Collins Youldon

Product Manual

Style 40VM and 42VM

Manhole Covers and Breather Vent

Installation and Maintenance Manual

INDEX

1.0 Important Notes

1.1 Regarding Silos

1.1.1 There have been a number of incidents in past years in which silos have been over-pressurised as a result of the pneumatic filling operation. It is essential that all constructors and users of silos carry out an assessment into the venting required during pneumatic filling. It should be noted that the operating characteristics of each silo are likely to be different. Therefore the assessment should include all relevant features of each system (e.g. vessel strength, existence of pressure operated isolation systems, other pressure relief valves, etc).

1.1.2 Table 1 below shows the approximate venting capacity of VM manhole covers. It is essential that constructors and users assure themselves that these flow rates are adequate for each installation. As an indication, research commissioned by the Health and Safety executive has identified that, under certain circumstances, a maximum flow rate of 10,440 cubic feet per hour may be required for safe operation of a cement silo. The chart clearly shows that the flow rates of VM manhole covers fall well short of this figure.

Table 1 – Flow Rates
(Use as a general guide only, as actual flow rates can be influenced by many factors)

Emergency Relief Valve Setting	5 kPa (0.75 psig) nominal	10 kPa (1.5 psig) nominal	21 kPa (3 psig) nominal
Air flow at 7 kPa	2550 m³/hour	---	---
Air flow at 10 kPa	3850 m³/hour	--	--
Air flow at 14 kPa	4550 m³/hour	--	--
Air flow at 21 kPa	5600 m³/hour	2650 m³/hour	--
Air flow at 28 kPa	6600 m³/hour	4550 m³/hour	--
Air flow at 35 kPa	7580 m³/hour	7000 m³/hour	5000 m³/hour
Liquid flow at 35 kPa (tested with water at ambient temperature)	--	--	approx 2950 litres/minute

1.1.3 We have been advised (as at August 1999) that guidance notes are being prepared for the industry. In the meantime, if you have any queries, relating to the above comments, please do not hesitate to contact us or the Health & Safety Executive at The Marches House, Midway, Newcastle under Lyme, Staffs (Tel : 01782 602300).

1.2 Regarding Manlids

WARNING

Dependant upon the product carried, there may be a residual pressure in the tank compartment. Before opening the manhole cover or carrying out any inspection or maintenance, ensure that this pressure has been safely relieved (see operator's maintenance procedure).

1.2.1 Style 40VM & 42VM manhole covers have been designed to perform a number of different functions. Some of these functions relate to the safety of the tank, not only during normal operating conditions, but also in the event of tank upset, fire engulfment, or overfilling. It is therefore important that the manhole cover is inspected and maintained on a regular basis, in order that it will carry out all these functions correctly when required to do so.

1.2.2 We have used our best endeavours to provide these guidelines for the inspection and replacement of the main operating parts. However, it is not possible to quantify exactly the condition of any component of the manhole cover, (in particular the condition of the spring, the fill cover seal or baseplate sealing face), that will guarantee a vapour and liquid tight seal, together with the correct operation of the 10" fill cover, which also acts as a pressure relief valve. If there is any doubt with regard to the condition of any component, in the interest of safety, we would recommend the replacement of that component. Similarly, if there is any doubt with regard to the vapour or liquid tightness of the manhole cover, we would recommend that it should be subjected to a pressure test.

1.2.3 Operators may like to use this manual as a basis for their own written scheme, but should note that it will need to be amended as appropriate to take account of individual operating conditions.

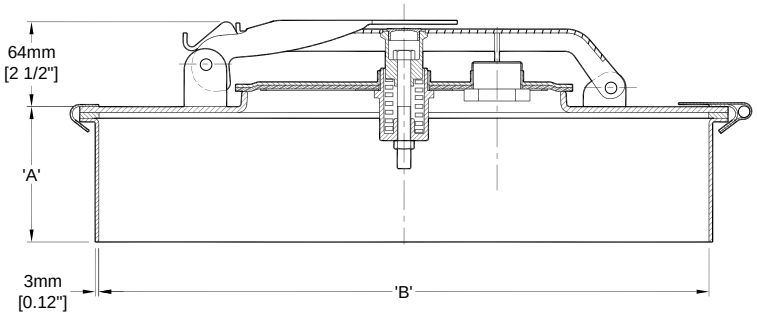
NOTE: *This manual covers Style 40VM and 42VM manhole covers. The lists of spare parts are in appendices 1 and 2.*
Please do not hesitate to contact our Sales Department if you require further information or guidance.

2.0 Description

2.1 Style 40VM Manhole Cover

Suitable for tanks and silos with a maximum working pressure of 0.35 bar (5 psi)

Figure 1 – Style 40VM sketch showing dimensions



Dimension	16"	20"	24"
'A'	86mm (3.4")	111mm (4.4")	111mm (4.4")
'B'	406mm (16")	508mm (20")	610mm (24")

2.1.1 The Style 40VM manhole cover has a 255mm (10 inch) diameter opening with a hinged lid on a baseplate. The baseplate is secured to the neckring by the locking band and the compression of the gasket ensures an efficient seal. The neckring is designed for welding directly into the tank shell.

2.1.2 The 10 inch fill cover is spring loaded to act as a relief valve. Different springs are available to give nominal opening pressures of 0.05 bar (0.75 psig), 0.1 bar (1.5 psig) and 0.21 bar (3 psig). The opening pressure cannot be adjusted and this range of manhole covers is not tested after assembly. Manhole covers should be tested after installation as any distortion caused by welding the neckring to the tank may affect the sealing face and reduce the opening pressure.

2.1.3 The cam action of the lid clamp and hinge provides a positive closing and sealing arrangement.

2.1.4 Manufactured in mild steel (zinc electro-plated, except for the neckring). A stainless steel 1-16 breather vent can be fitted if required (not suitable for powders or hazardous liquids). The standard fill cover gasket is nitrile and the standard neckring gasket is nitrile bonded cork.

NOTE 1: A special version of this manhole cover (Style 40VMP) is also available. Depending upon the regulations applying to a particular installation, these manhole covers may be suitable for use on tanks containing petroleum spirit and fuel oils. The minimum opening pressure of the VMP range of manhole covers is 3.5 psi (0.24 bar).

NOTE 2: The VMP series of manhole covers do not meet the requirements of EN13317:2002 Manhole Cover Assembly – Tanks for the Transport of Dangerous Goods.

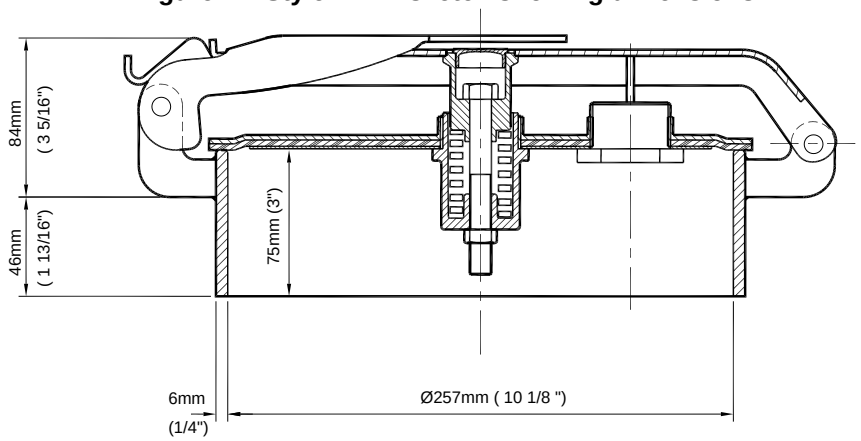
WARNINGS

1. **Before opening or removing any manhole cover or inspection hatch, ensure that all pressure in the tank has been relieved. This will eliminate the possibility of a potentially dangerous "kick-back" and the risk of injury.**
2. **Before ordering please ensure that the relief valve on this manhole cover is suitable for your application. If this valve is intended to protect against over pressurisation of a vessel or system, it is important that an assessment is made to ensure that the pressure setting and the flow capability of the valve will ensure protection against damage to the plant and/or personnel. Flow rates are detailed in Table 1.**

2.2 Style 42VM Manhole Cover

Suitable for tanks and silos with a maximum working pressure of 0.35 bar (5 psi).

Figure 2 – Style 42VM sketch showing dimensions



2.2.1 The Style 42VM mild steel manhole cover has a 255 mm (10 inch) diameter opening with a hinged lid on a neckring for welding directly into the tank shell.

2.2.2 The 10 inch fill cover is spring loaded to act as a relief valve. Different springs are available to give nominal opening pressures of 0.05 bar (0.75 psi), 0.1 bar (1.5 psi) and 0.21 bar (3 psi). The opening pressure cannot be adjusted and this range of manhole covers is not tested after assembly. Manhole covers should be tested after installation as any distortion caused by welding the neckring to the tank may affect the sealing face and reduce the opening pressure.

2.2.3 The cam action of the lid clamp and hinge provides a positive closing and sealing arrangement.

2.2.4 Manufactured in mild steel (zinc electro-plated, except for the neckring). A stainless steel 1-16 breather vent can be fitted if required (not suitable for powders or hazardous liquids). The standard fill cover gasket is nitrile.

NOTE 1: A special version of this manhole cover (Style 42VMP) is also available. Depending upon the regulations applying to a particular installation, these manhole covers may be suitable for use on tanks containing petroleum spirit and fuel oils. The minimum opening pressure of the VMP range of manhole covers is 3.5 psi (0.24 bar).

NOTE 2: The VMP series of manhole covers do not meet the requirements of EN13317:2002 Manhole Cover Assembly – Tanks for the Transport of Dangerous Goods.

WARNINGS

1 Before opening or removing any manhole cover or inspection hatch, ensure that all pressure in the tank has been relieved. This will eliminate the possibility of a potentially dangerous "kick-back" and the risk of injury.

2 Before ordering please ensure that the relief valve on this manhole cover is suitable for your application. If this valve is intended to protect against over pressurisation of a vessel or system, it is important that an assessment is made to ensure that the pressure setting and the flow capability of the valve will ensure protection against damage to the plant and/or personnel. Flow rates are detailed in Table 1.

3.0 Installation of the Style 40VM manhole cover

Suitable for tanks and silos with a maximum working pressure of 0.35 bar (5 psi)

NOTE 1: *Style 40VM manhole covers are supplied assembled for final inspection and to facilitate easy packing and handling during despatch. The standard fill cover gasket is Buna-N and the standard neckring gasket is nitrile bonded cork. Before installation, check that these materials are compatible with the products to be stored or carried in the tank.*

3.1 Before fitting the neckring to the tank the baseplate assembly should be removed from the neckring. Release the lid clamp (using a key if a lock is fitted). Remove the locking band bolt and lift off the locking band. Separate the neckring, gasket and baseplate assembly.

3.2 Insert the neckring into the tank aperture; adjust the height as required, and tack-weld into position.

3.3 Check that the top face of the neckring is flat, and that the shape is round before welding.

3.4 After welding, re-assemble the manhole cover as follows.

3.5 Check that the neckring and baseplate faces are clean and free from damage. Release the lid clamp on the baseplate assembly and place the assembly on the neckring with the gasket between the baseplate and the neckring. Do not allow the gasket to fall into the tank.

3.6 Fit the locking band with the lugs in the most suitable position, usually in-line with the hinges. Fit the bolt and tighten up the locking band until it just starts to grip.

3.7 Open the lid and check that the neckring gasket is fitted correctly by feeling inside and pushing the gasket into position. Tighten the locking band and, at the same time, assist it to fit snugly by tapping gently with a soft mallet around the periphery. **DO NOT OVERTIGHTEN.**

NOTE 2: *The VM series of manhole covers are available with three different nominal pressure settings: 0.75 psi, 1.5 psi and 3 psi.*

NOTE 3: *These manhole covers are not tested before despatch. We therefore recommend that a pressure test should be carried out after installation.*

NOTE 4: *We are unable to advise on the appropriate procedure for this test as these manhole covers are designed for use on a wide variety of tanks.*

4.0 Installation of the Style 42VM manhole cover

Suitable for tanks and silos with a maximum working pressure of 0.35 bar (5 psi)

NOTE 1:- *Style 42VM manhole covers are supplied assembled for final inspection and to facilitate easy packing and handling during despatch. The standard fill cover gasket is Buna-N. Before installation, check that this material is compatible with the products to be stored or carried in the tank.*

4.1 Release the lid clamp. Remove the hinge pin circlips and washers and push out the hinge pin to separate the lid hinge / fill cover assembly.

4.2 Locate the neckring over the tank aperture. Weld in position.

4.3 Check the neckring sealing face for damage before re-fitting the lid hinge / fill cover assembly. Insert the hinge pin, re-fit the plain washers and the circlips.

NOTE 2 *The VM series of manhole covers are available with three different nominal pressure settings: ¾ psi, 1½ psi and 3 psi.*

NOTE 3: *These manhole covers are not tested before despatch. We therefore recommend that a pressure test should be carried out after installation.*

NOTE 4: *We are unable to advise on the appropriate procedure for this test as these manhole covers are designed for use on a wide variety of tanks.*

5.0 Recommended Inspection and Maintenance

NOTE 1: *If at any time there are signs of physical damage, wear, or signs of leakage of product through the manhole cover (or any other tank top fitting) these should be investigated and repaired at the earliest opportunity.*

WARNING **Dependant upon the product carried, there may be a residual pressure in the tank compartment. Before carrying out any inspection or maintenance on the manhole cover, ensure that this pressure has been safely relieved (see operator's maintenance procedure).**

5.1 Monthly Maintenance

5.1.2 Manhole cover baseplate - Style 40VM only

Check the manhole cover baseplate for obvious signs of damage. Check that the gasket between the baseplate and the neckring is in good condition. Inspect on and around the baseplate for any evidence of leakage of product.

5.1.3 Sealing face of 10" aperture - Style 40VM & 42VM

After relieving the pressure in the tank compartment, check the condition of the sealing face on the 10" aperture. A few scratches will not normally impair the sealing qualities of the manhole cover, but nicks and chips on the sealing face may cause leaks. A baseplate or neckring with a damaged sealing face must be replaced.

5.1.4 Fill cover assembly - Style 40VM & 42VM

After relieving the pressure in the tank compartment open and close the manhole cover several times to check the operation of the lid hinge and lid clamp.

5.1.5 Check the condition of the hinge pins and that the circlips and washers on each end of the hinge pins are in place and secure, see appendices 1 and 2.

5.1.6 Check that there is no wear in the hinge pin holes in the lid hinge, the lid clamp or the hinge lugs on the Style 40VM baseplate or the Style 42VM neckring.

5.1.7 Check that the lid hinge is straight and not damaged in any way. It should pass between the arms of the lid clamp without hitting the sides.

5.1.8 Inspect the fill cover gasket. The gasket should sit flush and tight in the groove, with the sealing face slightly convex. If the sealing face of the gasket has shrunk below the machined faces of the gasket groove it should be replaced. It should also be replaced if it is damaged or shows signs of hardening.

5.1.9 Finally, with the fill cover held firmly closed, check the adjustment of the fill cover as follows. Swing the lid clamp over the end of the lid hinge, see figure 3. It should just touch the tip of the safety catch as it hinges over. If it does, close the manhole cover. If it does not, the fill cover needs adjustment, follow the instructions in section 5.3.

NOTE 2: *The opening pressure of the fill cover cannot be varied by adjustment. It is, however, important that the fill cover is adjusted so that the fill cover pressure relief valve will function as designed and also so that the secondary latch operates correctly).*

5.2 Other Maintenance

5.2.1 Initially, this should be carried out at intervals of not more than three months. After the first two inspections it may be advisable to decrease or increase the length of this period depending on the environment in which the manhole cover is installed, and also the product in the tank.

5.2.2 To dismantle the fill cover, it is necessary to remove the plastic plug fitted to the adjusting bolt aperture in the top of the lid hinge and also the lock nut on the end of the centre bolt, see figure 3. The fill cover should be held in the OPEN position. It can then be safely dismantled by unscrewing the centre bolt with a socket spanner. Note: the compression of the spring is completely released before the centre bolt disengages from the thread in the fill cover, so the assembly can be dismantled without any danger from the spring.

5.2.3 The spring should be inspected and, if showing signs of significant corrosion, should be replaced. The spring well in the fill cover should be inspected and any deposits of road dirt etc should be removed.

5.2.4 To improve weather resistance a plastic plug and a rubber bellows are fitted to all Style 40VM and Style 42VM manhole covers, see parts list in appendices 1 and 2. However the bellows cannot completely prevent the ingress of water or cleaning chemicals, particularly when high pressure washing systems are used. Where ingress of water occurs, it may be necessary to increase the frequency of inspection.

5.2.5 We recommend that a new plug and bellows are fitted to all Style 40VM and 42VM manhole covers on re-assembly if either of these items are damaged or missing.

5.2.6 The fill cover assembly must then be re-assembled in accordance with instructions at section 5.3.

5.3 Adjustment of the fill cover assembly

5.3.1 With the fill cover held firmly closed, swing the lid clamp over the end of the lid hinge (see sketch below). It should just touch the tip of the secondary safety catch as it hinges over.

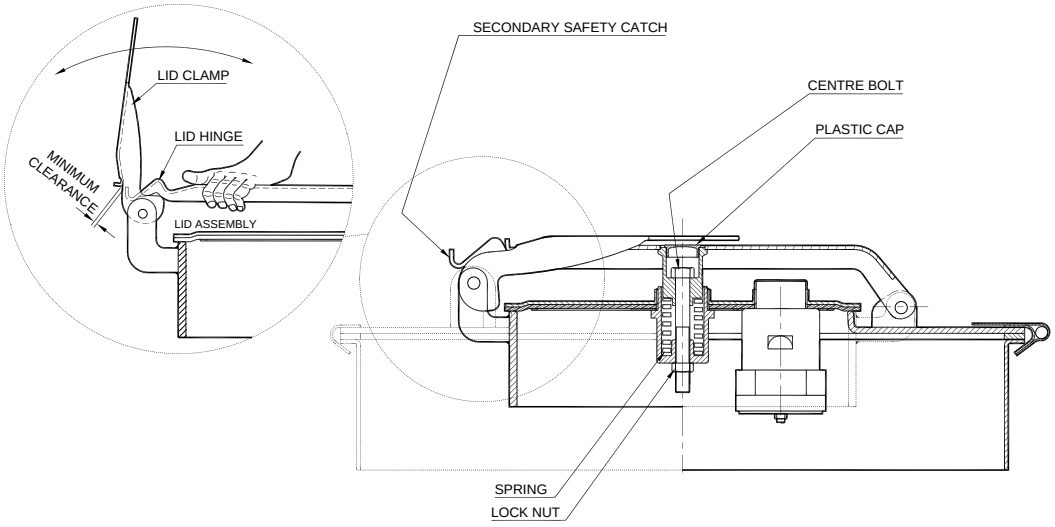


Figure 3 – fill cover adjustment

5.3.2 If the fill cover setting is not correct, then the fill cover assembly must be adjusted:-

5.3.3 Remove the lock nut on the centre bolt. The plastic plug which is in the centre of the lid hinge should then be removed to gain access to the end of the centre bolt. With the fill cover in the OPEN position, the centre bolt should be completely unscrewed from the fill cover. Before this occurs, the compression of the spring will be completely released, thus ensuring that the assembly can be dismantled without any danger from the spring.

5.3.4 Before re-assembling the fill cover assembly, several drops of Permabond A131 thread sealant must be applied to the thread of the centre bolt at a distance of 1¼" from the end of the thread nearest the head of the bolt. The fill cover assembly can then be re-assembled by screwing the centre bolt into the thread of the fill cover. Also check that the guide lugs on the top of the fill cover are at the end of the lid hinge nearest to the hinge pin as shown above.

5.3.5 With the fill cover held firmly closed, adjust the centre bolt until the lid clamp just touches the tip of the secondary latch on the end of the lid hinge as shown above.

5.3.6 Tighten the lock nut and check the adjustment again. If necessary, repeat the adjustment procedure and finally tighten the lock nut. Refit the plastic plug in the centre bolt aperture in the lid hinge.

5.3.7 Finally, we recommend that the tank compartment is pressurised to ensure that a leak-tight seal has been achieved. We are unable to advise on the appropriate procedure for this test as these manhole covers are designed for use on a wide variety of tanks. The VM series of manhole covers is available with three different nominal pressure settings: 0.75 psi, 1.5 psi and 3 psi

6.0 Fitting replacement parts

6.1 Removing the fill cover assembly and lid clamp

6.1.1 If the manhole cover is closed, relieve all tank pressure, then open the 10" fill cover.

6.1.2 Remove the circlip and washer from one end of the fill cover hinge pin, taking care that the circlip and washer do not fall into the tank compartment. Then, whilst holding the fill cover assembly in one hand, withdraw the hinge pin from the lugs in the baseplate, taking care that the circlip and washer on the other end of the hinge pin do not fall into the tank compartment.

6.1.3 Repeat the above process for the lid clamp, if this component is also being replaced.

6.2 Replacing the fill cover assembly and lid clamp

6.2.1 Before fitting the replacement fill cover assembly or lid clamp, we recommend that the manhole baseplate is inspected for signs of damage or wear, particularly on the sealing face of the 10" aperture.

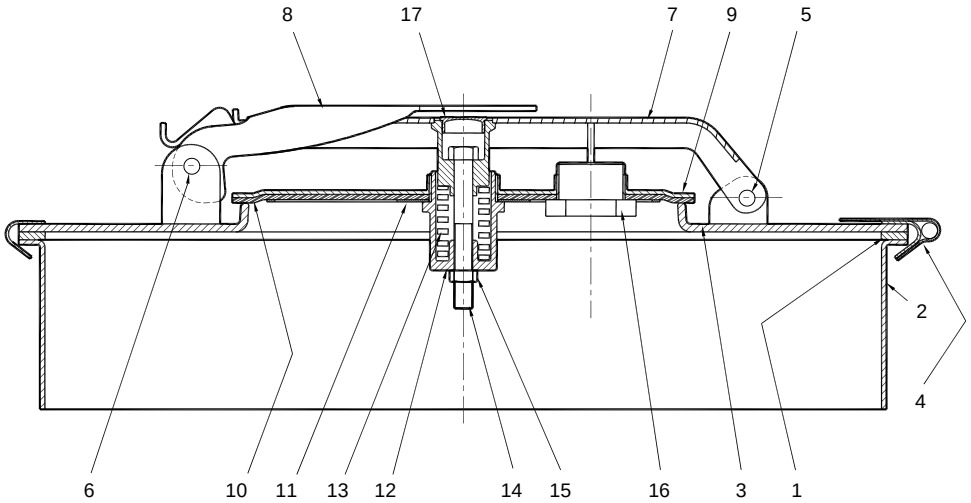
6.2.2 Using the hinge pin previously removed from the manhole cover, fit the replacement fill cover assembly to the baseplate. Re-fit the washers and circlips to the hinge pin

6.2.3 Using the other hinge pin previously removed from the manhole cover, fit the replacement lid clamp. Re-fit the washers and circlips to the hinge pin.

6.2.4 Finally, the adjustment of the fill cover assembly must be checked. With the fill cover held firmly closed, swing the lid clamp over the end of the lid hinge, see figure 3. It should just touch the tip of the secondary safety catch as it hinges over. If the fill cover requires adjustment, follow the instructions at section 5.3.

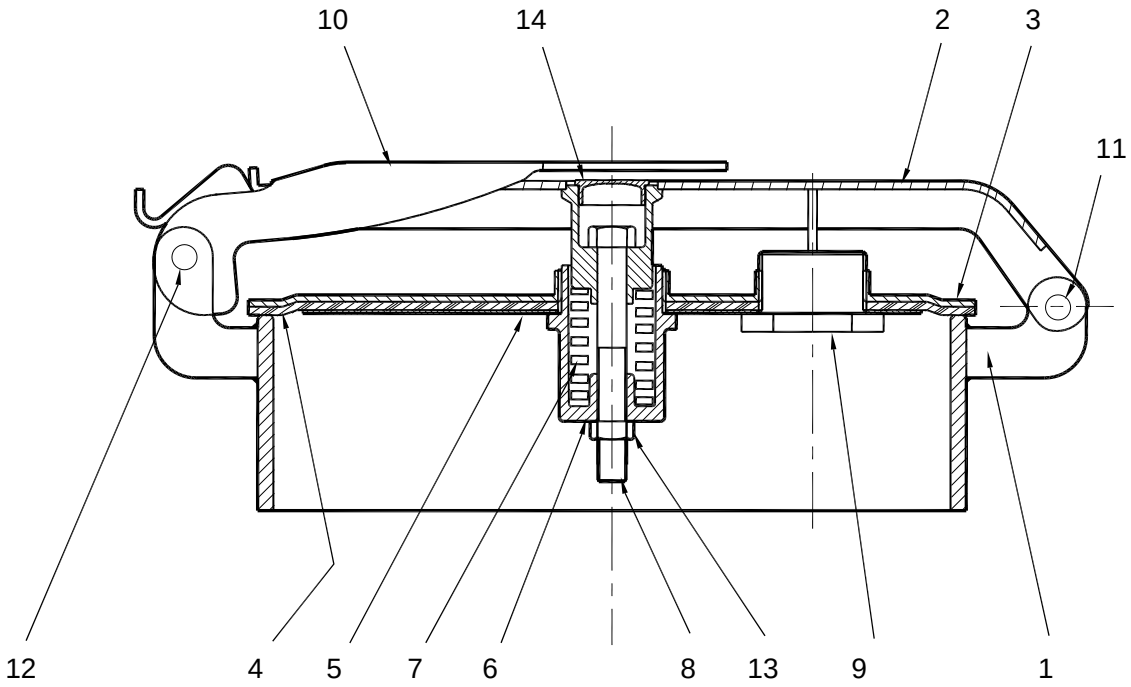
NOTE 1. All replacement fill covers are tested on a baseplate before despatch. We recommend that a pressure test should be carried out after installation of the replacement fill cover assembly to ensure that a vapour-tight seal has been achieved. We are unable to advise on the appropriate procedure for this test as these manhole covers are designed for use on a wide variety of tanks. The VM series of manhole covers is available with three different nominal pressure settings: 0.75 psi, 1.5 psi and 3 psi

Appendix 1
Style 40VM Manhole Cover - Parts Breakdown



Item	Description	Part No
1	16" Neckring gasket	1064.00.N
	20" Neckring gasket	5038.01.N
	24" Neckring gasket	5039.02.N
2	16" Neckring	1062.00.M
	20" Neckring	5038.02.M
	24" Neckring	5039.01.M
3	16" Baseplate	1065.31.M
	20" Baseplate	5038.31.M
	24" Baseplate	5039.03.M
4	16" Locking band assembly	1073.00A.M
	20" Locking band assembly	5038.04.M
	24" Locking band assembly	5039.05.M
	includes: Locking Band Bolt	1074.01.M
	Locking Band Nut	FPN.344
5	Hinge pin & circlips (hinge)	9122.13.Z
6	Hinge pin & circlips (clamp)	9122.14.Z
7	Lid hinge (for plug or 1-16 vent)	9122.00.M
8	Lid clamp (no lock lug)	9128.04.M
9	Fill cover (for plug or 1-16 vent)	9122.09.M
10	Fill cover gasket	9122.10.T
11	Retaining plate	9122.11.M
12	Springwell	9122.06.A
13	¾ psi spring	9122.01.S
	1½ psi spring	9122.02.M
	3 psi spring	9122.04.Z
14	Centrebolt	9122.05.M
15	Nyloc nut	FPN.348
16	Aluminium Plug	1635.00.A
	1-16 vent - stainless steel	3088.NPT.S
17	Polythene plug	PP.011

Appendix 2
Style 42VM Manhole Cover- Parts Breakdown



Item	Description	Qty	Part Number	
1	Neckring	1	9121.00.M	
2	Lid hinge (for plug or 1-16 vent)	1	9122.00.M	9122.00A.M
3	Fill cover (for plug or 1-16 vent)	1	9122.09.M	9122.09.MX
4	Fill cover gasket - nitrile	1	9122.10.T	
5	Retaining plate	1	9122.11.M	
6	Springwell	1	9122.06.A	
7	¾ psi spring	1	9122.01.S	
	1½ psi spring	1	9122.02.M	
	3 psi spring	1	9122.04.Z	
8	Centre bolt	1	9122.05.M	
9	Plug (shown above)	1	1635.00.A	
	or 1-16 vent stainless steel	1	3088.NPT.S	
10	Lid clamp	1	9128.04.M	
11	Hinge pin & circlips (hinge)	1	9122.13.Z	
12	Hinge pin & circlips (clamp)	1	9122.14.Z	
13	Nyloc Nut	1	FSN.348	
14	Polythene plug	1	PP.011	

Suffix "M" denotes mild steel, "Z" 304 stainless steel, "S" 316 stainless steel, "A" aluminium, "T" nitrile