Catalogue

Accessories & Spare Parts

FORT VALE

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FORT VALE

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Accessories & Spare Parts

Catalogue

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Appendix

0-60 PSIG Air Charge Kit

Part No: US100

Includes all items in the Parts List table.

Parts List

Description	Part No.
0-60 PSIG pressure gauge, ¼" NPT	US000
¾" NPT crows foot fitting	US006
¾" NPT crows foot blank cao	US031
¾" NPT socket ball valve	US007
¾" NPT x 1.5" nipple	US017
¼" NPT x 2" SCH 40 nipple	US025
¼" NPT 45° elbow	US026

Tankvent Relief Valve Caging Tool

Part No: 400/0104

The Tankvent relief valve caging tool lets you safely compress the spring so that you can service the valve.

Compatibility
½" UNC connecton: compatible with R407/ and R408/ Hyper Tankvent relief valves.

Specification

Nominal sizes
From 6mm to 100mm

Body type options
One piece
Two piece
Three piece

Inlet/outlet connection options
BSP female both ends - all types
Weld prepared both ends - 3 piece valve only

Properties
Lockable handle

Materials
Contact parts: 316 stainless steel
Main seal: PTFE

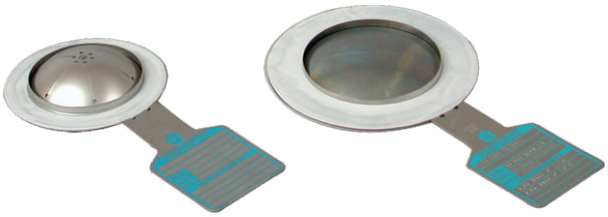
Part Numbers

Size mm	Size inch	One Piece BSP	Two Piece BSP	Three Piece BSP	Three Piece Weld Prepared
6	¼	410/104025	410/204025	410/304025B	410/304025W
10	⅜	410/104037	410/204037	410/304037B	410/304037W
15	½	410/104050	410/204050	410/304050B	410/304050W
20	¾	410/104075	410/204075	410/304075B	410/304075W
25	1	410/104100	410/204100	410/304100B	410/304100W
32	1¼	410/104125	410/204125	410/304125B	410/304125W
40	1½	410/104150	410/204150	410/304150B	410/304150W
50	2	410/104200	410/204200	410/304200B	410/304200W
65	2½	-	410/204250	410/304250B	410/304250W
80	3	-	410/204300	410/304300B	410/304300W
100	4	-	-	410/304400B	410/304400W

CAUTION: During installation, do not tighten the ball valve too much or it will cause the valve to malfunction.

Burst Discs

Accessories & Spare Parts



Specification

Our range of non-fragmenting burst discs is compatible with Fort Vale relief valves and accessories. If you have other manufacturer's equipment, please contact us.

WARNING: A burst disc decreases the air flow capacity of a relief valve. Calculate to make sure that the decreased flow will give sufficient protection to your tank/system. Refer to Fort Vale for more information.

Nominal sizes

65mm XL, 80mm XL, 89mm, 250mm
Other sizes are available, please contact us.
NOTE: 65mm XL/80mm XL discs replace the original 65mm/80mm discs. We do not recommend 65mm/80mm discs with Fort Vale relief valves.

Disc options

Forward Acting: a cross-scored solid metal disc
Forward Composite: a multi-layered disc for burst settings of less than 3.67 Bar
Reverse Acting: compatible with gas service

Materials

65XL/80XL/89mm: PTFE/316 stainless steel/Nickel
250mm: PTFE/316 stainless steel
Other materials are available, refer to next page.

65mm XL Burst Discs

Compatible with general purpose tank containers and road tankers.

Burst Pressure Bar	Burst Temperature °C	Part No.
2.28	20	862/X0228020B
2.41	20	862/X0241020B
2.69	20	862/X0269020B
3.10	20	862/X0310020B
3.67	20	862/X0367020A
4.10	20	862/X0410020A
4.40	20	862/X0440020A
4.84	20	862/X0484020A

NOTE: The specification changes the part no.

80mm XL Burst Discs

Compatible with general purpose tank containers and road tankers.

Burst Pressure Bar	Burst Temperature °C	Part No.
3.67	20	864/X0367020A
4.10	20	864/X0410020A
4.84	20	864/X0484020A

NOTE: The specification changes the part no.

89mm Reverse Acting Burst Discs

Compatible with compressed liquefied gas tank containers.

Burst Pressure Bar	Burst Temperature °C	Part No.
12.10	55	864/X1210055GX
15.00	55	864/X1500055GX
22.00	55	864/X2200055GX
27.50	55	864/X2750055GX
34.50	55	864/X3450055GX

NOTE: The specification changes the part no.

250mm Standard Burst Discs

Compatible with hydrogen peroxide service.

Burst Pressure Bar	Burst Temperature °C	Part No.
4.50	20	865/1200
4.50	60	865/1250
6.00	20	865/1400

Example: 8 6 X / X 0484 020 X X

Disc Size

862/ 65mm XL
864/ 80mm XL or 89mm Reverse Acting

Disc Manufacturer

A CDC (Continental Disc Corporation)
B BS&B Safety Systems
C Schlesinger

Burst Pressure in kPa

0484 484 kPa (4.84 Bar)

Burst Temperature in °C

020 20°C

Disc Type

A Forward Acting (ICON)
B Forward Composite (PC-SERT)
G Reverse Acting: Gas service

Special Material/Service: Disc Type A & B Only

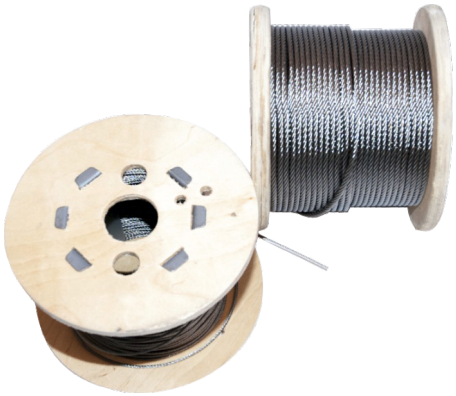
Note: No number = Standard Material/Service
1 PFA Lined
2 PTFE Lined
3 Tantalum
4 Alloy 600
5 Oxygen Cleaned
6 High Temperature 250°
7 Titanium
8 Standard 30° Angle
9 Monel ®

Special Material/Service: Disc Type G Only

Note: No number = Standard Material/Service
1 Hastelloy ® / PTFE
2 Monel ®
3 Tantalum
4 Alloy 400

Stainless Steel Cable

Accessories & Spare Parts



Specification

Our 7x19 stainless steel cable can be used to assemble remote control assemblies and to secure dust caps, blank caps and plugs

Nominal sizes Ø
2mm, 3mm, 4mm

Material
316 stainless steel

CAUTION: Make sure the cable diameter is compatible with your service conditions

Stainless Steel Cable

Supplied in rolls of 100 metres

Size	Part No.
2mm x 100m	6110-110
3mm x 100m	6110-111
4mm x 100m	6110-112

Threaded Blank Caps

Accessories & Spare Parts

Specification

Caps are supplied with a washer and a security wire or heavy duty chain as standard.

Nominal sizes
From ½" to 4"

Thread options
BSP, NPT, NPSL

Material options
Cap: stainless steel, aluminium
Washer: PTFE, leather

If the type you need is not shown, please contact us.

Stainless Steel Caps - BSP Thread

Supplied as standard with a PTFE washer and a stainless steel chain or wire to prevent loss/theft.

Size	Wire or Chain	Part No.
½" BSP	Wire	10316PS
¾" BSP	Chain	10306PS
1" BSP	Chain	10305PS
1½" BSP	Chain	10300PS
2" BSP	Chain	10301PS
2½" BSP	Wire	10302PS
3" BSP	Chain	10303PS
4" BSP	Wire	10304PSC

Spare Parts - Washers

Description	Part No. Leather	Part No. PTFE
½" washer	-	10335P
¾" washer	10331L	10331P
1" washer	10319L	10319P
1½" washer	10326L	10326P
2" washer	10327L	10327P
2½" washer	10328L	10328P
3" washer	10329L	10329P

NPT & NPSL Caps

Supplied as standard with a washer and a chain to prevent loss/theft.

Size	Cap	Washer	Chain	Part No.
1½" NPT	st/st	PTFE	st/st	10300NPTP
2" NPT	st/st	PTFE	st/st	10301NPTP
3" NPSL	st/st	PTFE	st/st	425/3240
3" NPT	aluminium	leather	brass	10711NPT

Aluminium Caps - BSP Thread

Supplied as standard with a leather washer and a brass chain to prevent loss/theft.

Size	Part No.
¾" BSP	10706AL
1" BSP	10707AL
1½" BSP	10708AL
2" BSP	10709AL
2½" BSP	10710AL
3" BSP	10711AL

Pressure-Tight Caps for Drytyt Tank Units

Accessories & Spare Parts

Example shown: 119mm cap, Part No. 915/5470X

The pressure-tight cap protects the tank unit outlet face from damage and can be used as a secondary or a tertiary closure. The top cap/seal plate assembly lets you safely release pressure that can be inside the tank unit.

All pressure-tight caps are fire-safe designed and seal metal-to-metal when installed onto the tank unit. The seal plate O ring makes a gas-tight and liquid-tight seal. (Refer to Seal Options NOTE).

Please read the Installation Instructions on the next page.

Design Conditions

56mm, 70mm, 105mm, 119mm only
Design Pressure (MAWP): 25.0 Bar
Test Pressure: 37.5 Bar

164mm only
Design Pressure (MAWP): 10.0 Bar
Test Pressure: 16.0 Bar

Design Temp. Min/Max: -40°C / 200°C (**metal parts**)

NOTE: The design temperature conditions are for metal parts only. The working temperature of the seal plate O ring can change the design temperature limits. Refer to Seal Options.

Design Codes
BS EN 14432

Specification

Nominal sizes
56mm, 70mm, 105mm, 119mm, 164mm

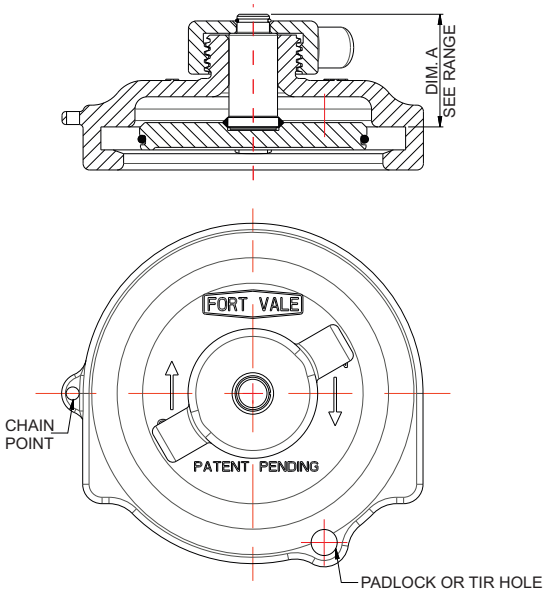
Compatibility
Fort Vale Drytyt, Todo®, Mann-Tek®, Avery Hardoll®

Properties
Chain point and TIR/padlock hole

Materials
Contact parts: 316 stainless steel
Seal plate O ring: refer to Seal Options

Section View

119mm cap (915/5470X) shown in the closed position



Range

Size	Weight	Dim.A	Part No.
56mm	0.91 Kg	45.1mm	915/5410X
70mm	1.07 Kg	42.1mm	915/5420X
105mm	1.92 Kg	44.1mm	915/5480X
119mm	2.33 Kg	44.1mm	915/5470X
164mm	3.68 Kg	44.1 mm	915/5490X

The Part No. suffix X refers to the seal material code - refer to Seal Options

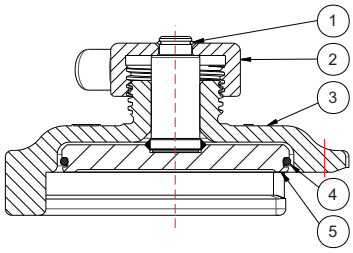
Seal Options

Seal Code	Seal Material	Seal Temp.Range
915/54XXB	Butyl	-30°C to +120°C
915/54XXE	EPDM	-20°C to +150°C
915/54XXF	Fortyt ***Note**	-55°C to +200°C
915/54XXN	Nitrile	-20°C to +100°C
915/54XXP	Perfluoroelastomer	-15°C to +200°C
915/54XXQ	Viton FDA approved	-20°C to +200°C
915/54XXV	Viton	-20°C to +200°C

NOTE: Fortyt is liquid-tight but is not bubble-tight

Parts Drawing

119mm cap (915/5470X) shown in the open position



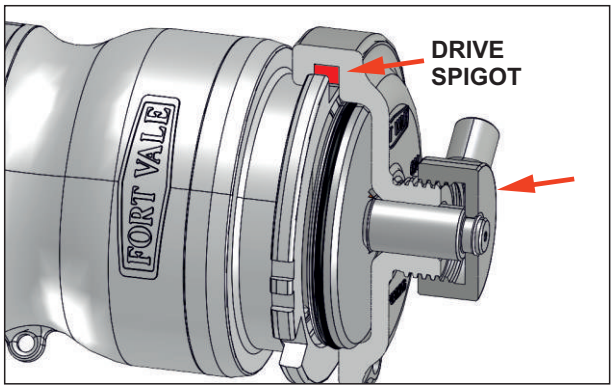
Parts List

Item	Description	Part No.
1	Retaining clip	5120-056
2	Anti-galling top cap ***Note**	915/54X4
3	Cap body ***Note**	915/54XX
4	O ring ***Note**	XXXXXXX
5	Seal plate ***Note**	915/54XX

NOTE: The cap specification changes the Part No.

Installation Instructions

Example shown: 119mm cap and tank unit



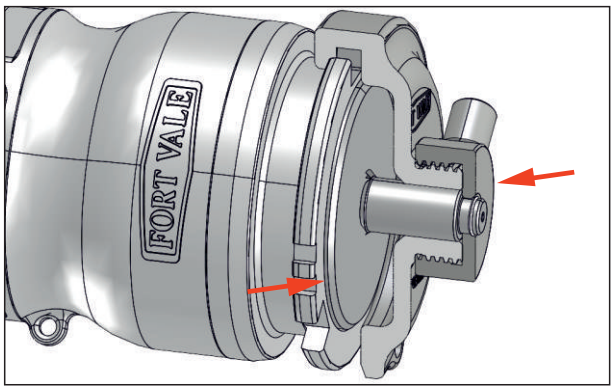
How to install the pressure-tight cap assembly

Move the top cap to the top of its thread.

Note the drive spigot position.

Align the drive spigot with a roller slot on the tank unit and move the cap assembly down to install it onto the tank unit.

Make sure the drive spigot engages with the slot.



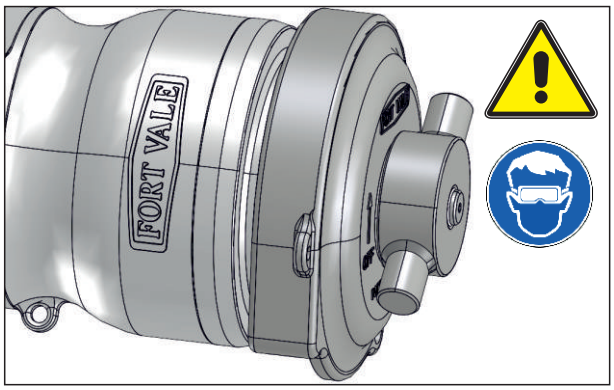
Tighten the top cap.

The seal plate will move into the recess in the tank unit.

When the top cap is fully tight, the assembly is locked and sealed.

NOTE: A Fortyt O ring will give a liquid-tight seal, but will not give a bubble-tight seal.

Attach a chain as necessary.



How to remove the pressure-tight cap assembly

CAUTION: There can be pressure inside the tank unit. Keep your face away from the cap and wear PPE.

Loosen the top cap and unscrew it until it is at the top of its thread.

The seal plate will retract into the cap body. If there is pressure inside the tank unit, it will be safely released.

When the pressure is released, move the cap assembly up to remove it from the tank unit.

Dust Caps & Plugs for Drytyt Dry Disconnect Couplings

Accessories & Spare Parts

Specification

Caps for tank units have a ring and tab to attach it to the tank unit.

Plugs for hose units have a 3mm hole to attach a keyring and chain or wire.

Nominal sizes
70mm, 119mm, 164mm

Material
Black EPDM rubber

If the type you need is not shown, please contact us.

Dust Caps - For Tank Units

Size	Part No.
70mm	915/5172
119mm	915/5175
164mm	915/5176

Dust Plugs - For Hose Units

Size	Part No.
70mm	915/5171
119mm	915/5173
164mm	915/5174

Specification

TW couplings are a tertiary closure system and are used to connect the valve outlet and hose. The lever locks the female part to the male part for product loading and discharge. TW couplings are supplied with a seal as standard. Compatible plugs and dust caps protect the couplings from dirt and damage.

Nominal sizes

DN50
DN80
DN100

Design Code

TW couplings obey EN 14420-6

Materials

Metal parts: stainless steel

Male Part - Type VK

Supplied as standard with a PTFE seal

Size	Part No.
VK50	90/TWVK50SS
VK80	90/TWVK80SS
VK100	90/TWVK100SS

Female Part - Type MK

Supplied as standard with a CSM seal

Size	Part No.
MK50	90/TWMK50SS
MK80	90/TWMK80SS
MK100	90/TWMK100SS

Cap - Type MB

Compatible with VK couplings

Size	Part No.
MB50	90/TWMB50SS
MB80	90/TWMB80SS
MB100	90/TWMB100SS

Plug - Type VB

Compatible with MK couplings

Size	Part No.
VB50	90/TWVB50SS
VB80	90/TWVB80SS
VB100	90/TWVB100SS

Related Parts

Seal for male part, type VK coupling

Size	Material	Part No.
50mm	PTFE	5005-TW50PTFE
80mm	PTFE	5005-TW80PTFE
100mm	CSM	5005-TW100PTFE

Related Parts

Seal for female part, type MK coupling

Size	Material	Part No.
50mm	CSM	5005-TWMK50HYP
50mm	Natural black rubber	5005-TWMK50NBR
80mm	CSM	5005-TWMK80HYP
100mm	CSM	5005-TWMK100HYP

Specification

Nominal sizes
75mm and 110mm

Body material options
Opaque plastic
Transparent plastic

Fixing bracket options
Plastic
Stainless steel

Cap
All document holders are supplied with a plastic cap as standard which is attached by a stainless steel wire to prevent loss/theft.

Document Holders

Size	Body	Brackets	Part No.
75mm	Opaque	Plastic	360/1101
75mm	Transparent	Plastic	360/1101T
75mm	Opaque	St/steel	360/1101ABSS
75mm	Transparent	St/steel	360/1101TBSS
110mm	Transparent	Plastic	460/1101T
110mm	Transparent	St/steel	460/1101TBSS

Spare Parts - Plastic Caps

All caps are supplied with a stainless steel cable.

Size	Part No.
75mm	360/1010
110mm	460/1010

Spare Parts - Fixing Brackets

Size	Material	Part No.
75mm	Plastic	360/1007
75mm	Stainless steel	360/1007SS
110mm	Plastic	460/1007
110mm	Stainless steel	460/1007SS

Flame Arresters

Specification

A relief valve flame arrester attaches around the ports of the relief valve body. It prevents an external flame from being transmitted into the tank on relief valves with a vacuum setting of ≤ 0.21 Bar (6"Hg).

For relief valves with a vacuum setting of > 0.21 Bar (6"Hg), a flame arrester is frequently used to prevent debris from going into the tank through the relief valve.

Nominal sizes
Compatible with 1", 1½" 2½", 65mm and 80mm relief valves

Material
Stainless steel

WARNING: If you install a flame arrester, it will decrease the air flow capacity of the relief valve. Thus, you must calculate to make sure that the decreased air flow capacity of the relief valve and flame arrester will give sufficient protection to your vessel/system. Refer to Fort Vale for more information.

Flame Arresters

Each flame arrester is compatible for the specified relief valve type only. Flame arresters are not interchangeable between relief valve types.

IMPORTANT: Refer to the air flow decrease data for your valve type. (See **WARNING**)

Compatible Relief Valve	Air Flow Decrease	Part No.
1" Minnow	17% to 20%	179/0300
1½" Twinact	See Note	200/5000
2½" Twinact	See Note	130/5000
2½" & 65mm Super Maxi	1%	176/2900
80mm Hyper Maxi	5.4%	176/2920

NOTE: For the air flow decrease data for Twinact relief valves, please contact Fort Vale.

Debris Protection - Gauzed Cowl

Part No: 176/6000

Specification

A gauzed cowl attaches to the 65mm Super Maxi relief valve cap. It is used to prevent debris from going into the tank through the relief valve.

Nominal sizes
Compatible with a 65mm/2½" Super Maxi relief valve only

Material
Stainless steel

CAUTION: If you install a gauzed cowl onto a Super Maxi relief valve, it can decrease the relief valve air flow capacity. Refer to Fort Vale for more information.

ACME Outlet Assemblies

Accessories & Spare Parts

Specification

The ACME outlet assembly is a tertiary closure system for liquefied gas discharge assemblies. It includes a spigot flange and a plug/cap assembly with a PTFE seal and retaining wire.

Nominal sizes

DN25, 1¾" ACME thread: compatible with vapour phase
DN50, 3¼" ACME thread: compatible with liquid phase

Connection

4 x 18mm holes on a 125mm PCD

Properties

¼" NPT connection for a sample/bleed valve or a pressure gauge. Safety bleed hole in the spigot.

Materials

Metal parts: 316 stainless steel
Seal: PTFE

Design Conditions

Design Pressure (MAWP):	34.5 Bar
Test Pressure:	70.0 Bar
Design Temperature Min:	-50°C
Design Temperature Max:	80°C

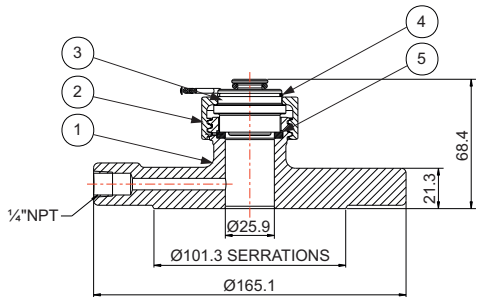
Range

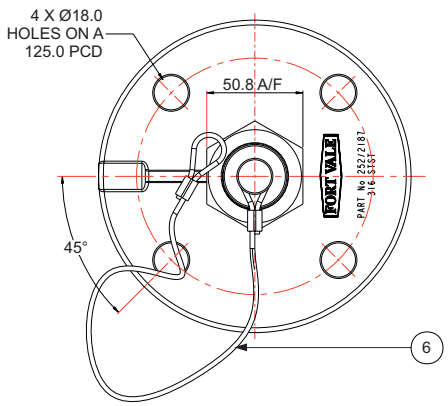
Description	Part No.
DN25 1¾" ACME thread	252/2187
DN50 3¼" ACME thread	252/2177

Spare Parts

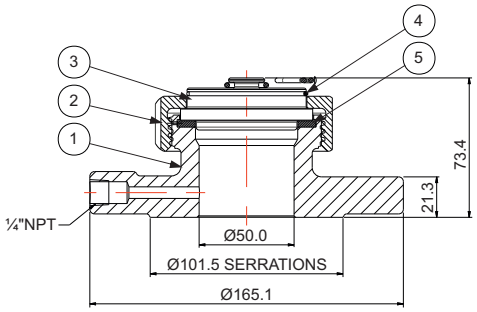
Item	Description	Part No. 1¾" ACME	Part No. 3¼" ACME
1.	Outlet flange	252/2084	252/2069
2.	ACME cap	252/2085	252/2075
3.	ACME plug	252/2086	252/2076
4.	Retaining ring clip	5120-028	5120-027
5.	PTFE seal	5005-878	5005-877
6.	Retaining wire	425/0009	425/0004

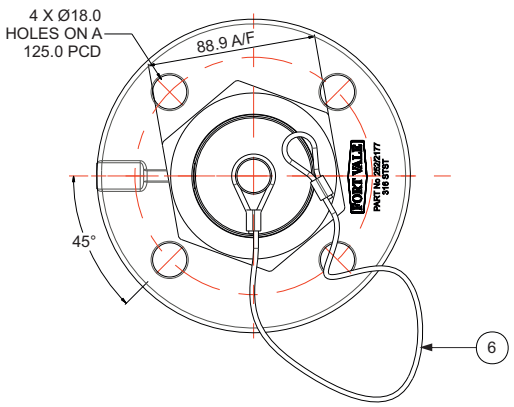
Section View - 1¾", Part No. 252/2187





Section View - 3¼", Part No. 252/2177





1½” Airline Ball Valve Adaptor Kit

Accessories & Spare Parts

Specification

The 1½” airline ball valve adaptor kit lets you change an airline ball valve with a 1½” BSP outlet/process connection to a DN40 or DN50 flanged outlet/process connection.

The kit includes these parts:

- BSP to DN adaptor flange
- blind flange
- bent handle
- envelope gasket
- bolting kit

NOTE: The ball valve is not included in the kit.

You can buy only the adaptor flange if you do not need the complete kit.

Range

Description	Part No.
1½” BSP to DN40 adaptor kit	530/ADAP40KIT
1½” BSP to DN40 adaptor flange only	530/ADAP40
1½” BSP to DN50 adaptor kit	530/ADAP50KIT
1½” BSP to DN50 adaptor flange only	530/ADAP50

Standard Adaptor Flanges

Compatibility	No. Holes	Hole Ø (mm)	PCD (mm)	Specification	Material	Part No.
2½" BSP relief valve	4	14	130	2½" BSP / DN65 PN6	CF3M	176/3000
2½" BSP relief valve	4	18	145	2½" BSP / DN65 PN10	316 st/steel	176/3091
3" bottom discharge valve mating flange	4	18	160	DN80	316 st/steel	294/0081
2½" BSP relief valve/burst disc inlet adaptor	6	M10	105		CF8M	176/7002
2½" BSP relief valve/burst disc	6	11	105		CF8M	176/7001
1½" BSP relief valve/burst disc	6	11	105		316L st/steel	176/7085
1½" BSP airline ball valve	8	M16 x4 18 x4	110 110	1½" BSP / DN40	316L st/steel	530/ADAP40 ***Note**
1½" BSP airline ball valve	8	M16 x4 18 x4	125 125	1½" BSP / DN50	316/316L st/steel	530/ADAP50 ***Note**
Top discharge syphon tube	8	14 x6 18 x4	168 160		CF3M	368/0810
Top discharge butterfly valve	8	M16 x4 18 x4	160 160	DN80	316 st/steel	S0404
4" bottom discharge mating flange	8	18	180	DN100 PN10	316 st/steel	875/4150

Please contact us if the adaptor flange you need is not shown.

NOTE: You can buy a complete kit to change a 1½" BSP connection to DN40 or DN50. Refer to data sheet SPA042.

176/3000

176/3091

294/0081

Shows underside

176/7002

176/7001

176/7085

530/ADAP40 & 530/ADAP50

Shows underside

368/0810

S0404

875/4150

Standard Blind Flanges

Compatibility	No. Holes	Hole Ø (mm)	PCD (mm)	Specification	Material	Part No.
Flanged airline ball valve eg 530/1000	4	17	110	DN40 PN10	CF8M	530/8053CM
Airline connection	4	17	125	DN50 PN10	CF8M	370/4239CM
Top/bottom discharge	4	17	160	DN80	CF8M	312/0022CM
Top/bottom discharge	4	18 slots	146 to 160	DN80 / 3"ASA	316 st/steel	360/8066
Relief valve weld-in flange (176/3150)	6	11	105	N/A	CF8M	176/3160CM
Top discharge weld-in flange (368/0800)	6	14	168	N/A	CF8M	S0206CM

Please contact us if the blind flange you need is not shown.

530/8053CM

370/4239CM

312/0022CM

360/8066

176/3160CM

S0206CM

Standard Outlet Flanges

Description	No. Holes	Hole Ø (mm)	PCD (mm)	Specification	Material	Part No.
3" BSP eccentric spigot, square flange	4	14	130	DN80	CF3M	SP368/5129
3" Camlock	4	17 slots	146 to 160	3" ASA150, 3"BSTD, DN80 PN10	CF8M	SP368/8058
3" BSP eccentric spigot, square flange	4	18	160	DN80	CF8M	SP368/8047
3" BSP offset spigot, square flange	4	19 slots	146 to 160	DN80	CF3M	SP368/8010

Please contact us if the outlet flange you need is not shown.

NOTE: We pressure test the outlet flanges shown.

SP368/5129

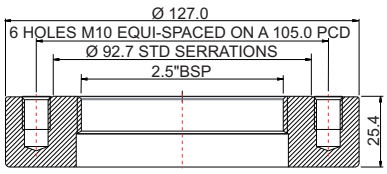
SP368/8058

SP368/8047

SP368/8010

Part No: 176/3150

Section View



Specification

Flange type
Weld-in flange

Nominal size
DN65 with 2½" BSP thread

Flange drilling
6 x M10 holes equi-spaced on a 104.9mm PCD

Material
316L stainless steel

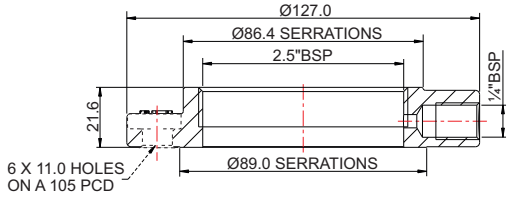
Compatible valve/part
2½" BSP Super Maxi relief valve
176/7001 adaptor flange with 65mm XL burst disc

Related Parts

Description	Part No.
CNAF/PTFE gasket	5005-398
Bolting kit	176/7021
Adaptor flange	176/7001

Part No: 176/7001

Section View



Specification

Flange type
Burst disc adaptor flange

Nominal size
DN65 with 2½" BSP thread

Flange drilling
6 x 11mm holes equi-spaced on a 105mm PCD

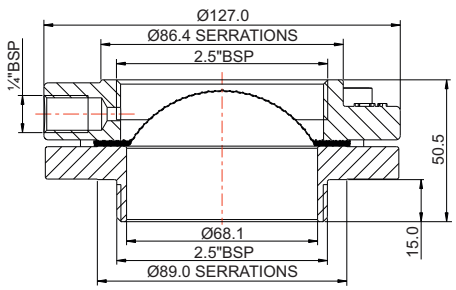
Properties
¼" BSP gauge connection

Material
316 stainless steel

Compatible valve/part
2½" BSP Super Maxi relief valve
65mm XL burst disc

Part No: 176/7020

Section View



Specification

Flange type
Burst disc adaptor flange assembly

Nominal size
DN65 with 2½" BSP thread

Inlet connection
2½" BSP

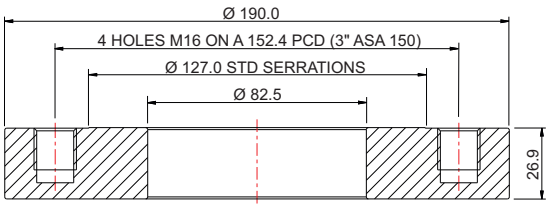
Properties
¼" BSP gauge connection, includes M10 washers & bolts
Burst disc not included

Material
316 stainless steel

Compatible valve/part
2½" BSP Super Maxi relief valve
65mm XL burst disc

Part No: 176/3125

Section View



Specification

Flange type
Weld-in flange

Nominal size
DN80

Flange drilling
4 x M16 holes equi-spaced on a 152.4mm PCD

Material
316L stainless steel

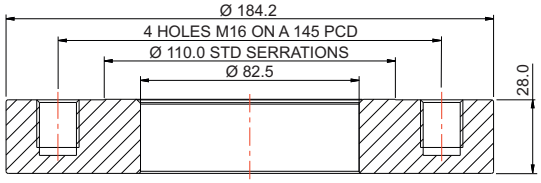
Compatible valve/part
80mm Super Maxi & 80mm Hyper Maxi relief valve
80mm XL burst disc

Related Parts

Description	Part No.
CNAF/PTFE gasket	5005-204
Stud kit	311/3700

Part No: 176/3250

Section View



Specification

Flange type
Weld-in flange

Nominal size
DN80

Flange drilling
4 x M16 holes equi-spaced on a 145.0mm PCD

Material
316L stainless steel

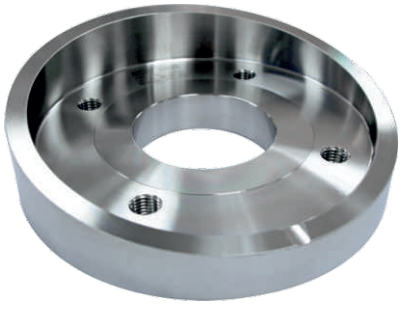
Compatible valve/part
80mm Super Maxi & 80mm Hyper Maxi relief valve
80mm XL burst disc

Related Parts

Description	Part No.
CNAF/PTFE gasket	5005-332
Bolt kit	311/3785

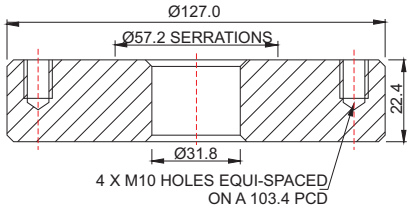
Special Flanges

We offer a large range of special weld-in flanges and adaptor flanges, such as recessed, low profile and dual drilled. Please contact us for more information.



Part No: 350/0025

Section View



Specification

Flange type
Weld-in flange

Nominal size
32mm

Flange drilling
4 x M10 holes equi-spaced on a 103.4mm PCD

Material
316L stainless steel

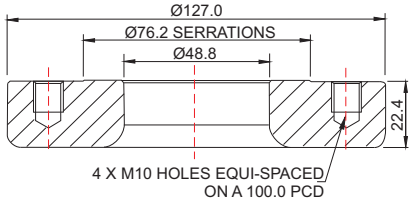
Compatible valve
1½" airline ball valve

Related Parts

Description	Part No.
Stud kit	350/1300

Part No: 355/1000

Section View



Specification

Flange type
Weld-in flange

Nominal size
50mm

Flange drilling
4 x M10 holes equi-spaced on a 100.0mm PCD

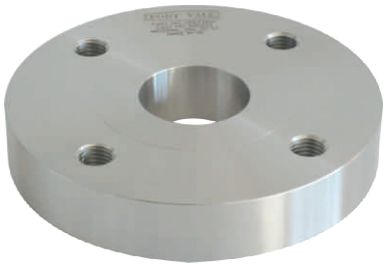
Material
316L stainless steel

Compatible valve
2" BSP airline butterfly valve

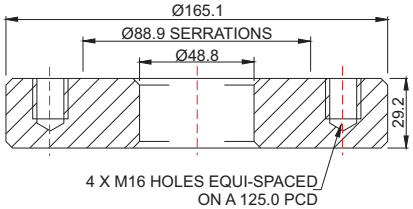
Related Parts

Description	Part No.
Stud kit	350/1300

Part No: 355/3100



Section View



Specification

Flange type
Weld-in flange

Nominal size
50mm

Flange drilling
4 x M16 holes equi-spaced on a 125.0mm PCD

Material
316L stainless steel

Compatible valve
2" flanged butterfly valve
2" flanged ball valve

Related Parts

Description	Part No.
Stud kit	311/3700

Blind Weld-in Flange: Hydrogen Peroxide

Part No: 324/9007

Specification

The blind weld-in flange is welded into the bottom of the vessel in the normal discharge valve position. If the vessel is changed to standard service, the centre section of the flange can be cut out so that a 45° discharge valve assembly can be installed.

Drilling pattern
8 x M12 holes equi-spaced on a 178mm PCD

Compatible
Standard 45° Cleanflow, Uniflow, Highlift & Univalve footvalves

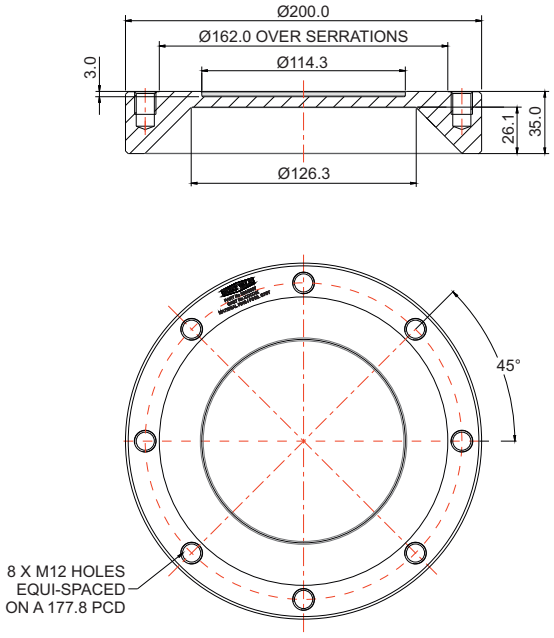
Material
316 stainless steel

Design Conditions

Weight	4.5 Kg
Design Pressure (MAWP):	6.67 Bar
Test Pressure:	10.0 Bar
Design Temperature Min:	-40°C
Design Temperature Max:	130°C

NOTE: The Design Conditions and Section View dimensions are for the specified part number only.

Section View



Footvalve Replaceable Seat Kit - Cleanflow Footvalve

Accessories & Spare Parts

Specification

The Cleanflow footvalve replaceable seat kit lets you replace the footvalve seating area if there is damage or corrosion. This saves time and avoids the cost of replacing a complete valve.

We also supply a complete 3" 45° Cleanflow footvalve assembly with replaceable seat, please refer to Range.

Compatibility
3"/80mm Cleanflow footvalve: 30°, 45°, 90°, 180°
4"/100mm Cleanflow footvalve: 30°, 45°, 90°, 180°

Seating flange materials
316 stainless steel
904L stainless steel
High nickel alloy
Titanium

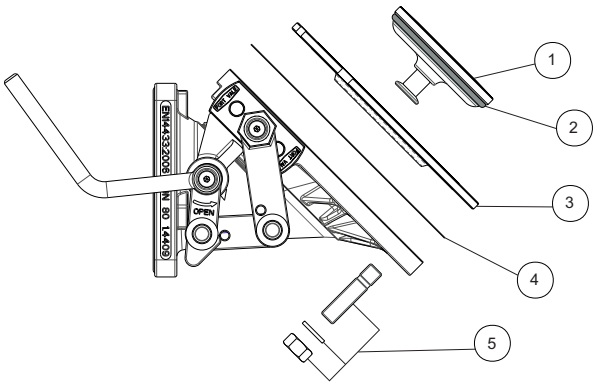
IMPORTANT: A Cleanflow footvalve with a replaceable seat protrudes more from the tank and the outlet centre line is lower than that of a standard valve. Please contact us for dimensions and more information.

Range

Description	Part No.
3" Cleanflow replaceable seat kit	845/16CKX *
4" Cleanflow replaceable seat kit	875/16CKX *
3" 45° Cleanflow with replaceable seat	845/16RXX *

* The seating flange material changes the Part No.

Kit Parts Drawing



Kit Parts List

Item	Description	3" Kit Part No.	4" Kit Part No.
1	Extended poppet	845/0042	875/0042
2	Fortyt O ring	5005-104	5005-349
3	Seating flange *Note	845/0090X	875/0090S
4	PTFE gasket	5005-829	5005-855
5	Stud kit	845/2055	875/2055

NOTE: The seating flange material changes the Part No.

Footvalve Replaceable Seat Kit - Highlift Footvalve

Accessories & Spare Parts

Specification

The 3" 45° Highlift footvalve assembly with replaceable seat lets you replace the footvalve seating flange assembly if there is damage or corrosion. This saves time and avoids the cost of replacing a complete valve.

Please refer to the Spare Parts Drawing and List.

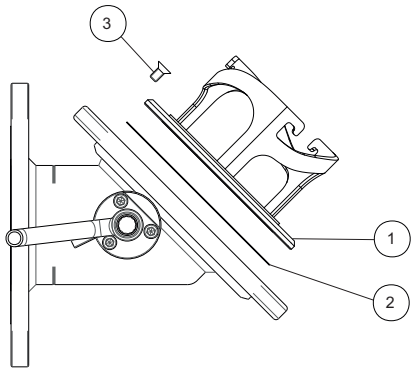
Seating flange materials
316 stainless steel
High nickel alloy
Titanium

Range

Description	Part No.
3" 45° Highlift with replaceable seat	826/0800XA *

* The seating flange material changes the Part No.

Spare Parts Drawing



Spare Parts List

Item	Description	Part No.
1	Seating flange *Note	826/0817X
2	PTFE gasket	5005-828
3	Retaining screw (3)	5111-018

NOTE: The seating flange material changes the Part No.

IMPORTANT: Some of the spare parts for a replaceable seat Highlift footvalve are different from a standard Highlift footvalve. Please contact Fort Vale for footvalve spare parts.

Fusible Link Assembly

Part No: 324/5760

Specification

A fusible link assembly automatically closes a footvalve if there is a fire. The device is installed onto the tank frame and attaches to the footvalve remote closure cable. The fusible element will melt at 100°C. This makes the spring-loaded chain operate the remote closure cable to close the footvalve.

Compatibility
All tank designs and most types of footvalve

Material
304/316 stainless steel

Design Conditions

Weight:	0.5 Kg
Fusible Element:	
Operating Temperature:	100°C
Maximum Load:	18.14 Kg

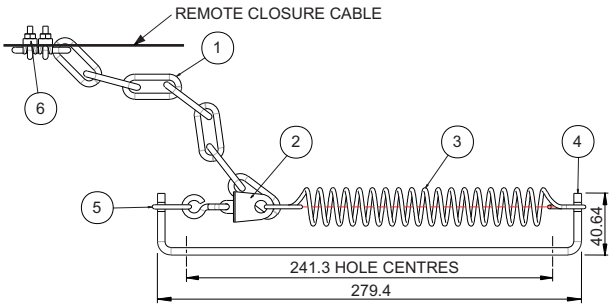
NOTE: The Design Conditions and Section View dimensions are for the specified part number only.

Approvals
Complies with US DOT CFR49 - Ch. 178275 [d]

Related Parts

Description	Part No.
2.5mm 7x7 strand st/st wire, 6.5m length	6110-022
Remote closure tension spring	5104-203
Footvalve handle remote operating lever	324/7610

Parts Drawing

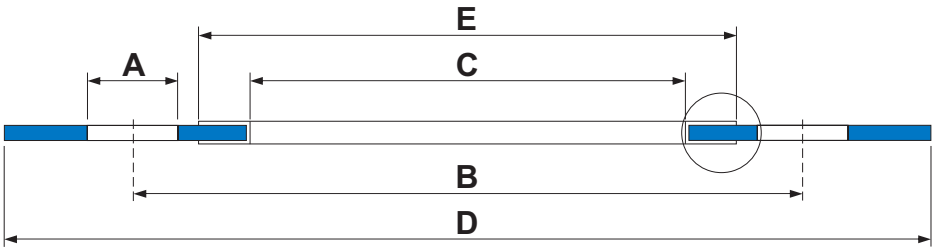


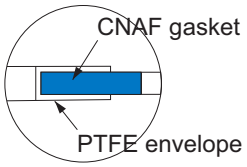
Parts List

Item	Description	Part No.
1	Stainless steel chain	6128-016
2	100°C fusible element	324/5616
3	Tension spring	252/3272
4	Remote closure bracket	324/5765
5	Solid ring	613/6150
6	Wire clamp (2)	324/5341

Important Precautions

- A fusible element is designed for a straight pull load. It is not compatible with a radial or twisting load.
- Keep the fusible link assembly in a cool, dry area.
- Do not use the fusible element where the load or temperature will be more than 18.14 Kg and 100°C.
- Do not apply paint or a coating material to the fusible element as this can prevent correct operation.
- Do not apply cleaning chemicals to the fusible element. Cover the element with a clean, wet cloth during cleaning.
- If the fusible link is installed in an atmosphere that can cause stress/strain/corrosion of surfaces, replace the fusible link at least annually if the fusible link shows signs of stress/strain/corrosion.
- Attach the remote closure wire to the chain using cable clamps. There must be the minimum possible amount of slack on the chain when the valve is in the open position.





Part No	No. of holes	Ø A Hole mm	B PCD mm	Ø C Internal mm	Ø D External mm	Ø E Envelope mm	Material	Compatible with
5005-046	-	-	-	75	90	90	Rubber/PTFE	2½" BSP relief valve tank seal
5005-191	-	-	-	75	90	90	CNAF/PTFE	2½" BSP relief valve tank seal
5005-049	-	-	-	78	112	103	CNAF/PTFE	3" clamped butterfly valve inlet
5005-052	-	-	-	78	142	103	CNAF/PTFE	3" clamped butterfly valve inlet
5005-490	-	-	-	89	142	114	CNAF/PTFE	3" clamped butterfly valve outlet
5005-193	4	14	98	50	127	-	Solid PTFE	1½" ASA150 & 1½" BSTD
5005-500	4	11	100	50	95 SQUARE	-	Solid PTFE	2" BSP butterfly valve inlet
5005-348	4	18	110	37	152	-	Solid PTFE	1½" flanged ball valve outlet
5005-361	4	18 open slot	114 minimum	50	165	-	Solid PTFE	2" flanged butterfly valve outlet
5005-055	4	17	114	55	152	80	CNAF/PTFE	2" BSTE
5005-360	4	18	125	49	165	-	Solid PTFE	2" flanged butterfly valve inlet
5005-036	4	18	146	80	184	-	Solid PTFE	3" BSTD
5005-427	4	18 open slot	146 minimum	83	190	103	CNAF/PTFE	3" ASA/BSTD/DIN80 3" ball/butterfly valve outlet
5005-417	4	18 open slot	146 minimum	83	190	-	Solid PTFE	3" ASA/BSTD/DIN80 3" ball/butterfly valve outlet
5005-875	4	18	146	89	184	114	CNAF/PTFE	3" clamped butterfly valve outlet 3" BSTD
5005-288	4	18	152	78	184	-	Solid PTFE	3" ASA150
5005-195	4	18	160	89	144 SQUARE	114	CNAF/PTFE	3" clamped butterfly valve outlet
5005-023	4	18	172	127	203	152	CNAF/PTFE	3" top discharge valve & 30° footvalve inlet
5005-177	4	18	172	136	203	152	CNAF/PTFE	3" top discharge ball valve inlet
5005-032	4	19	178	114	216	141	CNAF/PTFE	30° footvalve inlet
5005-398	6	11	105	75	127	90	CNAF/PTFE	2½" flanged relief valve weld-in flange
5005-345	6	11	119	89	140	-	Solid PTFE	3" composite butterfly valve outlet
5005-016	6	14	159	127	184	146	CNAF/PTFE	Parkfield footvalve inlet
5005-169	6 not equi-spaced	13	168	78	197	103	CNAF/PTFE	3" flanged butterfly & 3" ball valve inlet
5005-222	6 not equi-spaced	14	168	102	203	127	CNAF/PTFE	3" top discharge butterfly valve inlet
5005-015	8	14	178	114	203	141	CNAF/PTFE	45° & 90° Cleanflow/Highlift footvalve inlet

NOTE: All diameters are nominal

Standard Pressure Gauge

Tell-Tale Pressure Gauge

Specification

We supply standard pressure gauges and tell-tale pressure gauges. Tell-tale pressure gauges have a secondary pointer to indicate if there has been an increase in pressure, even if the pressure subsequently decreases.

All pressure gauges have a ¼" BSP bottom connection and are glycerine filled.

Pressure range options
0-6 Bar, 0-10 Bar, 0-16 Bar, 0-40 Bar

Material options - internal parts
Brass, stainless steel

Standard Pressure Gauge

Pressure Range Bar	PSI	Internal Parts	Part No.
0-6	0-90	Brass	921/06BBSP
0-6	0-90	St/steel	920/06BBSP
0-10	0-150	Brass	921/10BBSP
0-10	0-150	St/steel	920/10BBSP
0-40	0-580	St/steel	920/40BBSP

Tell-Tale Pressure Gauge

Pressure Range Bar	PSI	Internal Parts	Part No.
0-6	0-90	Brass	921/06TTBBSP
0-6	0-90	St/steel	920/06TTBBSP
0-10	0-150	Brass	921/10TTBBSP
0-10	0-150	St/steel	920/10TTBBSP
0-16	0-230	St/steel	920/16TTBBSP
0-40	0-580	St/steel	920/40TTBBSP

Analogue Temperature Gauge - Capillary

Specification: Analogue

Temperature range options
-20°C to 160°C
-20°C to 200°C
NOTE: The temperature range refers to the capillary or probe only

Temperature sensor options
2500mm capillary
250mm stainless steel tube with brass thermowell probe

Gauge fill options
Silicone oil filled
Not filled

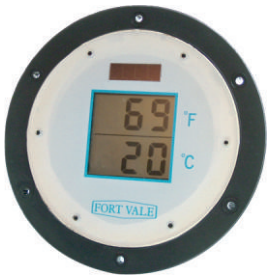
Analogue Temperature Gauge - Probe

Analogue Temperature Gauges

Temperature Range °C	Temperature Range °F	Capillary or Probe	Oil Filled	Part No.
-20 to 200	-4 to 392	Capillary	Yes	922/TEMP200
-20 to 160	-4 to 320	Capillary	Yes	922/TEMP160
-20 to 200	-4 to 392	Probe	No	922/TEMPT200
-20 to 160	-4 to 320	Probe	No	922/TEMPT160

NOTE: The temperature range refers to the capillary/probe only.

Digital Temperature Gauge - Capillary



Specification: Digital

Temperature range options
-200°C to 250°C
NOTE: The temperature range refers to the capillary or probe only

Temperature sensor options
1000mm capillary

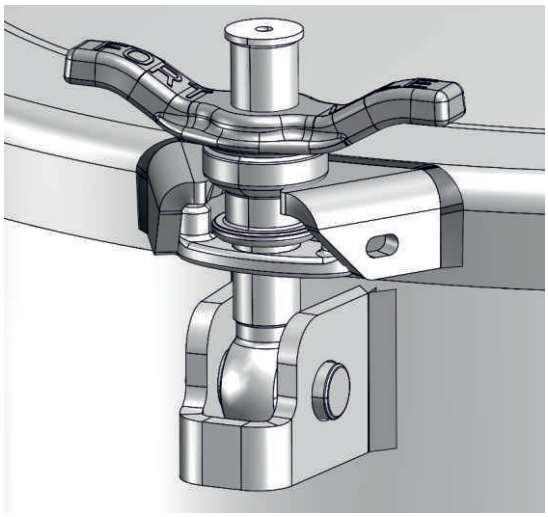
Digital Temperature Gauge

Temperature Range °C	Temperature Range °F	Capillary or Probe	Part No.
-200 to 250	-328 to 482	Capillary	922/TEMPDIGI250

NOTE: The temperature range refers to the capillary/probe only.

Safebolt Assembly

Part No: 496/4XXX



Specification

Description
Safebolt assembly including eyebolt with pivot pin, retaining collar and captivated low profile safebolt handnut

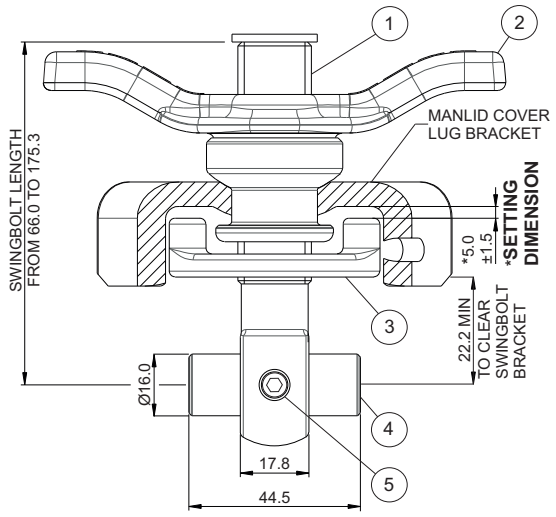
Size
Eyebolt: ¾" BSW eyebolt with Ø 16mm eye, available length from 66mm to 175.3mm (Dimension C)
Safebolt handnut & retaining collar: ¾" BSW
Pivot pin: Ø 16mm

Materials
304 stainless steel

Options
Eyebolt: ¾" eye - refer to Fort Vale
Handnut: refer to the Range table

Special instructions
The customer must set the retaining collar and weld it in the correct position. Refer to the procedure below.

Section View: 496/4XXX



Range: Standard Safebolt Assemblies

Handnut Description	Part No.
Low profile stainless steel ***Note**	496/4XXX
Low profile anti-galling - stainless steel with brass thread insert ***Note**	496/EXXXSB
Extended anti-galling - stainless steel with brass thread insert ***Note**	496/CXXXSB

Parts List: 496/4XXX

Item	Description	Part No.
1	¾" BSW eyebolt, 16mm eye ***Note**	540/0XXX
2	Low profile st.st. safebolt handnut	490/0305
3	Retaining collar	701/0050
4	Ø 16mm pivot pin	10913SS
5	M8 grubscrew	5111-002

NOTE: The eyebolt length changes the Part No.

IMPORTANT PRECAUTIONS

A safebolt must be installed opposite the manlid hinge. The safebolt retaining collar must be set by the customer. This includes a safebolt that is supplied as part of a manlid assembly and a safebolt supplied as a spare part.

How to set the safebolt retaining collar:

- With the safebolt assembly installed in the neckring lug bracket, start with the retaining collar at the bottom of the swingbolt thread. Engage the safebolt assembly with the manlid cover lug bracket.
- Do not tighten the handnut, there must be no compression on the seal.
- Measure the SETTING DIMENSION (Refer to the Section View).
- Disengage the safebolt assembly from the cover lug and move the retaining collar up to the correct position.
- Engage the safebolt assembly with the cover lug bracket again. Check that the SETTING DIMENSION is satisfactory. Adjust the position of the retaining collar if necessary.
- When the SETTING DIMENSION is satisfactory, tack weld the retaining collar to the eyebolt.
- The safebolt retaining collar is now set.

CAUTION: If you change the seal material type in your manlid cover, you must check the setting dimension again. It is possible that you must change the position of the retaining collar to be compatible with the new seal.

Please read the User Manual on page 2.

Overview

A safebolt is a special fastener that can be used on all standard manlid assemblies. It is a safety device that permits the controlled release of residual tank pressure before the manlid is opened.

If there is residual tank pressure, the manlid cover can open suddenly with force which can cause serious injury to the operator. A safebolt lets the operator break the seal between the manlid cover and the neckring while it holds the manlid cover in a retained position, thus preventing the risk of injury.

Precautions

Install the safebolt next to the manlid cover handle, opposite the hinge. Obey the SETTING DIMENSION - refer to the Section View on page 1.

When you operate a manlid assembly installed with a safebolt you must:

- release the safebolt last when you open the manlid.
- fasten the safebolt first when you close the manlid.

WARNING: Before you try to open the manlid, make sure that the vessel/system pressure is at zero. When all the vessel/system pressure is released, use an approved method to release all residual pressure before you loosen any fasteners. If you do not release all pressure, the manlid cover can open suddenly with force which can cause serious injury or death. Open the fasteners gradually in a diametrically opposite sequence.

Operation

This information is for general guidance only. For more information, please refer to our Installation & Operating Instructions - Hinged Manlid Assemblies.

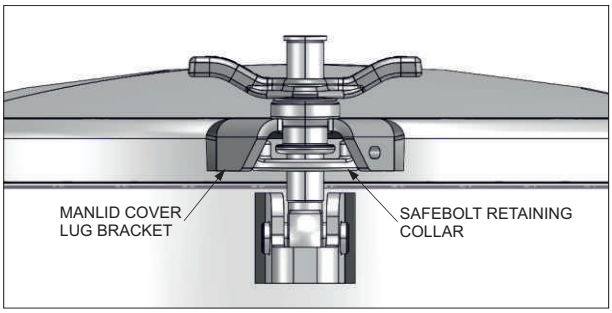


Figure 1 - Closed Position

Closed Position

When the safebolt is in the closed position, the safebolt keeps the manlid cover closed. Refer to Figure 1.

If the handnut becomes loose accidentally, the safebolt retaining collar keeps the eyebolt in the vertical position. This prevents the manlid cover from opening suddenly if there was an increase of pressure in the vessel.

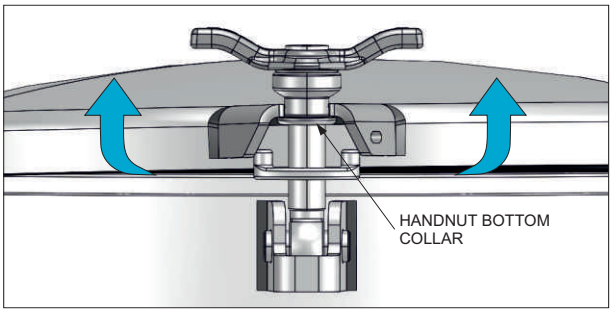


Figure 2 - Retained Position

Retained Position

To operate the safebolt, loosen the handnut and keep the safebolt in the vertical position. When the handnut is loosened, the handnut bottom collar lifts the manlid cover up. This breaks the seal between the manlid seal and the neckring but keeps the manlid cover in a safe “retained position” to prevent it from opening suddenly. Refer to Figure 2.

Make sure that all residual pressure is released before you move the safebolt to the open position.

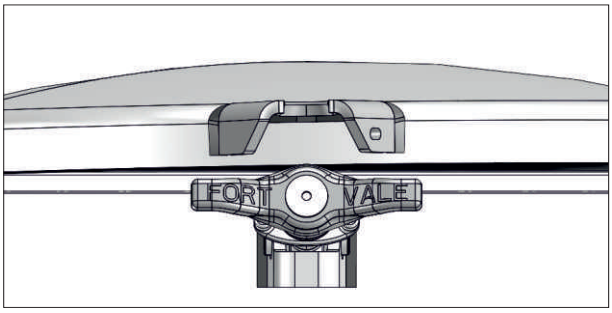


Figure 3 - Open Position

Open Position

To put the safebolt in the open position, turn the handnut until it touches the top retaining washer on the eyebolt. This gives clearance between the safebolt retaining collar and the manlid cover lug bracket. You can then rotate the safebolt assembly away from the manlid cover. Refer to Figure 3.

If the safebolt is difficult to rotate away, use the manlid cover handle to lift the manlid cover by a small amount.

Swingbolt Assemblies

Accessories & Spare Parts

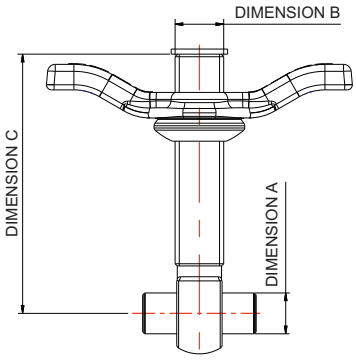
We supply a range of swingbolt assemblies with different eyebolt lengths and handnut types.

The standard sizes shown are the most frequently used. If the size you want is not shown, please contact us.

A complete swingbolt assembly includes the eyebolt, the pivot pin (attached with a grubscrew) and the handnut with captivating washer. You can also buy all these components separately.

For Safebolt assemblies, please refer to data sheet SPA065 or contact us for more information.

Standard Swingbolt Assemblies



Specification

Eyebolt options

Ø eye: Dimension A - 16mm or ¾”
Thread: Dimension B - ¾” BSW
Length: Dimension C - from 49.3mm to 175.3mm
NOTE: Length is measured from the centre of the eye to the end of the bolt
Material: stainless steel

Standard handnut options

Low profile stainless steel
Low profile naval brass with stainless steel thrust washer
Extended stainless steel with anti-galling brass thread

Special handnut options

Extended stainless steel
Low profile stainless steel with anti-galling brass thread
Hexagonal stainless steel nut

Range: Standard Swingbolt Assemblies

The sizes shown are the most frequently used. If the size you want is not shown, please contact us.

16mm Eye Swingbolt Assemblies

Eyebolt Length (Dimension C)		Stainless Steel Handnut	Naval Brass Handnut	Anti-galling Extended Handnut
mm	inches			
62	2.44	496/5260	496/1260	-
66	2.60	496/5275	496/1275	496/C260
70	2.75	496/5290	496/1290	496/C275
83	3.26	496/5342	496/1342	-
87	3.42	496/5358	496/1358	496/C342
92	3.63	496/5379	496/1379	496/C379
95	3.75	496/5375	496/1375	496/C375
108	4.25	496/5425	496/1425	496/C425
133.4	5.25	496/5525	496/1525	496/C525

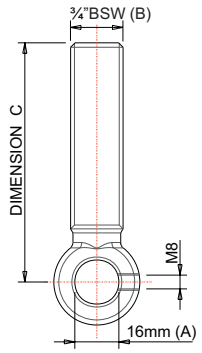
¾” Eye Swingbolt Assemblies

Eyebolt Length (Dimension C)		Stainless Steel Handnut	Naval Brass Handnut
mm	inches		
66	2.60	495/1005	495/1081
87	3.42	495/1015	495/1060
95	3.75	495/1059	495/1055
120.7	4.75	495/0210	-

Related Parts

Description	Part No.
Handnut torque increase tool, compatible with low profile handnuts	495/10T0

16mm Eye (A) x ¾” BSW Eyebolt (B)



Specification

Supplied as standard with an M8 grub screw

Length options (C): from 49.3mm to 175.3mm

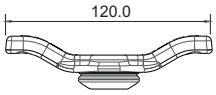
Material: stainless steel

Other eye sizes and thread types are available, please contact us.

Eyebolt Length (Dimension C)		Part No.
mm	inches	
69.85	2.75	540/0275
75.95	2.99	540/0299
80.01	3.15	540/0315
95.25	3.75	540/0375

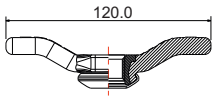
¾” BSW Handnut

Standard low profile handnut

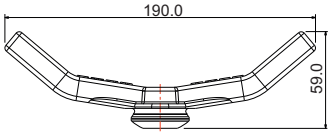


Anti-galling handnut

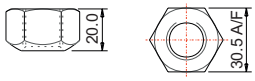
Low profile



Extended



Hexagonal nut



Specification

Standard handnuts are low profile in stainless steel or naval brass.

Special handnuts include extended stainless steel and anti-galling in stainless steel with a brass thread insert. These are available low profile or extended.

For our flat bolted manlids, we also supply stainless steel hexagonal nuts.

Description	Material	Part No.
Low profile	Stainless steel	490/0310
Low profile	Naval brass with stainless steel thrust washer	490/1060
Extended	Stainless steel	490/0313
Anti-galling low profile	Stainless steel with brass thread insert	490/0380
Anti-galling extended	Stainless steel with brass thread insert	490/0410
Hexagonal nut	Stainless steel	490/1190

Eyebolt Pivot Pin

Specification

Standard Ø: 16mm or ¾”

Material: stainless steel

Description	Part No.
Ø 16mm x 44.5mm long	10913SS
Ø ¾” x 1.82" long	10911SS

Related Parts

Manlid/Neckring Hinge Pin Assembly

Specification

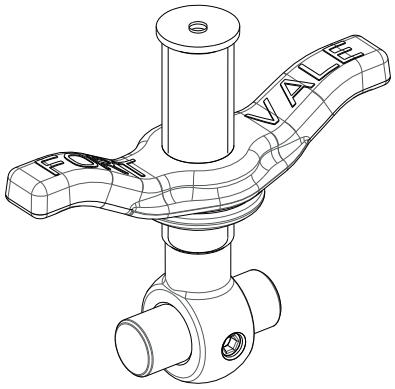
Includes the pin, washers and nyloc nuts

Material: stainless steel

Description	Part No.
Manlid/neckring hinge pin assembly	600/1060

Swingbolt Assembly Part Number Code

Accessories & Spare Parts



Example: 4 9 6 / X X X X

496/ Specification

16mm eye x ¾"BSW swingbolt assembly, including eyebolt, hinge pin and captivated handnut.

¾" BSW Handnut Type

Code	Description	Material
0	Hexagonal nut	Stainless steel
1	Low profile	Naval brass with stainless steel thrust washer
4	Safebolt	Stainless steel
5	Low profile	Stainless steel
8	Extended	Stainless steel
C	Extended anti-galling	Stainless steel with brass thread insert
E	Low profile anti-galling	Stainless steel with brass thread insert

Eyebolt Length

The code is equivalent to the working length of the bolt. This is calculated from the centre of the eye to the end of the bolt, given in inches.

e.g. **375** = 3.75" (95.25mm)

Eyebolts are available from 49.3mm (2.10") long to 175.3mm (6.90") long.
Refer to the Range tables on page 1 for standard sizes.

Manlid & Inspection Hatch Seals - Introduction

Accessories & Spare Parts

Specification

We supply a large range of seals in a selection of sizes and materials for compatibility with many different types of cargo and service conditions. Please contact us if the material you want is not on our data sheet.

If you are ordering a manlid or inspection hatch assembly, we can install the seal if you request this at the time of your order.

We supply three seal types:

- Elastomer Seals
- Composite Seals
- Braided Packing (Non Gas-Tight)

Elastomer Seals

Seals moulded from rubber compounds are suitable for many types of cargo and service conditions. Some advantages of elastomer seals include:

- easy to clean
- good resilience qualities
- excellent sealing performance
- economical to replace regularly

Please refer to data sheet SPA062 for our standard range of elastomer seals.

Composite Seals

Composite seals have been developed for general purpose tanks where the cargo can vary, therefore a multi-purpose seal is useful. Advantages of composite seals include:

- easy to clean
- good resilience qualities
- excellent sealing performance
- do not become porous
- suitable for a range of cargoes and temperatures

Please refer to data sheet SPA063 for our standard range of composite seals.

Composite Seal Types:

Super Tanktyt

The Super Tanktyt seal has a rubber core with a PTFE envelope bonded to three sides. There are two types:

- high temperature Nitrile core/PTFE envelope
- EPDM core/PTFE envelope

The Super Tanktyt seal is the ideal choice for the chemical industry. The seal's rubber core gives it the resilience to be gas-tight up to 4 Bar, and the PTFE envelope gives it excellent resistance to hazardous cargoes.

Please refer to data sheet SPA074 for more information about Super Tanktyt manlid seals.

Fortyt

The Fortyt seal has a silicone rubber core fully encapsulated with a FEP envelope. There are two types:

- round section
- square section

Please refer to data sheet SPA074 for more information about Fortyt manlid seals.

Tuffort

The Tuffort seal has a silicone rubber core fully encapsulated with an advanced fluoroplastic envelope which gives the seal increased resilience. There are two types:

- round section
- square section

Please refer to data sheet SPA074 for more information about Tuffort manlid seals.

Braided Packing (Non Gas-Tight)

Braided packing is made from PTFE impregnated fibre that is tightly braided. There are two types:

- PTFE braided fibre with silicone core
- PTFE braided fibre (no core)

We supply PTFE braided fibre packing either as a cut length or in a roll for you to cut to the necessary size.

CAUTION: Braided packing is a rigid material that will not give a gas-tight seal. The material is lubricant-free but it does contain a small percentage of the wetting agents used during its manufacturing process. Note that small amounts of these wetting agents can leach during use.

For high temperature service conditions, we also supply a Graphite impregnated fibre seal.

Please refer to data sheet SPA064 for our standard range of braided seals.

Precautions

Seal Gas-Tightness

The seal material, the number of manlid bolt fasteners and neckring distortion can affect seal gas-tightness.

For more information, please refer to the linked document below, or contact us.

View Handnut Torque Guide - Hinged Manlid Assemblies

CAUTION: When the neckring has been welded into the vessel, the neckring must be flat to a maximum tolerance of 2mm and round to a maximum tolerance of 4mm. If the neckring is distorted during welding, the manlid assembly will not seal correctly and it can malfunction during operation. Fort Vale accepts no responsibility for distortion caused by welding.

Compatibility

CAUTION: Make sure that the seal material is compatible with the cargo and the service conditions. This includes, but is not limited to:

- dimensions
- maximum allowable working pressure
- test pressure
- vacuum conditions
- minimum/maximum design temperatures
- materials of construction.

PTFE Impregnated Braided Fibre

PTFE braided packing is available as a cut length or as a roll of material for you to cut to the necessary size. There are two types:

- PTFE braided fibre with silicone core - see Table 1
- PTFE braided fibre (no core) - see Table 2

CAUTION: Braided packing is a rigid material that will not give a gas-tight seal. The material is lubricant-free but it does contain a small percentage of the wetting agents used during its manufacturing process. Note that small amounts of these wetting agents can leach during use.

Table 1 - With Silicone Core

Section (mm)	Length (m)	Part No.
14 x 10	1.65	5005-1410S165
15 x 10	1.65	5005-1510S165
14 x 14	1.65	5005-1414S165
14 x 14	50	5005-1414SR50
15 x 15	1.65	5005-1515S165
16 x 16	1.75	5005-1616S175
16 x 16	30	5005-1616SR30

Table 2 - No Silicone Core

Section (mm)	Length (m)	Part No.
14 x 10	1.65	5005-1410D165
15 x 10	1.65	5005-1510D165
14 x 14	1.65	5005-1414D165
14 x 14	50	5005-1414DR50
15 x 15	1.65	5005-1515D165
16 x 16	1.75	5005-1616D175
16 x 16	30	5005-1616DR30

Related Parts

Description	Part No.
Mitre seal cutter - for use with braided packing	400/3100

Graphite Impregnated Braided Fibre

CAUTION: Braided packing is a rigid material that will not give a gas-tight seal.

Material	Compatibility (Example Only) & Minimum/Maximum Temperature	Pendle Manlid Seal Part Number & Section Dimension (mm)			Euro Lid Seal
		300mm (12")	500mm (20")	600mm (24")	500mm (20")
Graphite Impregnated Fibre (Non-asbestos)	Non-corrosive high temperature cargo e.g. tar, bitumen -50°C to 250°C (-58°F to 482°F)	5005-30GA 14.2 x 14.2	5005-50GA 14.2 x 14.2	5005-60GA 14.2 x 14.2	5005-53GA 16 x 16

Compatibility

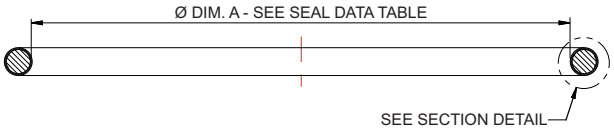
CAUTION: The compatibility information in the table is for general guidance only. Make sure that the seal material is compatible with the cargo and the service conditions. This includes, but is not limited to:

- dimensions
- maximum allowable working pressure
- test pressure
- vacuum conditions
- minimum/maximum design temperatures
- materials of construction.

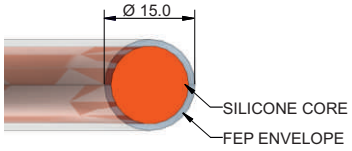
For our standard range of elastomer seals and composite seals, please refer to data sheet SPA062 and SPA063.

Fortyt: Round Section

Section View



Section Detail



Specification & Design Conditions

Material composition
Core: Silicone
Envelope: FEP - full encapsulation

Standard sizes
Ø300mm, Ø500mm

Design temperature minimum/maximum
-60°C / 205°C (Refer to CAUTION)

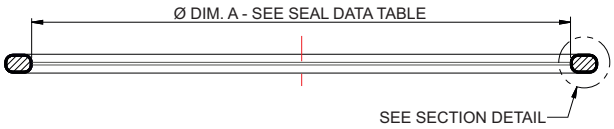
Maximum torque
68Nm (Refer to CAUTION)

Seal Data

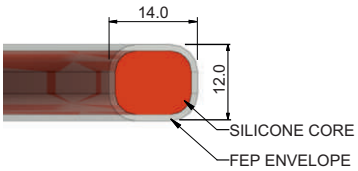
Nominal Ø (mm)	Dim. A (mm)	Part No.
300	290.0	5005-30FT
500	485.0	5005-50FT

Fortyt: Square Section

Section View



Section Detail



Specification & Design Conditions

Material composition
Core: Silicone
Envelope: FEP - full encapsulation

Standard sizes
Ø300mm, Ø500mm

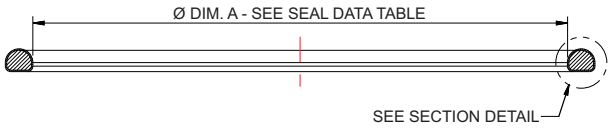
Design temperature minimum/maximum
-60°C / 205°C (Refer to CAUTION)

Maximum torque
Ø300: 54Nm (Refer to CAUTION)
Ø500: 68Nm (Refer to CAUTION)

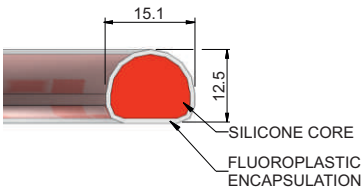
Seal Data

Nominal Ø (mm)	Dim. A (mm)	Part No.
300	292.0	5005-30FTSQ
500	484.0	5005-50FTSQ

Tuffort: D Section



Section Detail



NOTE: Install the Tuffort seal with the curved face down into the seal groove and the flat face up.

Specification & Design Conditions

Material composition
Core: Special silicone
Envelope: Advanced fluoroplastic - full encapsulation

Standard sizes
Ø300mm, Ø500mm

Design temperature minimum/maximum
-60°C / 160°C

Maximum torque
80Nm (Refer to CAUTION)

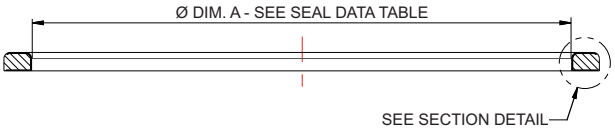
Seal Data

Nominal Ø (mm)	Dim. A (mm)	Part No.
300	293.0	5005-30TUF
500	485.0	5005-50TUF

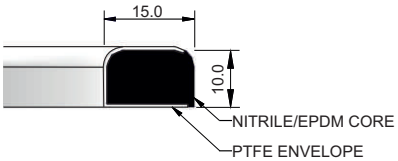
CAUTION: Obey the minimum/maximum design temperature and maximum torque limits. If you do not obey these values, it can cause permanent damage to the seal.

Super Tanktyt

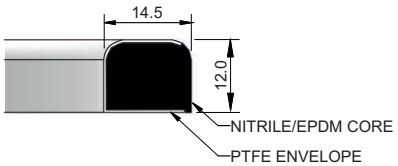
Section View



Section Detail: Ø300



Section Detail: Ø500



NOTE: Install the Super Tanktyt seal with the curved face down into the seal groove and the flat face up.

Specification & Design Conditions

Super Tanktyt is a Fort Vale trade name.
We supply 2 types of core material:

Material composition
Core: High-temperature Nitrile or EPDM
Envelope: PTFE (encapsulated 3 sides)

Standard sizes
Ø300mm, Ø500mm

Design temperature minimum/maximum
High-temp Nitrile: -25°C / 140°C (Refer to CAUTION)
EPDM: -50°C / 150°C (Refer to CAUTION)

Maximum torque
68Nm (Refer to CAUTION)

Seal identification
High-temp Nitrile: The core is marked with the part no.
EPDM: The core is marked with the part no. and a blue/red colour code

Seal Data

Nominal Ø (mm)	Dim. A (mm)	Part No. Nitrile core	Part No. EPDM core
300	293.6	5005-890	5005-890EP
500	483.9	5005-860	5005-860EP

CAUTION: Obey the minimum/maximum design temperature and maximum torque limits. If you do not obey these values, it can cause permanent damage to the seal.

Seal Gas-Tightness

The seal material, the number of manlid bolt fasteners and neckring distortion can affect seal gas-tightness.

CAUTION: When the neckring has been welded into the vessel, the neckring must be flat to a maximum tolerance of 2mm and round to a maximum tolerance of 4mm. If the neckring is distorted during welding, the manlid assembly will not seal correctly and it can malfunction during operation. Fort Vale accepts no responsibility for distortion caused by welding.

Compatibility

CAUTION: Make sure that the seal material is compatible with the cargo and the service conditions. This includes, but is not limited to:

- dimensions
- maximum allowable working pressure
- test pressure
- vacuum conditions
- minimum/maximum design temperatures
- materials of construction.

For more information about handnut torque values and handnut torque conditions, please refer to the linked document below, or contact us.

View Handnut Torque Guide - Hinged Manlid Assemblies

Composite Seals

The table shows our standard range. For more information about composite seals, please refer to data sheet SPA074.

If the material you need is not shown, please contact Fort Vale. For our standard range of elastomer seals and braided packing, please refer to data sheet SPA062 and SPA064.

Material	Compatibility (Example Only) & Minimum/Maximum Temperature	Pendle Manlid Seal Part Number & Section Dimension (mm)					Euro Lid Seal
		170mm (7")	300mm (12")	460mm (18")	500mm (20")	600mm (24")	500mm (20")
Fortyt Round section Silicone/FEP	Corrosive cargo - resistance similar to PTFE -60°C to 205°C (-76°F to 401°F)		5005-30FT Ø15		5005-50FT Ø15		
Fortyt Square section Silicone/FEP	Corrosive cargo - resistance similar to PTFE -60°C to 205°C (-76°F to 401°F)		5005-30FTSQ 14 x 12		5005-50FTSQ 14 x 12		
Fortyt Square section White silicone/FEP	Corrosive cargo - resistance similar to PTFE -40°C to 205°C (-40°F to 401°F)				5005-50FTSQWS 14 x 12		
Super Tanktyt Nitrile core	Corrosive cargo - resistance similar to PTFE -25°C to 140°C (-13°F to 284°F)		5005-890 15 x 10	5005-870 14.5 x 10	5005-860 14.5 x 12	5005-850 16 x 10	5005-871 16 x 16
Super Tanktyt EPDM core	Corrosive cargo - resistance similar to PTFE -50°C to 150°C (-58°F to 302°F)	5005-830EP 15.5 x 10	5005-890EP 15 x 10	5005-870EP 14.5 x 10	5005-860EP 14.5 x 12	5005-850EP 15 x 10	
Tuffort D Section Silicone/FEP	Corrosive cargo - resistance similar to PTFE -60°C to 160°C (-76°F to 320°F)		5005-30TUF 15.1 x 12.5		5005-50TUF 15.1 x 12.5		
PFA White silicone/ PFA	Corrosive cargo - resistance similar to PTFE -40°C to 260°C (-40°F to 500°F)		5005-30PFA Ø15		5005-50PFA Ø15		

Compatibility

CAUTION: The compatibility information in the table is for general guidance only. Make sure that the seal material is compatible with the cargo and the service conditions. This includes, but is not limited to:

- dimensions
- maximum allowable working pressure
- test pressure
- vacuum conditions
- minimum/maximum design temperatures
- materials of construction.

Elastomer Seals

The table shows our standard range. Our elastomer seals are colour-coded to identify the material. The applicable colour is marked on the outer edge of the seal.

If the material you need is not shown, please contact Fort Vale. For our standard range of composite seals and braided packing, please refer to data sheet SPA063 and SPA064.

Material	Compatibility (Example Only) & Minimum/Maximum Temperature	Pendle Manlid Seal Part Number & Section Dimension (mm)					Euro Lid Seal Part Number & Section Dimension (mm)			Colour Code
		170mm (7")	300mm (12")	460mm (18")	500mm (20")	600mm (24")	300mm (12")	460mm (18")	500mm (20")	
Butyl	Non-corrosive cargo -40°C to 120°C (-40°F to 248°F)	5005-17B 16 x 10	5005-30B 16 x 10	11536B 14.5 x 11.8	5005-50B 15.24 x 11.8	5005-60B 16 x 10	5005-33B 16 x 16	5005-47B 16 x 16	5005-53B 16 x 16	Blue
EPDM	Some corrosive cargoes. Do not use with petroleum-cased cargo -50°C to 150°C (-58°F to 302°F)	5005-17EPD 16 x 10	5005-30EPD 16 x 10	11536EPD 14.5 x 11.8	5005-50EPD 15.24 x 11.8	5005-60EPD 16 x 10	5005-33EPD 16 x 16	5005-47EPD 16 x 16	5005-53EPD 16 x 16	Red/Blue
CSM	Moderately corrosive cargo. Do not use with petroleum-cased cargo -40°C to 85°C (-40°F to 185°F)	5005-17CSM 16 x 10	5005-30CSM 16 x 10	11536CSM 14.5 x 11.8	5005-50CSM 15.24 x 11.8	5005-60CSM 16 x 10	5005-33CSM 16 x 16	5005-47CSM 16 x 16	5005-53CSM 16 X 16	White
Natural White Rubber	Food products -50°C to 80°C (-58°F to 176°F)	5005-17SWR 16 x 10	5005-30SWR 16 x 10	11536SWR 14.5 x 11.8	5005-50SWR 15.24 x 11.8	5005-60SWR 16 x 10	5005-33SWR 16 x 16	5005-47SWR 16 x 16	5005-53SWR 16 x 16	
Neoprene	Non-corrosive cargo -30°C to 100°C (-22°F to 212°F)	5005-17NR 16 x 10	5005-30NR 16 x 10	11536NR 14.5 x 11.8	5005-50NR 15.24 x 11.8	5005-60NR 16 x 10	5005-33NR 16 x 16	5005-47NR 16 x 16	5005-53NR 16 x 16	Green
Nitrile (Black)	Aliphatic hydrocarbons -25°C to 100°C (-13°F to 212°F)	5005-17N 16 x 10	5005-30N 16 x 10	11536N 14.5 x 11.8	5005-50N 15.24 x 11.8	5005-60N 16 x 10	5005-33N 16 x 16	5005-47N 16 x 16	5005-53N 16 x 16	Red
Orange Silicone	High temperature non-corrosive cargo -50°C to 200°C (-58°F to 392°F)	5005-17S 16 x 10	5005-30S 16 x 10	11536S 14.5 x 11.8	5005-50S 15.24 x 11.8	5005-60S 16 x 10	5005-33S 16 x 16	5005-47S 16 x 16	5005-53S 16 x 16	
White Silicone	Food products. FDA approved -50°C to 200°C (-58°F to 392°F)	5005-17WS 16 x 10	5005-30WS 16 x 10	11536WS 14.5 x 11.8	5005-50WS 15.24 x 11.8	5005-60WS 16 x 10	5005-33WS 16 x 16	5005-47WS 16 x 16	5005-53WS 16 x 16	Red
Viton A	Moderately corrosive cargo -15°C to 200°C (5°F to 392°F)	5005-17VR 16 x 10	5005-30VR 16 x 10	11536VR 14.5 x 11.8	5005-50VR 15.24 x 11.8	5005-60VR 16 x 10	5005-33VR 16 x 16	5005-47VR 16 x 16	5005-53VR 16 x 16	Yellow

Compatibility

CAUTION: The compatibility information in the table is for general guidance only. Make sure that the seal material is compatible with the cargo and the service conditions. This includes, but is not limited to:

- dimensions
- maximum allowable working pressure
- test pressure
- vacuum conditions
- minimum/maximum design temperatures
- materials of construction.

Threaded Weld-In Sockets

Specification

Weld-in sockets are heavy-duty and have an oversized thread so that re-tapping after welding is not necessary

Nominal sizes
From DN15 to DN65

Thread sizes
From ½" BSP to 2½"BSP

Material
316 stainless steel

If the type you need is not shown, please contact us

Weld-In Sockets

Nominal Size	Thread	Part No.
DN15	½" BSP	600/1030
DN20	¾" BSP	653/1000
DN25	1" BSP	600/1025
DN40	1½" BSP	600/1010
DN50	2" BSP	600/1017
DN65	2½" BSP	600/1000

DIN11851 Weld-In Sockets

Specification

DIN11851 fittings are compatible with hygienic service conditions. A complete assembly includes a weld-in socket, a slotted nut and a silicone seal

Nominal sizes
DN50, DN65, DN80

Compatible parts
1½", 2" and 2½" relief valves

Material
Socket & nut: 316 stainless steel
Seal: Silicone

If the type you need is not shown, please contact us

DIN11851 Hygienic Fittings

Size	Weld Socket Part No.	Slotted Nut Part No.	Silicone Seal Part No.
DN50	176/2660	176/2670	176/2675S
DN65	176/2645	176/2630	176/2653S
DN80	176/2550	176/2650	176/2685S

We supply a range of special tools and repair kits to do scheduled maintenance and repair procedures to our valves.

We recommend that you use the correct special tools to help you do maintenance and repairs quickly and easily without causing damage to the valve or the new spare parts.

A selection of step-by-step maintenance instruction manuals is also available, please contact us.

CAUTION: Valve maintenance and repair can be dangerous. To do maintenance, you must have experience and qualifications related to valve installation on pressure vessels and systems.

Relief Valve Pressure/Vacuum Test Rig

Part No: 400/8000

Specification

You can use the relief valve test rig to test the pressure and vacuum setting of Hyper Maxi, Super Maxi, Twinact, Uniact, Minnow and Steam relief valves.

Valve connection
2½" BSP.
We supply adaptors to change to other BSP and flanged connections.

Test rig supply connection
¼" BSP female socket

Test range
From -0.7 Bar to 6.9 Bar (-10 PSI to 100 PSI)

Related documents
Operating Instructions: OPIN26. Please contact us.

Footvalve & Relief Valve Seat Repair Kit

Part No: 3" Kit - 400/2600
Part No: 4" Kit - 400/2900

Specification

You can use the seat repair kit to re-surface the seating face of a valve if there is damage caused by corrosion.

Compatible
3" Kit: compatible with 2½" Super Maxi relief valve and 3" Cleanflow and Highlift footvalves
4" Kit: compatible with 4" Cleanflow & Highlift footvalves

Connection
Compatible with power tools with a ½" chuck

Kit contents
Selection of grinding and polishing discs
Selection of face-forming tools
Instruction manual

Related documents
Operating Instructions: 3" Kit OPIN70, 4" Kit OPIN77. Please contact us.

Spare Parts: Grinding Discs

Description	Part No. 3"	Part No. 4"
Box of 100 x 60 grit	400/2610	400/2615
Box of 100 x 80 grit	400/2620	400/2625
Box of 100 x 180 grit	400/2630	400/2635
Box of 100 x 500 grit	400/2640	400/2645

Relief Valve Tool Kits

Description	Part No.
Test rig adaptor flange - adapts 2½"BSP to 3"ASA150, DIN65 PN10 & DIN80 PN6	425/1000
C spanner - to install/remove Twinact relief valves	400/3000
C spanner - to install/remove Super Maxi relief valves	400/3001
Tightening tool for MKIII Super Maxi relief valves	400/8380
Tool kit - 1½" & 2½" Twinact valves	400/1000
Tool kit - 65mm & 80mm Super Maxi & Hyper Maxi relief valves	400/8300

Footvalve Tool Kits

Description	Part No.
3" Cleanflow footvalve tool kit	400/2150
3" Highlift footvalve tool kit	400/2450

Ball Valve Tool Kits

Description	Part No.
1½" ball valve tool kit	400/2500
3" ball valve tool kit	400/2200

Butterfly Valve Tool Kits

Description	Part No.
2" butterfly valve tool kit	400/2300
3" butterfly valve tool kit	400/2700

We supply a selection of wear gauges, special tools and kits to check the condition and do scheduled maintenance on the Safeload range of equipment.

We recommend that you use the correct special tools and only genuine spare parts. These will help you do maintenance and repairs quickly and easily without causing damage.

A selection of step-by-step maintenance instruction manuals is also available, please contact us.

CAUTION: To do maintenance, you must have experience and qualifications related to equipment installation on pressure vessels and systems.

Loading Adaptor Wear Gauge

Part No: 94/2150

Couplers, dump adaptors and caps can cause wear to the diameter and rear contact face of loading adaptors. A worn loading adaptor can cause an incorrect connection and product leakage.

The wear gauge helps you check the condition of the adaptor. It will show:

- if the loading adaptor diameter is under-size.
- if the loading adaptor diameter is over-size (caused by de-lamination of the steel on the rear contact face).
- if there is too much wear to the rear contact face.
- if the wear is less than the permitted limit and the loading adaptor is satisfactory.

The wear gauge is also compatible with the Fort Vale coupler parking nose, part no. 94/25PC.

Related Document: Operating Instructions OPIN32

Safeload Coupler Wear Gauge

Part No: 94/3050

The Safeload coupler wear gauge helps you check the condition of the coupler latches and operating mechanism. It will show:

- if there is too much wear to the latches.
- if there is some wear to the latches and you must schedule maintenance.
- if the wear is less than the permitted limit and the coupler is satisfactory.

The coupler wear gauge is compatible with semi-automatic, high-pressure and manual Safeload couplers.

Related Document: Operating Instructions OPIN33

Safeload Coupler Seal Replacement Tool

Part No: 400/94X0

The Safeload coupler seal replacement tool helps you set the coupler in the correct position to give access to replace the seals.

The tool has two different faces, one to let you replace the main seal and seal carrier O rings and the other to let you replace the spindle O rings.

Range

Description	Part No.
Compatible with standard semi-automatic & manual coupler	400/9420
Compatible with high-pressure coupler	400/9440

Seal Kits

We supply seal kits in a range of seal materials for our Safeload couplers, please refer to the coupler data sheet for more information.

Safeload Accessory Kits

Description	Part No.
Seal kit for MK2 Safeload coupler, part no. 94/2000 (pre-2007)	94/20SK
Loading arm assembly kit	94/7AK
Loading arm swivel grease nipple kit	94/7GNK
Loading arm base swivel stop device: stop plate & stop bar	94/7079/XXA 94/7081

Related Parts

We also recommend our range of compatible accessories:

- API coupler parking nose
- Loading arm spools
- Drop hoses

Please contact us for more information about these parts.

FORT VALE

APPENDIX

Accessories & Spare Parts

Catalogue

Compatibility

Make sure that the function and technical specification of the valve/accessory is compatible with the vessel service conditions and the cargo. This includes, but is not limited to:

- dimensions
- pressure/vacuum setting
- air/vapour/liquid flow capacity
- maximum allowable working pressure
- test pressure
- minimum/maximum design temperatures
- materials of construction.

Maintenance

Fort Vale valves and accessories have a long life if you use them correctly in compatible service conditions. It is not necessary to lubricate the parts, but we recommend that you do the checks that follow:

Visual checks at regular intervals:

1. Examine the valve to make sure there is no damage, wear or corrosion.
2. Examine the valve and adjacent area to make sure there is no leakage of cargo.
3. Examine the fasteners to make sure they are not loose.
4. Make sure the valve operates correctly.

CAUTION: If you operate the valve with very corrosive cargo, or near its temperature and/or pressure limit (very high or very low temperature and/or pressure), do the visual checks more frequently.

Also, schedule regular maintenance based on how frequently the valve is used, the type of cargo and the service conditions.

Checks after 2½ years of service:

1. Examine the valve to make sure there is no damage, wear or corrosion.
2. Make sure the valve operates correctly.
3. Do a pressure test on the valve.

Checks after 5 years of service:

1. Disassemble and clean the valve.
2. Replace all the valve seals and do a pressure test. .

Replacement Parts

Do not adapt or change the valve. If you install a replacement part, it must be a genuine Fort Vale part.

WARNING: If you install a part that is not genuine, there is a risk of:

- injury to personnel
- permanent damage to the valve
- permanent damage to the vessel
- valve malfunction.

External Fire

If you install the valve in an area where there is a risk of external fire, you must install compatible accessories to prevent damage to the valve.

Compatibility of Accessories

Accessory components must cause no interference with the valve's function. Accessories must be made from compatible materials that will cause no damage to the valve materials. Do not install an accessory that will cause an increased load on the valve, such as mechanical, static, dynamic or thermal load.

Mis-use

Obey the instructions and recommended procedures in the installation and operating instructions. Obey the pressure and temperature markings on the valve and on the drawing. Use the valve/accessory for its correct function only. Fort Vale accept no liability or responsibility for incorrect use of the valve/accessory.

Flange Bolting

CAUTION: Weld-distortion and too much tightening force will cause damage to a flange.

It is important not to cause damage to weld-in flanges and mating flanges. If a flange is damaged it will not give a satisfactory seal when a gasket and secondary mating flange is installed.

Bolt-stress can decrease after initial tightening. The cause can be deformation of the gasket material, particularly with soft materials such as a CNAF/PTFE envelope gasket.

Best procedure recommends that, after initial bolting, the flange joint is tightened again after a period of time. Most gasket manufacturers advise a period of 24 hours. ASME PCC-1-2000 GUIDELINES FOR PRESSURE BOUNDARY BOLTED FLANGE JOINT ASSEMBLY advises a minimum period of 4 hours.

Bolt torque calculations are based on a flat flange to within 0.15mm.

Recommended bolt torque values will be reduced if a lubrication is used.

Bolt Torque

Bolt Torque Values

Fort Vale bolt torque values are given as a reference guide only and are based on:

- The use of a CNAF/PTFE gasket.
- Unlubricated fasteners.
- A flange flat to within 0.15mm.

CAUTION: If you use a different gasket material, a lubricant, a flange with distortion, you must re-calculate the torque value.

Bolt Torque Procedure

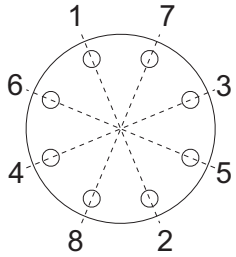
To install flanged parts correctly:

- Examine the mating flange of the part.
- If the flange is marked with a torque value, obey that torque value.
- If there is no torque value marked on the mating flange, obey the bolt torque values given in Table BT1.
- Tighten the bolts evenly in sequence. See Figure BT1.
- Obey the Step Loading Procedure (ASME PCC-1-2000). See next page.

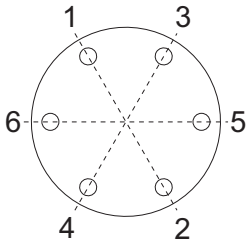
Table BT1

Thread	Torque Value
M10	30 Nm (22 lbf.ft)
M12	65 Nm (48 lbf.ft)
M16	81 Nm (60 lbf.ft)

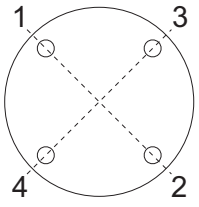
Figure BT1



8 HOLE PATTERN



6 HOLE PATTERN



4 HOLE PATTERN

Step Loading Procedure

To install flanged parts correctly, obey the Step Loading Procedure extract from ASME PCC-1-2000:

Install

Hand tighten, then “snug up” to 15 Nm (10 lbf.ft) to 30 Nm (20 lbf.ft) (not to exceed 20% of Target Torque).
Check flange gap around circumference for uniformity. If the gap around the circumference is not reasonably uniform, make the appropriate adjustments by selective tightening before proceeding.

Round 1

Tighten to 20% to 30% of Target Torque. Check flange gap around circumference for uniformity. If the gap around the circumference is not reasonably uniform, make the appropriate adjustments by selective tightening before proceeding.

Round 2

Tighten to 50% to 70% of Target Torque. Check flange gap around circumference for uniformity. If the gap around the circumference is not reasonably uniform, make the appropriate adjustments by selective tightening before proceeding.

Round 3

Tighten to 100% of Target Torque. Check flange gap around circumference for uniformity. If the gap around the circumference is not reasonably uniform, make the appropriate adjustments by selective tightening before proceeding.

Round 4

Continue tightening the bolts, but on a rotational clockwise pattern until no further nut rotation occurs at the Round 3 Target Torque value. For indicator bolting, tighten bolts until the indicator rod retraction readings for all bolts are within the specified range.

Round 5

Time permitting, wait a minimum of 4 hr and repeat Round 4; this will restore the short-term creep relaxation/embedment losses. If the flange is subjected to a subsequent test pressure higher than its rating, it may be desirable to repeat this round after the test is completed.

Operating Conditions

- When the vessel is in service, all the swingbolt assemblies on the manlid or inspection hatch assembly must be correctly installed and in the closed position.
- Obey the given Handnut Torque Values.
- Make sure that the seal material is compatible with the cargo and the vessel operating conditions.

Handnut Torque Values

If the manlid cover is marked with a maximum torque value, obey that torque value. If there is no torque value on the manlid cover, obey the torque values given in Table MT1. To apply the recommended handnut torque, use a handnut torque adaptor, part number 495/10T0 and a torque wrench.

NOTE: The information given in Table MT1 is applicable to round, hinged manlid assemblies only. This information is not applicable to flat bolted or elliptical manlid assemblies.

Table MT1 - Manlid Maximum Recommended Torque Values

Manlid Cover Type	MAWP	Handnut Maximum Recommended Torque
Single skin	2.67 Bar	68 Nm (50 Lb.ft)
EN14025 double skin	3 Bar & 4 Bar	93.2 Nm (68.7 Lb.ft) **NOTE:** Some seals are not compatible - See **SEAL CAUTION**
ASME double skin	3 Bar & 4 Bar	118 Nm (87 Lb.ft) **NOTE:** Some seals are not compatible - See **SEAL CAUTION**
All other manlids	-	50 Nm (37 Lb. ft)

SEAL CAUTION: Some seal materials are not compatible with the Handnut Maximum Recommended Torque value for the Manlid Cover Type given in Table MT1. Please refer to Table MT2 - Seal Maximum Recommended Torque Values. Do not torque the handnuts more than the Handnut Maximum Recommended Torque value applicable to the seal material type. Too much tightening force can cause damage to the seal, which can cause the manlid assembly to leak.

Table MT2 - Seal Maximum Recommended Torque Values

Seal Material Type	Tank Type	Handnut Maximum Recommended Torque
Braided Packing	EN14025	93.2 Nm (68.7 Lb.ft)
	ASME	118 Nm (87 Lb.ft)
Composite E.g. Super Tanktyt, Tuffort, Fortyt	N/A	68 Nm (50 Lb.ft) - See **SEAL CAUTION**
Elastomers E.g. Viton, EPDM	N/A	Will seal at 20 Nm (14.8 Lb.ft)
	EN14025	93.2 Nm (68.7 Lb.ft)
	ASME	118 Nm (87 Lb.ft)

Handnut Torque Conditions

The given Handnut Maximum Recommended Torque values are based on:

- unlubricated swingbolt assemblies.
- a neckring that is flat to a tolerance of 2mm.
- a neckring that is round to a tolerance of 4mm.

If a lubrication is used, the Handnut Maximum Recommended Torque values will decrease.

CAUTION: If the neckring flatness and roundness does not obey the permitted tolerances, the manlid cover and neckring seal faces will not align correctly and the assembly will leak. Fort Vale accepts no responsibility for distortion caused by welding.

NOTE: Bolt stress can decrease after initial tightening. The cause of this can be deformation of the seal, particularly with soft materials such as elastomers. We recommend that you check the handnut torque again after a period of time - a minimum of 4 hours.

Important Safety Notice

If you disassemble a valve from a vessel to solve a problem or a leak, do a risk assessment and obey the **Maintenance Safety Precautions** (OPIN41). You will need torque spanners that are compatible with the stud kits and bolting kits.

If you disassemble a flanged connection, always install a new gasket when you assemble the parts again.

Read **Client Responsibilities - Valves & Ancillaries.**

If there is a leak from a flanged connection, check these possible causes:

- Check that the fasteners are tightened to the correct torque. If necessary, tighten the fasteners in a diametrically opposite sequence. Refer to **Bolt Torque Guide & Step Loading Procedure**.
- Examine the scrolled sealing faces of the flanges. Make sure they are clean and that there is no damage.
- Examine the flanges for distortion caused by welding, over-tightening or impact. Flanges must be flat to 0.15mm.
- Examine the gasket for signs of damage or wear. Always install a new gasket.

If there is a leak from a threaded connection, check these possible causes:

- Check that the connection is tightened to the correct torque. Use the correct tightening tool.
- **WARNING:** If you need to tighten or loosen a relief valve, do not hold the cap to turn the valve. Only hold the valve body to turn the valve. The valve is spring-loaded and turning the cap is dangerous.
- Examine the seal area for signs of damage or debris. Install a new seal.
- Examine the male and female threads for signs of damage.

If there is a leak from the valve main seal, check these possible causes:

- Check that there is no debris or solid cargo in the main seal area.
- Examine the main seal for signs of damage.
- Examine the sealing face for signs of damage or corrosion.
- Check that the vessel operating pressure is compatible with the valve operating pressure.

If the valve will not open/close, check these possible causes:

- Make sure there are no TIR fasteners.
- If there is a handle, make sure it is correctly installed.
- Make sure that the valve is correctly aligned to the mating flange.
- Check that there is no debris or solid cargo in the closure plate/poppet area,
- Check the spindle area for signs of cargo in the spindle assembly.
- Check that the vessel operating pressure is compatible with the valve operating pressure.

Technical Support

If you have a problem that you cannot solve using these recommended checks, please contact us.

Important Safety Notice

If you disassemble a valve from a vessel to solve a problem or a leak, do a risk assessment and obey the **Maintenance Safety Precautions** (OPIN41). You will need torque spanners that are compatible with the stud kits and bolting kits.

If you disassemble a flanged connection, always install a new gasket when you assemble the parts again.

Read **Client Responsibilities - Valves & Ancillaries.**

If there is a leak from a flanged connection, check these possible causes:

- Check that the fasteners are tightened to the correct torque. If necessary, tighten the fasteners in a diametrically opposite sequence. Refer to **Bolt Torque Guide & Step Loading Procedure**.
- Examine the scrolled sealing faces of the flanges. Make sure they are clean and that there is no damage.
- Examine the flanges for distortion caused by welding, over-tightening or impact. Flanges must be flat to 0.15mm.
- Examine the gasket for signs of damage or wear. Always install a new gasket.

If there is a leak from a threaded connection, check these possible causes:

- Check that the connection is tightened to the correct torque. Use the correct tightening tool.
- **WARNING:** If you need to tighten or loosen a relief valve, do not hold the cap to turn the valve. Only hold the valve body to turn the valve. The valve is spring-loaded and turning the cap is dangerous.
- Examine the seal area for signs of damage or debris. Install a new seal.
- Examine the male and female threads for signs of damage.

If there is a leak from the pressure plate/vacuum poppet area, check these possible causes:

- Check that there is no debris or solid cargo in the pressure plate/vacuum poppet area.
- Examine the pressure/vacuum O ring for signs of damage.
- Examine the valve seating face for signs of damage or corrosion.
- If there is a composite pressure plate, make sure the nut/screws are tightened to the correct torque.

If the valve does not open/close at the correct pressure, check these possible causes:

- Check that there is no debris or solid cargo in these areas: pressure plate/vacuum poppet area, body ports and bore, between the spring guide.
- Examine the spring for signs of damage.
- Make sure that there is no blockage in the mating flange/socket.
- Test the valve on a calibrated test rig and adjust the settings if necessary.

Technical Support

If you have a problem that you cannot solve using these recommended checks, please contact us.

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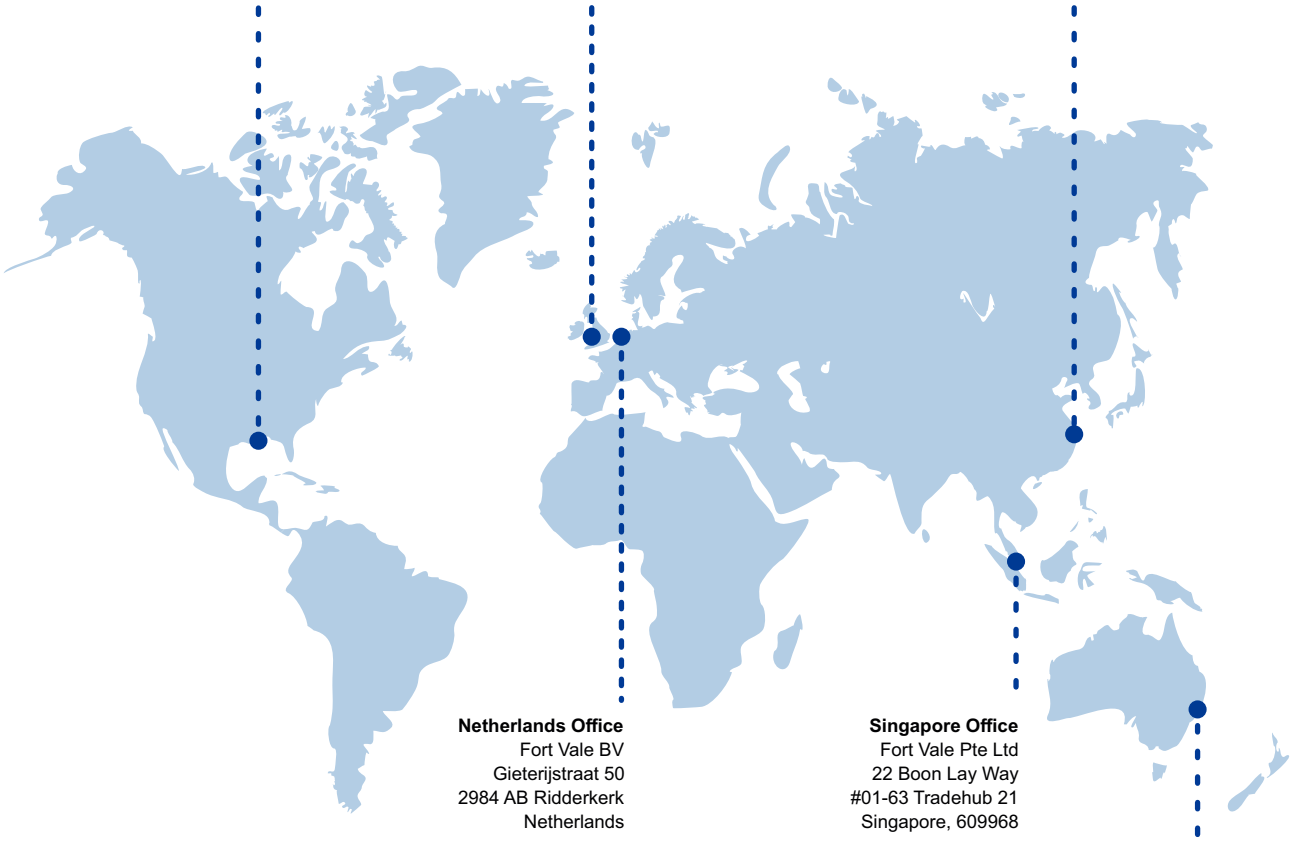

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We also have Authorised Distributors around the world to provide you with product sales and after-market services.
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