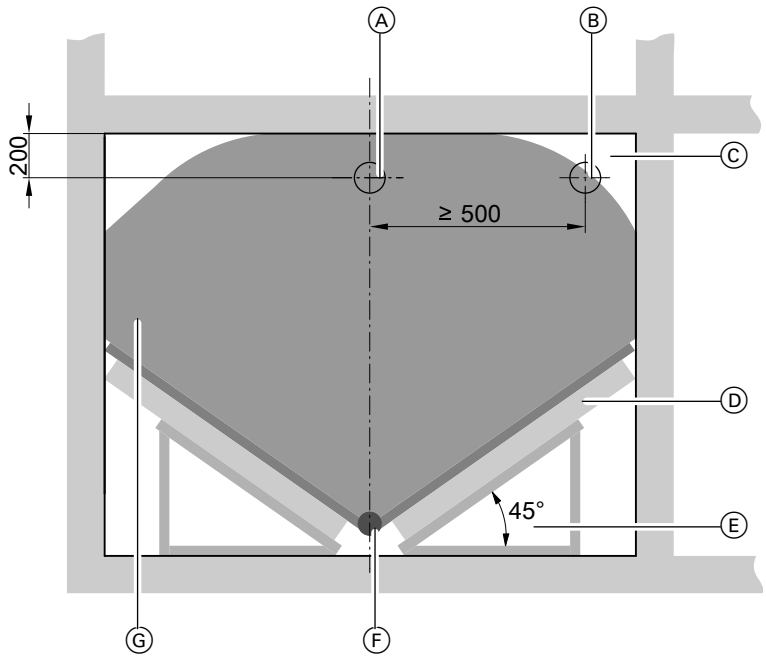
Example:
Pellet storage room with sloping floor
Heat load of building (e.g. detached house) 50 kW
Volume for annual heat demand [m^3] = 50 kW x 0.6 m^3/kW
= 30 m^3
Amount of pellets [t] = 30 m^3 x 0.65 t/m^3 = 19.5 t

Storage rooms with sloping floor

- Empty space must also be taken into account to ensure that the volume for the annual fuel demand [m^3] is covered. About 1/3 of the volume is lost due to the sloping floor.
- Volume of a storage room with sloping floor [m^3] = volume for annual fuel demand[m^3] x factor 1.5

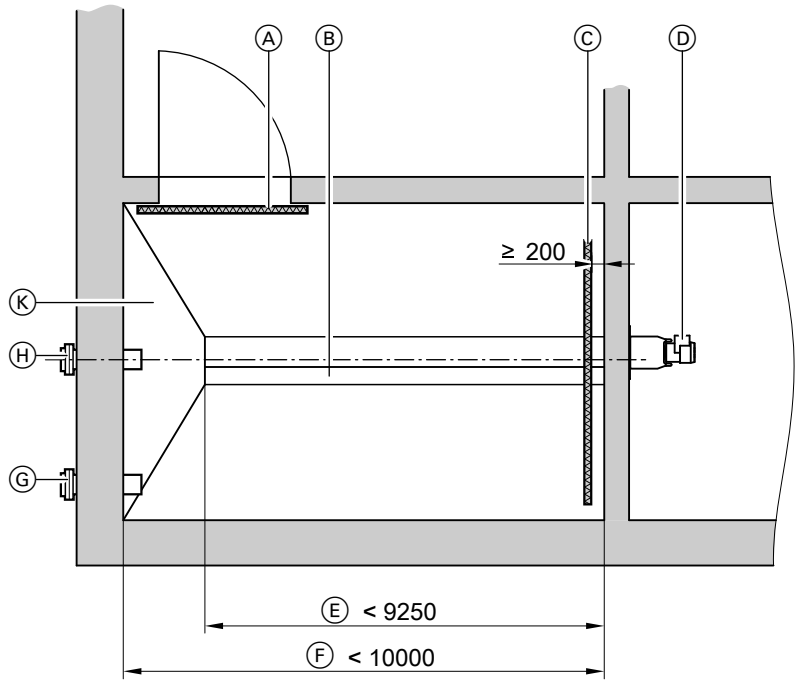
Converting storage room volume into the amount of pellets:
Amount of pellets [t] = storage room volume [m^3] x 0.65 t/m^3

Volume of a storage room with sloping floor [m^3] = 30 m^3 x 1.5 = 45 m^3
Room height: 2.3 m, floor area of the storage room = 45 m^3 ÷ 2.3 m
= approx. 20 m^2
A minimum room size of 4 x 5 m is adequate for storing a year's supply of fuel.
Stored amount of energy = 19,500 kg x 5 kWh/kg = 97,500 kWh



Ⓐ Fill connector
Ⓑ Return air connector
Ⓒ Air space
Ⓓ Sloping floor
Ⓔ Empty space
Ⓕ Viessmann discharge system
Ⓖ Available volume = ⅔ of the room

Pellet storage room design and required system components



Ⓐ Protective boards at the entrance to the storage room
Ⓑ Extraction area, screw conveyor system
Ⓒ Baffle mat
Ⓓ Discharge to feed screw conveyor
Ⓔ Min./max. length of extraction area
Ⓕ Max. storage room length
Ⓖ Return air connector
Ⓗ Fill connector
Ⓚ Slanted panel to compensate for the length of the storage room/ extraction area

General requirements for the pellet storage room and required system components

Note
For further information, we advise consulting VDI 3464 "Storage of wood pellets at the consumer's premises" and leaflet "Recommendations for the storage of wood pellets" issued by DEPV e. V. and DEPI.

- The pellet storage room must be dry, as pellets will swell up markedly if exposed to moisture. This leads to substantial difficulties in supplying pellets to the boiler.
- The pellet storage room must be dust-tight and of solid construction since filling creates dust and exerts high pressure on the walls.
- The pellet storage room or the installation room for prefabricated stores must be vented. Vents should not be positioned directly below windows or supply air apertures. Observe the requirements for the ventilation of pellet stores according to VDI Directive 3464. Vents should be closed during filling, so that the vacuum fan can create a slight negative pressure in the storage room.
- According to static requirements, the following wall thicknesses have proven to be useful:
  For example, bricks 17 cm, rendered on both sides; hollow breeze blocks 12 cm, rendered on both sides; concrete 10 cm, plaster block 12 cm.
  If the stored amount of pellets exceeds 6.5 t, surrounding walls and intermediate ceilings must comply with fire resistance category F90.
- Doors or access hatches into the pellet storage room must open outwards and must be dust-tight (with an all-round gasket). With a stored amount of pellets in excess of 6.5 t, doors must be self-closing and have a fire resistance rating of T30.
- Fit protective boards on the inside of the door opening, so that pellets do not push against the door (see chapter "Protective boards with Z brackets").
- There should be no electrical installations inside the pellet storage room. Essential electrical installations must be explosion-proof – in accordance with current regulations.
- Ⓐ In Austria, surrounding walls and ceilings in the storage room must be designed in accordance with fire resistance class F90, and doors or access hatches in accordance with T30. Observe fire regulations according to TRVB H-118 and the respective statutory requirements. For more information, please refer to ÖNORM M 7137.
- Due to condensation and the risk of burst pipes, the installation of water pipes inside the storage room should be avoided.
- Pellet storage rooms should be equipped with a fill connector Ⓗ and a return air connector Ⓖ with a Storz coupling, type A, Ø 100 mm (fire hose connector), with extension pipes leading into the pellet storage room. Pipes should be **metal**, connected to the brickwork and earthed.
- Fit a baffle mat Ⓒ opposite the fill connector to protect the pellets and the brickwork.
- The pellet storage room must be free from foreign bodies (small stones, wood particles, etc.).
- The wall duct for the room discharge should be sealed from the storage room side with fireproof material (e.g. rendered).

Fuel storage (cont.)

- The pellet storage room must be inaccessible to children. The pellet boiler should be shut down approximately one hour before the storage room is filled. The storage room should be sufficiently vented before anyone enters.
- The sloping floor in the pellet storage room should preferably be made from wood-based materials and have a smooth surface. Three-ply shuttering panels and multi-layer plywood boards have proven useful in practice. Plain chipboard is not suitable however.

Note

To ensure a permanent fault-free fuel supply to the boiler, the fuel store must be cleaned regularly. This includes carefully removing fines in the fuel store. After two to three deliveries, the fuel store should be cleaned prior to the next pellet delivery. Over time, pellet dust accumulates in the lower part of the fuel store and can cause faults in the fuel supply. Wood pellets of inferior quality with an increased percentage of fines cause increased accumulations of dust in the storage room. However, fines are also produced by the mechanical stresses that wood pellets are subjected to during transport and injection (injection pressure, installations, etc.) into the storage room. With its strict requirements for wood pellets, the ENplus certificate ensures flawless pellet quality. This involves monitoring the entire value chain from production to delivery. Manufacturers and suppliers of high quality wood pellets as well as further information can be found at www.enplus-pellets.de.

Additional safety instructions for pellet stores

- Access by unauthorised persons is forbidden and doors must be kept locked.
- Smoking, fires and other sources of ignition are prohibited.
- Risk to life due to odourless carbon monoxide (CO) and a lack of oxygen
- Before entering, ensure sufficient ventilation is in place – keep door open while inside.
- Entry is only permitted under the supervision of a person standing outside the storage room
- Risk of injury caused by moving parts
- Ensure filling is carried out under the conditions stipulated by the heating system installer and pellet supplier
- Protect the wood pellets from moisture.

Fire safety

Requirements of the pellet storage room in accordance with the Muster-Feuerungsverordnung (Sample Combustion Ordinance, M-FeuVo, Germany, as of September 2007)

Pellet storage amount < 10,000 l (approx. 6500 kg)	**Pellet storage amount > 10,000 l (approx. 6500 kg)**	**Rated boiler heating output ≤ 50 kW**
No requirements for – Walls – Ceilings – Doors – Use	Requirements of the pellet storage room – Walls F90 – Ceilings F90 – Doors and access hatches with self-closing and fire-resistant (T30) closures – No other use for the storage room – No lines through ceilings and walls	For solid fuels (installation rooms for combustion equipment) – No requirements for the room – Combustion air supply to the combustion equipment through an aperture of at least 150 cm^2 – Clearance between the combustion equipment and the flue store at least 1 m or less if a ventilated radiation shield is used – Up to 6000 kg of pellets may be stored inside the boiler room.

The fire regulations of the relevant country should be adopted. Requirements on the pellet storage room are subject to national or regional regulations and must be complied with. These do not yet exist everywhere.

Your local flue gas inspector or heating contractor will inform you of any resulting requirements.

Ventilating the pellet storage room

Requirements concerning pellet store ventilation in accordance with VDI Directive 3464 (ÖNORM M7137)

Length of ventilation line	Ventilation type	Pellet store capacity	
		≤ 10 t	> 10 to 40 t
< 2 m	Seal cap ventilation	– Two ventilating covers on two Storz A couplings – Ventilation to outdoors or to ventilated installation room of the heating system	– Minimum two ventilating covers on two Storz A couplings – Min. cross-section 4 cm^2/t capacity – Ventilation to outdoors or to ventilated installation room of the heating system
2 m to 5 m	(Separate) ventilation aperture	– Aperture of ventilation line min. 100 cm^2 – Clear aperture min. 80 cm^2 – Ventilation to outdoors	– Aperture per ventilation line 100 cm^2 cross-section – Total ventilation cross-section min. 10 cm^2/t capacity – Clear aperture min. 8 cm^2/t capacity
> 5 m to 20 m	Mechanical ventilation	– Store room ventilation via ventilation line with fan – Fan with a triple air change rate per hour relative to the gross volume of the storage room – Fan is linked to the opening of the storage room door	
Required measures when entering the pellet store			
		– Transverse ventilation from entry door to ventilation aperture at least 15 minutes before entering. – Entry to the storage room is only permitted under the supervision of a person standing outside the room. – Within the first 4 weeks after filling, only enter with CO detector. – General monitoring obligation only for underground stores and stores with mechanical ventilation.	– Transverse ventilation from entry door to ventilation aperture at least 15 minutes before entering. – Entry to the storage room is only permitted under the supervision of a person standing outside the room. – General monitoring obligation only for underground stores and stores with mechanical ventilation.

Larger pellet stores
For pellet stores with a capacity > 40 to < 100 t, ventilation apertures or mechanical ventilation are the only permissible types of ventilation.

Note
Further information on designing pellet store rooms is available from DEPI (German Pellet Institute)

Room discharge with suction wands (changeover unit)

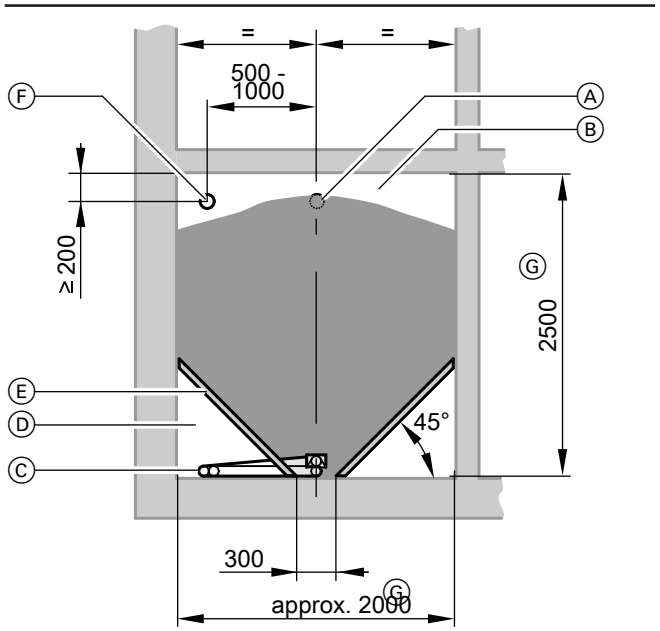
Suction wands are distributed at specified intervals in the pellet storage room. The pellets are transported from the storage room to the boiler via the suction wands. Suitable for use in brick-built storage rooms, with or without sloping floors, two separate storage zones and in awkwardly shaped storage rooms (e.g. L-shaped or very long, narrow rooms; see following pages).
Viessmann offers vacuum supply systems with either manual or automatic suction wand changeover.

The manual changeover unit requires the switch between suction wands to be performed manually. With the automatic changeover unit, the boiler control unit automatically activates the suction wands in specific cycles. This ensures the pellet storage room is emptied evenly.

Number of suction wands	8	3 or 4
On-site conditions	– Brick-built pellet storage room, at least 4 m^2 floor area – 2 separate pellet storage rooms – Specially shaped floor plans (e.g. L-shaped)	– Rectangular, brick-built pellet storage room, up to 6 m^2 floor area
Sloping floors	– Floor area: 1 m^2/suction wand – Version with sloping floors (extraction funnel) for improved storage room emptying – Residual amount remaining in storage room is minimised (complete emptying)	
Without sloping floors	– Floor area: 0.8 m^2/suction wand – Arrange the wands at suitable intervals to enable complete emptying of the storage room. – With floor areas > 0.8 m^2/suction wand, expect a residual amount of up to 20 %	
Reliable suction length	25 m from boiler to farthest wand	
Maximum pellet storage room fill level	2.5 m	

Fuel storage (cont.)

Suction wands with sloping floor (installation example)



Ⓐ Fill connector
Ⓑ Air space
Ⓒ Pellet supply hose and return air hose
Ⓓ Non-usable space
Ⓔ Lateral slope for improved emptying
Ⓕ Return air connector
Ⓖ Example, dimensions can vary

Sloping floors are key to ensuring the pellet storage room is emptied as completely as possible. Sloping floors in pellet stores are used to route the pellets from the extraction area (e.g. screw conveyors or suction wands).
Design them in a way that allows the storage room to be emptied as completely as possible via the extraction system.
The angle of the sloping floor should be between 45 to 50 degrees, so that the pellets slide downwards for better emptying. Slopes with an angle of less than 45 degrees make it more difficult for the pellets to slide down.

Room discharge with suction wands and automatic changeover unit

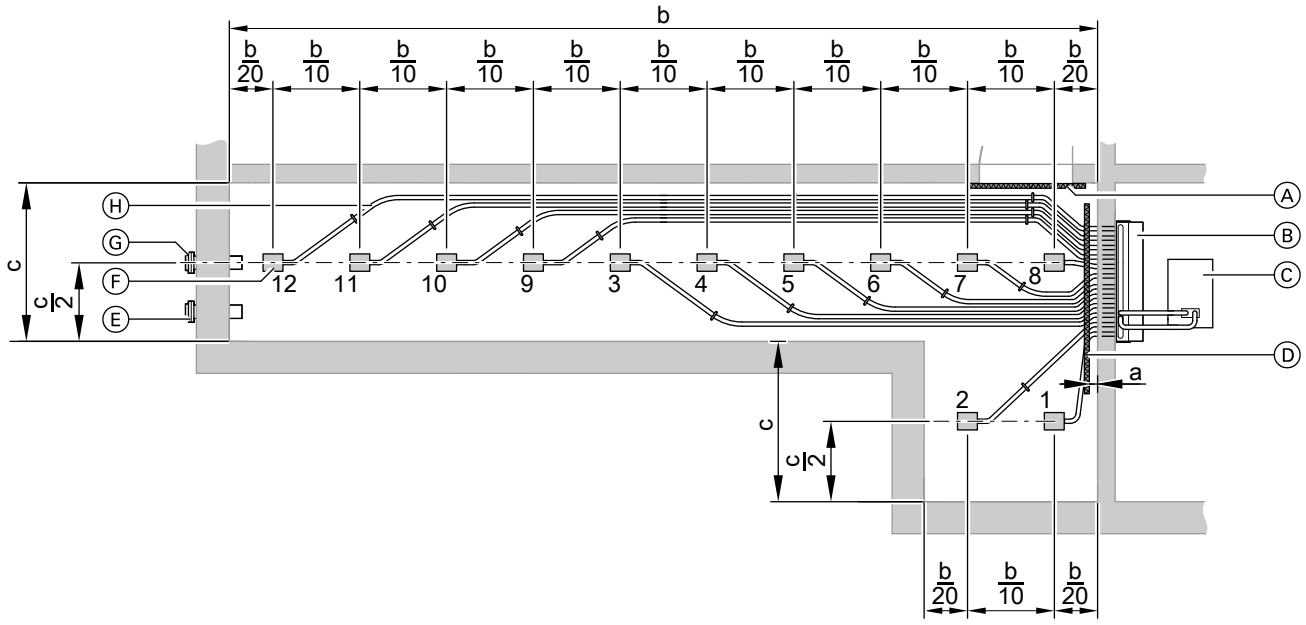
Design of the pellet storage room
The following illustrations represent example pellet stores and their component layout. Modify the given dimensions accordingly in the case of alternative storage room dimensions.
Distribute the suction wands evenly across the floor area of the storage room.
Allow 0.8 m^2 per suction wand for optimum efficiency in storage rooms without slopes. With larger floor areas, expect up to 20 % of the fuel to remain in the store as residual amount.
The distance of the outer wands to the walls of the storage room should be approx. half of the distance between the wands.

Arrange the fill connectors so that the wands are evenly covered with pellets. Bear in mind that the pellets will form pouring cones when they are blown into the store. Ensure the fuel is uniformly distributed, especially in asymmetrical storage rooms.

Pellet storage rooms without sloping floors
If pellet storage rooms are designed without a sloping floor, they will always contain a residual quantity of pellets that cannot be picked up by the suction wands.

Fuel storage (cont.)

Pellet storage room with 12 suction wands



Ⓐ Wooden boards
Ⓑ Changeover unit
Ⓒ Boiler
Ⓓ Baffle mat
Ⓔ Return air connector (Storz coupling)
Ⓕ Suction wands
Ⓖ Fill connector (Storz coupling)
Ⓗ Pellet supply hoses and return air hoses

Dimensions

a	mm	100
b	mm	approx. 10000
c	mm	approx. 1000

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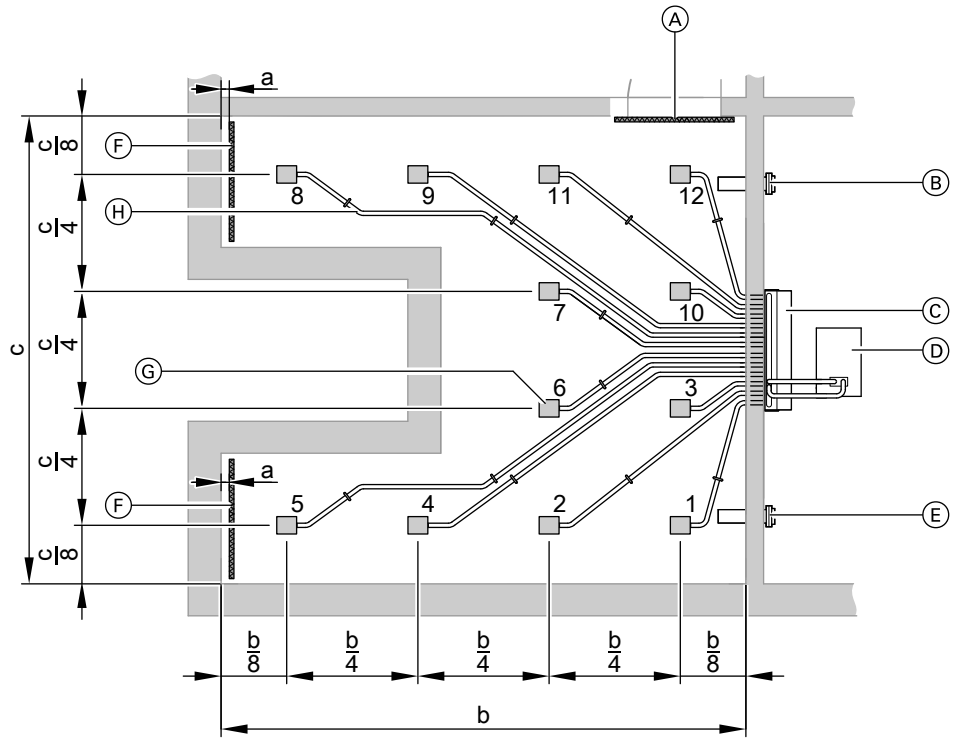
Fuel storage (cont.)

2 pellet storage rooms with 12 suction wands



Ⓐ Wooden boards
Ⓑ Return air connector (Storz coupling)
Ⓒ Changeover unit
Ⓓ Boiler
Ⓔ Fill connector (Storz coupling)
Ⓕ Baffle mat
Ⓖ Suction wands
Ⓗ Pellet supply hoses and return air hoses

Dimensions

a	mm	100
b	mm	approx. 4000
c	mm	approx. 3600

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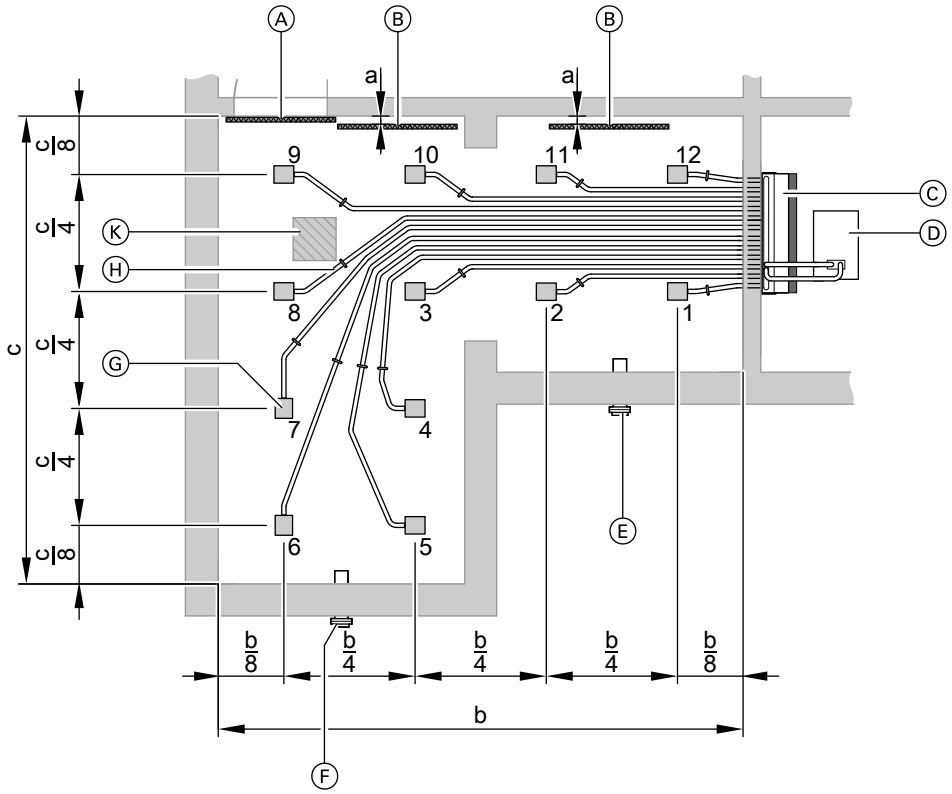
Fuel storage (cont.)

L-shaped pellet storage room with 12 suction wands

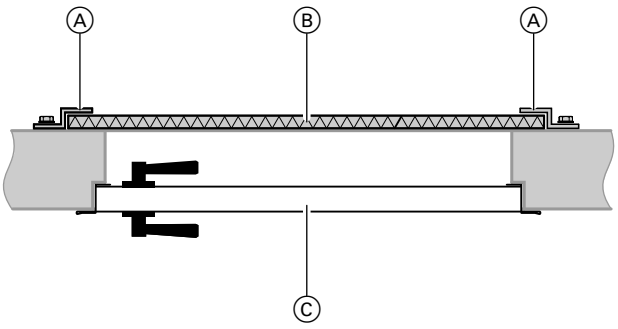


Ⓐ Wooden boards
Ⓑ Baffle mat
Ⓒ Changeover unit
Ⓓ Boiler
Ⓔ Return air connector (Storz coupling)
Ⓕ Fill connector (Storz coupling)
Ⓖ Suction wands
Ⓗ Pellet supply hoses and return air hoses
Ⓚ Pillar in pellet storage room with baffle mat

Dimensions

a	mm	100
b	mm	approx. 3600
c	mm	approx. 3600

Protective boards with Z brackets



Z brackets are available as accessories for installation of the protective boards.
To facilitate the addition or removal of protective boards, do not install Z brackets up to the ceiling.

Ⓐ Z bracket (length 2000 mm)
Ⓑ Protective board (30 mm thick; on-site)
Ⓒ Door to the storage room

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Fill connector and return air connector

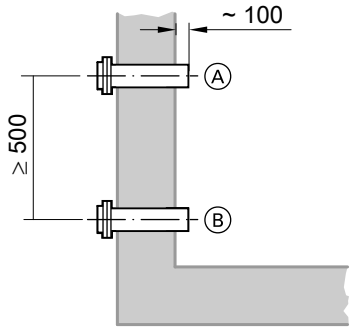
- Arrange the connectors so that no overpressure can develop in the pellet storage room during the filling process. The return air connector must remain free from blockage at all times.
- The connectors should be located high up inside the pellet storage room to enable the room to be filled to the maximum. To prevent pellets hitting the ceiling, the fill connector must be at least 20 cm below the ceiling. (Fit a protective panel if the ceiling is plastered.)
- Ideally, the connectors should be located on the narrow side of the storage room.
- With straight fill connectors, the fill width is approx. 4 - 5 m.
- If 2 x 45° bends are located before the inlet into the storage room, fit a straight pipe of at least 0.5 m length on the other side to protrude into the storage room. This enables the pellets to reach the required filling velocity and therefore the required fill width.

Earth

The connectors must be earthed to prevent static charging during the filling process. We recommend connecting each pipe element to the equipotential bonding of the building. At the very least, connect each pipe element securely to the brickwork, either by setting the pipe into the brickwork (without thermal insulation) or by means of pipe clips anchored into the brickwork.

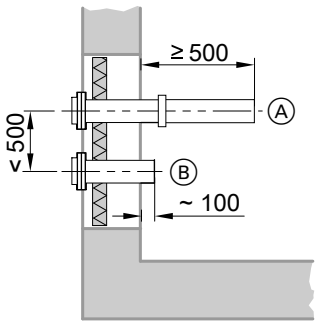
Connector length and location

The length of the fill connector depends on the distance to the return air connector. Connector spacing of < 500 mm may occur if both connectors are set into a cellar window.



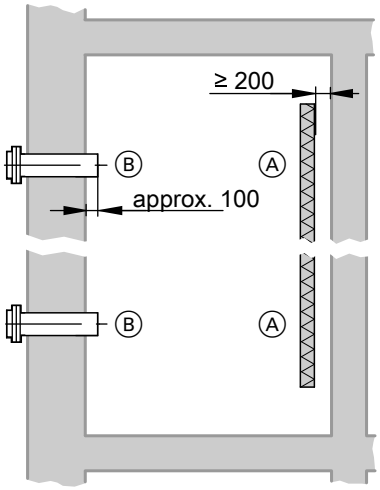
Connector spacing ≥ 500 mm

Ⓐ Fill connector
Ⓑ Return air connector



Connector spacing < 500 mm

Ⓐ Fill connector
Ⓑ Return air connector



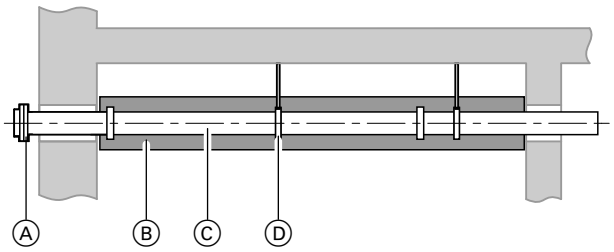
Alternating filling between connectors

Ⓐ Baffle mat
Ⓑ Fill and return air connectors

If connectors have to be located on the long side of the storage room, we recommend alternating filling between both connectors. This ensures more efficient filling of the storage room. Both connectors must always be earthed. Install a baffle mat opposite both connectors.

Internal pellet storage room

If the fill and return air connectors have to be routed through an adjacent room, clad them with a material with a fire rating of F90 (rock wool or similar). Earth each extension pipe using pipe clips. Plastic pipes must not be used as extension pipes.

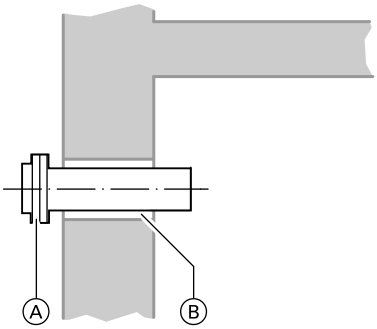


Ⓐ Connector
Ⓑ Fire-resistant cladding F90
Ⓒ Extension pipe
Ⓓ Pipe clip

Fuel storage (cont.)

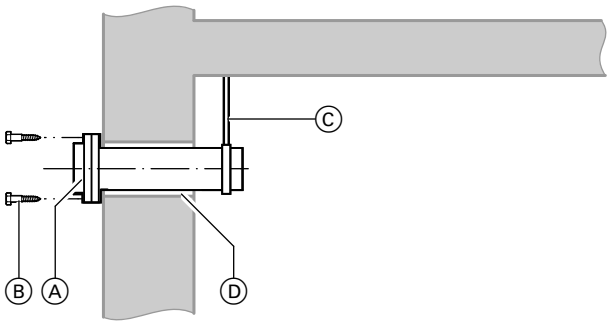
Connector installation options

Setting into brickwork
The connector is set into the outlet with mortar and **without thermal insulation**.



Ⓐ Fill connector
Ⓑ Wall duct Ø 150 mm

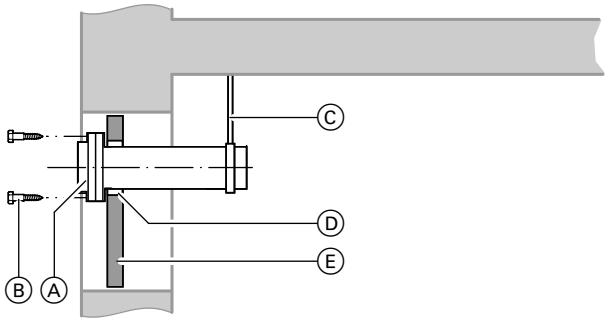
Wall installation with screws
The connector is secured to the outside wall with screws and earthed with a pipe clip.



Ⓐ Fill connector
Ⓑ Screws
Ⓒ Pipe clip for earthing
Ⓓ Wall duct Ø 110 mm

Fuel storage (cont.)

Window installation with screws
A plate is set into the window opening. The connector is fitted through the plate, secured with screws and earthed with a pipe clip.

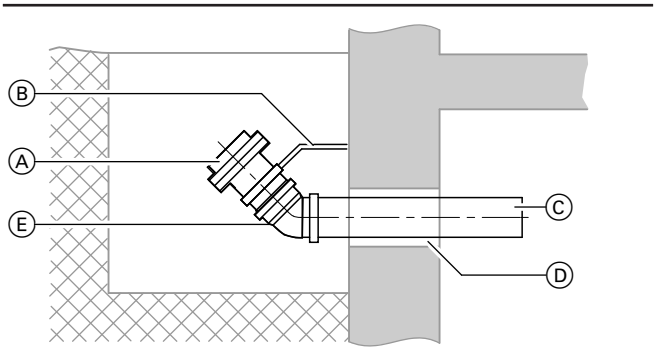


Ⓐ Fill connector
Ⓑ Screws
Ⓒ Pipe clip for earthing
Ⓓ Outlet Ø 110 mm
Ⓔ Window opening

Installation in the light well

The following types of installation are possible:
- Into the wall
- Into the window opening

The shortened fill and return air connectors are each inserted into a 45° bend. Insert the bend into the extension pipe that passes through the wall or window opening.



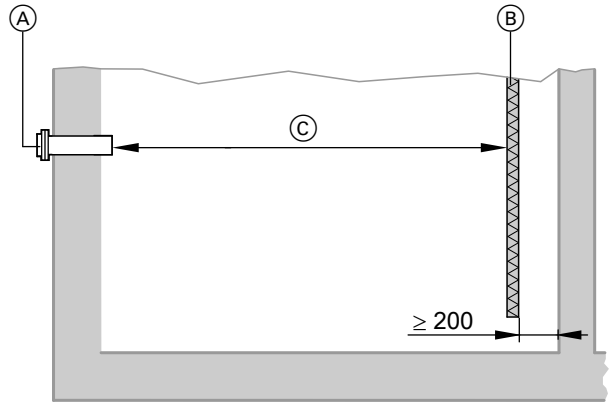
Ⓐ Fill connector
Ⓑ Pipe clip for earthing
Ⓒ Extension pipe
Ⓓ Wall duct Ø 110 mm
Or
Outlet Ø 110 mm
Ⓔ 45° bend

Accessories for the on-site pellet store

Baffle mat 1.42 x 1.25 m

For part no., see pricelist
The baffle mat consists of a 4.0 mm thick pressed rubber mat with fibre-reinforcement for high strength.
Install baffle mat Ⓑ with a clearance of at least 200 mm from the wall opposite the fill connector. The baffle mat protects the wood pellets, the brickwork and the plaster/render.
Pieces of plaster/render or wall that have been knocked off can hinder the pellet supply or block the ash removal from the boiler.

Standard delivery
- Baffle mat 1.42 x 1.25 m
- Section anchor with carbine fastening

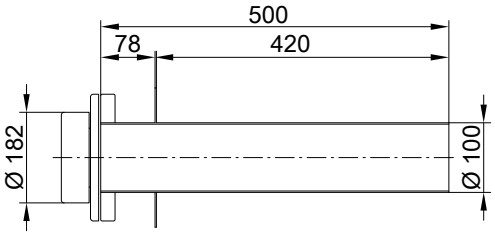


Ⓐ Fill connector
Ⓑ Baffle mat (1420 x 1250 mm)
Ⓒ Fill width approx. 4 - 5 m

Fill connector and return air connector, straight

For part no., see pricelist

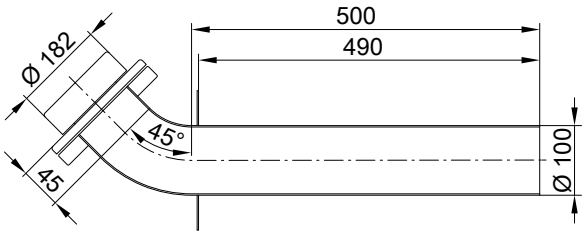
Standard delivery:
- Fill connector with Storz coupling 4"
- Mounting flange 200 x 200 x 2 mm
- Connecting aluminium pipe
- Dummy coupling with imprint and padlock



Fill connector and return air connector, 45°

For part no., see pricelist

Standard delivery:
- Fill connector with Storz coupling 4"
- Mounting flange 200 x 200 x 2 mm
- Connecting aluminium pipe
- Dummy coupling with imprint and padlock



Extension for fill connector and return air connector

For part no., see pricelist

Standard delivery:
- Extension DN 100, 1000 mm long
- Connecting aluminium pipe
- Clip for fastening

Extension, 45° bend

For part no., see pricelist

Standard delivery:
- Bend DN 100
- Connecting aluminium pipe

Fill level meter for wood pellets

For part no., see pricelist
Stationary ultrasound measuring system to capture the fill levels in the pellet store, made by Sonavis.
For on-site installation in the pellet storage room.
Up to 54 sensors can be linked to each other and connected to a fill level meter.

Standard delivery

Sonavis Profi EA standard pack
- Display unit
- 3 sensors
- Power cable, 1000 mm long
- Sensor extension cable, 2500 mm long

Extension set
- Sensor unit
- Sensor extension cable, 2500 mm long

7.2 Filling the on-site fuel store

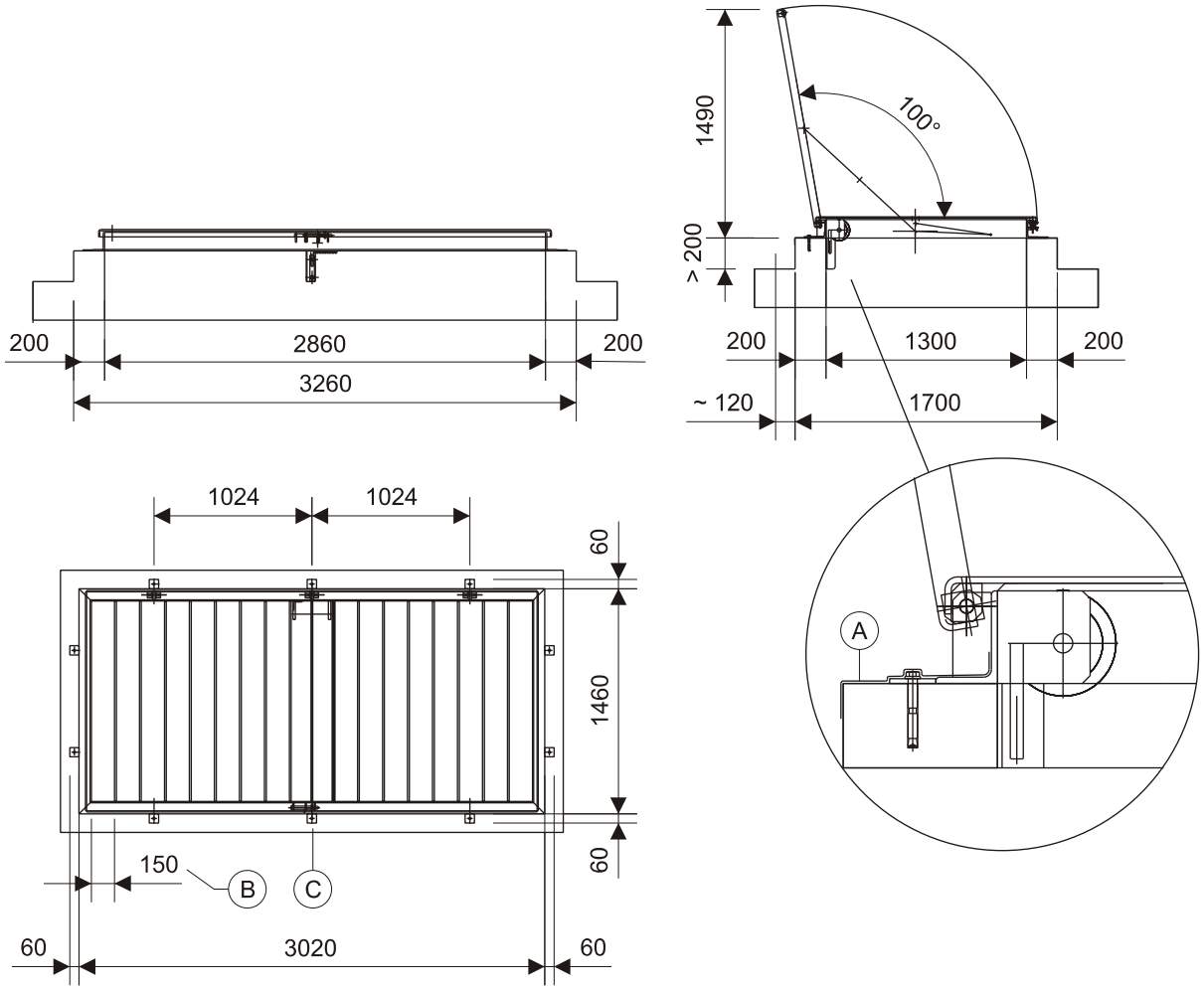
Manual silo cover FDM 2.9/1.3 m

For part no., see pricelist
Cover for secure sealing of openings for fuel delivery to the fuel store.
The cover is operated manually with leg springs as an opening aid.
The opening has a fall protection grille to prevent falling.

Note
For the filling process (opening, filling, closing), local accident prevention regulations must be observed (e.g. enclosure, safety personnel).

Standard delivery:
- Steel supporting structure
  - Permissible load 250 kg/m²
  - Sand-blasted
  - Primed with zinc dust and painted
- Welded fall protection grille with 150 mm bar spacing
- Cover
  - Aluminium button plate surface
  - Welded watertight
- Leg springs as opening aid

To be carried out by the customer:
- Preparation of the ceiling recess with concrete collar
- Seal between cover frame and concrete collar bearing surface
- Padlock to protect against incorrect operation



Ⓐ All-round seal required. Not included in the standard delivery.
We recommend Kemperol Kombi roof seals.
Ⓑ Bar spacing, fall protection grille
Ⓒ 10 x secured with screws

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FDH hydraulic bunker cover

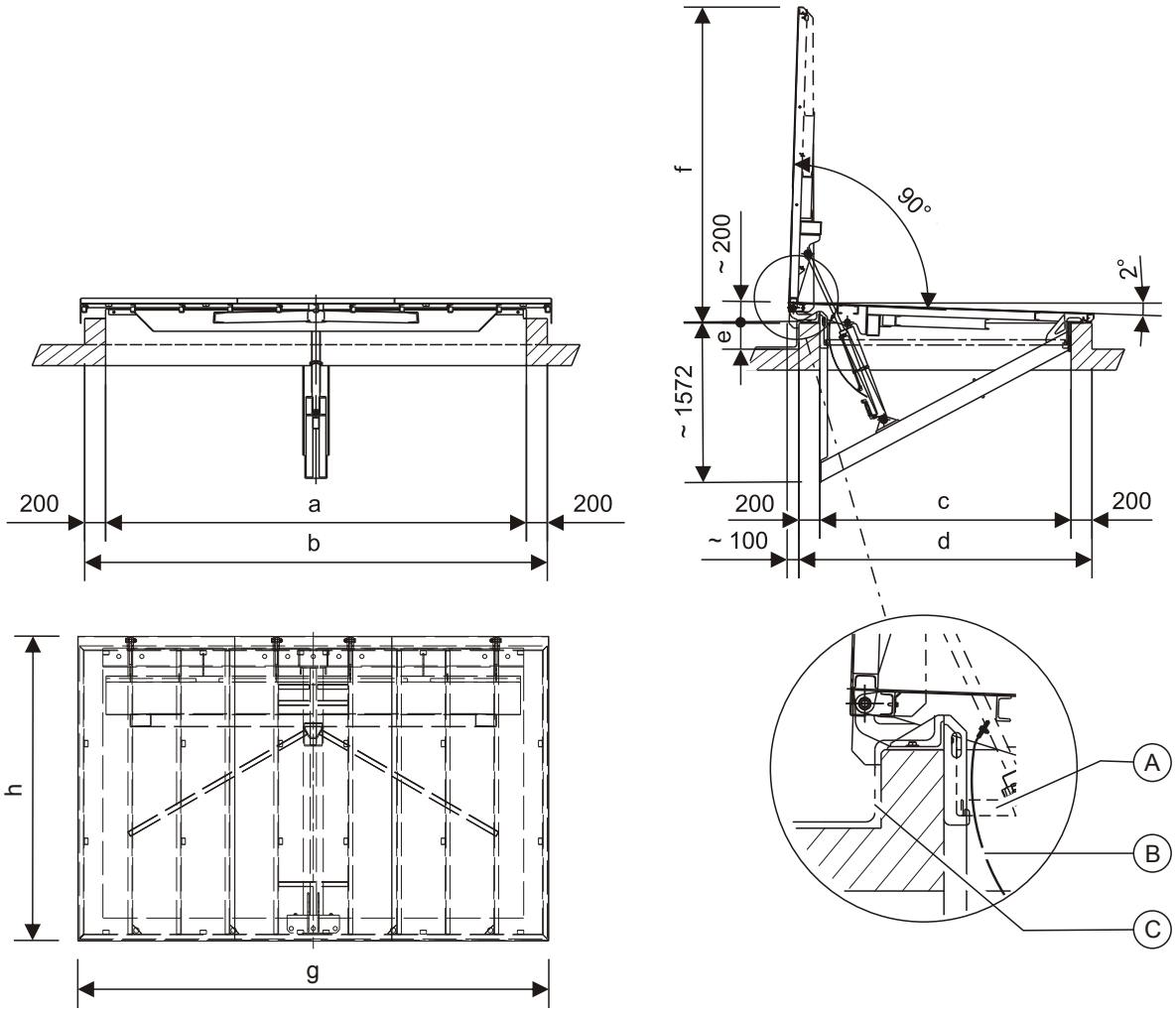
For part no., see pricelist
Cover for secure sealing of openings for fuel delivery to the fuel store
The cover is actuated by means of a hydraulic cylinder. A stay prevents the cover from falling shut.

Note
For the filling process (opening, filling, closing), local accident prevention regulations must be observed (e.g. enclosure, safety personnel).

Note
The cover must not be opened in windy conditions (> 10 m/s).

Standard delivery:
- Steel supporting structure
  - Permissible load 250 kg/m^2
  - Sand-blasted
  - Primed with zinc dust and painted
- Cover
  - Aluminium button plate surface
  - Welded watertight
- Hydraulic cylinder
  - With hinge lug connection, pipe break protection, bearing block
  - Hydraulic hoses, 1 m long
- Rubber apron to deflect woodchips on the hinge side

To be carried out by the customer:
- Preparation of the ceiling recess with concrete collar
- Seal between cover frame and concrete collar bearing surface



Ⓐ Fall protection grille (optional)
Ⓑ Rubber apron
Ⓒ All-round seal required. Not included in the standard delivery.
We recommend Kemperol Kombi roof seals.

Specification

Type[*21]		**FDH 4.0/2.4**	**FDH 5.5/2.4**	**FDH 7.0/2.4**	**FDH 8.5/2.4**
Opening length x width					
a	mm	4020	5520	7020	8520
c	mm	2400	2400	2400	2400
Concrete collar dimensions					
b	mm	4420	5920	7420	8920
d	mm	2800	2800	2800	2800
e	mm	250	250	250	250
External cover dimensions					
f	mm	3025	3025	3025	3025
g	mm	4500	6000	7500	9000
h	mm	2924	2924	2924	2924
Number of hydraulic cylinders	pce	1	1	1	2
Cover weights	kg	1029	1231	1516	1823

*[*21] Type 7.0/2.4 and 8.5/2.4 with covered expansion joint for thermal expansion*

Fall protection grille 120 for FDH

For part no., see pricelist
Fall protection grille (in multiple elements) to prevent anyone falling when the cover is open. Matching corresponding fuel store cover. Each element is prepared for installation of a shaker motor (shaker motor at an additional charge).
Max. load 200 kg/m^2

Standard delivery:
- Support profile for installation in ceiling recess
- Fall protection grille in several elements
  Mesh size: 200 x 120 mm

Specification

Fall protection grille, type 120 for		FDH 4.0/2.4	FDH 5.5/2.4	FDH 7.0/2.4	FDH 8.5/2.4
Number of elements	pce	2	2	3	4
Weight per pce	kg	117	161	133/141	124/120

Fall protection grille 200 for FDH

For part no., see pricelist
Fall protection grille (in multiple elements) to prevent anyone falling when the cover is open. Matching corresponding fuel store cover. Each element is prepared for installation of a shaker motor (shaker motor at an additional charge).
Max. load 200 kg/m^2

Standard delivery:
- Support profile for installation in ceiling recess
- Fall protection grille in several elements
  Mesh size: 200 x 200 mm

Specification

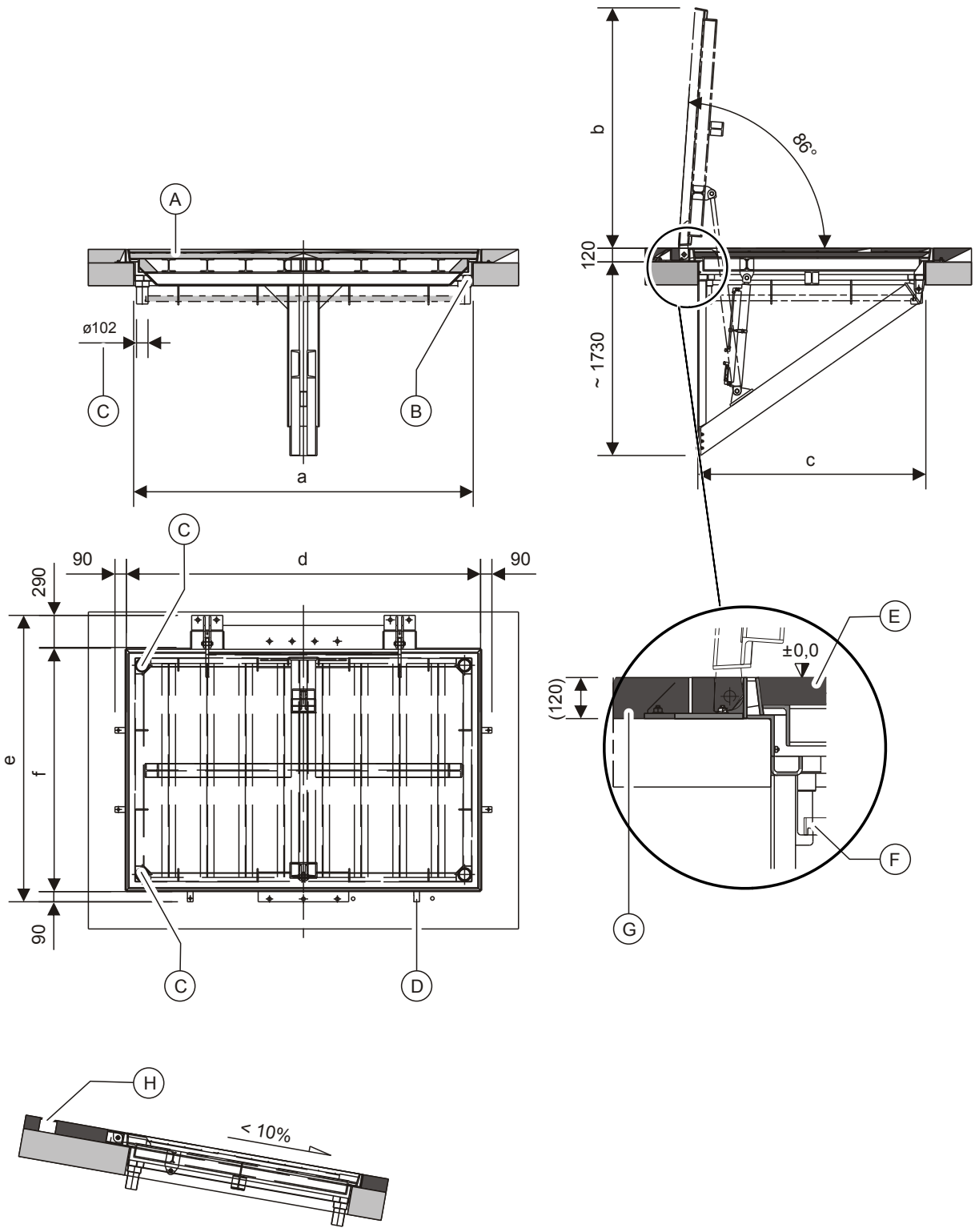
Fall protection grille, type 200 for		FDH 4.0/2.4	FDH 5.5/2.4	FDH 7.0/2.4	FDH 8.5/2.4
Number of elements	pce	2	2	3	4
Weight per pce	kg	104	143	118/125	110/106

FDB drive-over bunker cover

For part no., see pricelist
Cover that can be driven over for secure sealing of openings for fuel delivery to the fuel store The cover closes flush with the road surface. The substructure is equipped with a drain channel.
The cover is actuated by means of a hydraulic cylinder. A stay prevents the cover from falling shut.

Standard delivery:
- Steel supporting structure
  - Permissible axle load
    - FDB 3.0/2.0: 7.5 t
    - FDB 3.8/2.4: 10.0 t
    - FDB 3.2/3.2: 10.0 t
  - Sand-blasted
  - Primed with zinc dust and painted
- Cover surface
  - For filling with asphalt or concrete by the customer
- Substructure
  - With drain channel and two DN 100 drain connectors
- Hydraulic cylinder
  - With hinge lug connection, pipe break protection, bearing block
  - Hydraulic hoses, 1 m long

To be carried out by the customer:
- If the travel surface is sloping, the water flowing to the cover must be drained away upstream of the cover frame by means of a drain channel.
- Drain line for rainwater, channel heating
- Seal between cover frame and supporting surface of cover frame
- Filling of the cover surface with a bitumen layer and asphalt or concrete, watertight design The max. permissible specific weight of the filling is 2400 kg/m^3.



Ⓐ Filling on site (concrete or asphalt)
Ⓑ Channel for rainwater
Ⓒ Rainwater drain (on site)
Ⓓ Fitting
Ⓔ Filling level
Ⓕ Fall protection grille (optional)
Ⓖ All-round seal required Not included in the standard delivery.
Ⓗ Drain channel, running water (on site)

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Specification

FDB drive-over bunker cover		FDB 3.0/2.0	FDB 3.8/2.4	FDB 3.2/3.2
a	mm	3000	3800	3200
b	mm	2110	2510	3310
c	mm	2000	2400	3200
d	mm	3150	3950	3350
e	mm	2530	2930	3730
f	mm	2150	2550	3310
FDB cover weight	kg	1520	2360	2680
Max. permissible axle load	t	7.5	10.0	10.0

Fall protection grille 120 for FDB

For part no., see pricelist
Fall protection grille (in multiple elements) to prevent anyone falling when the cover is open. Matching corresponding fuel store cover. Each element is prepared for installation of a shaker motor (shaker motor at an additional charge).
Max. load 200 kg/m^2

Standard delivery:
- Support profile for installation in ceiling recess
- Fall protection grille in several elements
- Mesh size: 200 x 120 mm

Specification

Fall protection grille, type 120 for		FDB 3.0/2.0	FDB 3.8/2.4	FDB 3.2/3.2
Number of elements	pce	2	2	2
Weight per pce	kg	130	205	230

Fall protection grille 200 for FDB

For part no., see pricelist
Fall protection grille (in multiple elements) to prevent anyone falling when the cover is open. Matching corresponding fuel store cover. Each element is prepared for installation of a shaker motor (shaker motor at an additional charge).
Max. load 200 kg/m^2

Standard delivery:
- Support profile for installation in ceiling recess
- Fall protection grille in several elements
- Mesh size: 200 x 200 mm

Specification

Fall protection grille, type 200 for		FDB 3.0/2.0	FDB 3.8/2.4	FDB 3.2/3.2
Number of elements	pce	2	2	2
Weight per pce	kg	120	180	210

Shaker motor for fall protection grille

For part no., see pricelist
The shaker motor sets the fall protection grille in an oscillating motion. This prevents the delivered fuel from bridging the fall protection grille and therefore ensures a steady material flow during filling.

Standard delivery:
- Shaker motor, 3 x 400 V incl. control, thermal relay and installation material
- Key switch

To be carried out by the customer:
- Electrical connection of shaker motor and key switch

Note
One shaker motor is required per fall protection grille element. When using shaker motors, a large control panel must be included in the plans.

Hydraulic unit for bunker charging cover

For part no., see pricelist
Hydraulic unit used exclusively for a hydraulic bunker cover (FDH, FDB). The cover is opened by the hydraulic cylinder when the key switch is actuated. The load holding valve fixes the cover in position.

Fuel storage (cont.)

Standard delivery:
- Hydraulic unit, comprising:
  - Gear pump 4 l/min, incl. motor 1.5 kW, 3 x 400 V
  - Oil container 12 l, non-return valve
  - Pressure limiter valve
  - Pressure diverter valve
  - Return filter
  - Oil level indicator
  - Pressure gauge
  - Shut-off valve
  - Oil filling
  - Hydraulic hoses
  - Wall mounting brackets
- Control:
  - Via the boiler control unit, protected by temperature and level switches in the oil container
- Key switch OPEN/OFF/CLOSED for installation of a locking cylinder on site
  We recommend installing the key switch near the cover. This lets you observe the movement of the cover.

Note
The hydraulic unit is required in fuel extraction systems without hydraulic actuation:
- *Flexible agitator discharge AF*
- *Horizontal discharge AH*
- *Funnel discharge AP*
- *External discharge system*

Cover drive for hydraulic unit

For part no., see pricelist
Use the cover drive if there is an existing hydraulic unit for the push-rod discharge.
The cover drive is used for a hydraulic bunker cover (FDH, FDB).
The cover is opened by the hydraulic cylinder when the key switch is actuated. The load holding valve fixes the cover in position.

Standard delivery:
- One valve block per cover, each equipped with:
  - 2 solenoid valves
  - 1 load holding valve
  - 2 non-return throttle valves

Control:
Via the boiler control unit
One key switch OPEN/OFF/CLOSED per cover for installation of a locking cylinder on site
We recommend installing the key switch near the cover. This lets you observe the movement of the cover.

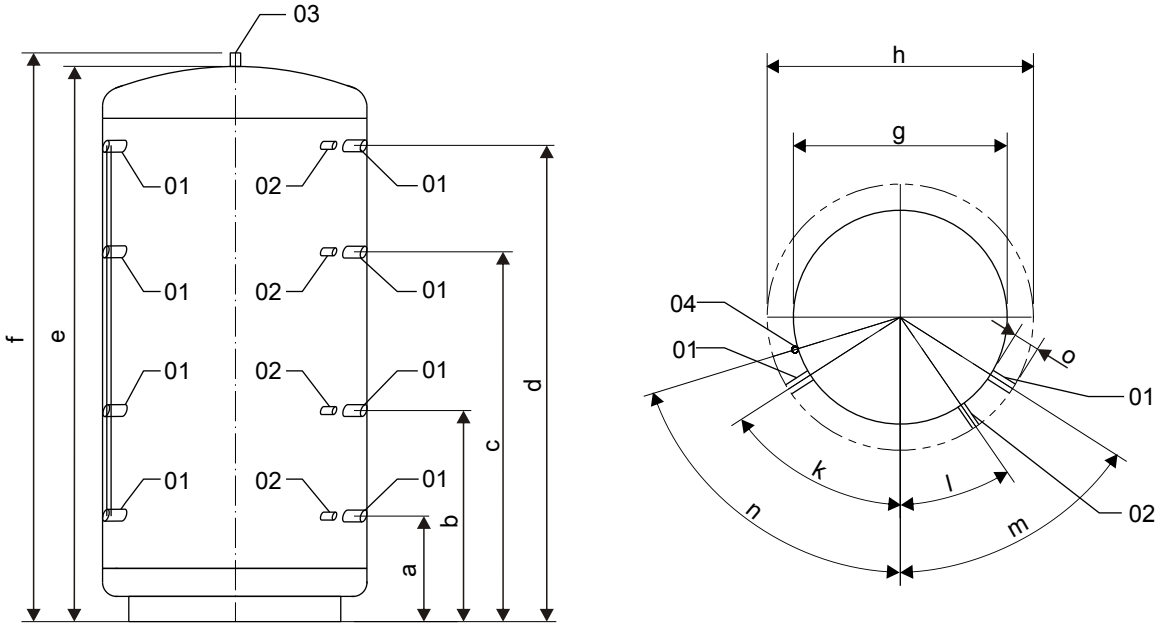
8.1 PSM heating water buffer cylinder

For part no., see pricelist
For storing heating water in conjunction with solid fuel boilers up to a rated heating output of 220 kW.

Version:
- Steel S 235 JRG2, untreated inside, anti-rust coating outside
- Max. operating pressure 3.0 bar (0.3 MPa)
- Test pressure: 4.5 bar (0.45 MPa)
- Max. temperature: 95 °C
- Connections: 8 female connections R 1½ or R 2, 4 female connections R ½, 1 sensor pipe 14 x 1.5 mm, 1 female connection top R 1¼, air vent valve R 1

Thermal insulation for the heating water buffer cylinder
For part no., see pricelist
The thermal insulation consists of 110 mm thick fleece.
Fire safety category B2 to EN 13501-1.

Note
On the inside, there are deflector plates at the connections marked 01. Immersion heaters must not be used here.
Alternative sizes and insulation types on request.



Heating water buffer cylinder								
Type			**1000**	**1250**	**1500**	**2000**	**2500**	**3000**
Max. rated heating output		**kW**	**150**	**150**	**150**	**150**	**220**	**220**
Cylinder capacity		l	887	1266	1500	2021	2304	2912
Support type			Support ring	Support ring	Support foot	Support foot	Support foot	Support foot
Weight								
– Heating water buffer cylinder		kg	106	155	165	198	236	282
– Thermal insulation		kg	30	35	38	40	45	53
– Total weight		kg	136	190	203	238	281	335
Dimensions								
Height when tilted		mm	2085	2070	2195	2420	2395	2830
a		mm	310	310	380	320	535	380
b		mm	745	745	825	900	975	1020
c		mm	1250	1250	1350	1490	1415	1680
d		mm	1710	1710	1760	2020	1855	2330
f	Height excl. thermal insulation	mm	2040	2010	2150	2370	2280	2770
	Height incl. thermal insulation	mm	2090	2060	2200	2420	2330	2820
g	Diameter excl. thermal insulation	mm	790	950	1000	1100	1250	1250
h	Diameter incl. thermal insulation	mm	1010	1170	1220	1320	1470	1470

Heating water buffer cylinder (cont.)

Heating water buffer cylinder								
Type			**1000**	**1250**	**1500**	**2000**	**2500**	**3000**
Max. rated heating output		**kW**	**150**	**150**	**150**	**150**	**220**	**220**
Connections								
k		°	50	50	50	50	50	50
l		°	28.2	31.9	32.9	34.3	36.2	36.3
m		°	50	50	50	50	50	50
n		°	70	70	70	70	70	70
o	Length of female connections	mm	100	100	100	100	100	100
01	Female connections, flow/ return	R	1 ½	1 ½	1 ½	1 ½	2	2
02	Female connections, sensor	R	½	½	½	½	½	½
03	Air vent valve	R	1 ¼	1 ¼	1 ¼	1 ¼	1 ¼	1 ¼
04	Sensor pipe		Ø14xL1400	Ø14xL1400	Ø14xL1400	Ø14xL1700	Ø14xL1250	Ø14xL1700

8.2 WDW heating water buffer cylinder

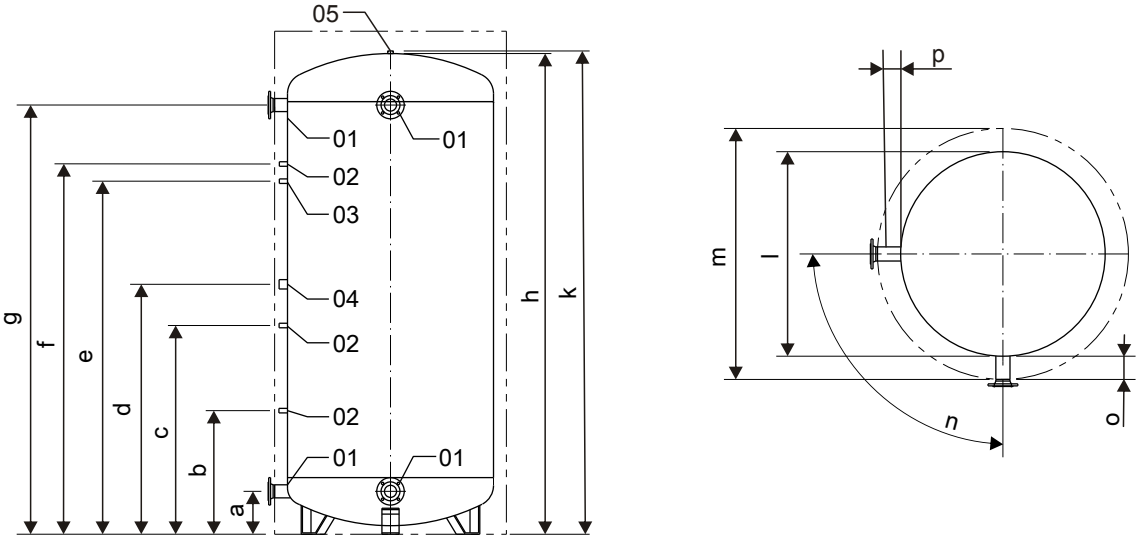
WDW 2000 l heating water buffer cylinder

For part no., see pricelist
Buffer cylinder for integration in a wood combustion system with a maximum rated heating output of 540 kW

Version:
- Steel S 235 JRG2, untreated inside, anti-rust coating outside
- Max. operating pressure: 3.0 bar (0.3 MPa)
- Test pressure: 4.5 bar (0.45 MPa)
- Max. temperature: 95 °C
- Connections: 4 flanges DN 80/PN 6, 3 female connections R ½, 1 female connection R 1½, 1 female connection R ¾, air vent valve R ½

Thermal insulation for WDW 2000 l
For part no., see pricelist
The thermal insulation is made from approx. 90 mm thick rigid foam shells (single part or multi part polystyrene) incl. cover.
Fire safety category B2 to EN 13501-1.

Note
Alternative sizes and insulation types on request.



WDW 2000 l heating water buffer cylinder			
Type			2000
Capacity		l	2000
Weight		kg	220
Dimensions			
Height when tilted		mm	2170
a		mm	280
b		mm	750
c		mm	1165
d		mm	1265
e		mm	1400
f		mm	1500
g		mm	1680
h		mm	2025
k	Total height	mm	2040
l	Diameter excl. thermal insulation	mm	1200
m	Diameter incl. thermal insulation	mm	1400
n		°	90
o	Flange length	mm	150
p	Length of female connections	mm	100
Connections			
01	Flow/return flange to DIN 2573		DN80/PN6
02	Sensor female connections	R	½
03	Sensor female connection	R	¾
04	Spare, immersion heater	R	1 ½
05	Air vent valve	R	1

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Heating water buffer cylinder (cont.)

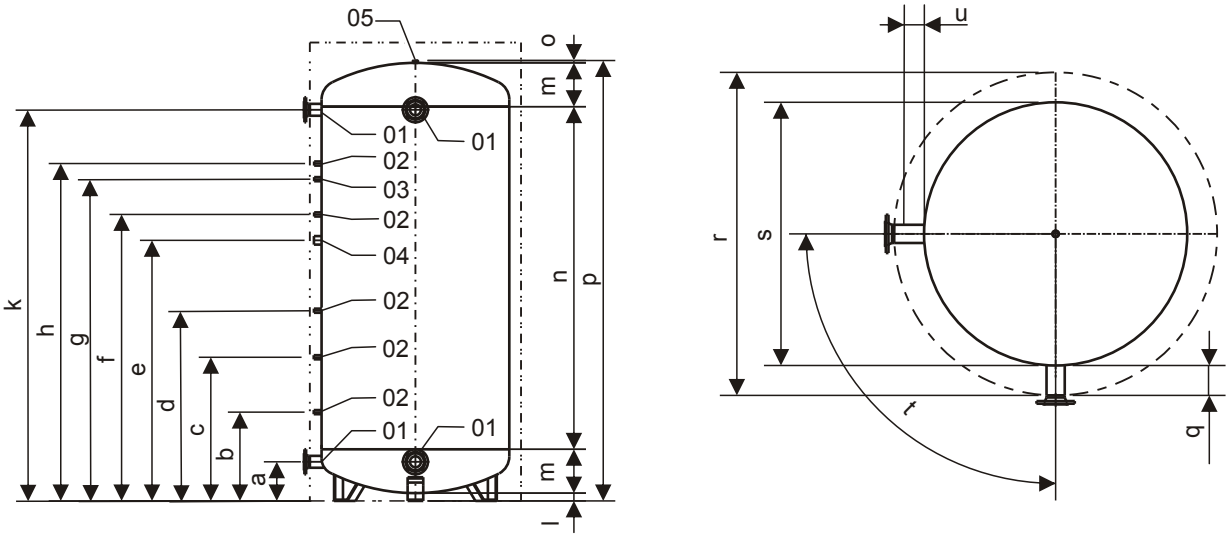
WDW 2900 l heating water buffer cylinder

For part no., see pricelist
Buffer cylinder for integration in a wood combustion system with a maximum rated heating output of 540 kW.

Version:
- Steel S 235 JRG2, untreated inside, anti-rust coating outside
- Max. operating pressure 3.0 bar (0.3 MPa)
- Test pressure: 4.5 bar (0.45 MPa)
- Max. temperature: 95 °C
- Connections: 4 flanges DN 80/PN 6, 5 female connections R ½, 1 female connection R 1½, 1 female connection R ¾, 1 air vent valve R 1

Thermal insulation for WDW 2900 l
For part no., see pricelist
The thermal insulation is made from approx. 90 mm thick rigid foam shells (single part or multi part polystyrene) incl. cover.
Fire safety category B2 to EN 13501-1.

Note
Alternative sizes and insulation types on request.



WDW 2900 l heating water buffer cylinder			
Type			2900
Capacity		l	2900
Weight		kg	295
Dimensions			
Height when tilted		mm	2890
a		mm	265
b		mm	745
c		mm	1155
d		mm	1560
e		mm	1785
f		mm	1920
g		mm	2130
h		mm	2230
k		mm	2465
l		mm	50
m		mm	280
n		mm	2200
o		mm	20
p		mm	2830
q	Flange length	mm	150
r		mm	1400
s		mm	1200
t		°	90
u	Length of female connections	mm	100

Heating water buffer cylinder (cont.)

WDW 2900 l heating water buffer cylinder			
Connections			
01	Flow/return flange to DIN 2573		DN80/PN6
02	Sensor female connections	R	½
03	Sensor female connection	R	¾
04	Immersion heater	R	1 ½
05	Air vent valve	R	1

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8.3 Heating water buffer cylinder on request

Heating water buffer cylinder (customised)

Special order
We supply buffer cylinders for a wide variety of applications on customer request.

Version:
- Steel S 235 JRG2, untreated inside, anti-rust coating outside
- Max. temperature: 95 °C

Information required:
- Max. operating pressure in bar (MPa)
- Max. temperature in °C
- Capacity in litres
- Maximum dimensions:
  ∅, height and height when tilted (without insulation)
- Connections: Type, number

Thermal insulation for special version heating water buffer cylinders
Special order
Suitable thermal insulation made from fleece or rigid foam shells (single or multi part) can be supplied on request.

Note
We are happy to assist you with the design of the heating water buffer cylinder.

Design information

9.1 System design

Selecting the rated heating output

Select solid fuel boilers according to the required heat load. The boiler must be planned as a base load boiler and always operated in conjunction with a buffer cylinder (management). The correct system design point therefore does not depend on the nominal load specification (i.e. the building heat load), but rather on the required duration of use (length of the heating season, heat demand).

Note
For locations over 1500 m above sea level, the project enquiry must include details about the precise geographical location (altitude and address of the location).

Safety temperatures

These boilers comply with EN 303 and DIN 4702. They can be used in accordance with EN 12828 in sealed unvented heating systems.

- Permissible flow temperatures (= safety temperatures):
  Up to 110 °C
- Max. possible flow temperature:
  Approx. 15 K below the safety temperature
- High limit safety cut-out of the boiler control unit:
  Delivered condition 100 °C

9.2 Delivery

Viessmann delivers to the site. The system is unloaded on site.
A special crane is required on site for unloading.

The personnel carrying out transportation must be aware of accident hazards and take appropriate measures to prevent them. The boiler should only be lifted when it is completely empty (water, fuel, ash).

Lifting the solid fuel boiler

Vitoflex 300-RF with a rated heating output of 150 – 300 kW: Lift by lifting eye
Vitoflex 300-RF with a rated heating output of 400 – 540 kW: Lift by flow and return connectors with tie-bar.

Note
See page 97.

9.3 Positioning

Handling

The boiler and flue gas/water heat exchanger are equipped with a sufficient number of lifting eyes, to which lifting gear may be attached.
To lift the boiler by the flow and return connectors, a tie-bar is required if the rated boiler heating output is between 400 and 540 kW.
Viessmann experts undertake handling and siting on prepared foundations.

The boilers can be sited on concrete without special foundations.
Observe the installed boiler height.
Minimum clearances to walls for installation and maintenance work must be observed.

Design information (cont.)

Note
The following details are important to ensure that project planning and installation run smoothly:
- *Description of the route along which the boiler must be transported in the building to the installation site*
- *Height of rooms*
- *Stairs*
- *Width and height of doors*

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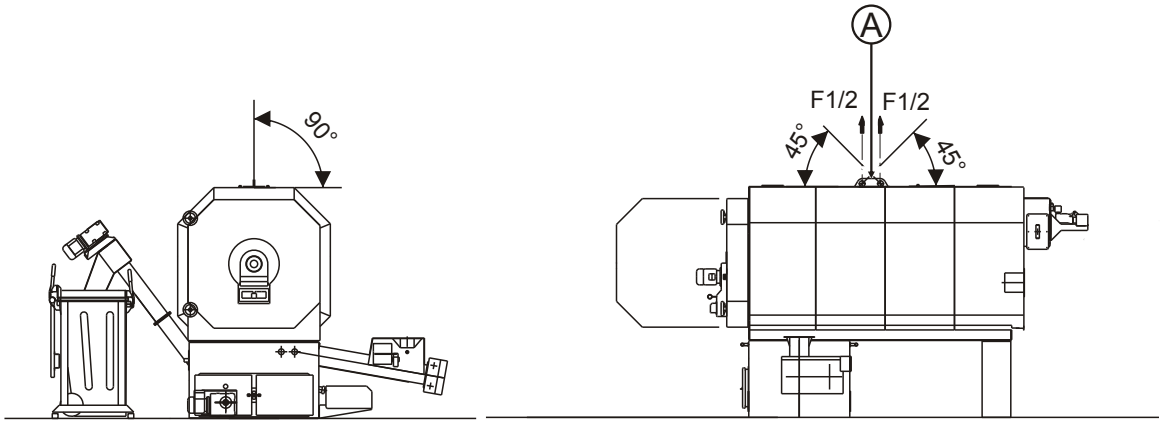

Ⓐ Lifting eyes
The Vitoflex 300-RF 400 - 540 kW boilers do not have lifting eyes. As the transport hooks are fitted on the boiler flow and return, a tie-bar is required for these boilers.

Boiler room requirements

A separate dry boiler room must be provided for the system. No combustible materials may be stored in the boiler room.
The minimum clearances to the walls and ceiling required for cleaning and maintenance must be observed. These can be found on the dimensions sheet. Adequate fresh air supply must be ensured direct from the open air into the boiler room. Forced ventilation is required in the case of narrow and/or internal boiler rooms. The temperature in the boiler room when operating the system must not exceed +40 °C (point of capture: Approx. 1 m from the boiler). The temperature in the boiler room when operating the system must not fall below +10 °C (point of capture: Inside of exterior wall).
- Avoid air contamination by halogenated hydrocarbons (e.g. as contained in sprays, paints, solvents and cleaning agents)
  For rooms where air contamination through **halogenated hydrocarbons** is expected:
  Boilers and flue gas/water heat exchangers may only be installed if adequate measures are taken to provide a supply of uncontaminated combustion air.
- Prevent very dusty conditions
- Prevent high levels of humidity
- Prevent frost and ensure good ventilation

Note
If these instructions are not observed, any consequential losses directly related to any of these causes are excluded from our warranty.
If in doubt, consult Viessmann on this matter.

Requirements regarding boiler room floor

The solid fuel boiler may only be installed on a fire- and temperature-resistant floor. No temperature-sensitive pipes or lines may be routed through the floor underneath the boiler.

The load bearing capacity of the boiler room floor must be designed for the system weight plus that of the water and the fuel it will contain. Floor load bearing capacity in the area of the boiler supporting surface: 3500 kg/m².

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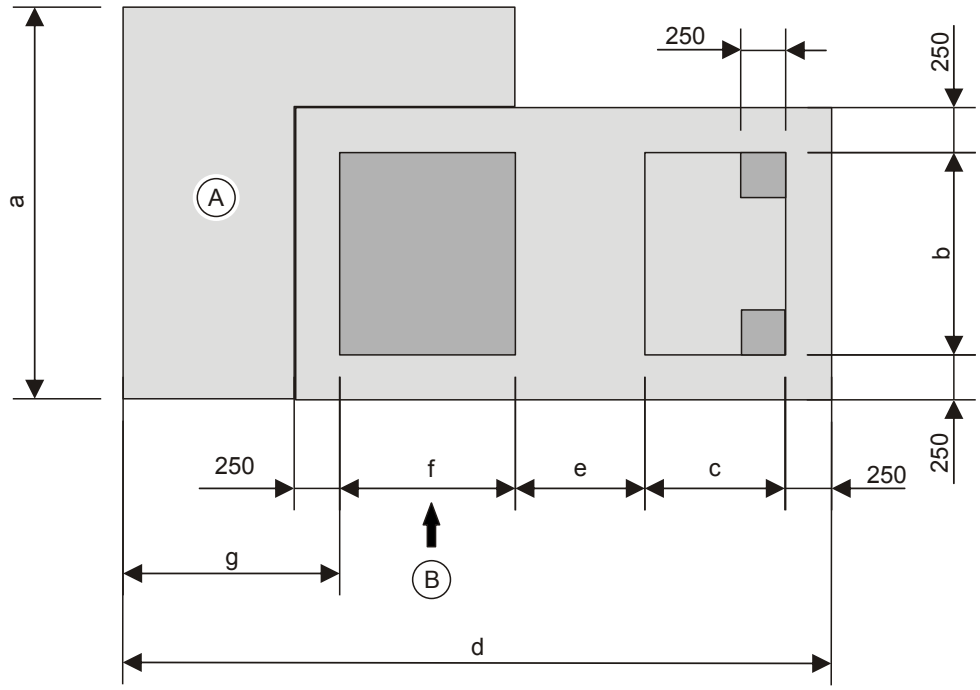


Ⓐ Floor in heat-resistant design
Ⓑ Supply side
Medium grey area Boiler supporting surface

Foundation properties

Trade name		Vitoflex 300-RF				
Rated heating output	**kW**	**150**	**220**	**300**	**400**	**540**
Dimensions						
a	mm	1570	2050	2050	2460	2460
b	mm	870	1150	1150	1390	1390
c	mm	620	680	680	800	800
d	mm	3053	3340	3683	3848	4078
e	mm	573	520	723	448	543
f	mm	740	740	880	960	1095
g	mm	870	1150	1150	1390	1390

Requirements of the Muster-Feuerungsverordnung [M-FeuVo Sample Combustion Ordinance - Germany]

Observe the specific building regulations and fire regulations in your country. The installation room must meet the standards laid down by the "Muster-Feuerungsverordnung".
Combustion appliances for solid fuels with a total rated heating output of more than 50 kW and which are to be operated simultaneously, may only be installed in special rooms (boiler rooms).

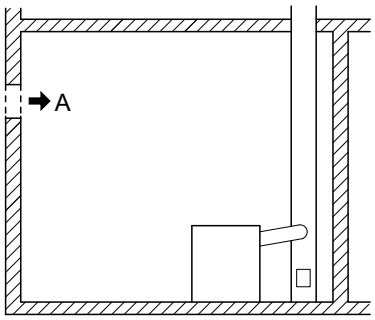
Recommendation
Consult your local flue gas inspector.

Emergency stop switch
On combustion equipment for solid fuels with a rated heating output above 50 kW, it must be possible to switch off the burner, fuel supply equipment and burner control units at any time by means of an emergency stop switch located outside the installation room. Provide a sign adjacent to the emergency stop switch that reads "EMERGENCY STOP SWITCH – COMBUSTION EQUIPMENT".

Combustion air supply

For open flue combustion equipment with a total rated heating output in excess of 35 kW, the combustion air supply is deemed to have been verified if the combustion equipment is located in areas which provide an aperture or duct leading outdoors.
At 35 kW rated heating output, the cross-section of the aperture must be at least 150 cm^2. For every kilowatt rated heating output in excess of 35 kW, the aperture must be 2 cm^2 larger than stated above.

Pipes must be sized to provide equivalent flow rates. The required cross-section may be split over up to 2 apertures or pipes.



$$A = 150\ cm^2 + 2\ \frac{cm^2}{kW}\ x\ (\Sigma \dot{Q}_n - 35\ kW)$$

$\Sigma \dot{Q}_n$ = sum of all rated heating outputs in kW

Never close or obstruct combustion air apertures or pipes. Use special safety measures to ensure that the combustion equipment can only be operated when the aperture is open.
The required cross-section must be free.

Safety precautions

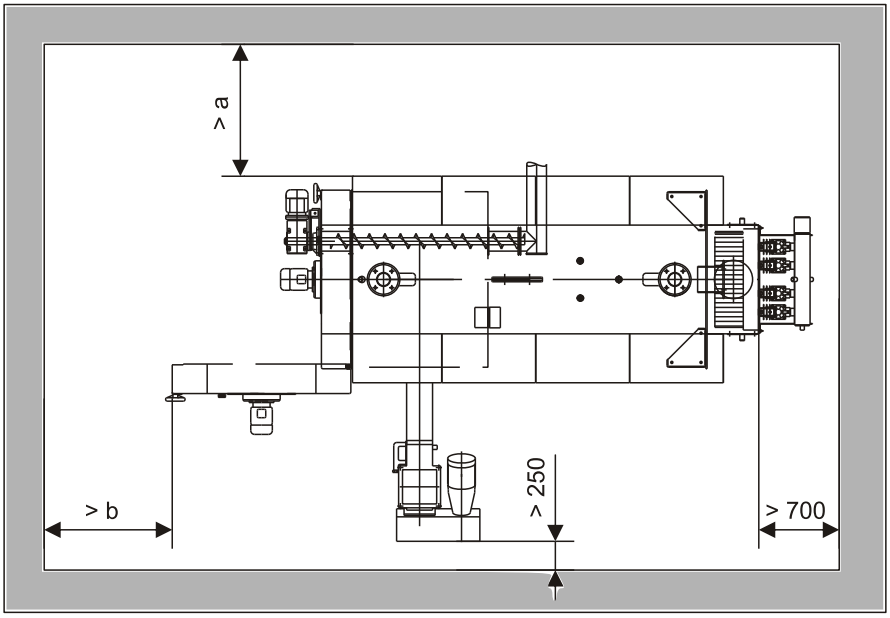
For gas combustion equipment installed in rooms, fuel lines **must** be equipped with the following safety equipment immediately upstream of the gas combustion equipment:
- In the event of an external thermal load in excess of 100 °C, the fuel supply must automatically shut off.
- Up to a temperature of 650 °C and over a period of at least 30 min, no more than 30 l/h (measured as air flow rate) must be able to flow through or out of the fuel line.

Combustion equipment must be installed at a sufficient distance from combustible materials and fitted furniture, or be shielded from them, to ensure that the temperature on such materials/furniture does not exceed 85 °C when the combustion equipment is delivering the rated heating output.

Room ventilation

Note
Means for adequate ventilation of the boiler room must be provided with all automatic heating systems.

Minimum clearances



Dimensions and clearances

Trade name		Vitoflex 300-RF				
Rated heating output	**kW**	**150**	**220**	**300**	**400**	**540**
Dimensions						
a	mm	700	900	900	1100	1100
b	mm	1920	2200	2200	2440	2440

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9.4 Water connection

Heating connections

Existing systems
Before connecting the boiler to an existing heating system, flush the system thoroughly to remove dirt and sludge residues.
Otherwise, this dirt and sludge will be deposited inside the solid fuel boiler and can lead to local overheating, noise and corrosion. Boiler damage caused by such deposits is excluded from our warranty.
Where necessary, install dirt traps.

Connections on the water side
On site, ensure that there is a water supply independent of the power supply. This (redundant) design guarantees that the boiler is reliably cooled via the thermally activated safety valve in the event of a power failure. We also refer to the standards and regulations listed in this document.

Connect all heat consumers and heating circuits to the boiler flow and boiler return connectors.
Never make any connections to the safety flow or to other connections.
We recommend you install shut-off valves in the heating flow and return lines, to avoid having to drain the entire water content out of the system if subsequent work is required on the solid fuel boiler or the heating circuits.

Straightforward installation
For safety temperatures up to 110 °C, the boiler requires no intermediate flow piece for the connection of safety equipment.
All the necessary connections, e.g. for water level or pressure limiters, are provided on the boiler.

Boiler circuit and shunt pump

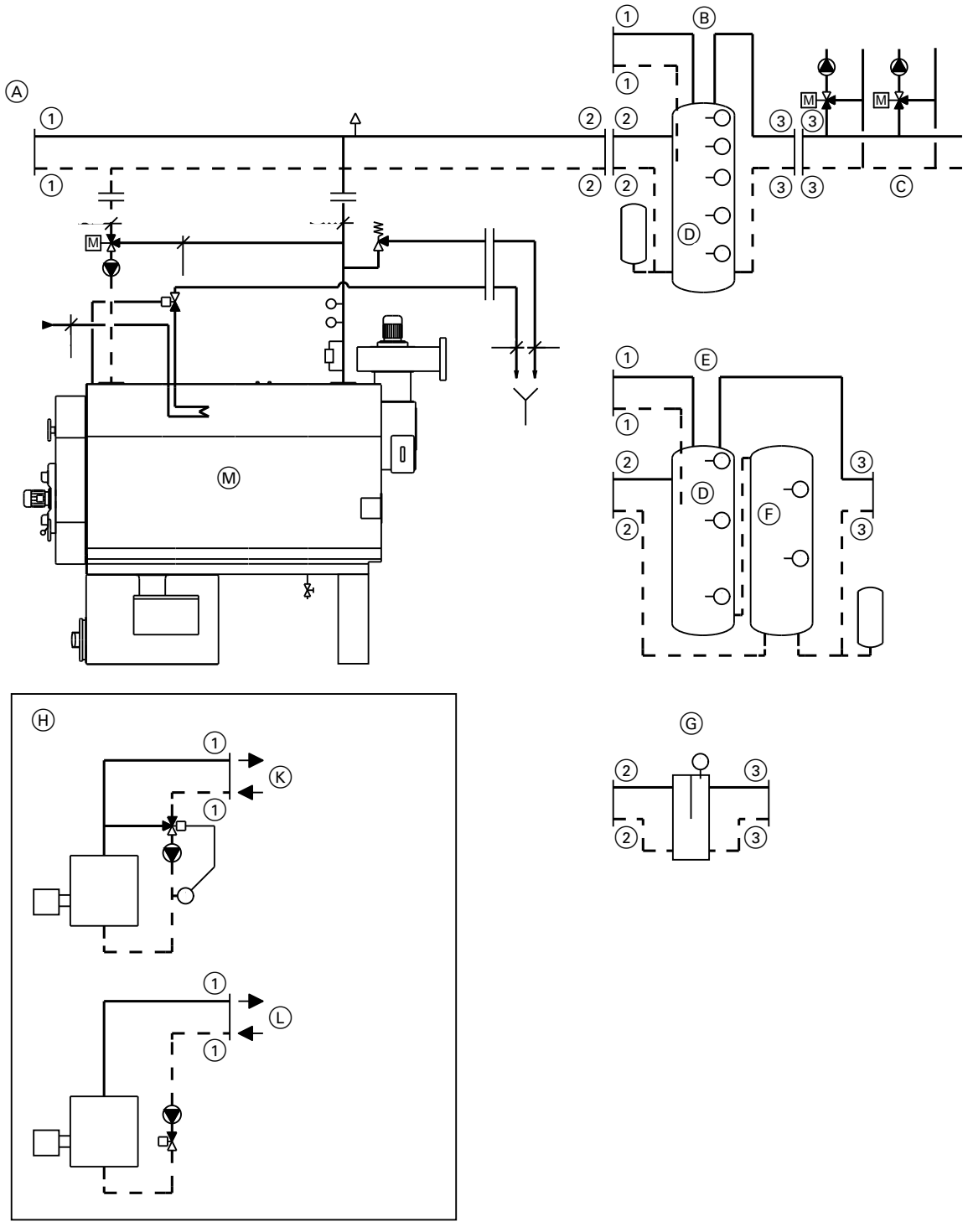
In order to reliably prevent boiler corrosion caused by flue gas condensation, the boiler return temperature must never fall below 65 °C. The boiler has variable output-dependent control. This requires a constant boiler flow rate of the water to be heated. For this reason, the boiler circuit with boiler circuit pump and boiler mixer must be installed in accordance with the design recommendations.

The boiler circuit should be designed in such a way that the temperature differential between flow and return is 15 °C or less. Control of the boiler circuit pump and valve of the return temperature raising facility is integrated in the supplied control unit.

System example

General information
- In order to reliably prevent boiler corrosion caused by flue gas condensation, the boiler return temperature must never fall below 65 °C. For this, a boiler circuit pump with boiler mixer should be provided in accordance with the system scheme.
- The boiler circuit should be designed in such a way that the temperature differential between flow and return is 15 K or less.
- Integration of heat consumers
- The expansion vessel must be connected to the boiler via the boiler flow, without shut-off devices.

Design recommendation for systems with sealed expansion, buffer cylinder circuit if required



Ⓐ Additional heat generator
Ⓑ Heating water buffer cylinder as low loss header (version A)
5 sensors
Ⓒ Heat consumer distributor
Ⓓ Heating water buffer cylinder 1
Ⓔ Heating water buffer cylinder as low loss header (version B)
5 sensors
Ⓕ Heating water buffer cylinder 2
Ⓖ Low loss header (version C)
(possible with large water volume in mains)
Ⓗ With additional heat generator, dual mode – oil, gas, electric
Ⓚ Additional heat generator for
- Oil/gas boiler
Ⓛ Additional heat generators for
- Oil/gas boiler
- Electric heater
Ⓜ Vitoflex 300-RF

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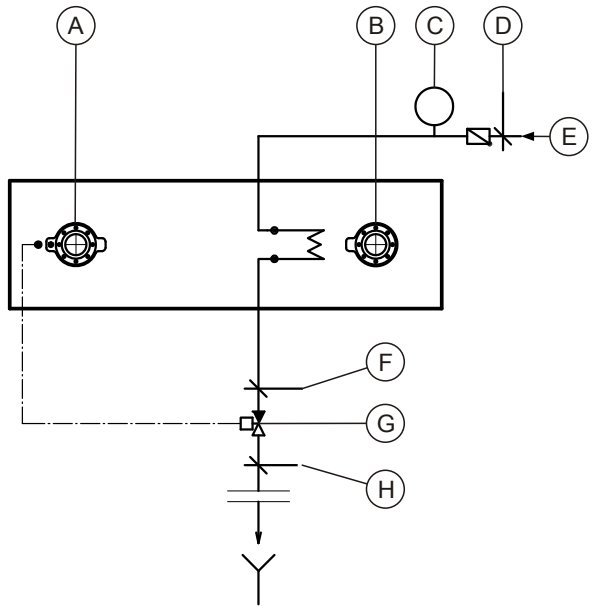
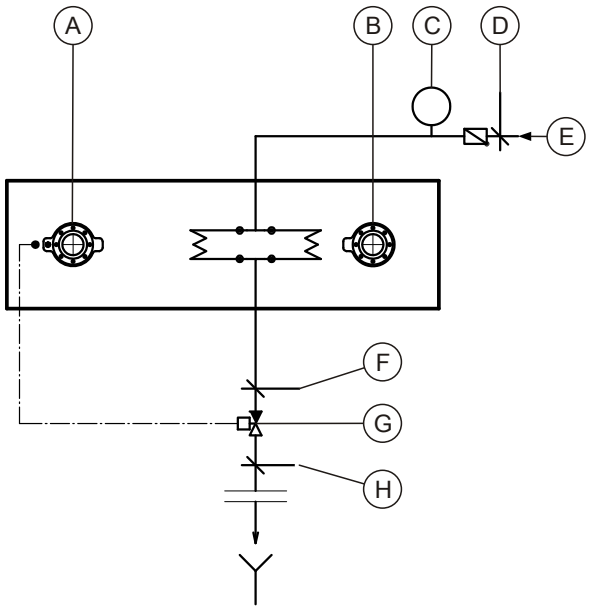
Vitoflex 300-RF safety heat exchanger

Vitoflex 300-RF safety heat exchanger, 150 to 300 kW



Ⓐ Boiler return
Ⓑ Boiler flow
Ⓒ Expansion, safety heat exchanger
Ⓓ Supply line (ZL)
Ⓔ Cold water connection (KW)
Ⓕ Supply line (ZL)
Ⓖ Thermally activated safety valve
Ⓗ Drain line (AL)

Vitoflex 300-RF safety heat exchanger, 400 and 540 kW



Ⓐ Boiler return
Ⓑ Boiler flow
Ⓒ Expansion, safety heat exchanger
Ⓓ Supply line (ZL)
Ⓔ Cold water connection (KW)
Ⓕ Supply line (ZL)
Ⓖ Thermally activated safety valve
Ⓗ Drain line (AL)

Design recommendation

Trade name		**Vitoflex 300-RF**				
Rated heating output	**kW**	**150**	**220**	**300**	**400**	**540**
Boiler circuit		DN 50	DN 50	DN 65	DN 80	DN 80
Thermally activated safety valve TS-131	pce	1	1	1	1	1
Required water flow rate at min. 2.5 bar (0.25 MPa) to max. 3.5 bar (0.35 MPa)	l/h	915	1230	1500	1880	2266
Cylinder capacity	l	1500	2200	2500	3200	4300
Supply line ZL	R	¾	¾	¾	¾	¾
Drain line AL	R	1	1	1	1	1
Safety valve type SV 68M	R	1	1	1 ¼	1 ¼	1 ½
Safety line SL		DN 40	DN 40	DN 50	DN 50	DN 65

Sizing the expansion vessel

In accordance with EN 12828, water heating systems must be equipped with a diaphragm expansion vessel. The size of the expansion vessel to be installed is subject to the heating system specification and should be checked in each case.

Quick selection table for calculating the vessel size V_n

Safety valve p_{sv}	**bar**	**3.0**			**V_n**
Pre-charge pressure	**bar**	**1.0**	**1.5**	**1.8**	**litre**
System volume V_A	litre	220	—	—	25
		340	200	—	35
		510	320	200	50
		840	440	260	80
		1050	540	330	100
		1470	760	460	140
		2100	1090	660	200
		2630	1360	820	250
		3150	1630	990	300
		4200	2180	1320	400
		5250	2720	1650	500
		6300	3260	1980	600
		8400	4350	2640	800
		10500	5440	3300	1000

Selection example

Conditions:

p_{sv} = 3 bar (response pressure of the safety valve)
H = 13 m (static head of the system)
Q = 18 kW (rated heating output of the heat source)
v = 8.5 l/kW (specific water capacity)
Panel radiators 90/70°C
V_{PH} = 1000 l (volume of buffer cylinder)

The specific water capacity v was determined as follows:
- Radiators: 13.5 l/kW
- Panel radiators: 8.5 l/kW
- Underfloor heating system: 20 l/kW

Calculation:

V_A = Q x v + 1000
V_A = 18 kW x 8.5 l/kW + 1000 l
= 1153 l

If possible, when calculating the gas pre-charge pressure, select a supplement of 0.2 bar:
p_0 ≥ H/10 + 0.2 bar
p_0 ≥ (13/10 + 0.2 bar) = 1.5 bar

From the table:

With p_{sv} = 3 bar, p_0 = 1.5 bar, V_A = 1153 l
V_n = 250 l (for V_A max. 1360 l)

Selected:

1 x diaphragm expansion vessel N 250 (from Vitoset pricelist)

- All details relate to a flow temperature of **90 °C**.
- The tables have allowed for a hydraulic seal to DIN 4807-2.

Recommendation:

- Select a sufficiently high safety valve response pressure:
  $p_{sv} \geq p_0 + 1.5$ bar
- For circulation pumps, due to the inlet pressure required, select at least 0.3 bar above the pre-charge pressure even for attic installations: $p_0 \geq 1.5$ bar
- Set the fill or starting pressure on the water side of vented systems in their cold state at least 0.3 bar above the pre-charge pressure:
  $p_F \geq p_0 + 0.3$ bar

Conversion factors for alternative flow temperatures other than 90 °C

Flow temperature °C	50	55	60	65	70	75	80	85	**90**	95	100
Conversion factor	3.03	2.50	2.13	1.82	1.59	1.39	1.24	1.11	**1.00**	0.90	0.82

Divide the vessel size found in accordance with the above tables by the conversion factor.

9.5 Electrical installation

Requirements

The electrical installation should be carried out in accordance with the wiring diagram. In the vicinity of hot parts (flue gas fan, flue pipe), cables must be routed in steel pipes and with appropriate clearances for temperature protection.
The cable entries for motors and appliances must be dust-proof and provided with strain relief.

Note
The regulations of the local power supply utility must be observed.

Positioning the control panel

Optimal positioning of the control panel can minimise cable lengths and therefore reduce costs. The location of the control panel must be selected so that negative influence caused by thermal radiation (boiler front panel, boiler back panel with flue gas collector and flue gas fan, as well as flue pipe) and exposure to dust during cleaning is minimised.

The ambient temperature of the control panel (approx. 10 cm away from the control panel) must not exceed 40 °C. In case of doubt, locating the control panel outside the boiler room near the boiler room door is preferred.

Note
The regulations of the local power supply utility must be observed.

9.6 Safety equipment to EN 12828

The safety equipment for the heating system must be installed by the authorised heating contractor.

EN 12828 applies to the design of hot water heating systems with safety temperatures up to 105 °C and a maximum rated output of 1 MW.

In the case of sealed unvented hot water heating systems, boilers with a rated heating output of up to 300 kW must be fitted with the following safety equipment:
- Diaphragm expansion vessel
- Safety valve

Expansion
In a sealed unvented system, the pre-charge pressure of the expansion vessel must be equal to the maximum system height plus 0.2 bar (0.02 MPa). For sizing the expansion vessel, see chapter "Expansion vessel sizing".

Safety valve
Equip the boilers with a type-tested safety valve. For all other operating conditions, this must be identified in accordance with TRD 721 with "D/G/H". Install the safety valve at an easily accessible location at the highest point of the boiler or in the immediate vicinity of the flow line. It must not be possible to shut off the line between the boiler and the safety valve. Pumps, fittings or constrictions must not be present in the line. The discharge pipe must be designed in such a way that no pressure increase is possible. Any expelled heating water must be drained off safely. The outlet point of the discharge pipe must be arranged in such a way that any water expelled from the safety valve can be drained off safely and visibly.

Note
The safety valve is not part of the standard delivery of the boiler.

High limit safety cut-out
Equip each directly heated boiler with a high limit safety cut-out that will shut down the combustion system when the permissible flow temperature is exceeded and prevent automatic restarting. A reset can only be performed manually by specialist personnel.

- Drain & fill facility
- High limit safety cut-out
- Thermometer
- Pressure gauge
- Low water indicator

Thermometer
The flow temperature of the boiler must be indicated by a thermometer.

Pressure gauge
Every sealed unvented heating system must be equipped with at least one pressure gauge that indicates positive pressure in bar.

Low water indicator
Boilers must be protected against water shortage to ensure that the combustion system is shut down and locked out if necessary. Install this in the flow line close to the boiler.
- With boilers up to a rated output of 300 kW, a low water indicator can be omitted as long as heating can be reliably prevented when the water level is low, e.g. by installing a minimum pressure limiter.
- In attic heating centres a low water indicator or other suitable device is required for every boiler to protect it against overheating in case of water shortage.

9.7 Safety equipment to protect against overfilling with fuel and burn-back

Safety equipment for burn-back prevention

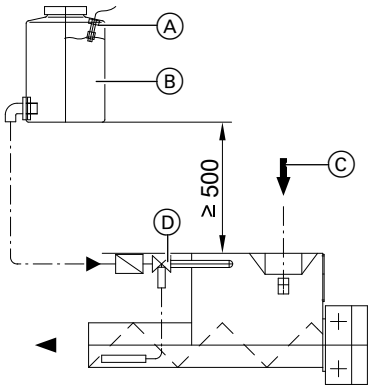
Automatic extinguishing device (SLE)

The purpose of the automatic extinguishing device on the feed is to safely prevent burn-back in the event of a fault, e.g. a power failure. The automatic extinguishing device is fitted with a 25 l extinguishing water tank and a float switch. In the event of excessive temperature, the feed screw conveyor is flooded just enough to ensure the system is safe. The float switch monitors the fill level or level of the extinguishing water tank. If the level is not reached, the solid fuel boiler shuts down and sets a fault message. For safety reasons and in order to avoid damage caused by flooding, it is not advisable to connect the extinguishing device directly to the water mains (cold water supply).

Design information (cont.)

Extinguishing device with extinguishing water container

For part no., see pricelist



Standard delivery:
- Danfoss AVTA extinguishing valve, adjustable 50 - 90° with dirt trap
- Extinguishing water container, 25 l, with retainer and water level monitoring (float switch)

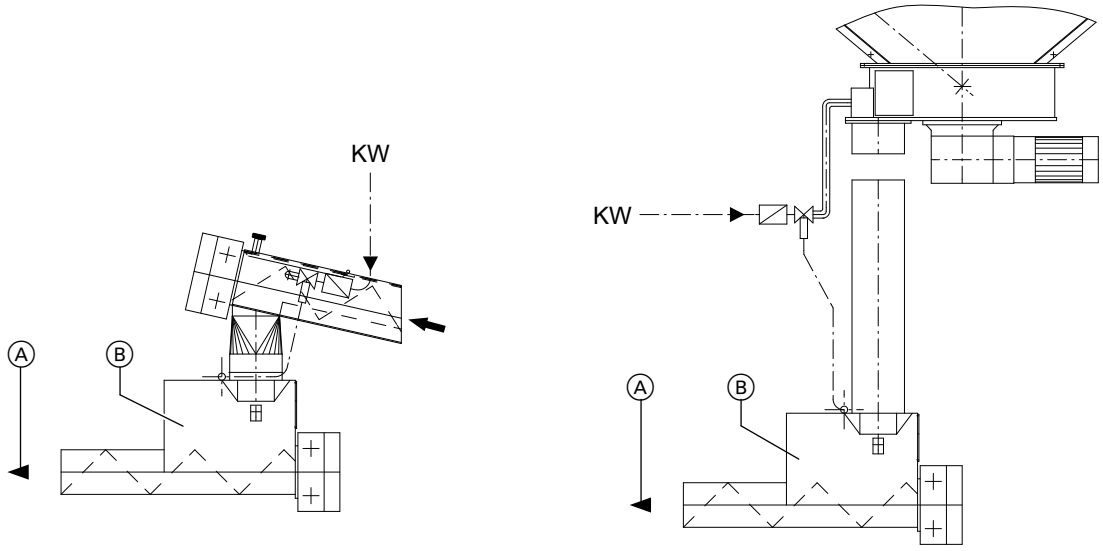
Note
The automatic extinguishing device is included in the standard delivery of the boiler.

Note
- *Valve setting 50 - 90 °C*
  3 corresponds to approx. 80 °C
- *The lines must be secured in metal pipes (½").*

Ⓐ N25 fill level monitoring
Ⓑ 25 l extinguishing water container
Ⓒ Material supply
Ⓓ Water valve

Extinguishing device with cold water supply

For part no., see pricelist



Ⓐ Combustion
Ⓑ Dosing container with barrier layer
KW Cold water supply DN 15 ½"
min. 2.0 bar (0.2 MPa), max. 3.0 bar (0.3 MPa)

Note
- *The lines must be secured in metal pipes (½").*
- *It must not be possible to shut off the cold water supply without the aid of tools.*

Note
Alternative or additional safety equipment
A shut-off gate valve is standard for an unpressurised material store or a rotary lock valve for a material store with overpressure (charging with fan, e.g. wood processing operations).

Preventing overfilling with fuel

To avoid overfilling the combustion chamber, install a fill level monitor in accordance with TRVB H-118. The light barrier installed in the boiler is used for this purpose.

Burn-back protection device (RHE)

A sensor located directly on the feed pipe detects any sign of burn-back risk. Briefly increasing the output (increasing the infeed of the material) counteracts the risk in good time.

By combining with the fuel overfill protection, activation of any specified protection device is prevented and standard mode is maintained to ensure extremely reliable heat supply.

Reignition protection (RZS)

In accordance with TRVB H-118 and EN 303-5, automatic wood combustion systems in which there is a risk of reignition due to a shower of sparks or the ignition of combustible gases flowing back into the conveyor pipe must be equipped with reignition protection.

Protection against solid fuel boiler reignition
- Permanent and monitored barrier layer
- Permanent monitored negative pressure operation
- Combination with the RSE (rotary lock valve or shut-off gate valve)

Note
The RSE is not included in the standard delivery and must be ordered separately.

Temperature and flame monitor (TÜF, FÜF)

In accordance with TRVB H-118, the solid fuel boiler is monitored for falling below the temperature limit. The system is also shut down if start-up combustion does not develop.

Burn-back protection device (RSE)

Note
See page 37

Additional "material transport burn-back protection" depends on the respective requirements (location, size of the fuel store, material, pressure, regulations) and is a separate item from the standard delivery ordered.

Available burn-back protection devices (RSE):
- Shut-off gate valve
- Rotary lock valve

Available extensions for burn-back protection devices (RSE):
- Dual rotary lock valve
- Drop chute

Note
In wood processing operations, 2 burn-back protection devices connected in series are required.
For example 2 rotary lock valves or 1 rotary lock valve in combination with a shut-off gate valve.

Note
Ensure a sufficient minimum distance between the RSE and the fuel charging system.

Shut-off gate valve
A shut-off gate valve is permitted in all non-pressurised fuel stores. According to TRVB H-118 (test certificate BV 2979/89), it is deemed a suitable burn-back protection device.

Rotary lock valve
Due to the pressure load, at least one rotary lock valve is required to reduce pressure between the fuel store and the boiler if wood remnants are blown into fuel storage rooms by fans. The rotary lock valve is suitable for reducing pressure. It is deemed a suitable burn-back protection device both in EN 303-5 and TRVB H-118 (test certificate BV 2979/89).

Dual rotary lock valve with pressure compensation
If, due to special circumstances, extremely high overpressure can be expected in the fuel store, then in accordance with the relevant project plan, 2 rotary lock valves with a pressure compensation line to the open air must be installed in the material transport path.
The maximum pressures to be expected must be confirmed by the supplier of the chip extraction system. Leaks may occur in the rotary lock valve under the discharge system as a result of wear on the sealing elements or due to larger pieces of wood that cannot be transported. Such leaks may allow the back flow of low temperature carbonisation gases from the combustion system into the fuel store. A flue gas alarm must be installed between the rotary lock valve and the discharge system which, when responding, switches off the system causing the negative pressure.
- Max. permissible positive pressure in the fuel store: + 1200 Pa
- Max. permissible negative pressure in the fuel store: + 0 Pa

Drop chute
A drop chute may be required in order to provide a sufficient distance between the RSE and the charging device. This prevents combustible material from being conveyed back (possibly by embers or sparks).

Note
The drop chute must be used in conjunction with an additional RSE. The design (diameter, profile) of the drop chute is matched to the relevant project at the factory.

9.8 Fire safety

The fire safety regulations for wood combustion systems vary from country to country.

The regulations applicable to the specific installation location must be observed.

Fuel store fire safety

The measures required for this (such as for example, temperature monitoring devices in the fuel store/hopper ("TÜB"); manually actuated extinguishing device ("HLE")) are not part of the Viessmann Holzheiztechnik GmbH standard delivery.

Note
In this regard, the conditions of the local planning office must be met by the operator.

9.9 Commissioning

Initial commissioning of a newly installed system may only be carried out by Viessmann or another heating contractor trained and authorised by Viessmann. Prior to commissioning, the system must be filled with water, fuel must be provided for commissioning and the installation must be checked.

Fuel for commissioning

Before storing the fuel, the function of the silo discharge system must be tested by an authorised contractor. Consequently, the fuel should not be stored until after the authorised contractor has arrived.

Note
For a list of permitted fuels for commissioning the Vitoflex 300-RF, see the chapter on "Fuels". Page 108.

Amount of fuel to be stored for commissioning

Rated heating output	Quantity
150 kW	approx. 1200 kg
220 kW	approx. 1500 kg
300 kW	approx. 2000 kg
400 kW	approx. 2500 kg
540 kW	approx. 3000 kg

The required quantity corresponds to consumption of approx. 10 – 24 full operating hours. This allows the discharge to be cleared quickly in the event of a fault.

Note
The fuel should not be stored until after the authorised contractor has arrived.

9.10 Fuels

The Vitoflex 300-RF is suitable for the following dry fuels:
- Woodchips up to a moisture content of 35 % (M35/P31S)
- Wood pellets to EN 17225-2, class A1 D06

Note
The following are unsuitable for combustion: Fossil fuels and those containing sulphur, such as anthracite and coke, as well as plastics, grain, straw, material soaked in flammable liquids and wood remnants treated with plastics or wood preservatives.

Note
See information on fuels in chapter 1 from page 6.

9.11 Standard values for water quality

The service life of any boiler as well as that of the complete heating system is influenced by the quality of the water.
The cost of a water treatment facility is always going to be less than that of repairing damage to your heating system.
Observing the following requirements is necessary to safeguard your warranty rights. The manufacturer's warranty excludes damage due to corrosion and scaling.

The main water quality requirements are summarised below.
A chemical water treatment can be ordered from Viessmann for filling.

Heating systems with rated operating temperatures up to 100 °C (VDI 2035)

The water used in heating systems must comply with the chemical values of the Drinking Water Ordinance [Germany]. If well water or similar is used, check its suitability before filling the system.

Avoid excessive scale deposits (calcium carbonate) on the heating surfaces. For heating systems with operating temperatures up to 100 °C, Guideline VDI 2035 Part 1 "Prevention of damage in water heating installations - Scaling in domestic hot water supply installations and water heating installations" applies together with the following standard values. For more information, see the explanations for guideline VDI 2035.

Total heating output in kW	> 50 to ≤ 200	> 200 to ≤ 600	> 600
Total alkaline earths in mol/m³	≤ 2.0	≤ 1.5	< 0.02
Total hardness in °dH	≤ 11.2	≤ 8.4	< 0.11

The standard values assume the following conditions:
- The total volume of fill and top-up water will not exceed three times the water content of the heating system during its service life.
- The specific system volume is less than 20 l/kW heating output. In multi boiler systems, apply the output of the smallest boiler.
- All measures to prevent corrosion on the water side in accordance with VDI 2035 Part 2 have been implemented.

Soften the fill and top-up water in heating systems with the following conditions:
- The total of alkaline earths in the fill and top-up water exceeds the standard value.
- Higher fill and top-up water volumes are expected.
- The specific system volume is greater than 20 l/kW heating output. In multi boiler systems, apply the output of the smallest boiler.

When designing the system, observe the following:
- Install shut-off valves in each section. This prevents the need for draining all the heating water in the case of repairs or system expansion.
- Install a water meter to record the volume of fill and top-up water. The volumes and hardness of the topped-up water volumes must be entered in the boiler service instructions.
- For systems with a specific volume greater than 20 litres/kW heating output (for multi boiler systems, the output of the smallest boiler should be used), the requirements of the next highest total heating output group should be applied (using the table). If even bigger (> 50 litres/kW), soften the water down to a total of alkaline earths of ≤ 0.02 mol/m³.

Operating information:
- Start the system gradually at a high heating water flow rate, starting with the lowest boiler output. This prevents localised concentration of limescale deposits on the heating surfaces.
- For multi boiler systems, all boilers should be started at the same time to prevent the entire volume of limescale settling on the heat transfer surface of only one boiler.
- During expansion or repair work, only drain the necessary sections.
- Where water treatment is required, treat even the first fill of the heating system prior to commissioning. This also applies to any subsequent filling, e.g. when adding top-up water or after a repair, or for any system expansion.
- Periodically inspect, clean and activate all filters, dirt traps or other blow-down or separating facilities in the heating water circuit after reinstalling or installing for the first time. Thereafter, this may be one as required, depending on the type of water treatment applied (e.g. water softening).

The build-up of limescale deposits on the heating surfaces will be minimised if these instructions are followed.
If failure to observe guideline VDI 2035 results in harmful limescale deposits, the service life of the installed boilers will in most cases have already been reduced. Removing limescale deposits may be an option to restore the operating capability. This must be carried out by Viessmann Industrieservice or a specialist contractor. Inspect the heating system for possible damage prior to returning it into use. The faulty operating parameters must be corrected in order to prevent excessive scale build-up from reoccurring.

Filling the heating system

The charge pressure of the cold hydraulic seal must be approx. 0.1 bar (0.01 MPa) higher than the pre-charge pressure of the sealed expansion vessel. However, it must not exceed a maximum of 3 bar (0.3 MPa).

9.12 Frost protection

Special antifreeze suitable for heating systems can be added to the fill water. The antifreeze manufacturer must verify its suitability, since otherwise damage to gaskets and diaphragms can occur as well as noisy heating operation. Viessmann accepts no liability for any resulting damage or consequential losses.

When planning, take into account that the use of antifreeze reduces the output of the boiler.

9.13 Connection on the flue gas side

Chimney

The Vitoflex 300-RF has output-dependent control modulating between 30 - 100 % of the rated heating output. This results in flue gas temperatures in the range of min. 100 °C and max. 250 °C. In order to avoid a risk of soot contamination, there should be an insulated chimney. The route from the flue gas fan to the chimney should be as short as possible. If at all possible, avoid 90° bends in the flue system. Flue pipes over 1 m long must be thermally insulated. The chimney should be connected so as to rise at an angle of 30 - 45°. The flue pipe, including the inlet to the chimney, must be gas-tight. A draught stabiliser (draught limiter) in the chimney is an essential requirement to ensure the Vitoflex 300-RF operates as intended.

A chimney compliant with regulations relevant to the rated boiler heating output is required for efficient boiler operation.
Provide verification to EN 13384.
Flue gas temperatures below 90 ºC can occur in the lower output range. Therefore, connect the boiler to a **moisture-resistant chimney** (thermal resistance class I according to DIN 18160 Part 1).

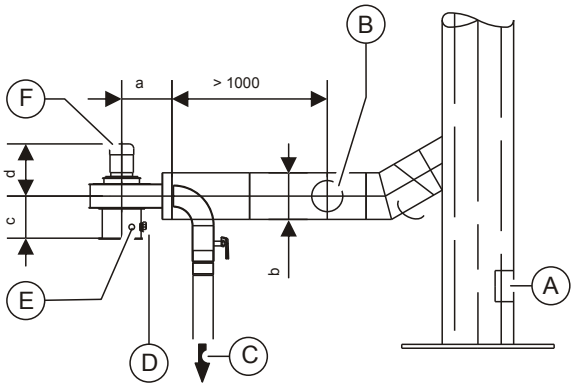
Note
*If the boiler is **not** to be connected to a moisture-resistant chimney, carry out a chimney calculation or request a chimney assessment (values for a chimney calculation, see page 14).*

Flue pipe (sizing)

Acoustic transmission may arise from the flue gas fan, which can lead to excessive noise. We therefore recommend making the connection to the chimney with a flexible flue pipe inlet.

Observe the following when connecting the flue pipe:

- Install the flue pipe with a rise to the chimney (45° if possible).
- Never push the flue pipe too far into the chimney.
- Ensure the entire flue gas path (including cleaning aperture) is gas-tight.
- Never seal the flue pipe into the chimney. Connect the flue pipe with a flexible flue pipe inlet.
- Provide a cleaning aperture.
- Use wall liners to adapt to flue systems from other manufacturers.
- Provide the flue pipe with thermal insulation at least 30 mm thick.



Ⓐ Recommended installation position of the draught stabiliser (chimney draught limiter)
Ⓑ Alternative installation position to Ⓐ of the draught stabiliser (chimney draught limiter)
Ⓒ Recirculation
Ⓓ Lambda probe with transducer
Ⓔ Flue gas temperature sensor
Ⓕ Flue gas fan

Rated heating output	kW	150	220	300	400	540
a	mm	292	292	323	323	442
b	mm	250	250	300	350	350
c	mm	232	257	277	355	355
d	mm	358	358	352	375	375

9.14 Sound insulation

The fans, circulation pumps and other units used in heating systems generate noise.
Noise is transferred from the installation room via the floor, ceiling and walls to neighbouring rooms and via the flue system as well as the ventilation air and extract air apertures to other rooms and to the outside.

There it may be considered a nuisance. To avoid this happening, additional protective measures may be required which should be considered at the design stage.
Subsequent measures to reduce noise development frequently require extensive effort and expenditure.

Airborne noise attenuation
To assess the noise emissions to the surrounding area, it is therefore advisable to consider the sound power level measured at the flue system terminal. It should be considered at the engineering stage whether a flue gas silencer will be necessary. It is important to ensure there will be sufficient space for the flue gas silencer behind the boiler. In accordance with EN 13384, the pressure drop of the flue gas silencer on the flue gas side will be required for calculating the flue system.

Structure-borne noise attenuation
Anti-vibration supports for the heat generator are an economical and effective measure. We therefore offer anti-vibration supports for this purpose. When sizing such supports, take the entire operating weight of the boiler system into consideration and, when using linear anti-vibration brackets, the condition of the supporting surface. Effective structure-borne noise attenuation is particularly important when installing boilers in attics. Compensators may be used to physically separate the combustion equipment from the building. These should be installed as near as possible to the boiler in the flow, return and safety line. Also insulate any braces or brackets, if installed, against sound/vibration transmission to the building. Detailed information for reducing noise emissions from combustion equipment in heating systems can be found in Information Sheet No. 10 of the BDH (Federation of German Heating Industry).

Appendix

10.1 General information on low pressure hot water boilers with safety temperatures of up to 110 °C

The pressure vessel (hot water boiler) is built in accordance with TRD 702 and must be equipped in line with this directive. Observe the operating conditions in this directive. Depending on type, the boiler meets the following standards regarding the stated rated heating output and technical requirements:
- DIN 4702 or EN 303
- EN 297
- EN 483
- EN 677

See details on the type plate and in the enclosed documentation.
During installation and commissioning of this boiler, observe all local Building Regulations and regulations concerning combustion systems, as well as the following Standards, Regulations and Directives:
- **DIN 18160-1:** Chimneys (design and performance)
- **DIN 1988:** Codes of practice for drinking water installations (TRWI)
- **DIN 4753:** DHW systems for potable water and for process water
- **EN 12828:** Heating systems in buildings – Design of hot water heating systems
- **EN 13384:** Chimneys – Thermal and fluid dynamic calculation methods
- **TRD 702:** Equipment for steam boiler systems with class II hot water boilers
- **Also observe EN 12953** in the case of:
  – Low pressure hot water boilers with safety temperatures > 110 to 120 °C
- **EN 12953-1:** Shell boilers – General
- **EN 12953-6:** Shell boilers – Requirements for equipment for the boiler
- **EN 12953-7:** Shell boilers – Requirements for firing systems for liquid and gaseous fuels for the boiler
- **EN 12953-8:** Shell boilers – Requirements for safeguards against excessive pressure
- **EN 12953-10:** Shell boilers – Requirements for feedwater and boiler water quality

Use of oil combustion
- **DIN 4755:** Oil firing installations
- **DIN 4787-1:** Atomising oil burner (above 100 kg/h)
- **DIN 51603-1**: Liquid fuels; fuel oil EL, minimum requirements
- **EN 230:** Specification for monobloc oil burners – Safety, control and regulation devices and safety times
- **EN 267:** Pressure-jet oil burner with fan
- **TRD 411:** Oil combustion for steam boilers (where applicable)

Use of gas combustion
- **EN 298:** Automatic gas burner control systems for gas burners and gas burning appliances with or without fans
- **EN 676:** Gas burners with fans
- **DVGW Code of Practice G 260/I and II**: Technical rules for gas quality
- **DVGW-TRGI 2008:** Technical rules for gas installations
- **TRD 412:** Gas combustion for steam boilers (where applicable)
- **TRF 1996:** Technical rules liquid gas

10.2 Pipe connections

All pipe connections to solid fuel boilers should be made free of load and torque stress.

10.3 Electrical installation

Carry out the electrical connection and installation in accordance with VDE regulations (DIN VDE 0100 and DIN VDE 0116) and the technical connection requirements laid down by your electricity supply company.

- **DIN VDE 0100:** Installation of HV systems with rated voltages up to 1000 V
- **DIN VDE 0116:** Electrical equipment for combustion systems

10.4 Operating instructions

According to EN 12828 section 5 and EN 12170/12171, the system installer must provide operating instructions for the whole system.

10.5 Checks as part of the Building Regulations approval procedure

As part of the building inspectorate approval process, condensing combustion equipment is tested by the flue gas inspector (where applicable) for adherence to Building Regulations and any general recognised technical rules to be observed.

The State Building Regulations, their implementation orders and the combustion equipment ordinances, as well as the general building inspectorate approvals and permits of the higher supervisory authority, in individual cases, are part of the Building Regulations requirements.

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