FORT VALE®

Catalogue

Standard Range of Manlid & Inspection Hatch Assemblies

FORT VALE

CONTENTS

Manlid & Inspection Hatch Assemblies

Catalogue

Continued over

FORT VALE

CONTENTS

Manlid & Inspection Hatch Assemblies

Catalogue

Function

A manlid assembly or inspection hatch assembly is usually installed on the top of the tank. A manlid assembly is used to give access to personnel to let them examine, repair or clean the inside of the tank. An inspection hatch is used for access to take a sample of cargo and can also be used as access for cleaning equipment.

Design Options

The design options below are available on our standard range of hinged circular manlid and inspection hatch assemblies. We can deliver manlids and inspection hatches assembled or disassembled.

Nominal Diameter

Inspection Hatch:
170mm, 300mm

Manlid:
460mm, 500mm, 600mm

Design Pressure: MAWP

From 0 Bar to 4 Bar

Special service conditions:
> 4 Bar

Opening Angle

120°: Fixed or liftover

135°: Fixed or liftover

Fixing Points

3, 4, 6, 8 points

Special service conditions:
Single point, 10 points

Neckring / Compensating Ring

Height: From ultra-low to extended

Profile: Straight (no profile) or profiled compatible with the tank radius

Compensation: With or without compensating ring

Material thickness: 6mm, 8mm or compatible with the MAWP and the tank shell thickness

Swingbolt Assemblies

Eyebolt: stainless steel

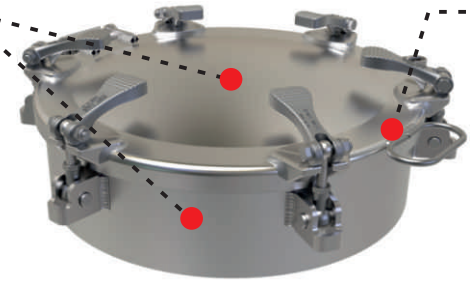
Handnut: naval brass - low profile; stainless steel - low profile or extended, with/without brass insert

Special service conditions:
Safebolt assembly (at one point)
Hexagonal nuts
Bow nuts
Single arm handnuts
Quick release latches
With locknuts

Material

Contact parts: 316 stainless steel

Special service conditions:
304 stainless steel
High nickel alloys
Carbon steel: Neckring only



Seal

A large range of seal materials is available

Design Options - continued

Special Options

Where compatible, we can also offer:

Weld-in fittings: E.g. sockets, flanges, breathers, vents, sight glass

Customer logo: Laser etched on cover

Hand polishing: To ultra-high grade

Lining: For corrosive cargo

Related Parts

We recommend our range of compatible accessories:

- Manlid cover seals
- Safebolts
- Fasteners

We have a large range of accessories, please contact us for more information about these parts.

Manlid Assemblies for Dedicated Service

We offer a range of manlid assemblies for these service conditions and special cargoes:

- Elliptical manlid assemblies for brewery & hygienic service
- Flat bolted assemblies for high pressure/dangerous cargo
- U.S. tank trucks
- Rail tank cars
- Hydrogen peroxide service
- Side-entry manlid assemblies for hygienic service

Please contact us for more information about these special assemblies.

170mm Inspection Hatch Assembly

Part No: 14I/3100XXXA

Specification

Nominal size
170mm

Cover
3 point

Neckring
Thickness: 6mm
Height range: 75mm to 305mm

Properties
1x spring-loaded swingbolt assembly lets the cover turn clear of the neckring in the open position

Materials
Contact parts: 316 stainless steel
Fasteners: stainless steel swingbolts and handnuts
Seal: supplied separately

Alternatives are available, refer to the Design Options page

Design Conditions

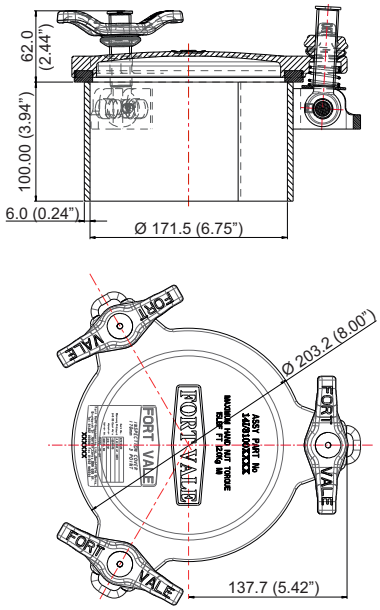
Weight:	8.9 Kg ***Note**
Design Pressure (MAWP):	4 Bar
Test Pressure:	6 Bar
Design Temperature Min:	-40°C
Design Temperature Max:	150°C

NOTE: The specification changes the weight.
The Design Temperature limits refer to metal parts only.
The Design Conditions and Section View dimensions are for the specified part number only.

Range

Description	Part No.
With 75mm neckring	14I/3100075A
With 100mm neckring	14I/3100100A
with 200mm neckring	14I/3100200A

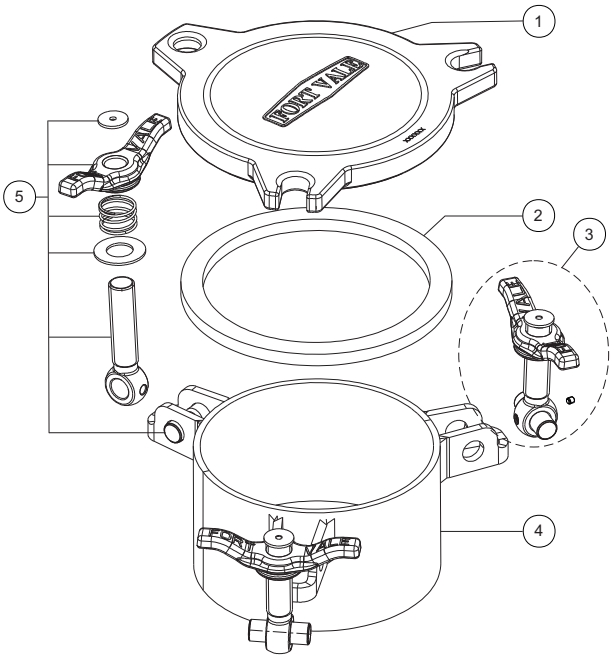
Section View



170mm Inspection Hatch Assembly

Part No: 14I/3100XXXA

Parts Drawing



Parts List

Item	Description	Part No.
1	Cover	672/0120
2	Seal (not included) ***Note**	5005-XXXX
3	Swingbolt assembly (2)	496/5342
4	Neckring ***Note**	661/36XXX
5	Spring-loaded swingbolt:	
	Top washer	5113-080
	Handnut	490/0310
	Spring	5104-506
	Washer	5123-005
	Swingbolt	540/0342
	Pivot pin	10913SS

NOTE: The specification changes the Part No.

300mm Inspection Hatch Assembly

Part No: 34C/43XX051E

Specification

Nominal size
DN300

Cover
4 point

Neckring/compensating ring
Thickness: 8mm
Height: 51mm from TDC
Tank radius profile range: 850mm to 1220mm

Materials
Contact parts: 316 stainless steel
Fasteners: stainless steel swingbolts with stainless steel handnuts
Seal: supplied separately

Alternatives are available, refer to the Design Options page

Design Conditions

Weight:	22.2 Kg
Design Pressure (MAWP):	4 Bar
Test Pressure:	6 Bar
Design Temperature Min:	-40°C
Design Temperature Max:	200°C

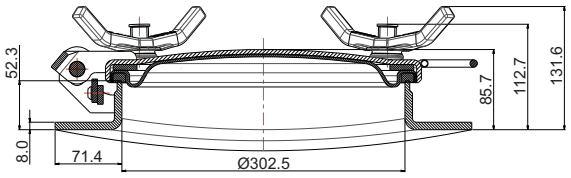
NOTE: The Design Temperature limits refer to metal parts only. The Design Conditions and Section View dimensions are for the specified part number only.

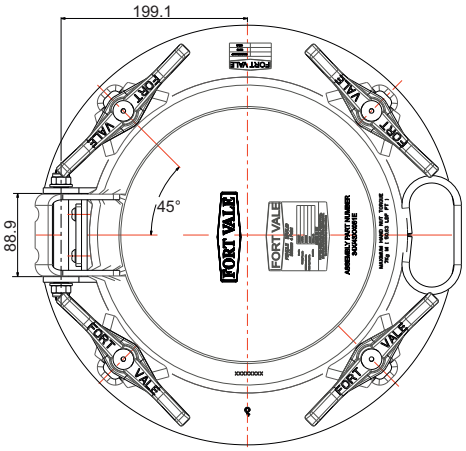
Design Code
BS EN 14025: 730/0600P cover only

Range

Standard Radii	Part No.
1040mm	34C/4304051E

Section View

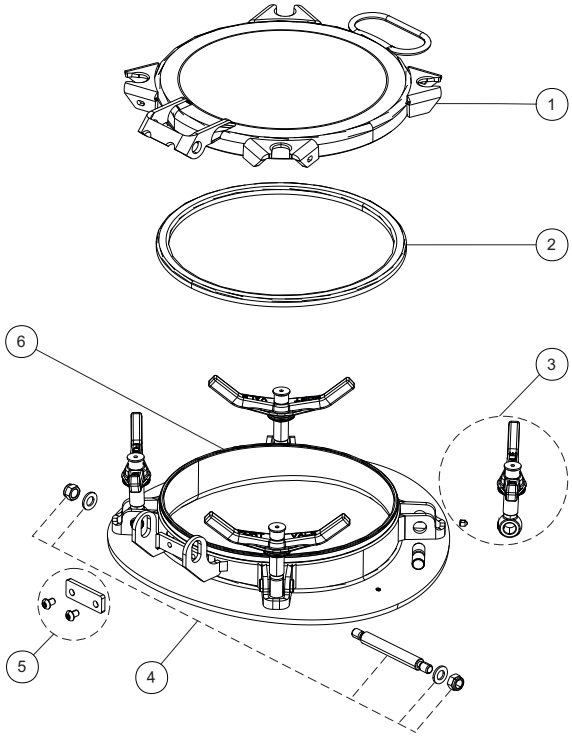




300mm Inspection Hatch Assembly

Part No: 34C/43XX051E

Parts Drawing



Parts List

Item	Description	Part No.
1	Cover	703/0600P
2	Seal (not included) ***Note**	5005-XXXX
3	Swingbolt assembly (4)	496/8342
4	Hinge pin assembly	600/1060
5	Hinge kit	135B
6	Neck/compensating ring ***Note**	673/2852XXXP

NOTE: The specification changes the Part No.

300mm Ultra Low Profile Inspection Hatch Assembly

Part No: 8PB/2750XXXP

Specification

Nominal size
DN300

Cover
4 point

Neckring/compensating ring
Thickness: 8mm
Tank radius profiling range: 750mm to 1220mm

Materials
Contact parts: 316 stainless steel
Fasteners: stainless steel swingbolts with naval brass handnuts
Seal: supplied separately

Alternatives are available, refer to the Design Options page

Design Conditions

Weight:	19.8 Kg
Design Pressure (MAWP):	4 Bar
Test Pressure:	6 Bar
Design Temperature Min:	-40°C
Design Temperature Max:	200°C

NOTE: The Design Temperature limits refer to metal parts only. The Design Conditions and Section View dimensions are for the specified part number only.

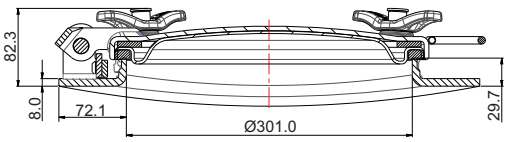
Design Code
BS EN 14025: 730/0600P cover only

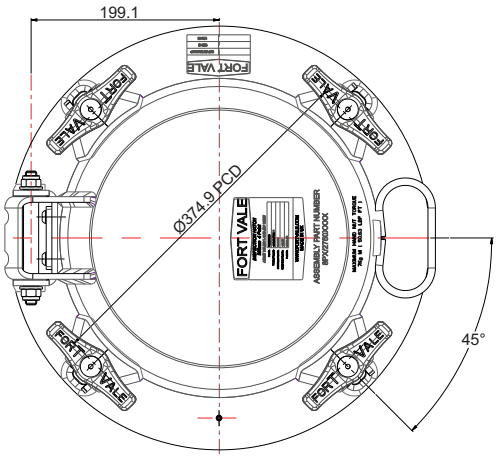
Range

Handnut Material	Part No.
Naval brass	8PB/2750XXXP
Stainless steel	8PB/2750XXXS

NOTE: The assembly specification changes the Part No.

Section View

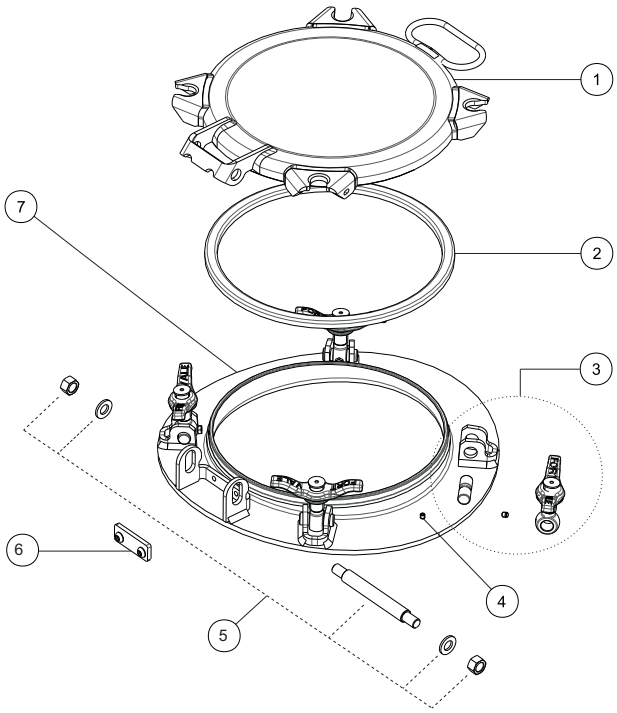




300mm Ultra Low Profile Inspection Hatch Assembly

Part No: 8PB/2750XXXP

Parts Drawing



Parts List

Item	Description	Part No.
1	Cover	703/0600P
2	Seal (not included) ***Note**	5005-XXXX
3	Swingbolt assembly (4)	496/1260
4	Grubscrew	5111-009
5	Hinge pin assembly	600/1060
6	Hinge kit - 135° fixed	135B
7	Neck/compensating ring ***Note**	63P/2750XXXP

NOTE: The specification changes the Part No.

460mm Pendle Manlid Assembly

Part No: 44C/6100XXXB

Specification

Nominal size
DN450

Cover
6 point

Neckring
Thickness: 6mm
Height range: 100mm to 250mm

Materials
Contact parts: 316 stainless steel
Fasteners: stainless steel swingbolts with naval brass handnuts
Seal: supplied separately

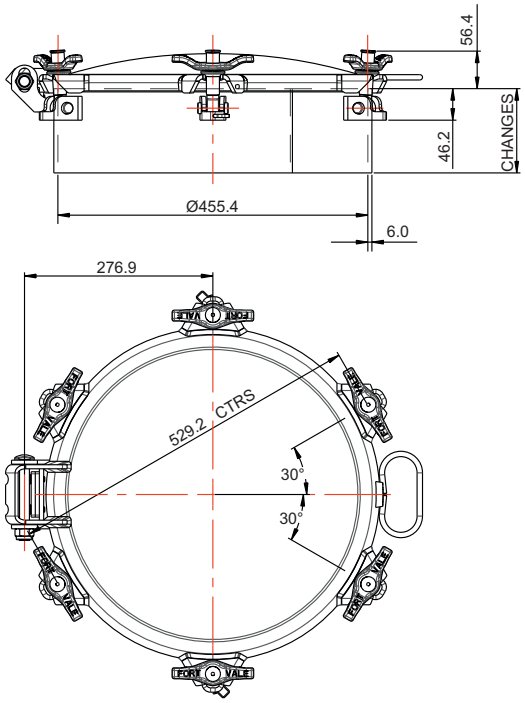
Alternatives are available, refer to the Design Options page

Design Conditions

Weight:	30 Kg ***Note**
Design Pressure (MAWP):	4 Bar
Test Pressure:	6 Bar
Design Temperature Min:	-40°C
Design Temperature Max:	180°C

NOTE: The specification changes the weight.
The Design Temperature limits refer to metal parts only.
The Design Conditions and Section View dimensions are for the specified part number only.

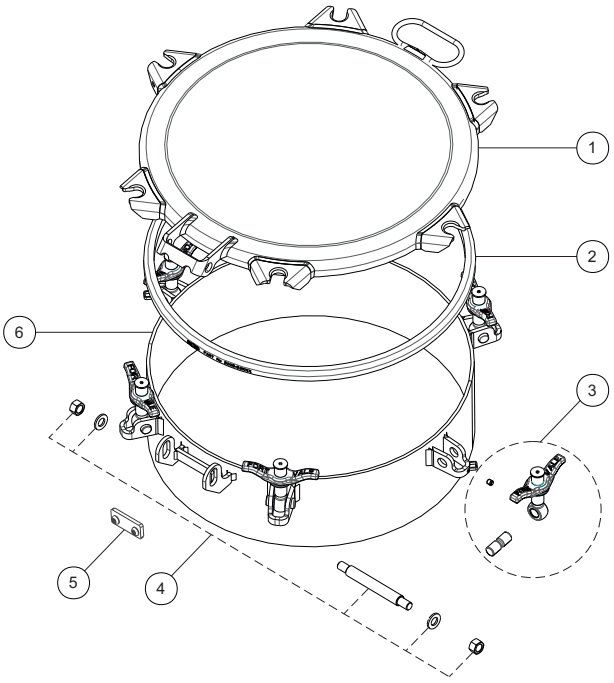
Section View



460mm Pendle Manlid Assembly

Part No: 44C/6100XXXB

Parts Drawing



Parts List

Item	Description	Part No.
1	Cover	710/1200P
2	Seal (not included) ***Note**	5005-XXXX
3	Swingbolt assembly (6)	496/1342
4	Hinge pin assembly	600/1060
5	Hinge kit	135B
6	Neckring ***Note**	664/66XXXA

NOTE: The specification changes the Part No.

500mm Low Pressure Pendle Manlid Assembly

Part No: E1C/4100XXXA

Specification

Nominal size
DN500

Cover
4 point

Neckring
Thickness: 6mm
Height: 100mm to 300mm

Materials
Contact parts: 316 stainless steel
Fasteners: stainless steel swingbolts with stainless steel handnuts
Seal: supplied separately

Alternatives are available, refer to the Design Options page

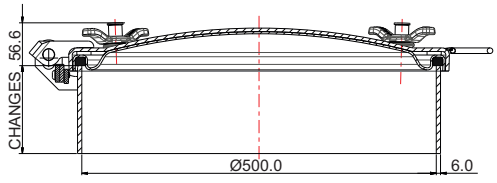
Design Conditions

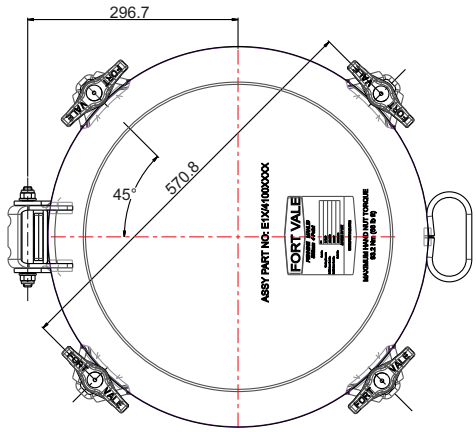
Weight:	30.5 to 45.7 Kg ***Note**
Design Pressure (MAWP):	1 Bar
Test Pressure:	1.5 Bar
Design Temperature Min:	-40°C
Design Temperature Max:	200°C

NOTE: The specification changes the weight.
The Design Temperature limits refer to metal parts only.
The Design Conditions and Section View dimensions are for the specified part number only.

Design Codes
BS EN 14025

Section View

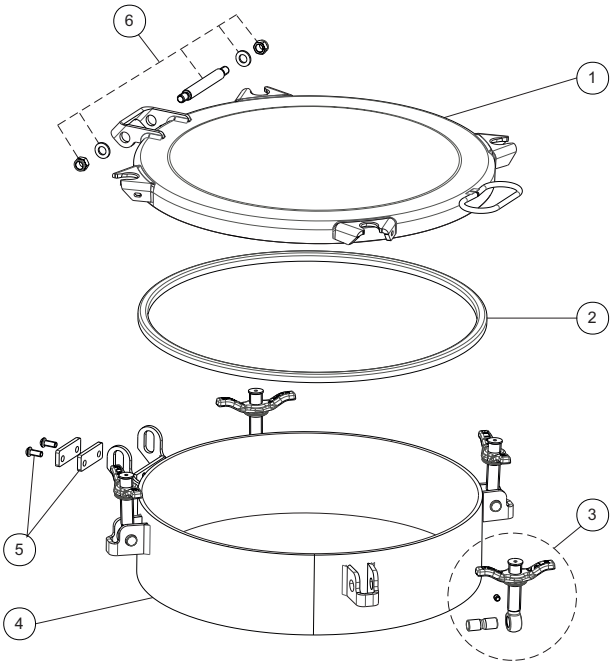




500mm Low Pressure Pendle Manlid Assembly

Part No: E1C/4100XXXA

Parts Drawing



Parts List

Item	Description	Part No.
1	Manlid cover	71E/0500
2	Seal (not included) ***Note**	5005-50XXX
3	Swingbolt assembly (6)	496/5379
4	Neckring ***Note**	66E/46XXXA
5	Hinge kit	135B
6	Hinge pin assembly	600/1060

NOTE: The specification changes the Part No.

500mm Pendle Manlid Assembly

Part No: E3C/6100XXXB

Specification

Nominal size
DN500

Cover
6 point

Neckring
Thickness: 6mm
Height: 60mm to 350mm

Materials
Contact parts: 316 stainless steel
Fasteners: stainless steel swingbolts with naval brass handnuts
Seal: supplied separately

Alternatives are available, refer to the Design Options page

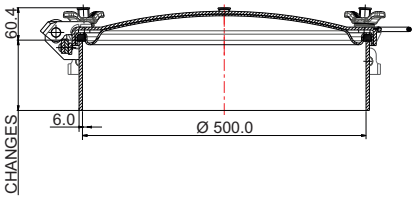
Design Conditions

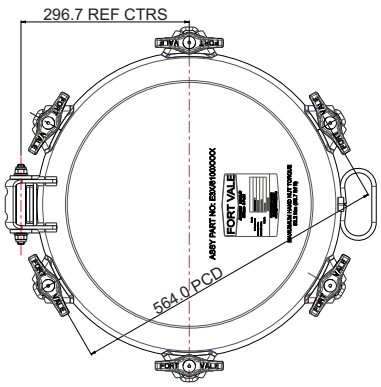
Weight:	28.6 to 50.9 Kg ***Note**
Design Pressure (MAWP):	3 Bar
Test Pressure:	4.5 Bar
Design Temperature Min:	-40°C
Design Temperature Max:	250°C

NOTE: The specification changes the weight.
The Design Temperature limits refer to metal parts only.
The Design Conditions and Section View dimensions are for the specified part number only.

Design Codes
BS EN 14025

Section View

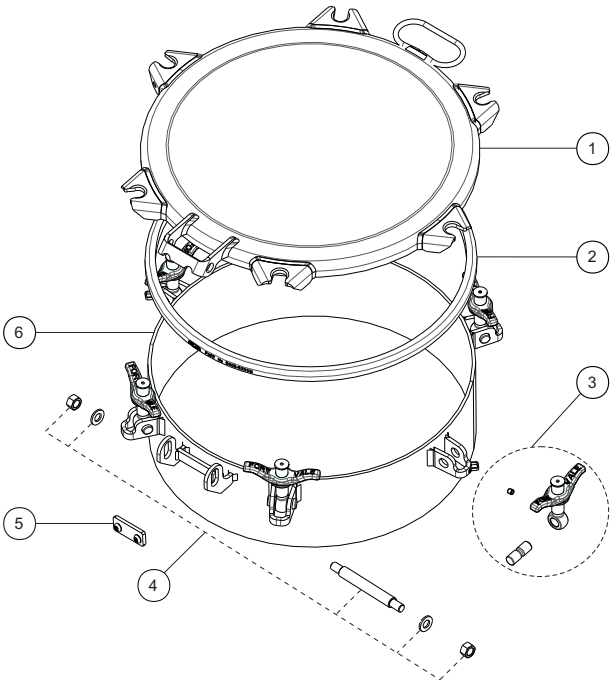




500mm Pendle Manlid Assembly

Part No: E3C/6100XXXB

Parts Drawing



Parts List

Item	Description	Part No.
1	Manlid cover	73E/0500
2	Seal (not included) ***Note**	5005-50XXX
3	Swingbolt assembly (6)	496/1375
4	Hinge pin assembly	600/1060
5	Hinge kit	135B
6	Neckring ***Note**	66E/66XXXA

NOTE: The specification changes the Part No.

500mm Ultra Low Profile Pendle Manlid Assembly

Part No: E4C/85XX025B

Specification

Nominal size
DN500

Cover
8 point

Neckring/compensating ring
Thickness: 8mm
Tank radius profiling range: 750mm to 1300mm

Materials
Contact parts: 316 stainless steel
Fasteners: stainless steel swingbolts with naval brass handnuts
Seal: supplied separately

Alternatives are available, refer to the Design Options page

Design Conditions

Weight:	40 Kg
Design Pressure (MAWP):	4 Bar
Test Pressure:	6 Bar
Design Temperature Min:	-40°C
Design Temperature Max:	200°C

NOTE: The Design Temperature limits refer to metal parts only. The Design Conditions and Section View dimensions are for the specified part number only.

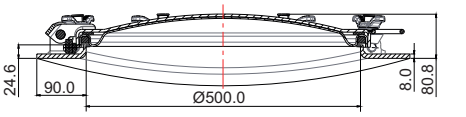
Design Codes
BS EN14025: 74E/0500 cover only (4 Bar)
BS EN14025: 73E/0500 cover only (3 Bar)

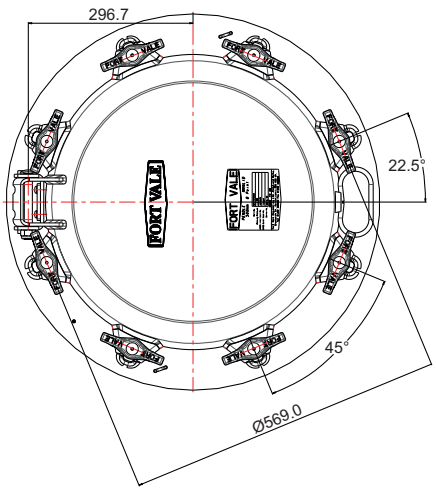
Range

Points	MAWP	Part No.
8	4 Bar	E4C/85XX025B
6	3 Bar	E3C/65XX025B

NOTE: The assembly specification changes the Part No.

Section View

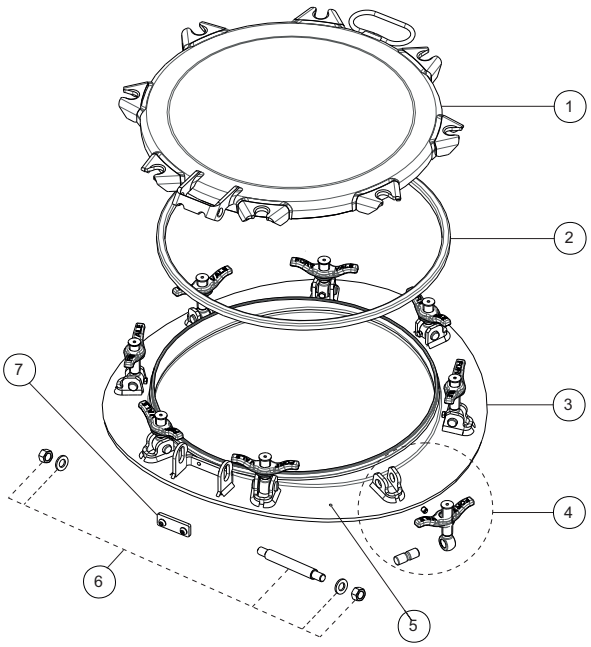




500mm Ultra Low Profile Pendle Manlid Assembly

Part No: E4C/85XX025B

Parts Drawing



Parts List

Item	Description	Part No.
1	Cover	74E/0500
2	Seal (not included) ***Note**	5005-XXXX
3	Neck/compensating ring ***Note**	6EP/7403XXXP
4	Long swingbolt assy. (4) ***Note**	496/XXXX
	Short swingbolt assembly (4)	496/1240
5	Grub screw	5111-009
6	Hinge pin assembly	600/1060
7	Hinge kit - 135° fixed	135B

NOTE: The specification changes the Part No.

500mm Ultra Low Profile Manlid Assembly: H_2O_2

Part No: E4X-85XX013A

Specification

Nominal size
DN500

Cover
8 point with a fill pipe flange assembly & a breather vent assembly with sintered disc and low-leak cap with secondary sintered disc

Neckring/compensating ring
Thickness: 8mm
Tank radius profiling range: 950mm to 1260mm

Materials
Contact parts: 316 stainless steel
Fasteners: stainless steel swingbolts and handnuts
Fill pipe gasket & breather vent seals: PTFE
Manlid cover seal: supplied separately

Alternatives are available, refer to Fort Vale

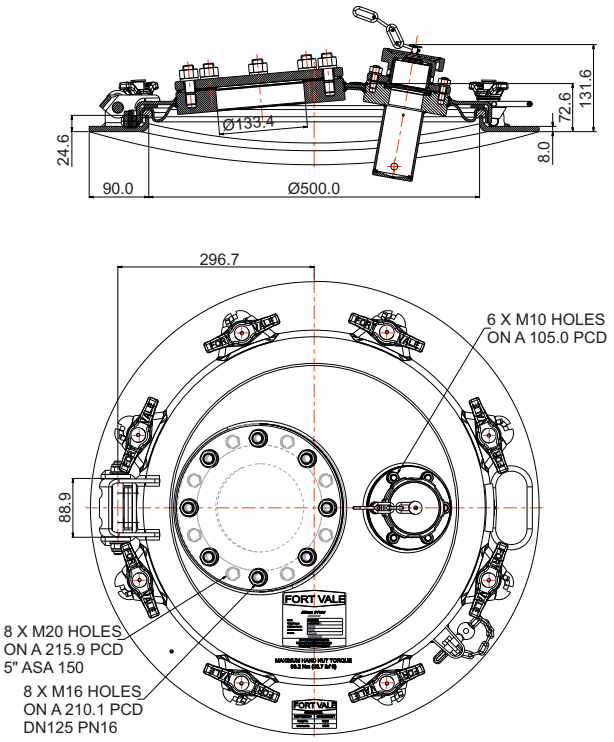
Design Conditions

Weight:	57.8 Kg
Design Pressure (MAWP):	4 Bar
Test Pressure:	6 Bar
Design Temperature Min:	-40°C
Design Temperature Max:	200°C

NOTE: The Design Temperature limits refer to metal parts only. The Design Conditions and Section View dimensions are for the specified part number only.

Design Codes
BS EN 14025

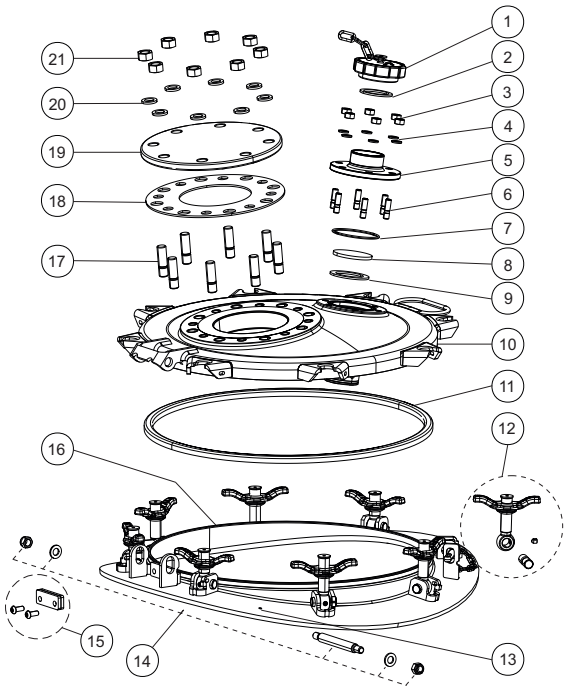
Section View



500mm Ultra Low Profile Manlid Assembly: H_2O_2

Part No: E4X-85XX013A

Parts Drawing



Parts List

Item	Description	Part No.
1	Breather cap assembly	674/3040
2	Breather cap seal	5005-414
3	M10 full nut (6)	5112-002
4	M10 spring washer (6)	5113-002
5	2" BSP outlet	674/3546
6	M10 x 35mm stud (6)	371/0001
7	PTFE O ring	5005-235
8	Sintered disc	865/2000
9	PTFE gasket	5005-435
10	Manlid cover	74E/0550T
11	Seal (not included) ***Note**	5005-XXXX
12	Short swingbolt assy. (4) Long swingbolt assy. (4) ***Note**	496/5250 496/5XXX
13	M6 set screw	5111-009
14	Hinge pin assembly	600/1060
15	Hinge kit ***Note**	135B
16	Neckring ***Note**	6EP/7403XXXPT
17	M16 x 60mm stud (8)	368/1109
18	PTFE fill flange gasket	5005-411
19	Blind flange	674/5051
20	M16 spring washer (8)	5113-012
21	M16 full nut (8)	5112-003

NOTE: The specification changes the Part No.

500mm Manlid Assembly with Quick Release Latches

Part No: 8EZ/66XXXSH

Specification

Nominal size
DN500

Cover
6 point

Neckring
Thickness: 6mm
Height range: 100mm to 180mm

Materials
Contact parts: 316 stainless steel
Fasteners: Nitronic 60 swingbolts with stainless steel quick release latches
Seal: supplied separately

Alternatives are available, refer to Range

Design Conditions

Weight range:	34.4 to 40.5 Kg ***Note**
Design Pressure (MAWP):	2.5 Bar
Test Pressure:	3.25 Bar
Design Temperature Min:	-20°C
Design Temperature Max:	150°C

NOTE: The specification changes the weight.
The Design Temperature limits refer to metal parts only.
The Design Conditions and Section View dimensions are for the specified part number only.

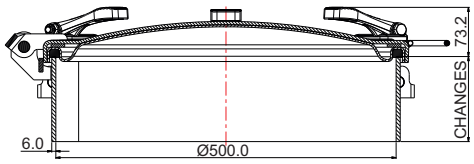
Design Codes
BS EN 14025

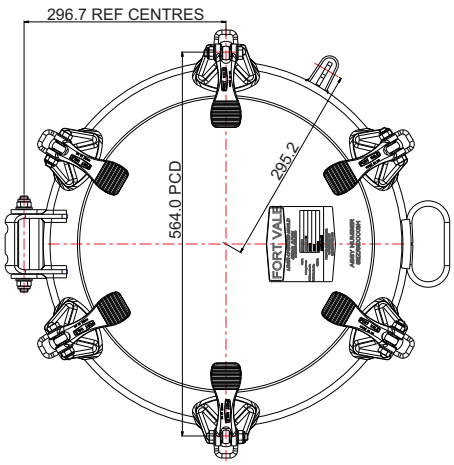
Range

Description	Part No.
Standard assembly	8EZ/66XXXSH
With RJT fitting in cover	8EZ/67XXXSH
With insulated cover	8EZ/68XXXSH

NOTE: The neckring height changes the Part No.

Section View

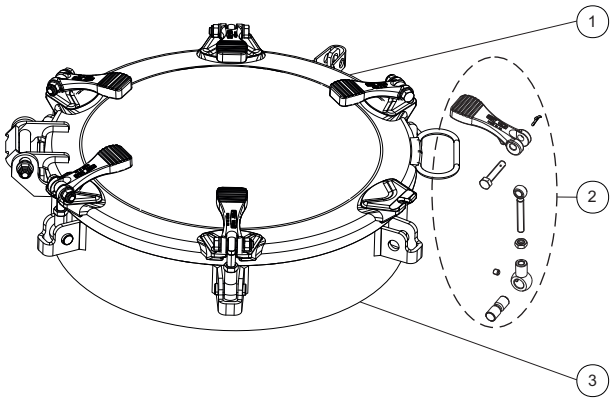




500mm Manlid Assembly with Quick Release Latches

Part No: 8EZ/66XXXSH

Parts Drawing

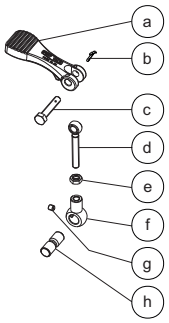


Parts List

Item	Description	Part No.
1	Manlid cover	73E/7200
2	Quick release swingbolt assembly (6) see below	86Z/0001
3	Neckring ***Note**	66E/66XXXSH

NOTE: The specification changes the Part No.

Swingbolt Assembly Parts Drawing



Swingbolt Assembly Parts List

Item	Description	Part No.
a	Quick release handle	490/4000
b	Split pin	5118-016
c	Clevis pin	895/1645/8N
d	M12 swingbolt	86Z/0003
e	M12 half nut	5112-017
f	16mm eye female swingbolt	86Z/0002
g	M8 socket screw	5111-002
h	16mm swingbolt pin	10913SS

600mm Manlid Assembly

Part No: 63C/6100XXXB

Specification

Nominal size
DN600

Cover
6 point

Neckring
Thickness: 6mm
Height range: 100mm to 500mm

Materials
Contact parts: 316 stainless steel
Fasteners: stainless steel swingbolts with naval brass handnuts
Seal: supplied separately

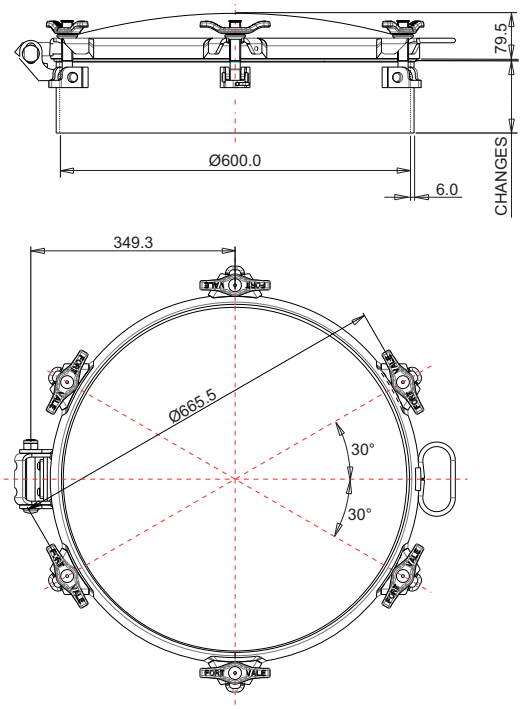
Alternatives are available, refer to the Design Options page

Design Conditions

Weight:	44 Kg ***Note**
Design Pressure (MAWP):	3 Bar
Test Pressure:	4.5 Bar
Design Temperature Min:	-29°C
Design Temperature Max:	200°C

NOTE: The specification changes the weight.
The Design Temperature limits refer to metal parts only.
The Design Conditions and Section View dimensions are for the specified part number only.

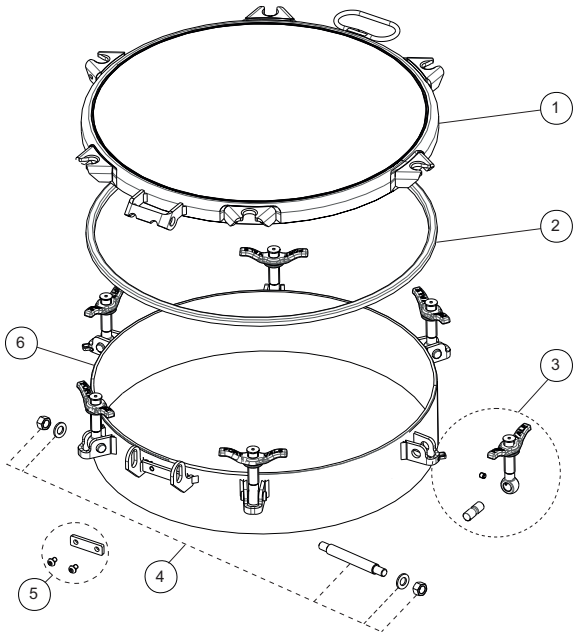
Section View



600mm Manlid Assembly

Part No: 63C/6100XXXB

Parts Drawing



Parts List

Item	Description	Part No.
1	Cover	606/2500P
2	Seal (not included) ***Note**	5005-XXXX
3	Swingbolt assembly (6)	496/1400
4	Hinge pin assembly	600/1060
5	Hinge kit	135B
6	Neckring ***Note**	666/66XXXA

NOTE: The specification changes the Part No.

Elliptical Manlid Assembly - Low Profile Neckring

Part No: 850/7500VXX

Specification

Nominal size
508mm x 406mm

Neckring
Thickness: 10mm
Height: 73.2mm

Properties
Cross-arm with handnut to clamp and seal the assembly; 2x handles to move the cover to the open/closed position

Operation
The cover opens into the vessel and turns to move out of the neckring, clear of the vessel

Materials
Contact parts: 316 stainless steel, cover surface finish 0.8um - 0.5um
Seal: vulcanised - refer to Range

Design Conditions

Weight:	25.3 Kg
Design Pressure (MAWP):	3 Bar
Design Vacuum:	-0.20 Bar ***Conditions**
Design Temperature Min:	-20°C
Design Temperature Max:	70°C

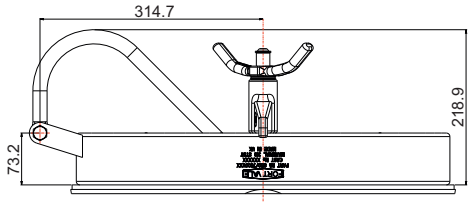
Vacuum Conditions: The assembly is compatible with -0.20 Bar vacuum only if neckring distortion caused by welding is kept to a minimum.

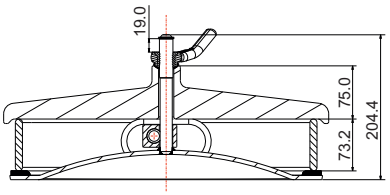
NOTE: The Design Conditions and Section View dimensions are for the specified part number only.

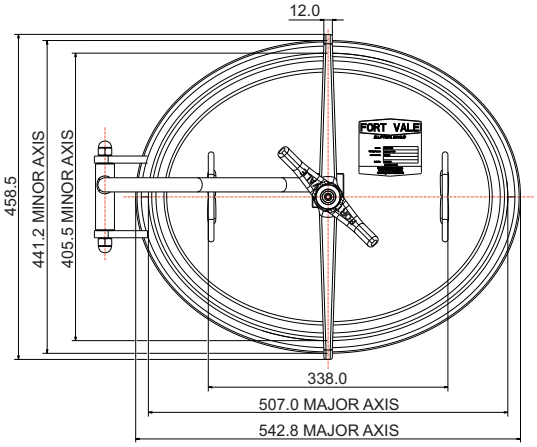
Range

Description	Part No.
With vulcanised black EPDM seal	850/7500VEP
With vulcanised blue nitrile seal	850/7500VBN
With vulcanised sweet white rubber seal	850/7500VSW

Section View



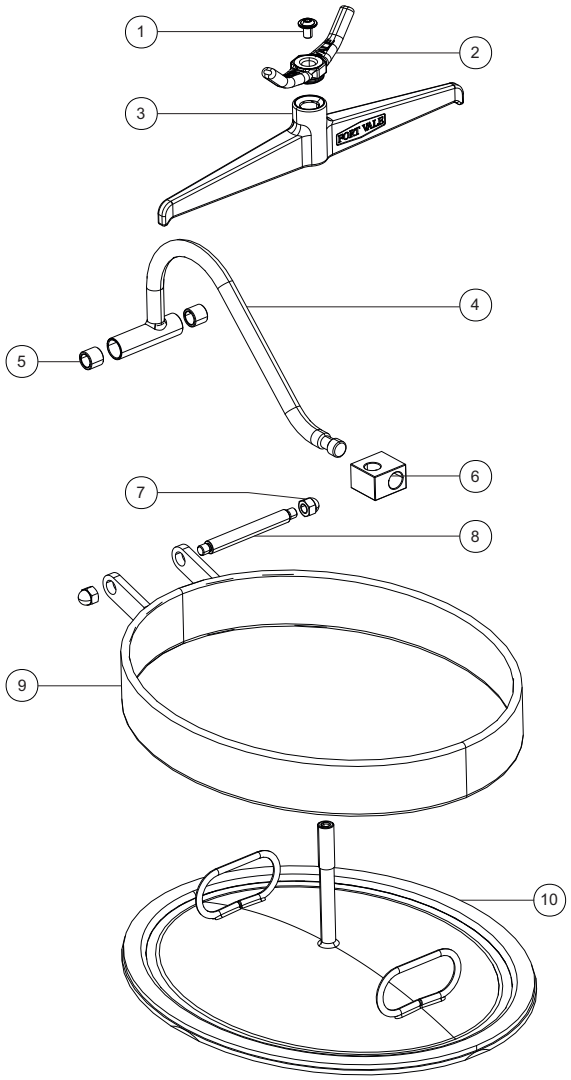




Elliptical Manlid Assembly - Low Profile Neckring

Part No: 850/7500VXX

Parts Drawing



Parts List

Item	Description	Part No.
1	M10 flanged button screw	5111-600
2	¾" star lock handnut	490/0410
3	Cross arm	750/6020DC
4	Pivot beam assembly	650/6020
5	Gunmetal bush (2)	650/6001
6	Pivot block	750/6001
7	M12 dome nut (2)	5112-050
8	Hinge pin	650/6008
9	Neckring	650/6010
10	Cover with vulcanised seal ***Note**	750/6070VSXX

NOTE: The specification changes the Part No.

Elliptical Manlid Assembly - Deep Neckring

Part No: 850/7600VXX

Specification

Nominal size
508mm x 406mm

Neckring
Thickness: 10mm
Height: 200.7mm

Properties
Cross-arm with handnut to clamp and seal the assembly; 2x handles to move the cover to the open/closed position

Operation
The cover opens into the vessel and turns to move out of the neckring, clear of the vessel

Materials
Contact parts: 316 stainless steel, cover surface finish 0.8um - 0.5um
Seal: vulcanised - refer to Range

Design Conditions

Weight:	41.3 Kg
Design Pressure (MAWP):	3 Bar
Design Vacuum:	-0.20 Bar ***Conditions**
Design Temperature Min:	-20°C
Design Temperature Max:	70°C

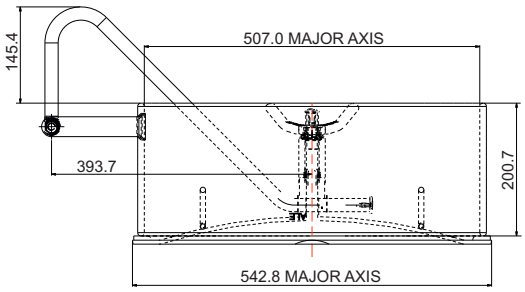
Vacuum Conditions: The assembly is compatible with -0.20 Bar vacuum only if neckring distortion caused by welding is kept to a minimum.

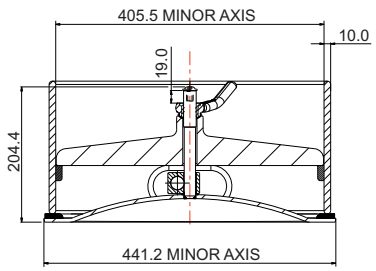
NOTE: The Design Conditions and Section View dimensions are for the specified part number only.

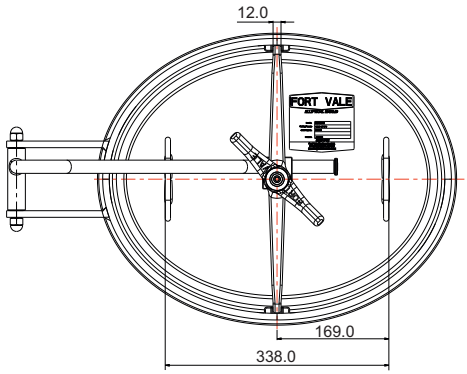
Range

Description	Part No.
With vulcanised black EPDM seal	850/7600VEP
With vulcanised blue nitrile seal	850/7600VBN

Section View



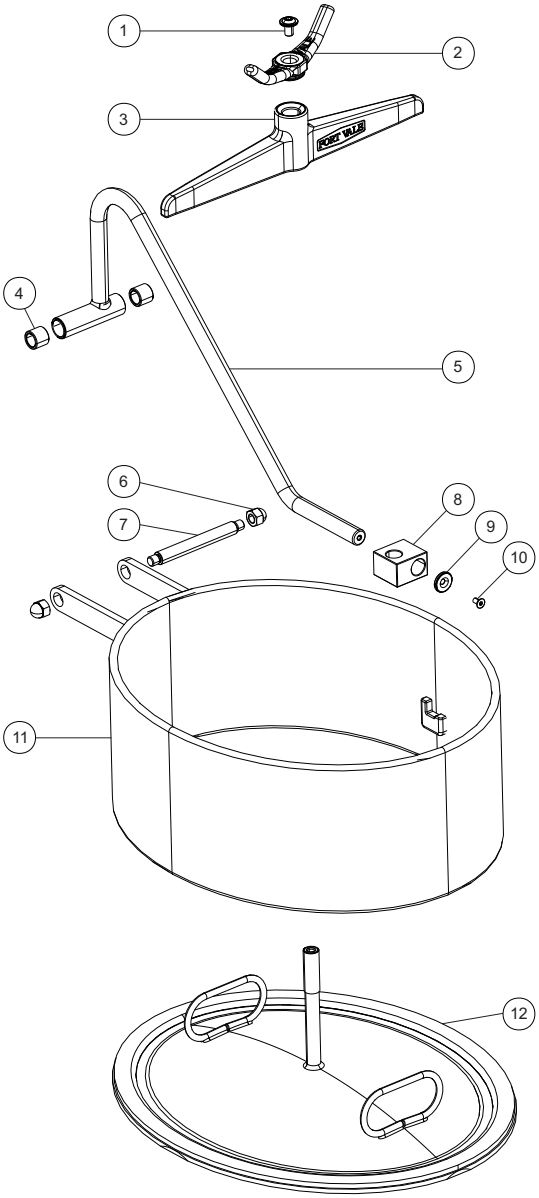




Elliptical Manlid Assembly - Deep Neckring

Part No: 850/7600VXX

Parts Drawing



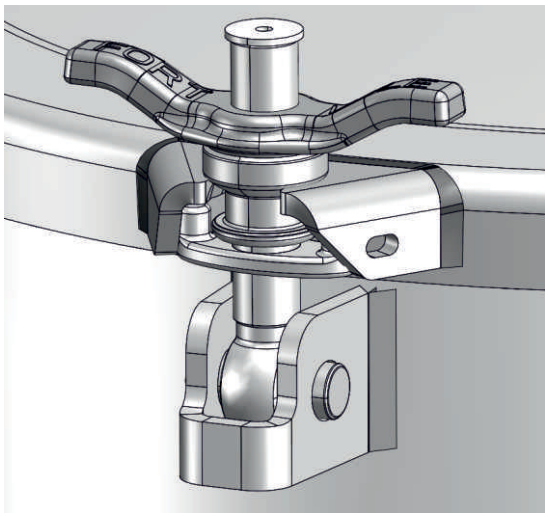
Parts List

Item	Description	Part No.
1	M10 flanged button screw	5111-600
2	¾" star lock handnut	490/0410
3	Cross arm	750/6535DC
4	Gunmetal bush (2)	650/6001
5	Pivot beam assembly	650/6535
6	M12 dome nut (2)	5112-050
7	Hinge pin	650/6008
8	Long pivot block	750/2501
9	Retaining washer	20370/2
10	6mm countersunk bolt	5111-018
11	Neckring	650/6530
12	Cover with vulcanised seal ***Note**	750/6070VSXX

NOTE: The specification changes the Part No.

Safebolt Assembly

Part No: 496/4XXX



Specification

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

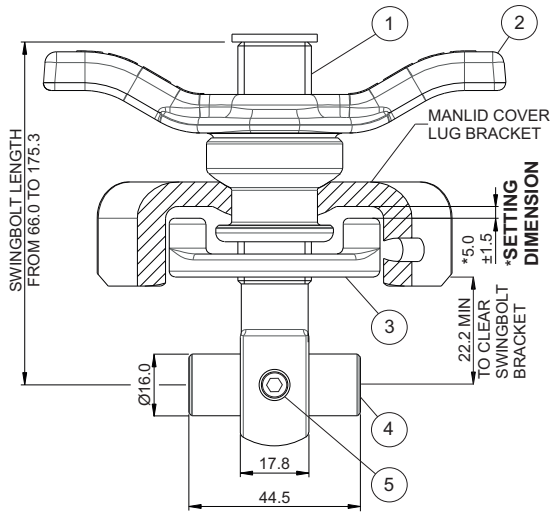
Size
Eyebolt: ¾" BSW eyebolt with Ø 16mm eye, available length from 66mm to 175.3mm (Dimension C)
Safebolt handnut & retaining collar: ¾" BSW
Pivot pin: Ø 16mm

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.

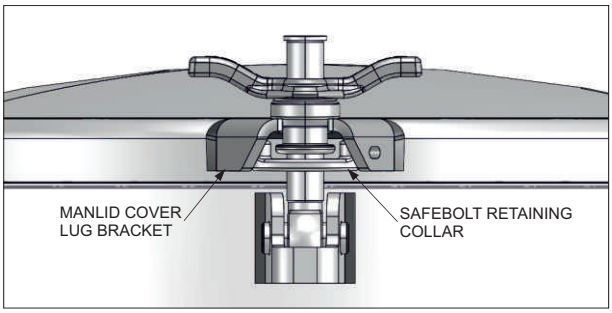


Figure 1 - Closed Position

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.

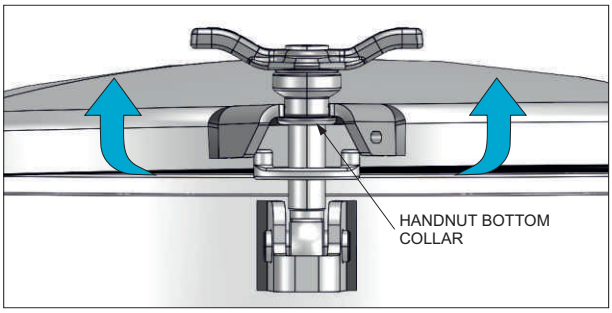


Figure 2 - Retained Position

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.

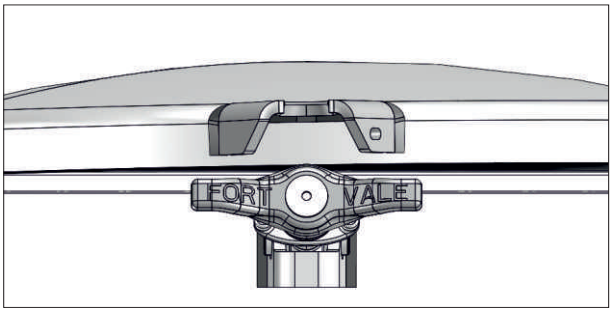


Figure 3 - Open Position

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

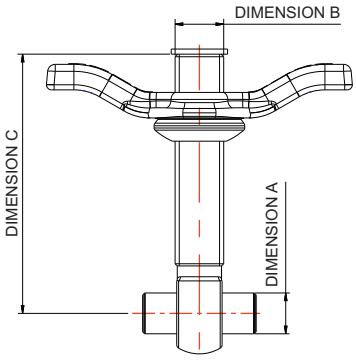
We supply a range of swingbolt assemblies with different eyebolt lengths and handnut types.

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

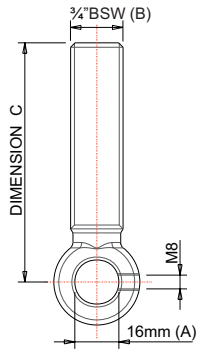
¾” Eye Swingbolt Assemblies

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

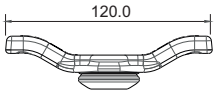
Material: stainless steel

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

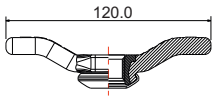
¾” BSW Handnut

Standard low profile handnut

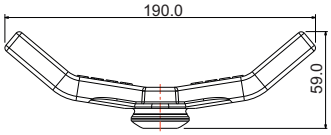


Anti-galling handnut

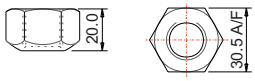
Low profile



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

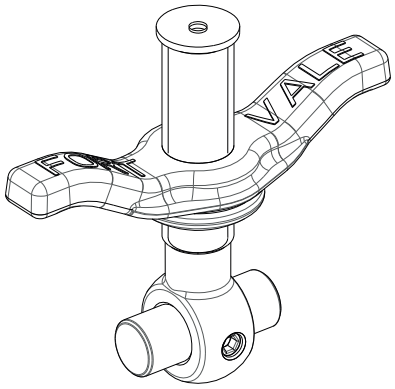
Manlid/Neckring Hinge Pin Assembly

Specification

Includes the pin, washers and nyloc nuts

Material: stainless steel

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



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.

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

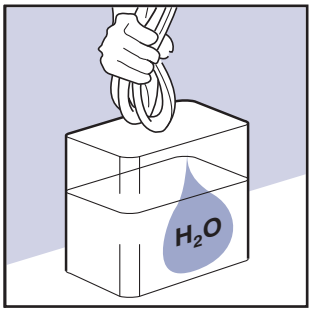
CAUTION: The compatibility information in the table is for general guidance only. Make sure that the seal material is compatible with the cargo and the service conditions. This includes, but is not limited to:

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

How to Install a Manlid/Inspection (Access) Hatch Seal

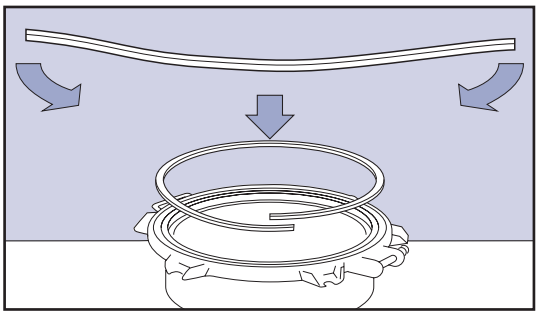
Installation Instructions

Check that the seal material is compatible with the cargo and the service conditions.

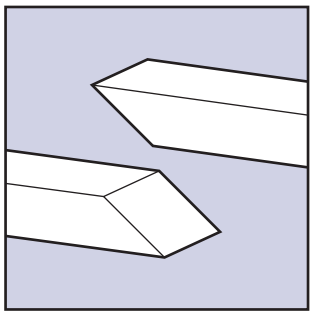


PRECAUTIONS: Examine the seal and the seal groove. Make sure all surfaces are clean with no corrosion, debris or damage. **CAUTION**: Do not use a damaged part.

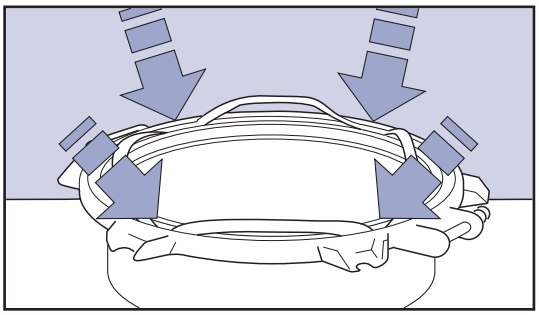
ELASTOMER SEAL: Put the seal momentarily into clean, cold water.



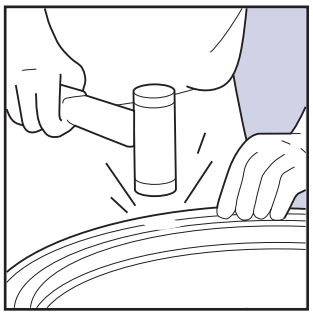
BRAIDED PACKING: Measure the packing around the circumference of the seal groove to get the correct size.



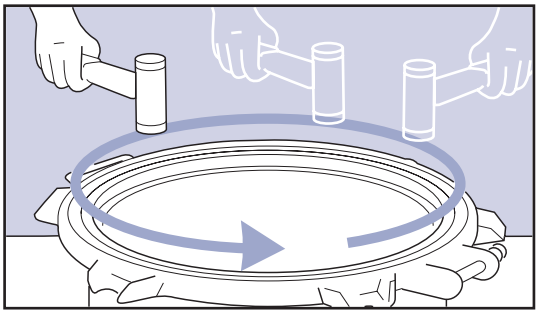
BRAIDED PACKING: Cut the seal with a mitre joint. If necessary, apply PTFE tape to the joint.
NOTE: We do not recommend the use of adhesive.



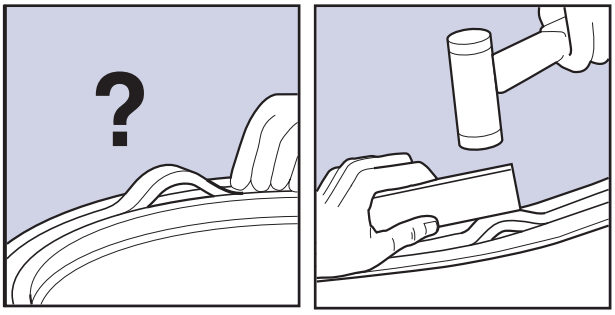
Step 1. Put the cover with the seal groove face up. Push the seal into the groove at 4 points, 90° to each other. Make sure the seal is not twisted.



Step 2. Use a plastic or wooden mallet to hit the seal and install it into the groove.
CAUTION: Do not use a metal hammer.



Step 3. Continue around the full circumference of the seal until it is fully installed.



Step 4. If a kink occurs in the seal, use a small piece of clean seal material and the mallet to install the seal correctly. Check again to make sure the installation is satisfactory. The procedure is complete.

FORT VALE

APPENDIX

Manlid & Inspection Hatch Assemblies

Catalogue

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.

Pressure Equipment Design Requirements

Make sure that the access hatch assembly has sufficient compensation to obey the pressure equipment calculations and standards. Add more compensation if necessary.

Pressure Release

Make sure that personnel who will operate the access hatch know that there is a risk of injury or death if an access hatch is opened when there is pressure inside the vessel. We recommend that you install a “safebolt” fastener to the assembly as protection. Contact Fort Vale for information.

Compatibility

Make sure that the function and technical specification of the access hatch assembly and seal is compatible with the vessel service conditions and the cargo. This includes, but is not limited to:

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

Maintenance

Fort Vale access hatch assemblies 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 obey the precautions that follow:

Visual checks before each load of cargo:

Cover: Examine the hinge assembly, all brackets and all swingbolt assemblies to make sure there is no damage or corrosion. Make sure there are no parts missing.

Swingbolts: Examine the swingbolt threads to make sure they are clean and that there is no wear. Check for correct operation. Make sure there are no parts missing.

Seal: Examine around the seal circumference to make sure it is clean and that there is no damage to the material. Make sure that the seal material is compatible with the cargo and service conditions. Check that the seal is correctly installed.

Neckring: Examine all brackets to make sure there is no damage or corrosion. Examine the circumference of the neckring sealing surface to make sure it is clean and flat, and that there is no damage.

CAUTION: If you operate the access hatch assembly 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.

As well as the visual checks, schedule suitable maintenance intervals for the access hatch assembly based on how frequently it is used, the type of cargo and the service conditions.

Replacement Parts

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

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

- injury to personnel
- permanent damage to the access hatch assembly
- permanent damage to the vessel
- access hatch assembly malfunction.

Compatibility of Accessories

Accessory components must cause no interference with the access hatch function. Accessories must be made from compatible materials that will cause no damage to the access hatch materials. Do not install an accessory that will cause an increased load on the access hatch, i.e. mechanical, static, dynamic, thermal.

Mis-use

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

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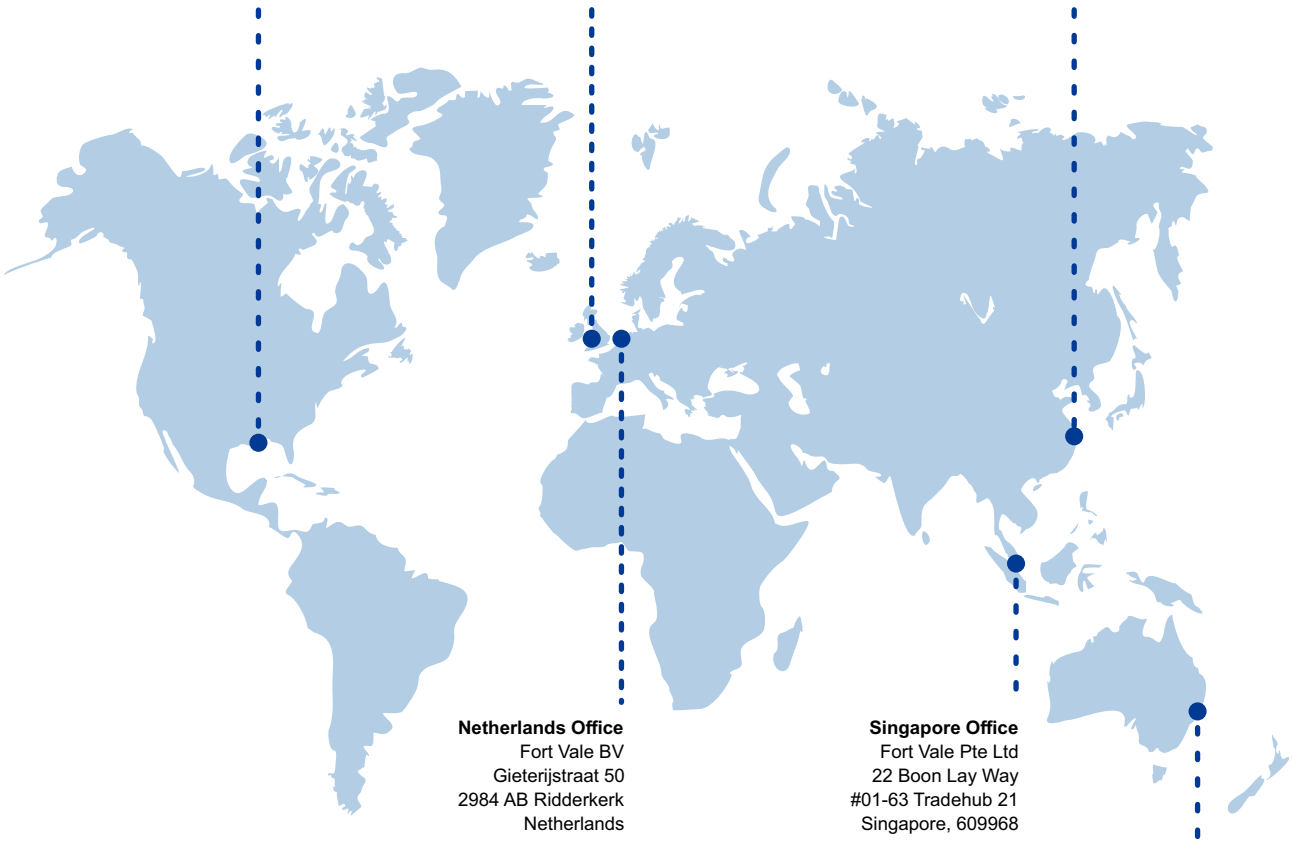

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