FORT VALE®

Catalogue

Standard Range of Manlid & Inspection Hatch Assemblies

REV01-20.04.22

FORT VALE

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Manlid & Inspection Hatch Assemblies

Catalogue

Continued over

FORT VALE

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Manlid & Inspection Hatch Assemblies

Catalogue

Manlid & Inspection Hatch Assembly

Design Options

Function

A manlid assembly or inspection hatch assembly is installed on the top of the tank. A manlid assembly is used to give access to personnel to let them clean, examine or repair 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 manlid and inspection hatch assemblies.

Nominal Diameter

Inspection Hatch:
170mm, 250mm, 300mm

Manlid:
460mm, 500mm, 600mm

Neckring/Compensating Ring

Height: From ultra-low to extended

Straight

Profiled: To be compatible with the tank radius

Material thickness: To be compatible with the tank shell thickness

Swingbolt Assemblies

Standard service conditions:
Stainless steel swingbolt with naval brass handnut
Stainless steel swingbolt & handnut
Safebolt assembly (at one point) ☆

Special service conditions:
Quick-release latches
Hexagonal nuts
Single arm handnuts

Opening Angle

120°: Fixed or liftover
135°: Fixed or liftover

Design Pressure (MAWP)

Standard service conditions:
0 Bar to 4 Bar

Special service conditions:
> 4 Bar

Fixing Points

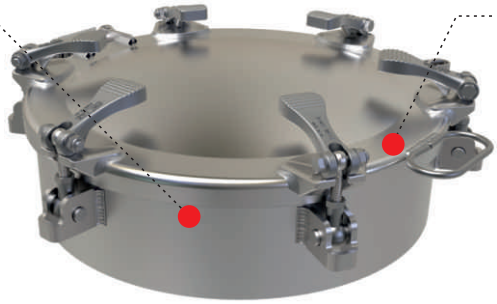
Standard service conditions:
3, 4, 6, 8

Special service conditions:
10, 12, 20

Material (Contact Parts)

Standard service conditions:
316 stainless steel

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



Seal

A wide range of seal materials is available.

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

Manlid Assemblies for Dedicated Service

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

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

Please contact us for more information about these assemblies.

Related Parts

We recommend our range of compatible ancillary parts:

- Manlid cover seals
- Safebolts
- Fasteners

Please contact us for more information about these parts.

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

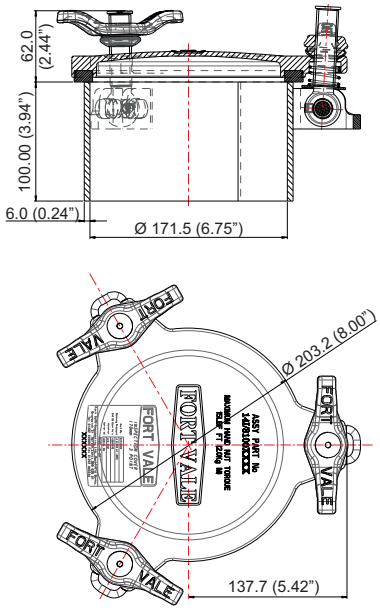
Weight:	8.9 Kg ***Note**
Design Pressure (MAWP):	4 Bar
Test Pressure:	6 Bar
Design Temperature Min:	-40°C
Design Temperature Max:	150°C

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

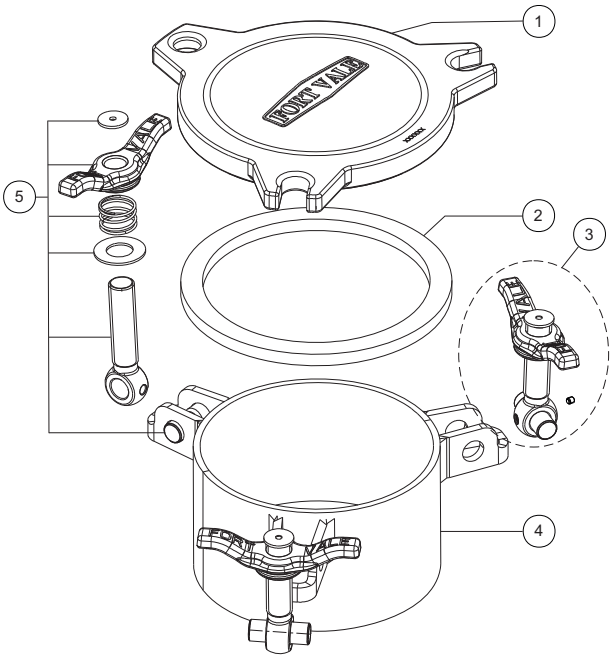
Section View



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

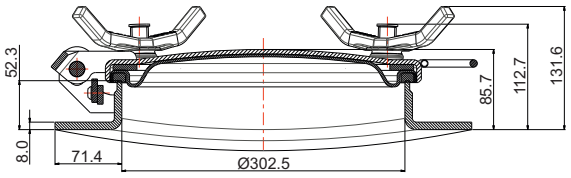
NOTE: The Design Temperature limits refer to metal parts only. The Design Conditions and Section View dimensions are for the specified part number only.

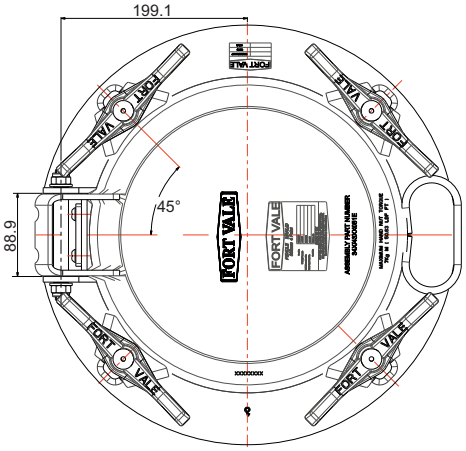
Design Code
BS EN 14025: 730/0600P cover only

Range

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

Section View

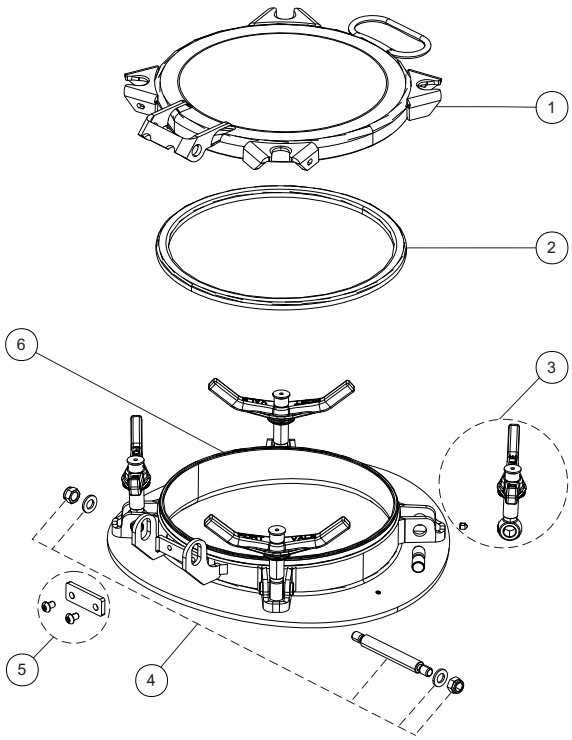




300mm Inspection Hatch Assembly

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.

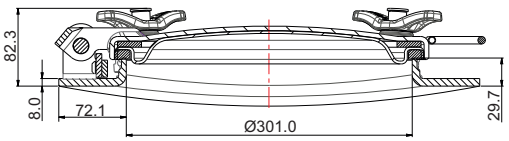
Design Code
BS EN 14025: 730/0600P cover only

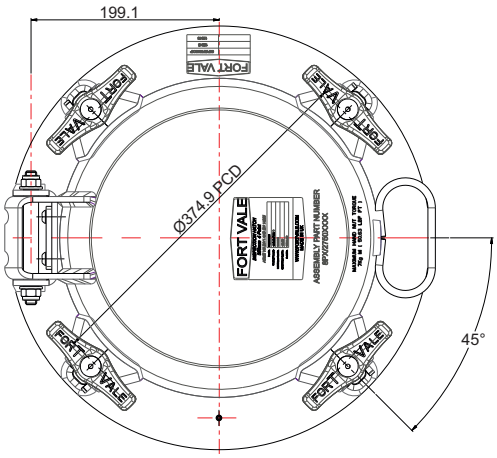
Range

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

NOTE: The assembly specification changes the Part No.

Section View

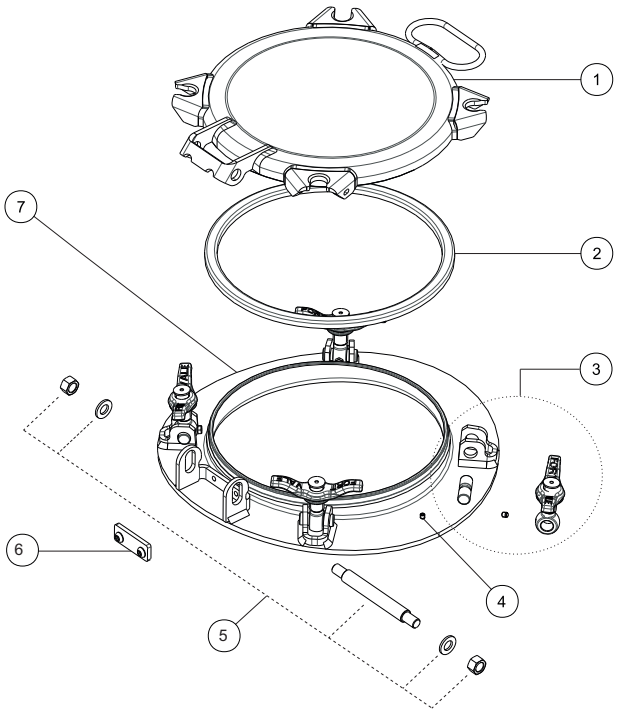




300mm Ultra Low Profile Inspection Hatch Assembly

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

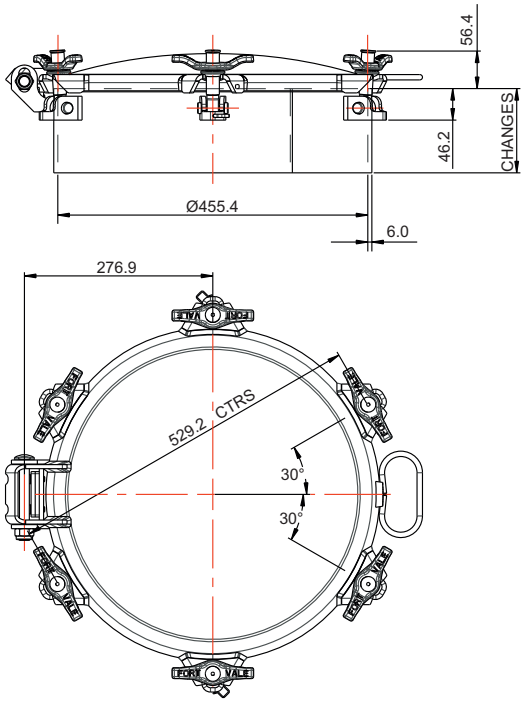
Alternatives are available, refer to the Design Options page

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.

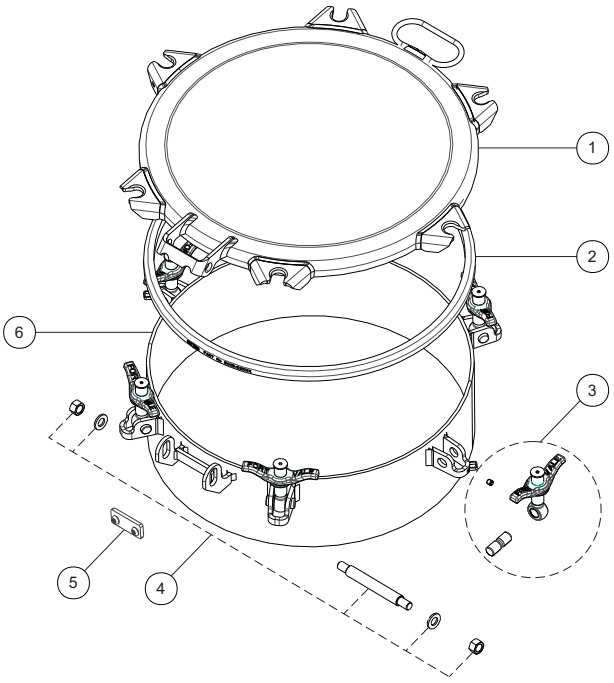
Section View



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: E2C/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

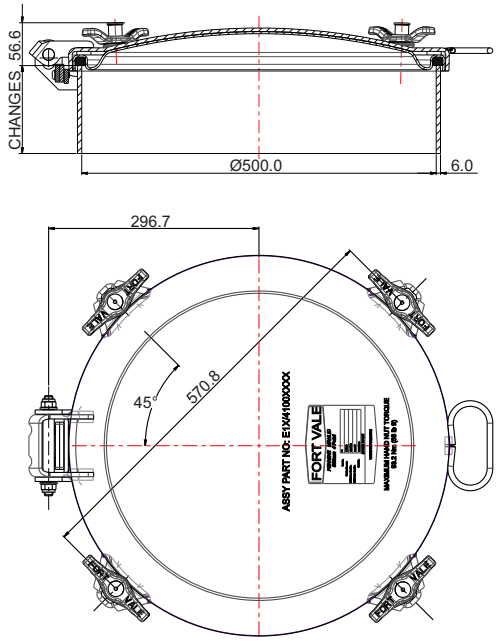
Design Conditions

Weight:	30.5 to 45.7 Kg ***Note**
Design Pressure (MAWP):	2 Bar
Test Pressure:	3 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

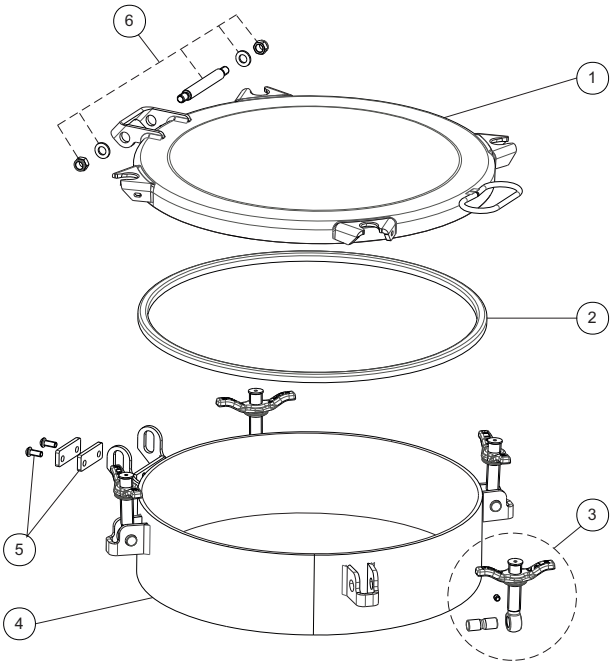
Section View



500mm Low Pressure Pendle Manlid Assembly

Part No: E2C/4100XXXA

Parts Drawing



Parts List

Item	Description	Part No.
1	Manlid cover	72E/1600
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

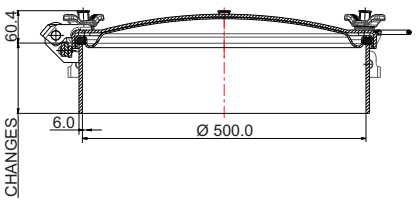
Design Conditions

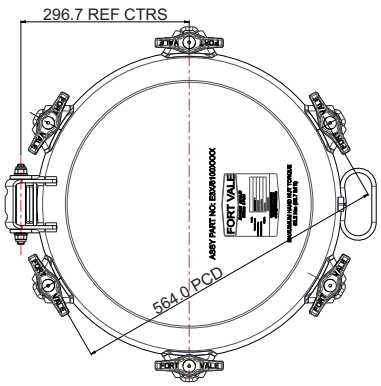
Weight:	28.6 to 50.9 Kg ***Note**
Design Pressure (MAWP):	3 Bar
Test Pressure:	4.5 Bar
Design Temperature Min:	-40°C
Design Temperature Max:	250°C

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

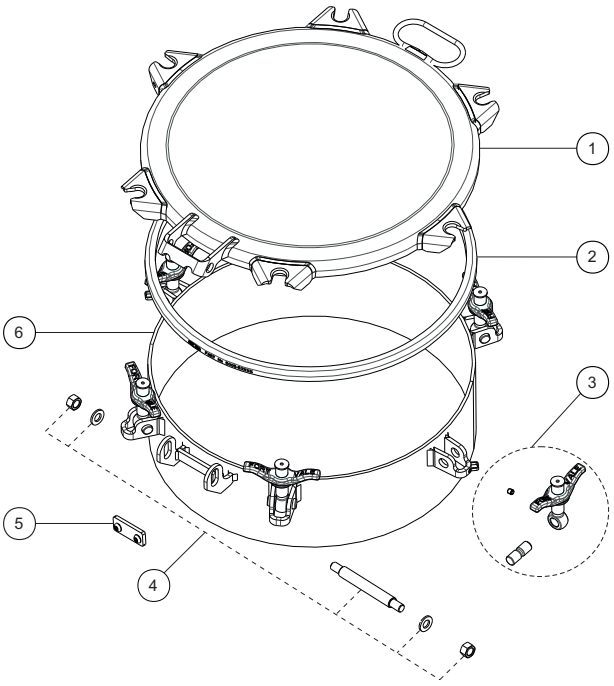




500mm Pendle Manlid Assembly

Part No: E3C/6100XXXB

Parts Drawing



Parts List

Item	Description	Part No.
1	Manlid cover	73E/1600
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.

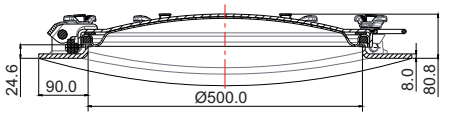
Design Codes
BS EN14025: 74E/1600 cover only (4 Bar)
BS EN14025: 73E/1600 cover only (3 Bar)

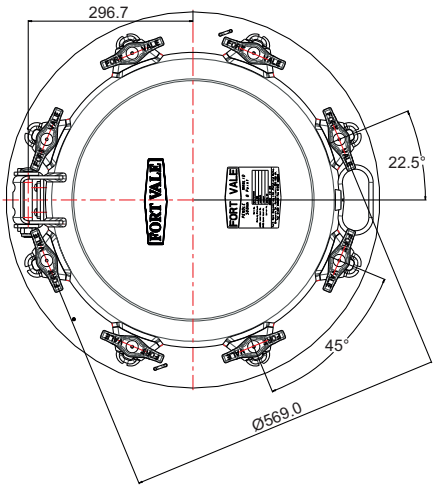
Range

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

NOTE: The assembly specification changes the Part No.

Section View

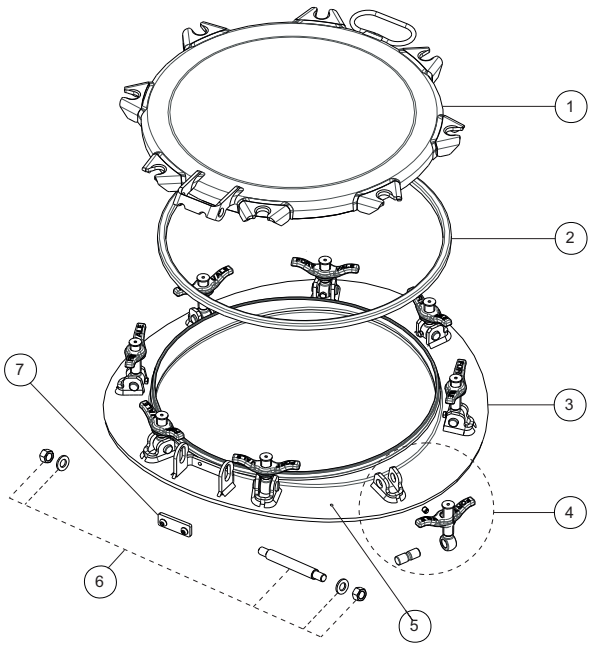




500mm Ultra Low Profile Pendle Manlid Assembly

Part No: E4C/85XX025B

Parts Drawing



Parts List

Item	Description	Part No.
1	Cover	74E/1600
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

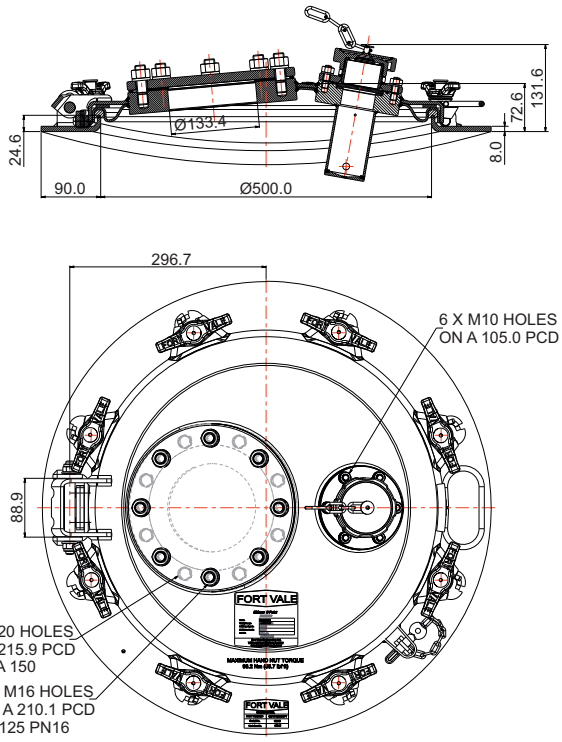
Design Conditions

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

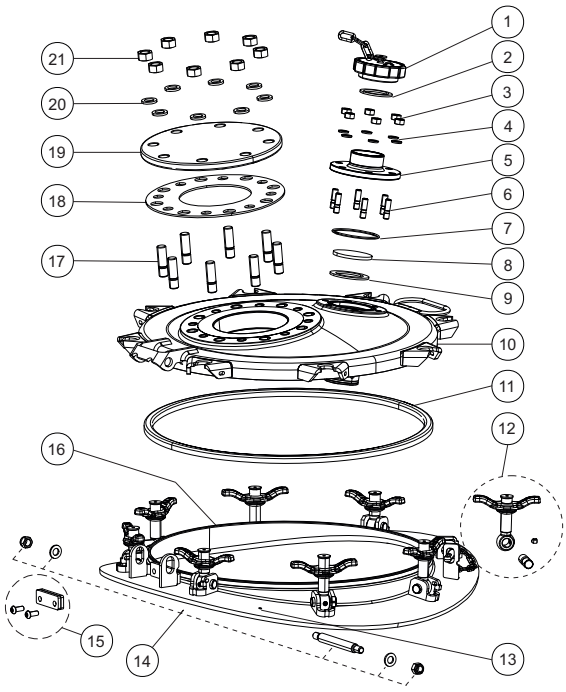
Section View



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/1650
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.

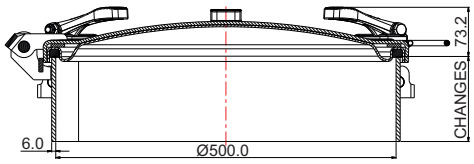
Design Codes
BS EN 14025

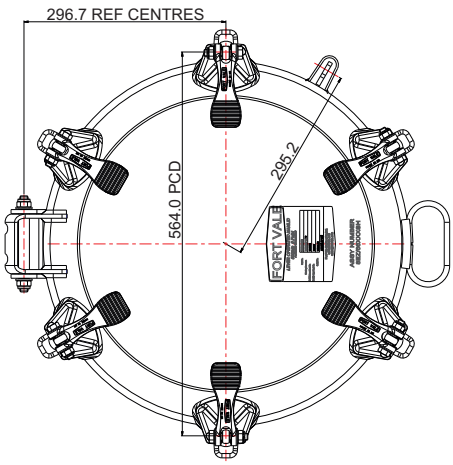
Range

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

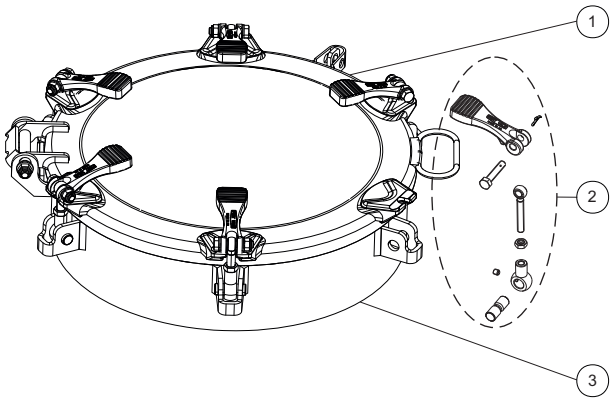




500mm Manlid Assembly with Quick Release Latches

Part No: 8EZ/66XXXSH

Parts Drawing

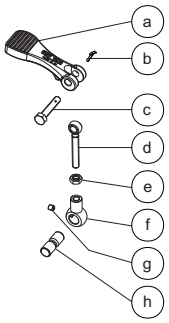


Parts List

Item	Description	Part No.
1	Manlid cover	73E/1672
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

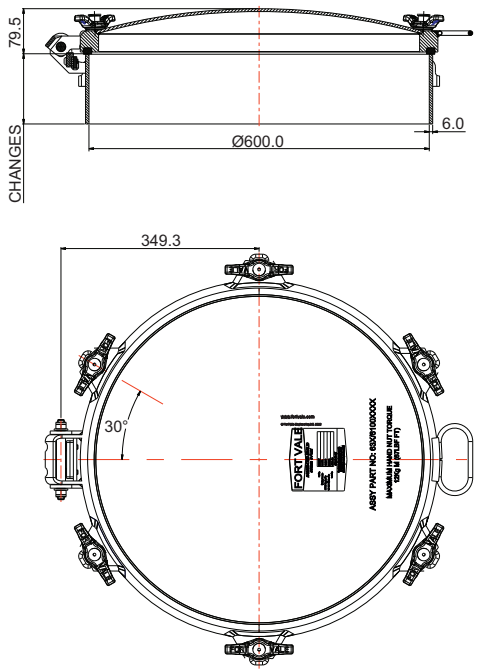
Alternatives are available, refer to the Design Options page

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.

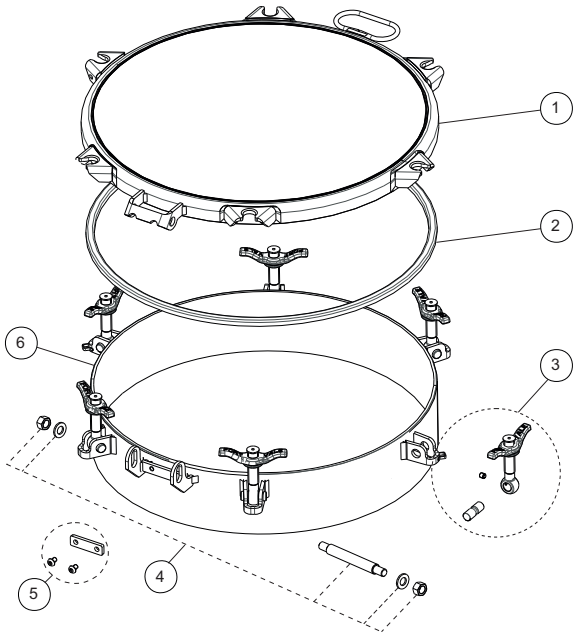
Section View



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:	-40°C (**metal parts**)
Design Temperature Max:	150°C (**metal parts**)

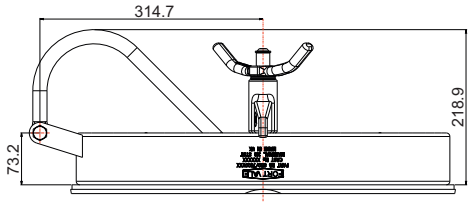
Vacuum Conditions: The assembly is compatible with -0.20 Bar vacuum only if neckring distortion caused by welding is kept to a minimum.

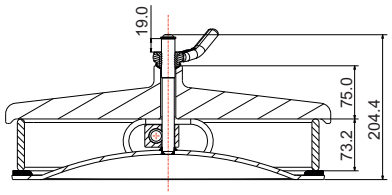
NOTE: The working temperature of the seal can change the design temperature limits. The Design Conditions and Section View dimensions are for the specified part number only.

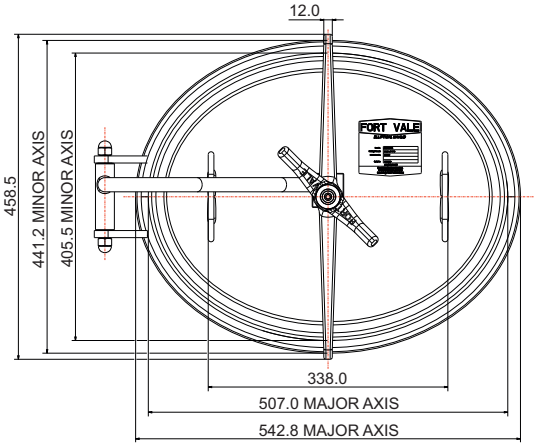
Range

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



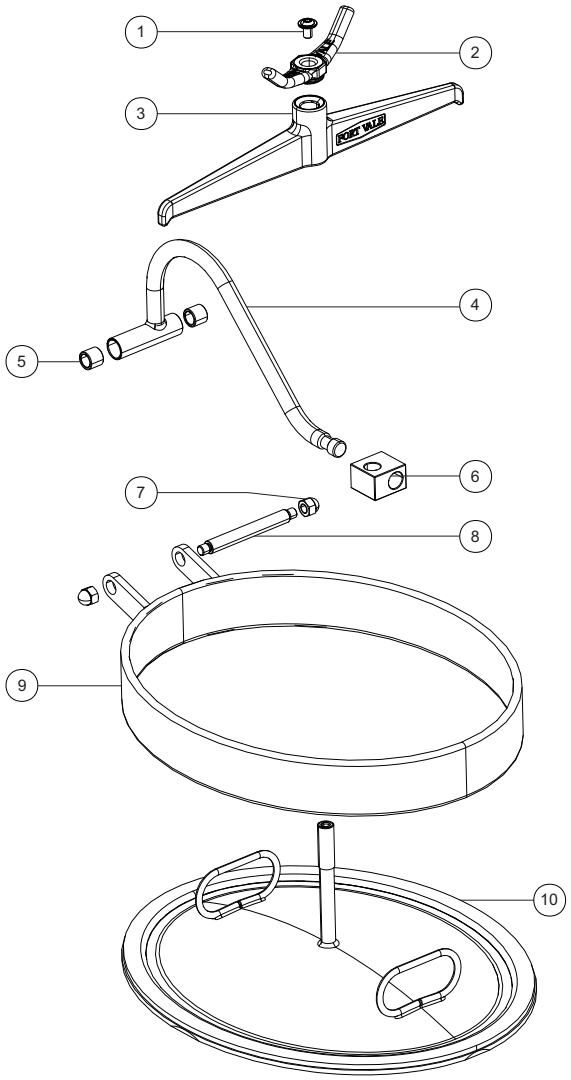




Elliptical Manlid Assembly - Low Profile Neckring

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:	-40°C (**metal parts**)
Design Temperature Max:	150°C (**metal parts**)

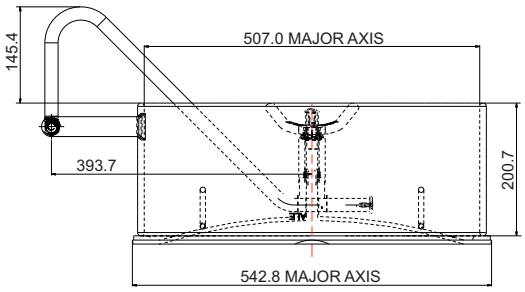
Vacuum Conditions: The assembly is compatible with -0.20 Bar vacuum only if neckring distortion caused by welding is kept to a minimum.

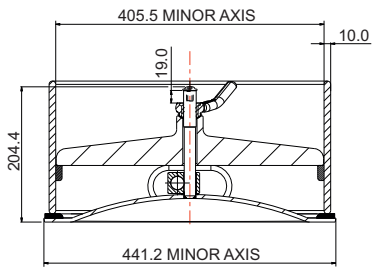
NOTE: The working temperature of the seal can change the design temperature limits. The Design Conditions and Section View dimensions are for the specified part number only.

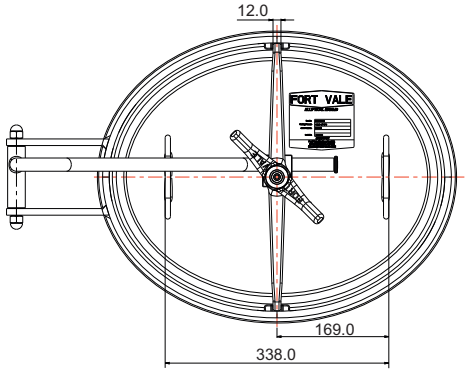
Range

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

Section View



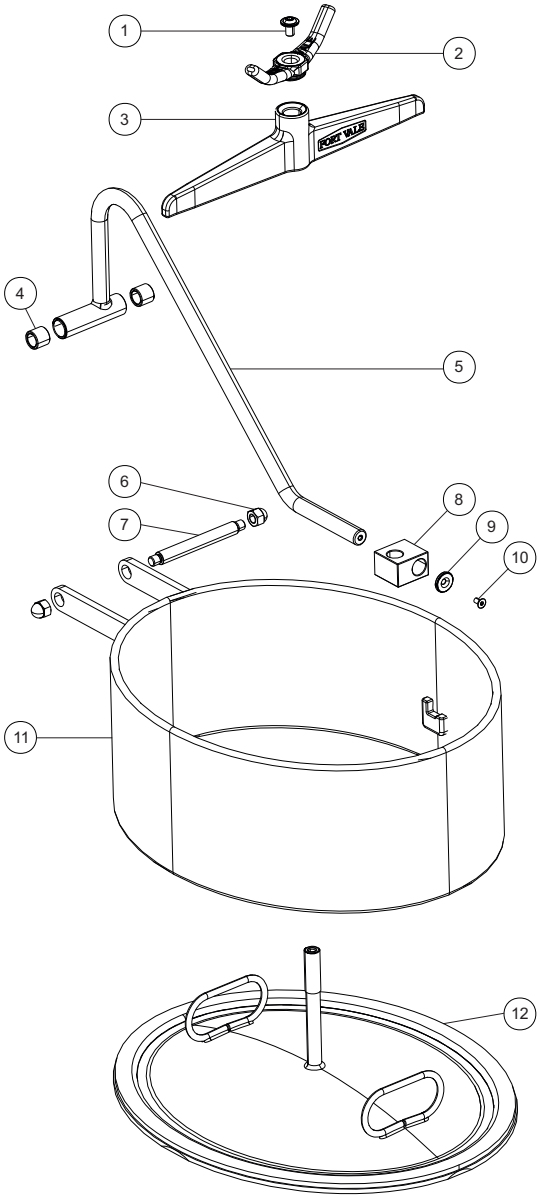




Elliptical Manlid Assembly - Deep Neckring

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

A safebolt is a special fastener that lets the operator safely release remaining tank pressure before the manlid cover is operated open. It can be used on all standard hinged manlid assemblies and inspection hatches to prevent the risk of injury to personnel.

IMPORTANT: Installation Precautions

You must always do the procedure to set the retaining collar and weld it in the correct position before the safebolt is put into service. This includes when a safebolt is supplied as part of a complete manlid assembly, and when a safebolt is supplied as a replacement spare part.

For the procedure to set the retaining collar, please refer to the Installation and Operating Instructions ref. **OPIN100**, available from Fort Vale.

Specification

Description

A safebolt assembly includes an eyebolt with pivot pin, a retaining collar and a captivated safebolt handnut

Eyebolt Options

Dimensions: ¾" BSW thread, Ø16mm eye & pivot pin
Length: From 66mm to 175.3mm (Length is measured from the centre of the eye to the end of the bolt)

Handnut Options

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

Safebolt Assembly Range

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

NOTE: The eyebolt length changes the Part No.

Related Parts (Refer to the next section)

Description	Part No.
Conversion kit: Includes the special retaining bracket and an information label (The safebolt assembly is not included)	701/KIT

500mm Manlid Cover Design Update: July 2025

From July 2025, the design of our 500mm manlid covers changed. The new geometry of the manlid cover lug brackets means that a special retaining bracket is welded to the cover lug bracket where a safebolt is installed. Refer to Figure 2. If you order a new manlid assembly with a safebolt, Fort Vale welds the special bracket.

If you want to change a standard fastener to replace it with a safebolt assembly on a manlid made after July 2025, a conversion kit is necessary, part no. 701/KIT. You must weld the special retaining bracket to the cover lug bracket. This procedure is shown in the Installation and Operating Instructions, ref. **OPIN100**.

For help with how to identify the new manlid cover type, please contact Fort Vale.

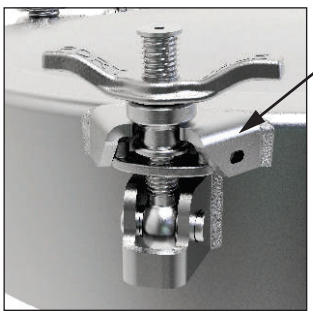


Figure 1

Manlid cover lug bracket before July 2025

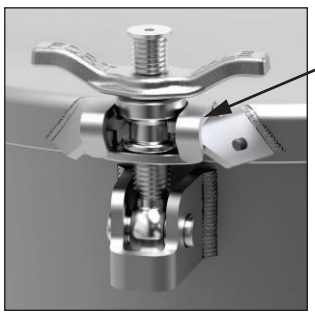


Figure 2

Manlid cover lug bracket after July 2025, with the special retaining bracket

Swingbolt Assemblies

Accessories & Spare Parts

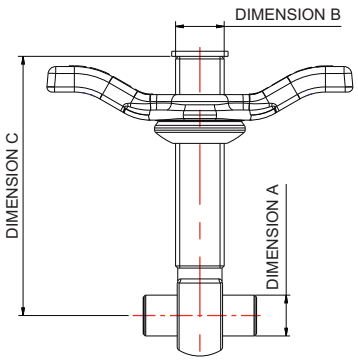
Shown: Swingbolt assemblies with standard handnuts

We supply a range of swingbolt assemblies with different eyebolt lengths and handnut types. Please contact us for help with part numbers and to order parts.

A complete swingbolt assembly includes the eyebolt, the pivot pin (attached with a set screw) and the handnut with a captivating washer. You can also buy each component separately.

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

Standard Swingbolt Assemblies



Specification

Standard eyebolt options

Ø eye: Dimension A - 16mm
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

Special eyebolt options

Ø eye: Dimension A - ¾"

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 Ø16mm Eye Swingbolt Assemblies

Includes ¾" BSW bolt with 16mm pivot pin, and captivated handnut.
NOTE: The eyebolt length changes the part no.

Part No.	Handnut Type	Material
496/**0**XXX	Hex nut	Stainless steel
496/**1**XXX	Low profile	Brass with st/st thrust washer
496/**5**XXX	Low profile	Stainless steel
496/**8**XXX	Extended	Stainless steel
496/**C**XXX	Extended anti-galling	Stainless steel with brass thread insert
496/**E**XXX	Low profile anti-galling	Stainless steel with brass thread insert

Range

Special Ø¾" Eye Swingbolt Assemblies

Includes ¾" BSW bolt with ¾" pivot pin, and captivated handnut.

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.
Eyebolt pivot pin Ø16 x 45mm long	10913SS
Eyebolt pivot pin Ø¾" x 1.82" long	10911SS
Manlid/neckring hinge pin assembly, includes pin, washers & nyloc nuts	600/1060
Handnut torque increase tool, compatible with low profile handnuts	495/10T0

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 Ø14.10		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 15.25 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 15.25 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 15.25 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 15.25 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 15.25 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 15.25 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 15.25 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 15.25 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 15.25 x 10	5005-33VR 16 x 16	5005-47VR 16 x 16	5005-53VR 16 x 16	Yellow

Compatibility

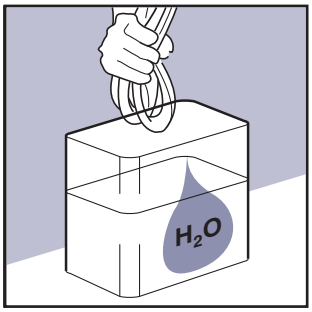
CAUTION: The compatibility information in the table is for general guidance only. Make sure that the seal material is compatible with the cargo and the service conditions. This includes, but is not limited to:

- 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

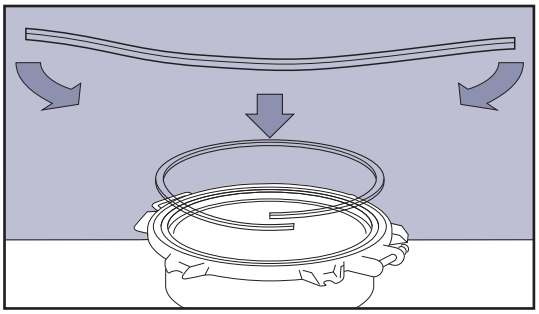
Installation Instructions

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

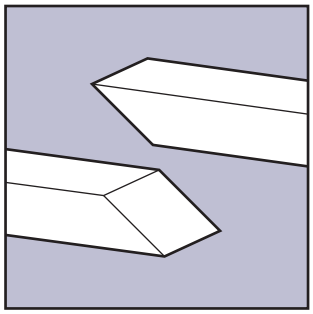


PRECAUTIONS: Examine the seal and the seal groove. Make sure all surfaces are clean with no corrosion, debris or damage. **CAUTION**: Do not use a damaged part.

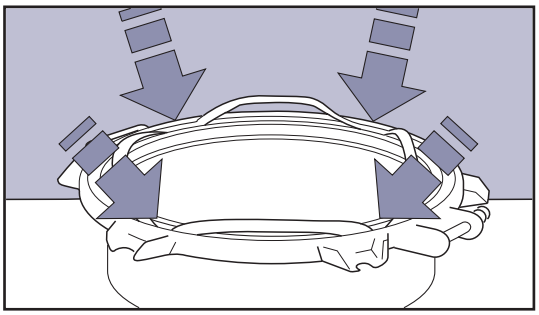
ELASTOMER SEAL: Put the seal momentarily into clean, cold water.



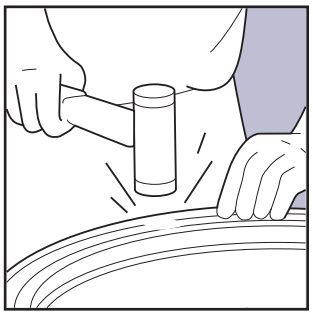
BRAIDED PACKING: Measure the packing around the circumference of the seal groove to get the correct size.



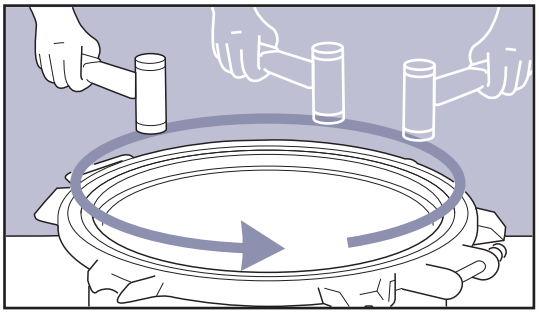
BRAIDED PACKING: Cut the seal with a mitre joint. If necessary, apply PTFE tape to the joint.
NOTE: We do not recommend the use of adhesive.



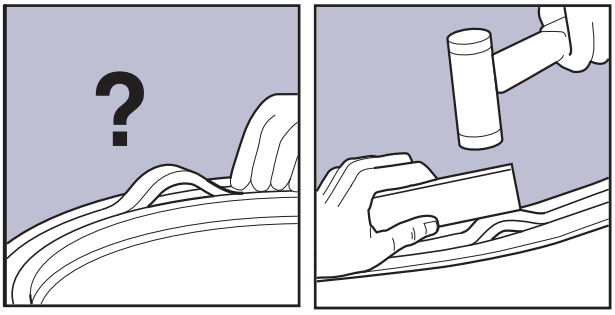
Step 1. Put the cover with the seal groove face up. Push the seal into the groove at 4 points, 90° to each other. Make sure the seal is not twisted.



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.

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APPENDIX

Manlid & Inspection Hatch Assemblies

Catalogue

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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 against pressure release. 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 do the inspections that follow:

Inspections 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 inspections more frequently.

Also, schedule regular maintenance based on how frequently the access hatch 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 genuine, 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, 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 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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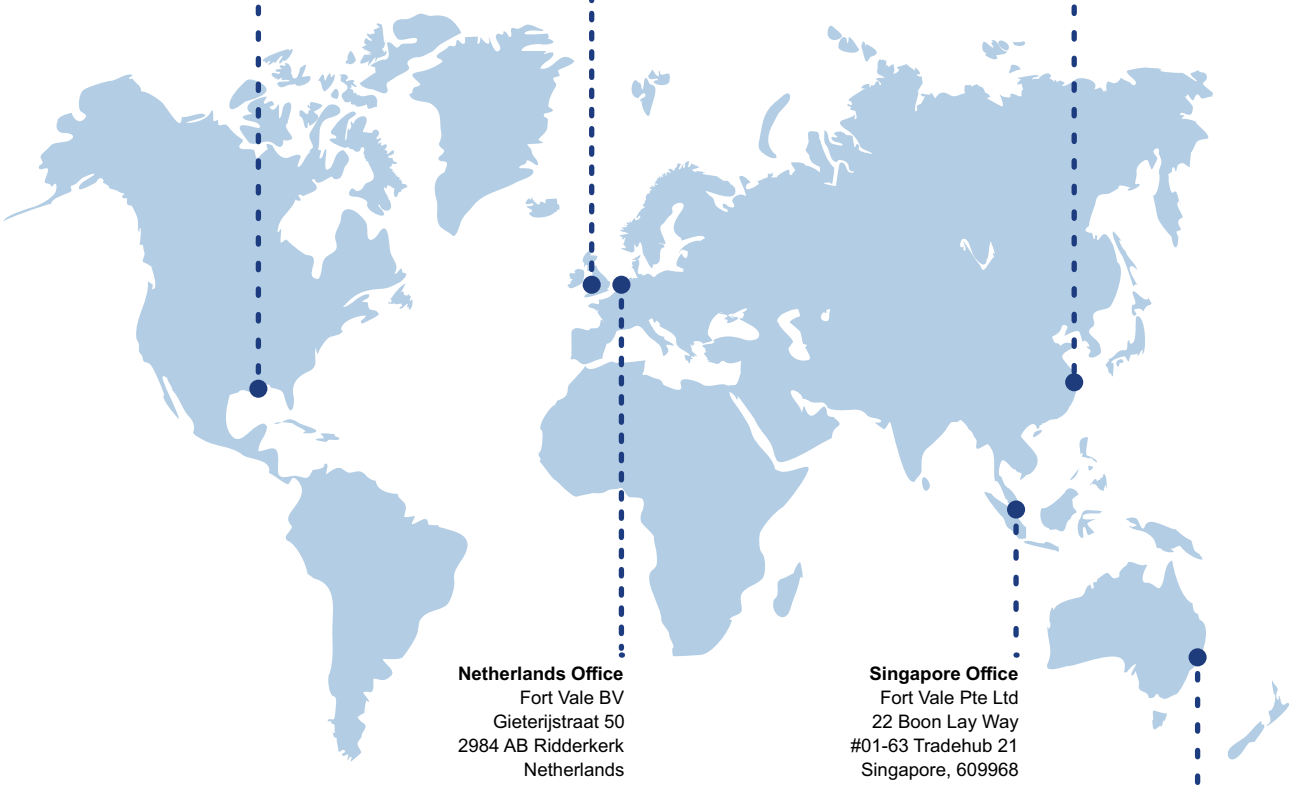

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