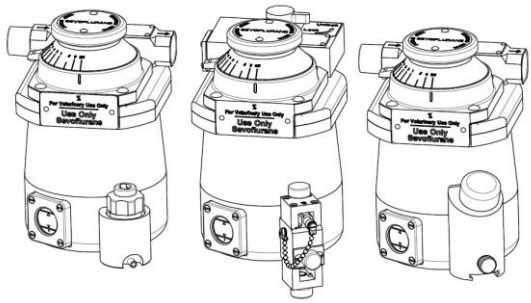
# Norvap International Operation & Maintenance Manual

## Apollo Vaporiser



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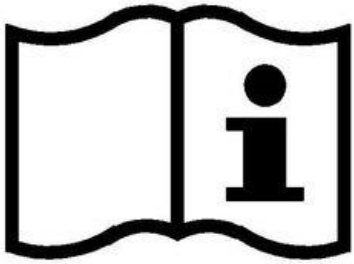


# Read This Manual Before Installing and Operating the Vaporiser

## 1 Introduction

This Apollo Tec 3 Style anaesthetic vapour delivery systems has been manufactured to comply with EN ISO 80601-2-13.

This Apollo Tec 3 Style anaesthetic vapour delivery system is to be used with halogenated anaesthetic agent monitoring equipment that complies with EN ISO 80601-2-55.

The Apollo Tec 3 Style anaesthetic vapour delivery system is to be used with an anaesthetic gas delivery system that complies with EN ISO 80601-2-13.

The Apollo Tec 3 Style anaesthetic vapour delivery system is to be used with an anaesthetic gas scavenging system that complies with EN ISO 80601-2-13.

The Apollo Tec 3 Style anaesthetic vapour delivery system can only be used with the agent filling system specified and which complies with BS EN ISO 5360:2012.

### 1.1 Warnings / Cautions

**WARNING:** Warnings tell about a condition that can cause injury to the user or the patient.

**CAUTION:** Cautions tell about a condition that can cause damage to the vaporiser and may result in injury to the user or the patient.

This manual and all its associated documentation must be studied thoroughly before any attempt is made to install, operate or maintain any part of the Apollo Tec 3 Style vaporiser. Failure to do so may result in user / patient injury.

Special attention must be paid to each Warning and Caution as it appears in the manual.

**WARNINGS**

The Apollo Tec 3 Style vaporisers are NOT MRI compatible.

Do NOT fill the Apollo Tec 3 Style vaporiser with any anaesthetic agent other than the one specified on the front label. Any other agent used other than the one specified can prove dangerous to the patient.

Do NOT overfill the Apollo Tec 3 Style vaporiser with any anaesthetic agent above the maximum fill level as this may affect the performance of the device. If it is over filled, then drain out the excess as described until the correct level is regained before use.

There is no interlock fitted to the Apollo Tec 3 vaporiser therefore ONLY one vaporiser to be connected at any one time to avoid cross contamination.

The Apollo Tec 3 Style vaporiser must NOT be used between zero and the first calibration, if applicable.

Keep the Apollo Tec 3 Style vaporiser upright at ALL times.

Ensure ALL connections are gas tight before using the machine.

Before use, ALL connections must be checked for leaks and functional tests MUST be performed as described in the anaesthetic machine user manual.

The dial control must be OPEN during all filling and draining operations.

Do NOT drain the anaesthetic agent into any other container other than a correctly marked container for disposal. Anaesthetic agents must be treated as pharmaceutical products and must never be drained into an open container or reused in case of contamination. The liquid must always be disposed of as a hazardous chemical.

After draining the Apollo Tec 3 Style vaporiser always ensure the drain plug is fully tightened before replacing the screw cap (if applicable – dependant on vaporiser configuration).

Do NOT turn the control dial on during filling, or attempt to fill the vaporiser beyond the full mark.

When filled with anaesthetic agent the dial control must be set at “OFF” when not in use and/or during transportation.

Anaesthetic agents are poisonous; great care must be taken to avoid the spilling of an agent during filling or draining to prevent the risk of persistent inhalation of trace concentrations from the atmosphere.

Expired anaesthetic gases must be removed from the operating theatre by an appropriate anaesthetic gas scavenging system.

Periodically check the agent level. The Apollo Tec 3 Style vaporiser must be filled at appropriate intervals. The vaporiser will function satisfactorily as long as the anaesthetic agent is above the minimum level mark on the agent level indicator.

Agent specific filling cannot be assured when bottles without collars are used.

Ensure the Apollo Tec 3 Style vaporiser is secured in an upright position for a minimum of 10 minutes before it is connected to a patient or a breathing system. Excess dosage may be delivered if the vaporiser is moved suddenly during use.

The Apollo Tec 3 Style vaporiser MUST be connected so that the flow of the gas to the patient is as indicated by the arrows on the device. The delivered concentration will be incorrect if the flow is reversed.

The Apollo Tec 3 Style vaporiser has a relatively high resistance and must NOT be incorporated in a breathing system downstream of the common gas outlet.

Do NOT put water or any other solvent in the Apollo Tec 3 Style vaporiser. Use the specified anaesthetic agent only.

Do NOT use the Apollo Tec 3 Style vaporiser if it has been dropped.

Do NOT carry the Apollo Tec 3 Style vaporiser by the control dial.

Do NOT immerse the Apollo Tec 3 Style vaporiser in any liquid including water.

Do NOT sterilise the Apollo Tec 3 Style vaporiser.

Do NOT modify, tamper with or disassemble the Apollo Tec 3 Style vaporiser. If the vaporiser is modified in any way there is danger of damaging the vaporiser and the accuracy of graduation.

Do NOT use if changes in the performance of the device have been identified.

**CAUTIONS**

The Apollo Tec 3 Style vaporiser may be pressurised. Turn the screw cap slowly when filling or draining vaporisers which are filled with screw cap fillers.

Turn the vaporiser dial control to “OFF” when not in use.

Halothane vaporisers must be periodically drained to prevent the build-up of Thymol.

### 1.2 Intended User Responsibility

This product will perform in conformity with the description thereof enclosed in this operating manual and associated labels, when assembled, operated, maintained and repaired in agreement with the instructions provided. The Apollo Tec 3 Style vaporiser is intended to be used by an anaesthesiologist trained in the use of this device. The device must be checked periodically. It must be operated and maintained in accordance with the instructions provided. A defective vaporiser must not be used. Components which are damaged, worn, distorted, broken, contaminated or missing must be replaced immediately. Should such repair or replacement be necessary, Norvap International recommend that a verbal or written request be made only to a Norvap International approved agency. The vaporiser must not be altered or modified in any way without prior written consent from Norvap International. The user of this vaporiser shall have sole responsibility for any malfunction, which results either from alteration by anyone other than Norvap International approved personnel, or from improper use, incorrect maintenance, improper repair or damage.

**1.3 Servicing**

The Apollo Tec 3 Style vaporiser must only be serviced by qualified service personnel. The contents of this manual are not binding. If any significant difference is found between the product and this manual, please contact Norvap International for further information.

To ensure that the Apollo Tec 3 Style vaporiser functions correctly, it must be serviced at regular intervals at a Norvap International approved Service Centre. Norvap International stipulates that the vaporiser must be serviced at intervals not exceeding three (3) years and calibrated at intervals not exceeding twelve (12) months. This is a criterion of the warranty.

***NOTE: Halothane vaporisers must be serviced annually.***

Qualified service personnel and genuine spare parts must be used for all servicing and repair requirements. Norvap International will otherwise not assume responsibility for the materials used, the work performed, or any possible consequences of the same.

If the equipment is to be transported back to Norvap International, drain the vaporiser, package it securely for protection in its original packaging. Enclose the following items:

1. A letter describing the fault with the equipment.

2. Warranty information e.g. copy of the invoice or applicable documentation.
3. Purchase Number for cover of repair of equipment not under warranty.
4. Customer information, shipping and bill to details.

**2. Description**

**2.1 General**

The Apollo Tec 3 Style vaporiser is designed for “out of circuit” use in fresh gas supply of a continuous flow techniques of inhalation anaesthesia. Each vaporiser is agent specific and is clearly labelled with the anaesthetic agent that it is designed for.

The Apollo Tec 3 Style vaporiser is temperature, flow and pressure compensated so that its output remains relatively constant despite cooling due to the vaporisation and variations in inlet flow.

The Apollo Tec 3 Style vaporiser provides accurate concentrations of anaesthesia gases in the fresh gas supply; the concentration is specified using the dial on vaporiser. The fresh gas supply must be between 0.5 and 10LPM.

The Apollo Plug on Block Tec 3 Style vaporiser is designed to be used on a Selectatec Compatibility Block only.

**Warning: If the vaporiser has been inverted, connect to a gas scavenging system, set the dial to the top output and purge the system with the carrier gas at 5LPM for 5 minutes.**

**Warning: improper use may result in patient injury.**

**Caution: Ensure the vaporiser is kept upright at all times.**

**Caution: Turn the vaporiser to the OFF position when not in use.**

## 2.2 The Dial Control

To set the desired concentration of anaesthetic agent, a single Dial Control with a concentration scale calibrated in % of anaesthetic agent vapour per volume (v/v) is used. This Dial Control incorporates a release button (see Fig 1 and 2) to help prevent accidental rotation of the dial from the “OFF” to the “ON” position. A counter-clockwise rotation of the dial and simultaneous depression of the release button is required to set the vaporiser to the on position.

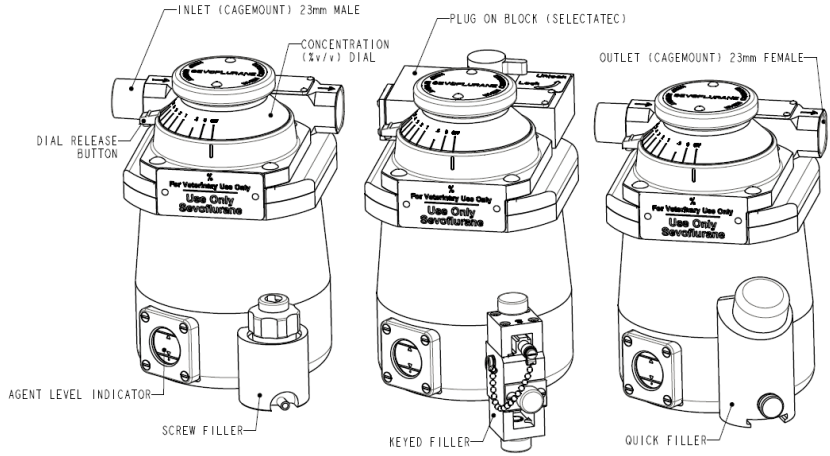



**Figure 1 Apollo Tec 3 Style Vaporisers**

## 3 Specifications

Apollo Tec 3 Style vaporisers are calibrated at 71.6°F (22°C) +/- 1°C using an oxygen carrier gas at a flow of 3 litres/minute. The variation in output with temperature, flowrate and duration of use is small, and the variation of output when used with Intermittent Positive Pressure Ventilation is negligible.

The output of the vaporiser is affected by barometric pressure, and it may be necessary to use a correction factor when analysing the output, especially at high altitudes >1500 metres. The barometric pressure is not normally of clinical significance

### 3.1 Liquid Capacity

Amount of anaesthetic agent to fully charge the vaporiser from empty is 150 mls (nominal).

Amount of anaesthetic agent to recharge the vaporiser from low level is 90 mls (nominal).

Amount retained by wick system is 60 mls (nominal).

### 3.2 Flow Rate

The Apollo Tec 3 Style Vaporiser is compatible with Gas flow of 0.5 to 10 litres/minute. Flow outside this range may affect the performance.

### 3.3 Temperature Range

The Apollo Tec 3 Style vaporiser is designed to operate at temperatures between 64.4°F (18°C) and 95°F (35°C).

The Apollo Tec 3 Style vaporiser Storage temperature range is -4°F (-20°C) to +113°F (+45°C).
Note: The vaporiser packaging must be protected from condensation.

### 3.4 Performance

Accuracy at 3 Litres/minute with Oxygen at 22°C ± 1°C is ±15% dial setting.
All Norvap International veterinary vaporisers are calibrated at 3 litres/min with oxygen.

### 3.6 Symbols Used

| Symbol | Indication/meaning |
|---|---|
|  | Mandatory to read the instruction manual. |
|  | Warning, cautions and read instruction label. |
|  | Maximum fill line symbol on the filling sight glass.<br>(Agent level indicator). |
|  | Minimum fill line symbol on the filling sight glass.<br>(Agent level indicator). |
|  | Direction of Flow |
| % | Percentage concentration |

## 4 Installation

The Apollo Tec 3 Style vaporiser must always be mounted between the flow meter unit and the patient breathing circuit, but upstream of any absorber or humidifier. The vaporiser must be connected so that the flow of gas to the patient is as indicated by the arrows on the device.

Check the integrity of the fittings to ensure that they are leak tight. If in doubt, seek advice from the manufacturer of the equipment to which the vaporiser is attached.

Ensure that the vaporiser is cleaned prior to first use. Remove the vaporiser from its packaging, clean the exterior of the Tec 3 style vaporiser with a cloth dampened with CE marked disinfectant as per the manufacturer's instructions.

Never allow cleaning agents to accumulate in the filler or gas inlet and outlet ports or around the dial control.

### 4.1 General

Unless otherwise specified, all Apollo Tec 3 Style vaporisers are supplied as standard with either 23mm Cagemount fitting inlet and outlet ports or a Selectatec compatible ports.

**Warning: Do not lift or support the vaporiser by the control dial, handle with care at all times.**

**Warning: Do not use vaporiser if the liquid level is below the minimum marker.**

**Warning: Allow the vaporiser to acclimatise to ambient temperature of the location it is being used in, before the vaporiser is used.**

**4.2 Mounting the Vaporiser - Cagemount**

Remove any dust caps before mounting. Cagemount fitted vaporisers have the standard 23mm tapered ports: male (inlet) on the left and female (outlet) on the right when viewed from the front, see Figure 1. There are two M6 threaded holes at the rear of the vaporiser, which are utilised to secure the vaporiser onto the backbar of the anaesthesia machine using appropriate M6 studs and spacers.

(i) Lightly smear the tapers with oxygen safe grease such as Fomblin UT18.

(ii) Push the gas tubing fully onto appropriate tapers and fully tighten the vaporiser securing nuts.

**Warning: Ensure all joints are gas-tight before using the machine, perform a backbar function test as described in the anaesthetic machine User Manual.**

**Warning: For cagemount models only one vaporiser to be connected at any time.**

**4.3 Mounting the Vaporiser - Selectatec**

**Warning: Before fitting the vaporiser to the Selectatec manifold ensure that the "O" rings on each manifold port valve are in good condition and no foreign matter around the mating surface, this could cause leaks if not checked correctly.**

1. Remove any dust caps before mounting.
2. Check all the port valve 'O' rings, ensure they are free from damage and intact, replace if necessary.
3. Ensure the vaporiser concentration control dial is in the 'OFF' position.
4. Ensure that the locking lever is in the unlocked position.
5. Carefully lower the vaporiser onto the manifold so that the vaporiser Plug on Block port covers the two manifold port valves. Ensuring the ports are correctly engaged with the valves.

**Caution: Make sure that the locking lever is pushed all the way down before turning it. The mechanism can be damaged if the locking lever is turned before it is at the full extent of its vertical travel.**

**Warning: To help to ensure correct operation, do not use a vaporiser which is visibly out of line on the manifold or which can be lifted off the manifold when the locking lever is in the locked position.**

6. Push the locking lever all the way down and turn the lever a quarter turn clockwise, to lock the vaporiser onto the manifold.

### 4.4 Vaporiser Removal from the Manifold

1. Turn the dial to the 'OFF' position, if the vaporiser is not completely turned 'OFF' then it cannot be released from the manifold.
2. Turn the locking lever a quarter of a turn anti-clockwise to the unlocked position which will release the vaporiser from the manifold.
3. Carefully lift the vaporiser up from the manifold, handling it from the main body.

## 5 Operating Instructions

### 5.1 General

**Warning: Do not fill the vaporiser until the dial is in the 'OFF' position, do not turn the dial whilst filling or attempt to over fill the vaporiser above the ▲ line.**

**Warning: Do not fill vaporiser with any other agent other than the agent specified vaporiser labelling. The vaporiser is designed for labelled specific agents only and filling of any other agent can prove to be dangerous to the patient.**

**Warning: Do not drain agent into any container other than a properly labelled drug specific container.**

The vaporiser must be filled and operated in an upright position. If the vaporiser is not completely in the upright position and deviates slightly this will not affect the output or the safety of the vaporiser.

Periodically ensure that the agent levels are checked and that the vaporiser is re-filled at regular intervals. As long as the vaporiser is above the line then the vaporiser will function in accordance with its specifications.

Not exceeding two weeks ensure that the vaporiser is drained into a drug specific container, ideally when the agent is low on the agent level indicator. This helps to remove accumulated contaminants and stabilisers and oxidised impurities preserving the drug purity. Less frequent draining maybe allowed if the anaesthetic agent does not contain additives or stabilising agents.

If using infrequently, Halothane vaporisers must be drained after use. When Halothane decomposes it releases halides which can corrode metal components, especially when in contact with water. Halothane also contains a preservative, which is added by the manufacturer to inhibit decomposition, which can cause vaporiser components to stick.

**5.2 Turning the vaporiser "ON" and "OFF"**

To turn the vaporiser "ON" depress the dial control release button and turn the dial in a counter-clockwise direction. See Figure 1.

To increase the concentration, turn the dial counter clockwise passed the zero mark to the required % concentration.

To reduce the concentration, turn the dial clockwise.

To avoid inadvertent delivery of small concentrations of agent, the dial control must be turned to "OFF" when the vaporiser is not in use. Ensure the Release Button returns to the locked position.

The vaporiser must not be used set between the Off and the Zero mark

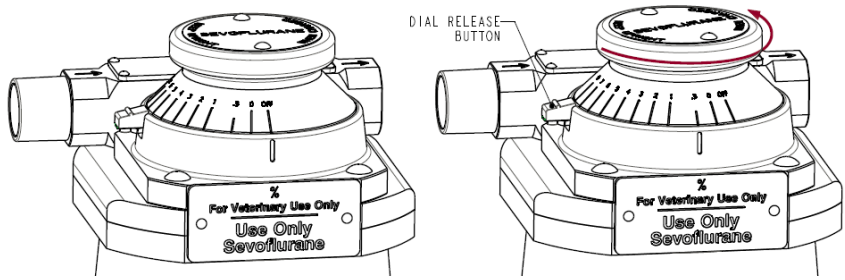



**Figure 1**

### 5.3 Filling & Draining

#### 5.3.1 Screw Cap Filler (filling procedure)

**Warning: Before filling a screw cap filler vaporiser, slowly unscrew the cap to allow any pressure to vent out slowly.**

1. Ensure that the dial is OPEN. Remove the screw cap by turning it counter clockwise.

2. Do not tip the vaporizer during the filling operation as this will result in over or under filling

3. Remove the filler cap by turning it counter-clockwise,

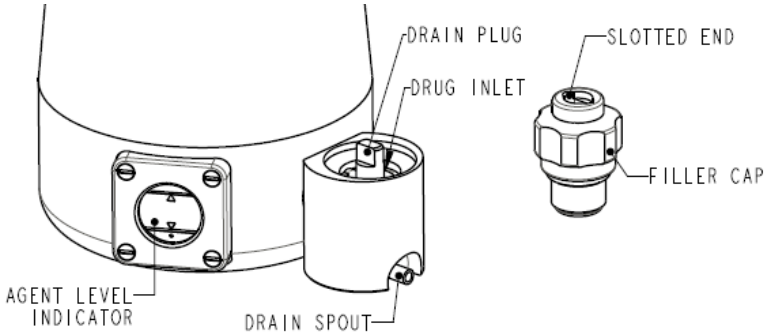



**Figure 2 Filling a screw cap filler vaporiser**

4. Check that the agent to be used is the same as that specified on the front of the vaporiser. In a ventilated area, pour the anaesthetic agent slowly into the filler opening, observing the agent level through the agent level indicator.

**Caution: If the vaporiser was dry before filling, the level will decrease slightly as the wick absorbs the agent.**

5. When the agent level reaches the maximum level mark on the agent level indicator the vaporiser is full. Replace the screw cap by turning it clockwise. To prevent leakage, ensure that the screw cap is fully tightened.

#### 5.3.2 Screw Cap Filler (draining procedure)

**Caution: Do not allow the drainage container to become completely full during draining.**

1. Remove the screw cap to reveal the drain plug.

2. Position a properly labelled container under the drain spout.

3. Invert the screw cap and use the slot in the top to unscrew the drain plug. Do NOT fully remove the drain plug.

4. Open the dial slightly.

5. In a ventilated area, drain the anaesthetic agent into an appropriately marked container and dispose of according to local regulations.

6. Ensure the drain plug is fully tightened before replacing the screw cap. Turn the dial to “OFF”.

 **Caution: If used infrequently, Halothane vaporisers shall be drained after use.**

**5.3.3 Keyed Filler (filling procedure)**

1. The keyed filler consists of 3 keyed elements
    - The anaesthetic agent bottle collar.
    - The bottle adapter.
    - The filling / draining unit fitted to the vaporiser.

2. Remove the cap and seal from the anaesthetic bottle. Check that the bottleneck is not chipped.

3. Fit the bottle collar of the bottle adapter to the bottleneck and screw together until fully tightened. The bottle is then ready for filling.

 **Caution: Always hold the bottle below the bottle adaptor end and below the vaporiser filler port, until the bottle adaptor is fixed into position in the vaporiser.**

 **Caution: If there is liquid in the air tube of the bottle adaptor, remove the adaptor from the drug bottle and gently shake the adaptor a few times to clear the tube.**

**Caution: The vaporiser must only be filled using the correct agent specific adaptor, the adaptor will not fit the filler socket if incorrect adaptor is used.**

4. Ensure that the dial control OPEN for filling and draining. Turn the top retaining screw on the filler unit slowly counter clockwise as the vaporiser may be pressurised and withdraw the dummy filler plug.

5. Check that the agent to be used is the same as that specified on the front of the vaporiser. Hold the bottle upright below the filler socket and bend the adapter so that its end is horizontal and the two holes in the adaptor are facing downwards. Insert the adaptor into the filler socket.

6. After insertion, turn the top retaining screw clockwise to tighten it and seal the bottle adaptor in the filler socket.

7. Raise the bottle above the level of the filler socket, avoiding kinking the adaptor tube. A steady stream of bubbles should emerge from the adaptor inner tube within two seconds. If this does not occur, remove the bottle adaptor from the vaporiser. Then remove the adaptor from the bottle. Carefully shake the adaptor two or three times to clear the tube, then repeat instructions from stage 1.

8. When the vaporiser is filled to the maximum level mark  in the agent level indicator, lower the bottle below the level of the filler socket and wait for 5 seconds to allow any agent in the adaptor to drain back into the bottle. Unscrew the top retaining screw and remove the adaptor from the filler. If there is any excess liquid agent allow this to escape from the filler socket completely, insert and fully tighten the dummy filler plug to prevent gas from escaping through the filler.

9. The Tec 3 Style vaporiser is now ready for use.

**Caution: If the vaporiser was dry before filling, the level will decrease slightly as the wick absorbs the agent.**

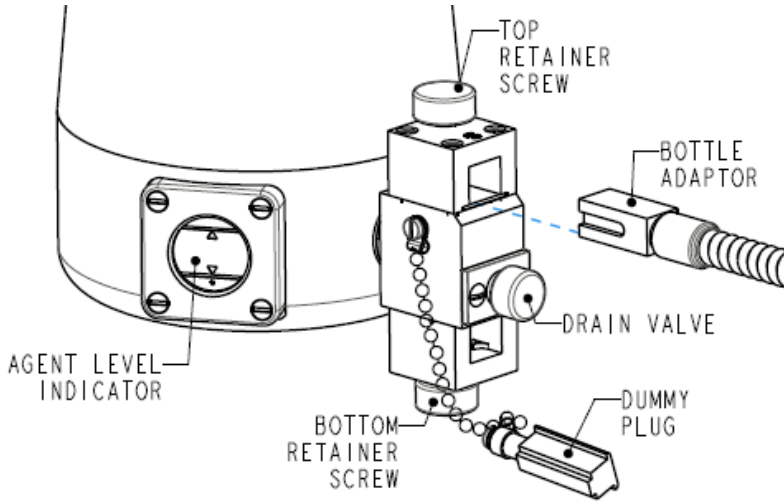



**Figure 3 Filling a Keyed Filler Vaporiser**

**5.3.4 Keyed Filler (draining procedure)**

**Caution: Do not allow the drainage container to become completely full during draining.**

**Caution: The vaporiser must only be drained using the correct agent specific adaptor, the adaptor will not fit the filler socket if incorrect adaptor is used.**

1. Fit the bottle adaptor to an empty bottle. Insert the bottle adaptor with its two holes facing upwards into the drain socket. Tighten the bottom retaining screw.

2. Ensure that the dial is in the “OPEN” position. Ensure that the bottle is below the level of the drain socket and the tube is not kinked. For draining purposes (and to allow air to vent) unscrew the top retaining screw slowly as the vaporiser may be pressurised and remove the dummy filler plug from the filler socket.

3. Open the drain valve by turning it counter-clockwise. Allow the vaporiser to drain.

4. Open the dial slightly.

5. If it is not possible to complete the draining process, close the drain valve, loosen the bottom retaining screw, then remove the bottle adaptor from the vaporiser. Remove the adaptor from the bottle. Carefully shake the adaptor two or three times to clear the tube, then reassemble and repeat instructions from stage 1.

6. When draining is complete, close the drain valve (clockwise), loosen the bottom retaining screw and remove the bottle adaptor. Replace the dummy filler plug into the top filler socket and fully tighten the top retaining screw in a clockwise direction. Then turn the dial to “OFF”.

**Caution: If used infrequently, Halothane vaporisers shall be drained after use.**

**Caution: If Halothane Vaporisers are used frequently, the vaporiser shall be drained weekly and the liquid disposed of as a hazardous chemical. Periodic draining of Halothane vaporisers is required because Halothane contains thymol as a stabilizing agent which is less volatile and will accumulate in the vaporiser, and can cause the output concentration to decrease. The thymol residue may also have clinically detrimental effects on the patient (see Rodenburg - Alila: Anaesthesia, 1984: 38: 581-583).**

**5.3.5 Quick Fill Filler (filling procedure)**

**Warning: Ensure that the drain screw; located on the bottom front of the filler body; is correctly tightened to prevent loss of liquid agent.**

1. Remove the protective cap from the anaesthetic agent bottle filler,

ensure that the filler or bottle is not damaged before use.

2. Remove the filler cap by turning it counter-clockwise and insert the bottle nozzle into the filler port. Make sure that the bottle filler nozzle keys are aligned with the index slots in the filler port, as illustrated in Fig. 4.

3. Press the agent bottle fully into the port of the filler block. Fill the vaporiser until the maximum level mark ▲ is reached on the sight level indicator. Pay attention to the air return bubbles flowing into the agent bottle this is guidance that the liquid is flowing.

4. Once the vaporiser is full and the continuous stream of bubbles has stopped, release the agent bottle from the filler port.

5. Remove the agent bottle and replace the filler cap and agent bottle cap. Make sure the filler cap is tight to reduce any possible leaks.

⚠ **Caution: If the vaporiser was dry before filling, the level will decrease slightly as the wick absorbs the agent.**

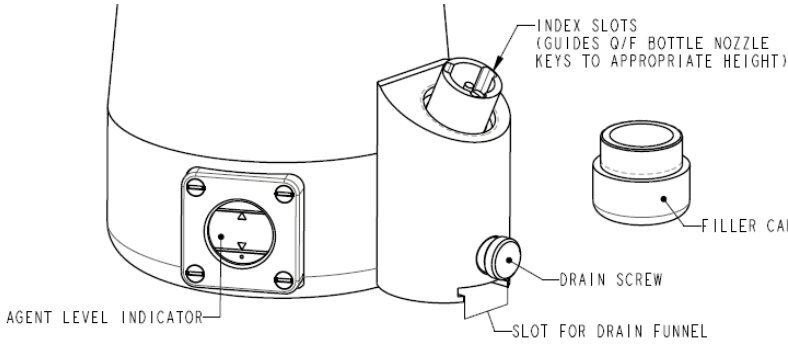



**Figure 4 Filling a Quick Fill Filler Vaporiser**

**5.3.6 Quick Fill Filler (draining procedure)**

**Caution: Do not allow the drainage container to become completely full during draining.**

**Caution: The vaporiser must be drained into a correctly labelled container.**

1. Remove the cap from the quick fill filler.

2. Remove the protective cap from an empty agent bottle. Place the drain funnel onto the nozzle of the agent bottle, ensuring that the index slots in the drain funnel are aligned with the agent bottle nozzle keys. Then screw funnel onto agent bottle to secure.

3. Insert the drain funnel into the keyed drain slot; which is located underneath the quick fill filler block.

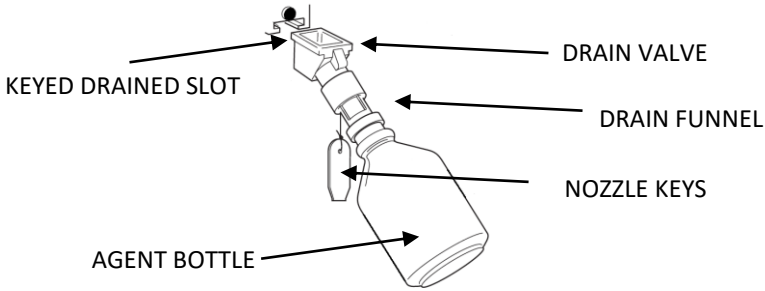
4. Unscrew the drain valve which will allow the vaporiser to start draining, drain until empty. Open the dial slightly.

5. Once draining is complete tighten the drain valve to reduce the potential of a leak.

6. Remove the drain funnel and tightly replace the filler cap.

7. Unscrew the drain funnel from the agent bottle and replace the protective cap. Turn the dial to “OFF”.

**Figure 5 Draining a Quick Fill Filler Vaporiser**



## 6 Checking the Calibration

The performance of the Apollo Tec 3 Style vaporisers, which are in clinical use, is monitored by observing patient signs and consumption of anaesthetic agent. The vaporiser is to be used with halogenated anaesthetic agent monitoring equipment complying with ISO/IEC 80601-2-55.

Some users may, however, wish to employ analysers to determine whether any abnormalities of performance have developed. For field checking of the state of calibration, many techniques and analysers are available. Norvap International do not recommend any one technique or analyser, but account must be taken of errors of use and calibration of analysers. Ensure that the appropriate carrier gas is used. The reliability of both the vaporiser and the analysis system must be realistically considered.

If user requires that calibration verification is carried out on a vaporiser, to determine whether any abnormalities of performance have developed the following points must be considered:

1. The test method must be so designed that it follows closely the clinical conditions of use.

2. The sampling technique is fully respective of the vaporiser output and that it ensures that the absorption of agent by connecting tubing is negligible.

3. If a number of vaporisers are being tested together and a consistent error is seen, it is very unlikely that it is due to a fault with the vaporiser. The apparent error probably lies in the test method employed.

4. Reproducibility and consistency within the analytical technique must be used.

5. Considerations into the effects of the carrier gas composition.

6. If obscure results are obtained from what is expected the accuracy of the test equipment and/or test technique must be questioned and verified.

7. Considerations of the effects of altitude and ambient temperature must be allowed for, the readings and output can vary under

different conditions.

8. Residual vapour will always stay in an anaesthetic machine from previous use, therefore don't be alarmed if an analyser detects small concentrations of agent for a short time at the machine outlet after the gas flow is turned on but the vaporiser is off.

9. If a selectatec fitting is being used and the readings are low, a cross leak or leak to atmosphere should be considered from the mounting system over the vaporiser.

## 7 Maintenance

**Warning: Do not disassemble, modify or tamper with the vaporiser. This can cause damage to the product and will alter the accuracy of the performance.**

Observation of the instructions provided, regular servicing and normal professional vigilance is normally all that is required to maintain the Apollo Tec 3 Style vaporiser in a safe working condition.

### 7.1 Schedule

Biweekly when the agent level is low, drain the vaporiser into a correctly labelled container and discard of the agent according to local regulations. If the anaesthetic agent does not contain additives or stabilising agents then the latter sentence can be less frequent, however the procedure must be done annually.

It is recommended that the Apollo Tec 3 Style vaporisers are serviced every one (1) year including calibration annually at a Norvap International authorised Service Centre.

This service includes the following

Complete disassembly of the vaporiser and its components.

- Thorough cleaning.

- Inspection for damage and wear.
- Renewal of wicks, seals and any damaged, worn or outdated components.
- Lubrication where necessary.
- Checks of delivered vapour concentration under closely defined conditions at different
  temperatures and flows with re-calibration or adjustment where necessary.

 **Caution: Halothane vaporisers must be serviced annually.**

**7.2 Cleaning**

 **Warning: Do NOT put water or any other solvent in the Apollo Tec 3 Style vaporiser. Do NOT immerse the vaporiser in any liquid, including water.**

 **Warning: Do NOT autoclave the vaporiser.**

Clean the exterior of the Apollo Tec 3 Style vaporiser with a cloth dampened with CE marked disinfectant as per the manufacturer's instructions.

Never allow cleaning agents to accumulate in the filler or gas inlet and outlet ports or around the dial control.

The Apollo Tec 3 Style vaporiser must be cleaned prior to each use.

 **Warning: If the vaporiser is filled with incorrect agent or any other contaminant, drain vaporiser and return to service centre stating the cause of contamination.**

### 7.3 Repairs

Repairs must only be carried out by Norvap International or authorised service representatives.

### 7.4 Disposal

At the end of life, the vaporiser must be drained and dried before disposing of too metallic waste in accordance with your regional regulations.

Anaesthetic agent drained from the vaporiser must be drained into a correctly marked container for disposal. Anaesthetic agents must be treated as pharmaceutical products and must never be drained into an open container or reused in case of contamination. The liquid must always be disposed of as a hazardous chemical.

## 8 Warranty

Such warranties are extended only with respect to the purchase of this product direct from Norvap International or Norvap International authorised dealers as new merchandise and are extended to the first buyer thereof, other than for the purpose of resale.

For a period of three (3) years from the date of original delivery to the first buyer or to buyers order, this product is warranted against functional defects in materials and workmanship and to conform to the description of the product contained in the Operation and Maintenance Manual and accompanying labels and inserts, provided that the same is operated under conditions of normal use, that regular periodic maintenance is performed and that replacements and repairs are made in accordance with the instructions provided. This same warranty is made for a period of thirty (30) days with respect to expendable parts.

**The foregoing warranties shall not apply if the product has been repaired or serviced other than by Norvap International or Norvap International authorised service facilities, or other than in accordance with the written instructions provided by Norvap International, or altered by anyone other than Norvap International or Norvap International authorised service facilities, or if the product has been subject to abuse, misuse, negligence or accident**.

Norvap International sole and exclusive obligation and the buyer's sole and exclusive remedy under the above warranties are limited to repairing or replacing, free of charge, at Norvap International option, a product which is confirmed as being defective by Norvap International following the buyer's notification to Norvap International in accordance with the instructions contained in the Servicing Section of the Operation and Maintenance Manual, not later than seven (7) days after the expiration date of the applicable warranty. **Norvap International shall not be otherwise liable for any damages including but not limited to incidental damages, consequential damages or special damages.**

**There are no express or implied warranties, which extend beyond the warranties herein above, set forth. Norvap International makes no warranty of merchantability or fitness for a particular purpose with respect to the product or parts thereof.**

When communicating with Norvap International, please quote the model and

serial number of the vaporiser. If the unit is being returned for repair, indicate the nature of the fault or the work required to be undertaken. Norvap International can be contacted by telephone by dialling (+44) 01282 698702 or emailing info@Norvapint.com .

**This warranty must be activated within (3) months of receipt of product.** An extended warranty can be purchased during activation stages and this will be at an additional cost. More information can be acquired by contacting the Sales Department at Norvap International tel. (+44) 01282 698702.


Contact Details

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