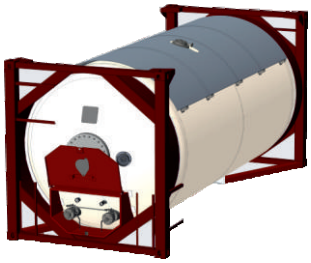
FORT VALE®

Catalogue

Standard Equipment for Liquefied Gas Tank Containers



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FORT VALE

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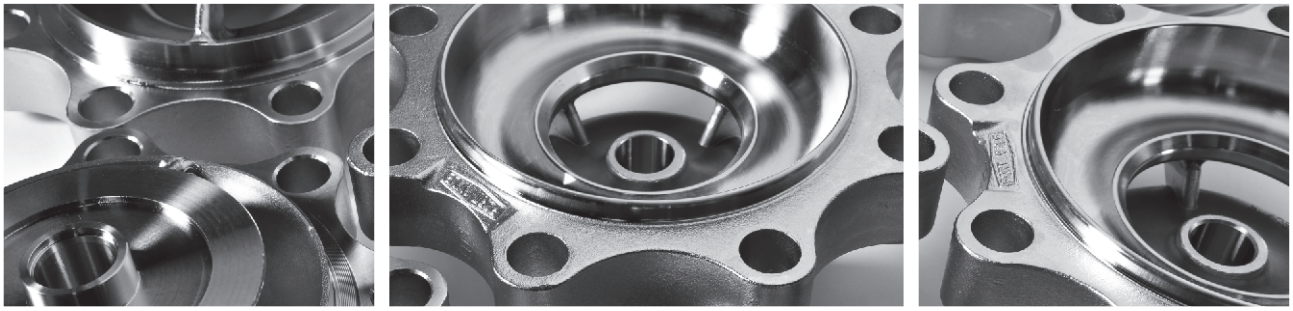
Internal Gas Relief Valves



Internal Gas Relief Valves: T50 Tank Containers

Design Options

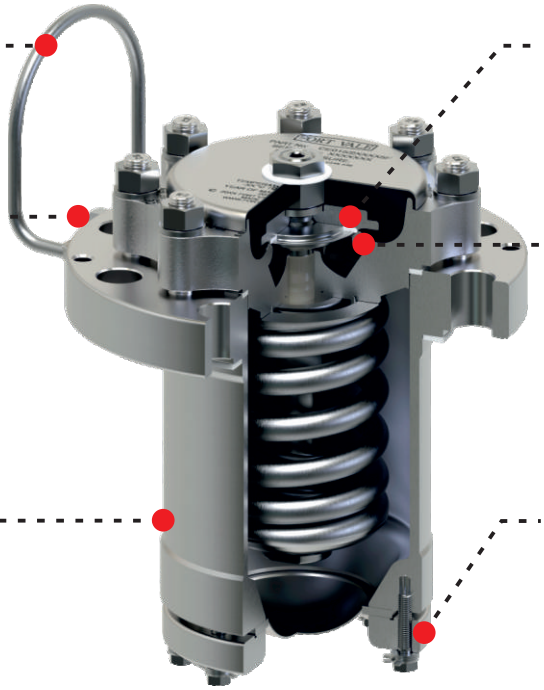
Function

An 80mm internal gas relief valve is installed in the vapour space of a liquefied gas tank. It is spring-loaded and pre-set to be compatible with the service conditions and it vents to protect the tank from accidental over-pressure. Internal gas relief valves have a high flow performance to prevent the catastrophic failure of a tank.

We offer a range of internal relief valves for different service conditions and flow requirements. Contact us for more information.

Design Options

The design options below are available on our standard range of 80mm internal gas relief valves.



Gauge Bar

Horizontal or vertical

Gauge Connection

¼" BSP
¼" NPT

Horizontal or vertical

Special service conditions:
90° elbow gauge connection

Finish

Electropolished

Special service conditions:
Polished
Oxygen Cleaning

Pressure Seal

RTFE

Special service conditions:
A range of seal materials is available

Pressure Seat

Stainless steel

Special service conditions:
Superseat (Alloy 600)

Burst Disc Support

Stainless steel

Special service conditions:
Special alloys e.g. Alloy 276

Body

Flanged: a selection of drilling patterns is available

Style: cutaway flange - compatible with a burst disc holder (as above)

or full flange - no burst disc

Pressure Setting

From 6.9 Bar to 38.5 Bar

Spring Set

Stainless steel

Special service conditions:
Special alloys

Related Parts

We recommend our range of compatible accessories:

- 89mm reverse-acting burst discs - a selection of burst pressures is available (**Note**)
- Pressure gauges
- Emergency blanking cap - to seal a relief valve pressure plate until maintenance is possible
- Gaskets
- Fasteners

NOTE: An 89mm burst disc will decrease the flow capacity of an internal gas relief valve by 1%. Make sure that the decreased flow capacity will give sufficient protection to your vessel/system.

Please contact us for more information about these parts.

Relief Valves for Dedicated Service

We offer a range of relief valves for these service conditions and special cargoes:

- T50 tank containers for liquefied gas
- Rail tank wagons
- U.S. tank trucks
- IBCs and small capacity tanks
- Steam-heating systems for tanks
- Hygienic service
- Food grade for liquid flow

Please contact us for more information about these valves.

80mm Internal Gas Relief Valve with Burst Disc Holder

Part No: 015/2XXXX5 - Metric Setting

Specification

Nominal size
DN80

Tank connection
Flanged: 8 x 26mm holes on a 220mm PCD

Set pressure
From 6.90 Bar to 38.50 Bar

Materials
Contact parts: 316 stainless steel
Pressure seal: RTFE
Tank seal: PTFE

Alternatives are available, refer to the Design Options page

Design Conditions

Weight:	30.5 Kg
Design Pressure (MAWP):	38.5 Bar
Test Pressure:	57.75 Bar
Design Temperature Min:	-55°C
Design Temperature Max:	65°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 14129
Obeys TPED, ADR, UKCA

Design Approval
LRQA

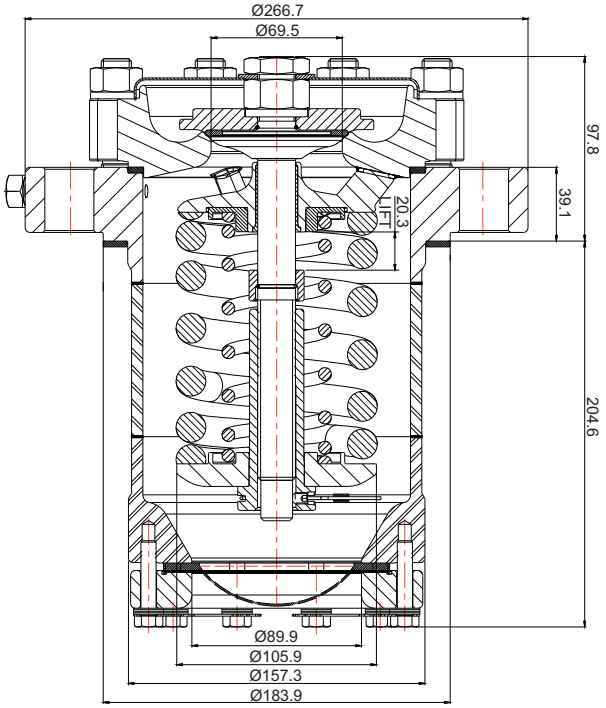
Related Parts

Description	Part No.
PTFE gasket	5005-812
Pressure gauge: 0-20 Bar ***Note**	92X/20XXXX
Pressure gauge: 0-40 Bar ***Note**	92X/40XXXX
Pressure gauge: 0-60 Bar ***Note**	92X/60XXXX
Emergency blank cap: 015/ series valve**	015/0070X
Emergency blank cap: 005/ series valve**	005/0060X

NOTE: The specification changes the part no.

****IMPORTANT:** Emergency blank caps have a pressure limit. Check with Fort Vale for compatibility.

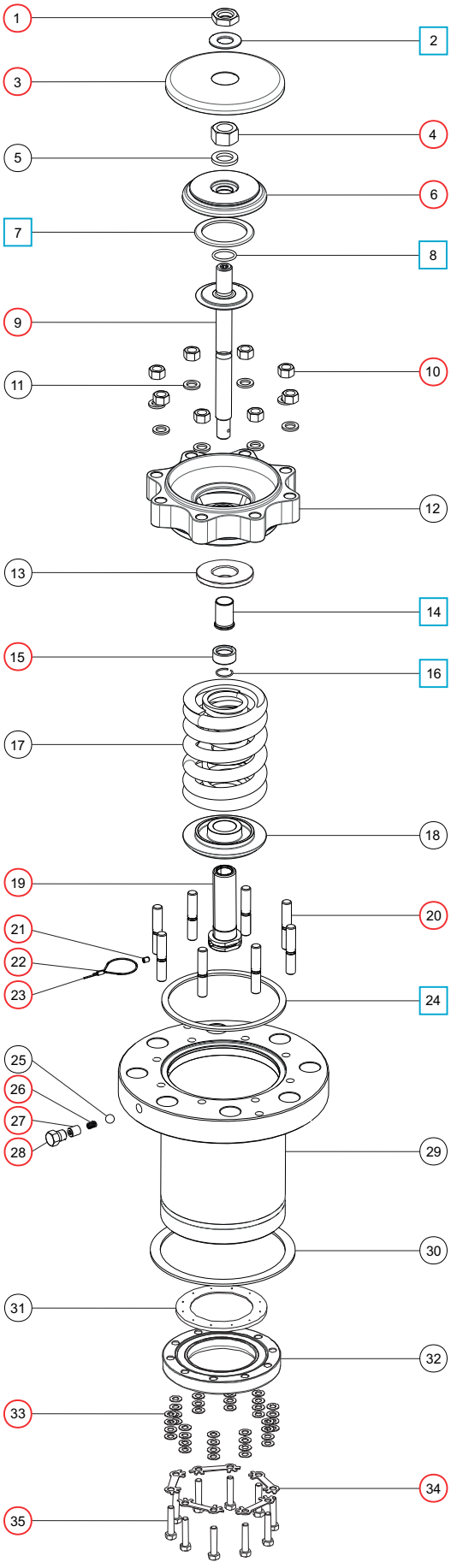
Section View



80mm Internal Gas Relief Valve with Burst Disc Holder

Part No: 015/2XXXX5 - Metric Setting

Parts Drawing



Parts List

Item	Description	Part No.	
1	M20 lock nut	5112-036	○
2	Cowl retaining washer	055/0135	□ ○
3	Cowl	055/0130	○
4	M20 full nut	5112-033	○
5	M20 spring washer	5113-016	
6	Poppet head	055/0127	○
7	RTFE main seal	5005-825	□ ○
8	Neoprene O ring	5005-995	□ ○
9	Poppet stem assembly	055/0120X	○
10	M16 full nut (8)	5112-003	○
11	M16 spring washer (8)	5113-012	
12	Body weld assembly	055/0207	
13	Top spring locator ***Note**	055/0116X	
14	Spindle guide bush	055/0115	□ ○
15	Stop collar	055/0125	○
16	Retaining ring clip	055/0114	□ ○
17	Spring pair ***Note**	8104-XXXX	
18	Bottom spring locator ***Note**	055/0110X	
19	Spring retainer	055/0020	○
20	M16 stud (8)	055/0055	○
21	M6 set screw	5111-133	○
22	Ferrule	SF1.5	○
23	Anti-tamper wire	6110-119	○
24	PTFE gasket	5005-826	□ ○
25	11mm ball	055/0031	
26	Spring	5104-115	○
27	Ball seal	055/0030	○
28	¼" BSP taper plug	5128-009	○
29	Burst disc holder	055/0190	
30	PTFE seal (supplied separate)	5005-812	
31	89mm burst disc (supplied separate)	864/XXXX	
32	Burst disc support flange	044/1034	
33	8mm Belleville washer (40)	5113-020	○
34	Anti-rotation tab (5)	055/0025	○
35	Hex bolt (10)	5111-011	○

NOTE: The top and bottom spring locators and the spring pair are a set with compatible dimensions. Please contact Fort Vale if you need to replace one of these parts.

Seal Kit

Description	Part No.
All parts marked □ in the Parts List	005/00SK

Repair Kit

Description	Part No.
All parts marked ○ in the Parts List	015/00RK

80mm Internal Gas Relief Valve (Cutaway Flange)

Part No: 016/2XXXX6 - Metric Setting

Specification

Nominal size
DN80

Tank connection
Flanged: 8 x 18mm holes on a 184.2mm PCD

Set pressure
From 6.90 Bar to 38.50 Bar

Materials
Contact parts: 316 stainless steel
Pressure seal: RTFE
Tank seal: PTFE

Alternatives are available, refer to the Design Options page

Design Conditions

Weight:	11.4 Kg
Design Pressure (MAWP):	38.5 Bar
Test Pressure:	57.75 Bar
Design Temperature Min:	-55°C
Design Temperature Max:	65°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.

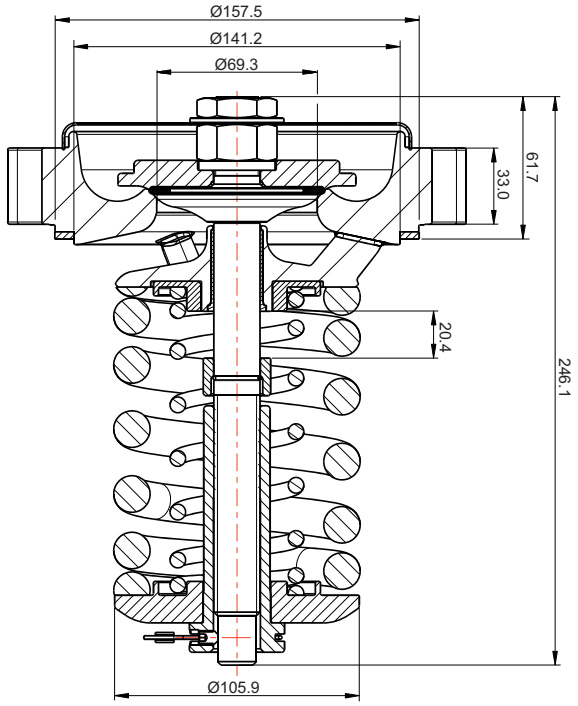
Design Codes
BS EN 14129
Obeys TPED, ADR, UKCA

Design Approval
LRQA

Related Parts

Description	Part No.
PTFE gasket	5005-826

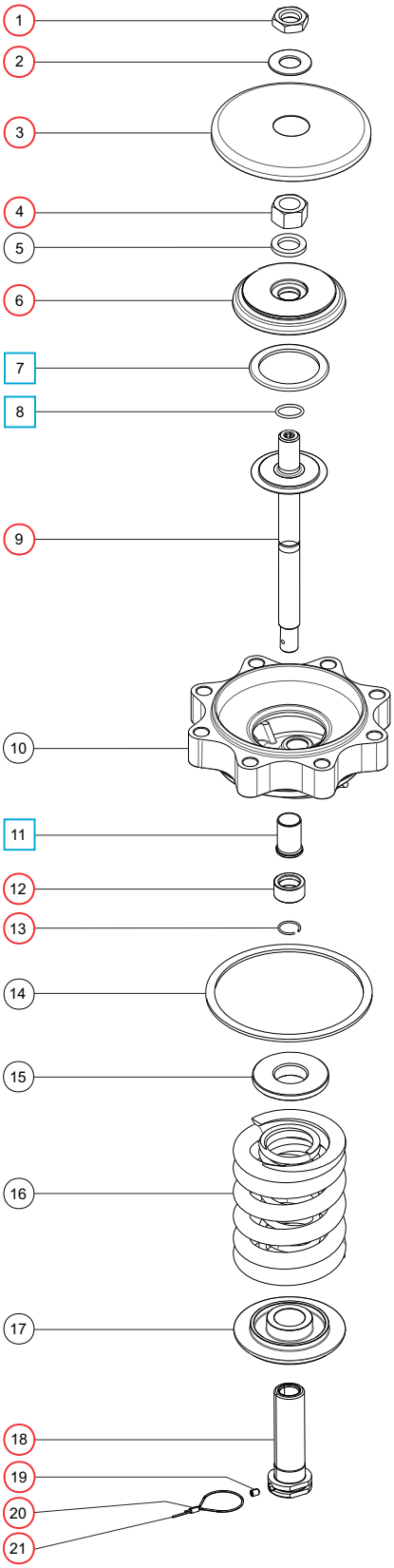
Section View



80mm Internal Gas Relief Valve (Cutaway Flange)

Part No: 016/2XXXX6 - Metric Setting

Parts Drawing



Parts List

Item	Description	Part No.	
1	M20 lock nut	5112-036	○
2	Cowl retaining washer	055/0135	○
3	Cowl	055/0130	○
4	M20 full nut	5112-033	○
5	M20 spring washer	5113-016	
6	Poppet head	055/0127	○
7	RTFE main seal	5005-825	□ ○
8	Neoprene O ring	5005-995	□ ○
9	Poppet stem assembly	055/0120	○
10	Body weld assembly	055/0207	
11	Spindle guide bush	055/0115	□ ○
12	Stop collar	055/0125	○
13	Retaining ring clip	055/0114	○
14	PTFE gasket (supplied separate)	5005-826	
15	Top spring locator ***Note**	055/0116X	
16	Spring pair ***Note**	8104-XXXX	
17	Bottom spring locator ***Note**	055/0110X	
18	Spring nut	055/0020	○
19	M6 set screw	5111-133	○
20	Ferrule	SF1.5	○
21	Anti-tamper wire	6110-119	○

NOTE: The top and bottom spring locators and the spring pair are a set with compatible dimensions. Please contact Fort Vale if you need to replace one of these parts.

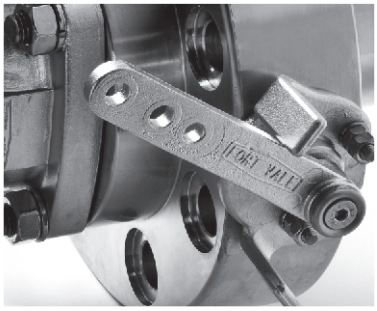
Seal Kit

Description	Part No.
All parts marked □ in the Parts List	006/00SK

Repair Kit

Description	Part No.
All parts marked ○ in the Parts List	016/00RK

Gas Discharge Valve Assembly



Function

The short profile discharge assembly is a compact internal valve with a secondary ball valve and tertiary closure. Two similar valve assemblies are installed on the tank, one connected to the liquid space and one to the vapour space. They operate on a pilot/main closure system so that they are easy to operate manually to control the loading and discharge of cargo.

The internal valve has an excess flow function. This is a safety feature to close the valve poppet if there is a sudden change to normal operating conditions, for example if there is a surge in the flow of cargo, or if there is a catastrophic leak in the downstream equipment.

The liquid and vapour phase valves are usually connected by a linkage mechanism so that they operate simultaneously.

Design Options

The design options below are available on our standard range of discharge assemblies for T50 tank containers.

Please contact us for more information about valve options.

Nominal Bore

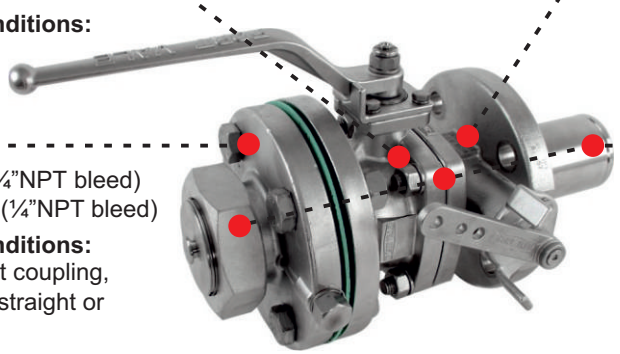
DN50

Special service conditions:
DN80

Outlet

Liquid: 3¼" ACME (¼"NPT bleed)
Vapour: 1¾" ACME (¼"NPT bleed)

Special service conditions:
Drytyt dry disconnect coupling, bobbin/blind flange, straight or angled



Footvalve Body Angle

180° short profile

Special service conditions:
51°, 90°

Main Seal

Footvalve/ACME: PTFE
Ball valve: RTFE

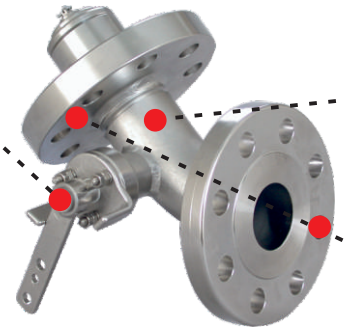
Special service conditions:
Elastomer

Footvalve

Operation

Manually operated

Special service conditions:
Hydraulically actuated
Pneumatically actuated



Valve Materials

316 & 304 stainless steel

Special service conditions:
Special alloys

Inlet/Outlet Flange

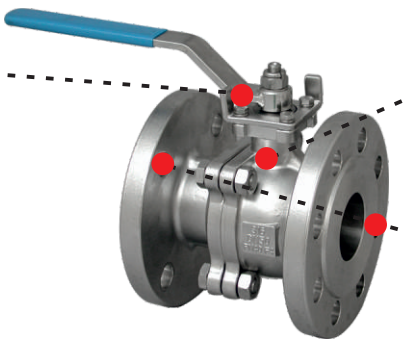
A range of drilling patterns is available

Ball Valve

Operation

Manually operated

Liquid: Left hand
Vapour: Right hand



Valve Materials

316 & 304 stainless steel

Special service conditions:
Special alloys

Inlet/Outlet Flange

A range of drilling patterns is available

Related Parts

We recommend our range of compatible accessories:

- Footvalve handle linkage mechanisms
- Emergency remote closure systems and fusible elements
- Couplings, caps and plugs
- Gaskets
- Fasteners

Please contact us for more information about these parts.

Footvalves for Dedicated Service

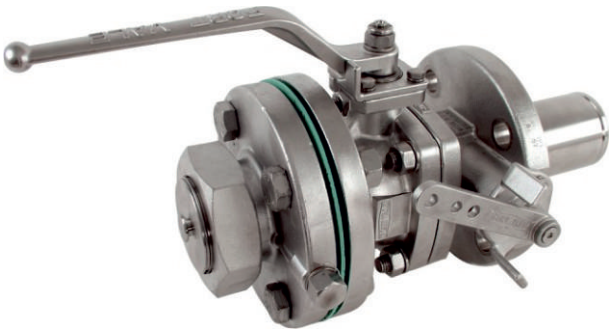
We offer a range of footvalves and discharge systems for these service conditions and special cargoes:

- T50 tank containers for liquefied gas
- Rail tank wagons
- Offshore fuel and chemical tanks
- Road tankers carrying hot product (bitumen)
- Road tankers: top operated screwdown valve
- Hygienic service

Please contact us for more information about these valves.

2" Short Profile Gas Discharge Valve Assembly

Part No: 802B/0010X



Specification

Nominal size/body angle
DN50 / 180°

Inlet connection
Flanged: 4 x 18mm holes equi-spaced on a 125mm PCD

Outlet connection
ACME threaded outlet with cap

Properties
Excess flow footvalve with ball valve, ACME outlet & cap
NOTE: You must install a separate tension spring to emergency-close the footvalve

Materials
Contact parts: 304/316 stainless steel
Footvalve main seal: PTFE
Ball valve main seal: RTFE
Cap seal: PTFE

Alternatives are available, refer to the Design Options page

Design Conditions

Weight: Liquid/Vapour Phase	18.8 Kg / 17.9 Kg
Design Pressure (MAWP):	34.5 Bar
Test Pressure:	70.0 Bar
Design Temperature Min/Max:	-55°C / 80°C

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

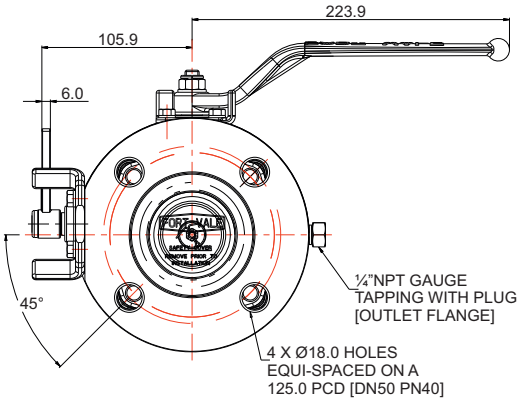
Design Codes
BS EN 14432
BS EN 14433
BS EN 13445
Obeys TPED, ADR, UKCA

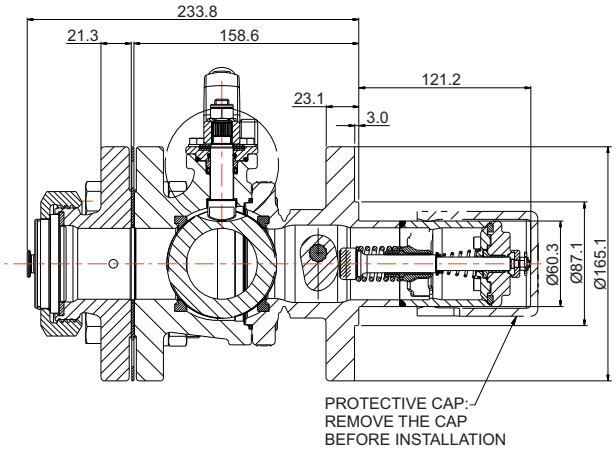
Design Approval
LRQA

Range

Description	Part No.
Liquid phase valve, 3¼" ACME outlet, left hand operation	802B/0010L
Vapour phase valve, 1¾" ACME outlet, right hand operation	802B/0010R

Section View: Liquid Phase

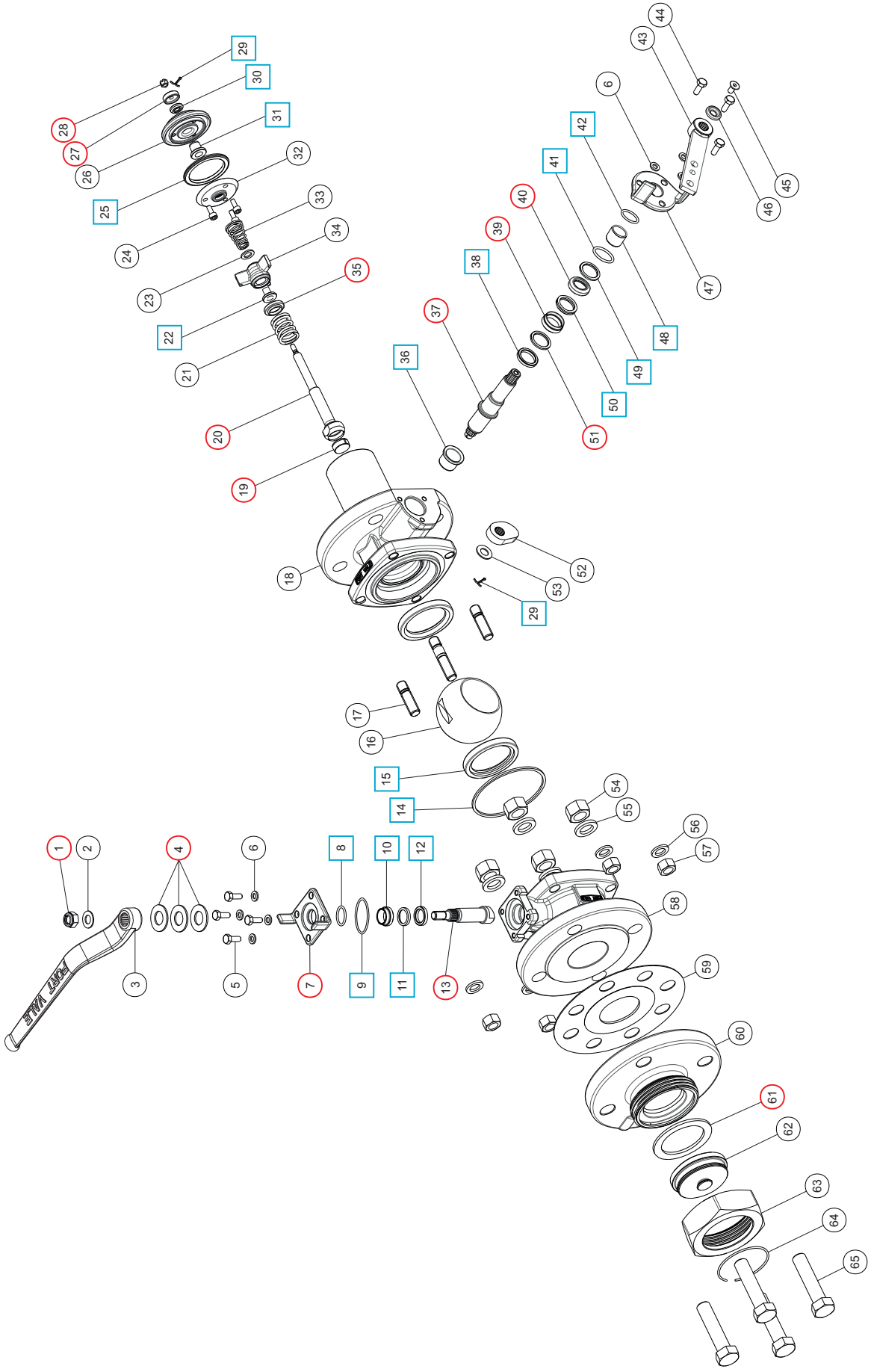




2" Short Profile Gas Discharge Valve Assembly

Part No: 802B/0010X

Parts Drawing: Liquid Phase



2" Short Profile Gas Discharge Valve Assembly

Part No: 802B/0010X

Parts List

Item	Description	Part No.	
1	M10 locking nut	5112-008	●
2	M10 washer	5113-009	
3	Handle	370/3306	
4	Disc spring (3)	5113-038	●
5	M6 hex head bolt (4)	5111-022	
6	M6 spring washer (4)	5113-008	
7	Clamp plate	370/3305B	●
8	Neoprene O ring	5005-216	■ ●
9	Neoprene O ring	5005-866N	■ ●
10	Spindle bush	370/3307B	■ ●
11	Spindle seal	359/2007	■ ●
12	Bottom bush	370/3321	■ ●
13	Spindle	370/3320	●
14	Body seal	370/3303	■ ●
15	PTFE ball seal (2)	370/3302	■ ●
16	50mm ball	370/3301	
17	M12 stud (4)	370/3314	
18	Footvalve body: LH liquid phase Footvalve body: RH vapour phase	252/5065L 252/5065R	
19	RTFE bearing pad	252/0580	○
20	Push stem	252/0525/1	○
21	Poppet spring	5104-826	
22	Push stem guide bush	252/0565	□ ○
23	Spring location washer	252/0511	
24	M5 sockethead capscrew (3)	5111-118	
25	PTFE main seal	252/0563	□ ○
26	Poppet head	252/0586	
27	Pilot seal retainer	252/0579/1	○
28	M6 castle nut	5112-094	○
29	Split pin (2)	5118-055	□ ○
30	Pilot seal	252/0583	□ ○
31	Spindle guide bush	252/0589	□ ○
32	Seal clamp	252/0588	
33	Liquid phase spring Gas phase spring	5104-824L 5104-821G	
34	Spider stem guide	252/3165	
35	Bottom spring pad	252/0526	○
36	Bottom guide bush	252/0506B	□ ○
37	Spindle	252/0504	○
38	Bottom stem seal	359/4007	□ ○
39	Spacer ring	252/0512	○
40	Top seal bush	252/0507	○
41	Neoprene O ring	5005-217	□ ○
42	Neoprene O ring	5005-216	□ ○
43	Handle assembly	252/3520	
44	M6 hex head bolt (3)	5111-022	
45	M6 countersunk screw	5111-018	
46	Retaining washer	20370	

Parts List

Item	Description	Part No.	
47	Stuffing plate	252/5058B	
48	Split bearing	252/0517	□ ○
49	Top guide bush	252/0502B	□ ○
50	Top gland seal	359/4013	□ ○
51	Spacer ring	359/4012	○
52	Operating cam	252/0527	
53	M10 washer	5113-009	
54	M16 full nut (4)	5112-003	
55	M16 spring washer (4)	5113-012	
56	M12 spring washer (4)	5113-010	
57	M12 full nut (4)	5112-006	
58	Ball valve body	370/3368	
59	CNAF/PTFE gasket	5005-726	
60	Outlet: 3¼" ACME Outlet: 1¾" ACME	252/2069 252/2084	
61	PTFE seal: 3¼" ACME PTFE seal: 1¾" ACME	5005-877 5005-878	● ●
62	Plug: 3¼" ACME Plug: 1¾" ACME	252/2076 252/2086	
63	Dust cap: 3¼" ACME Dust cap: 1¾" ACME	252/2075 252/2085	
64	Retaining ring clip: 3¼" ACME Retaining ring clip: 1¾" ACME	5120-027 5120-028	
65	M16 hex head bolt (4)	5111-090	

Seal Kit

Description	Part No.
Ball valve seal kit: All parts marked ■ in the Parts List	370/33SKB
Footvalve seal kit: All parts marked □ in the Parts List	252/50SKB

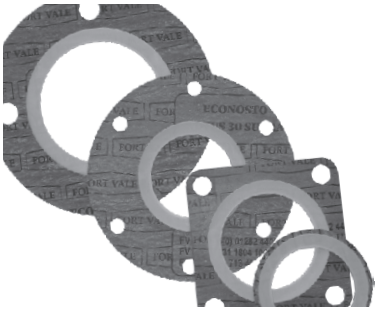
NOTE: The seal kits are compatible with liquid phase and vapour phase valves

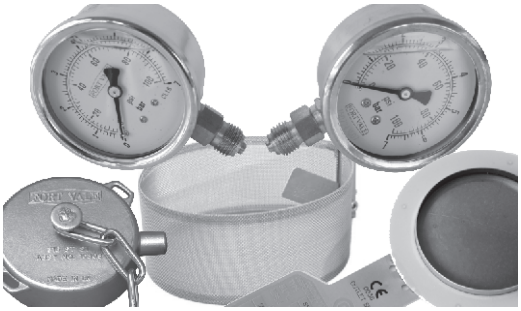
Repair Kit

Description	Part No.
Ball valve repair kit: All parts marked ● in the Parts List	370/33RKB
Footvalve repair kit: All parts marked ○ in the Parts List	252/50RKB

NOTE: The repair kits are compatible with liquid phase and vapour phase valves

Accessories





ACME Outlet Assemblies

Accessories & Spare Parts

Specification

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

Nominal sizes

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

Connection

4 x 18mm holes on a 125mm PCD

Properties

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

Materials

Metal parts: 316 stainless steel
Seal: PTFE

Design Conditions

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

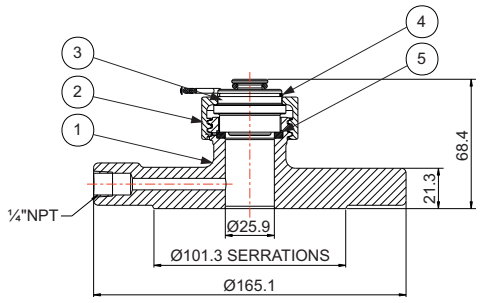
Range

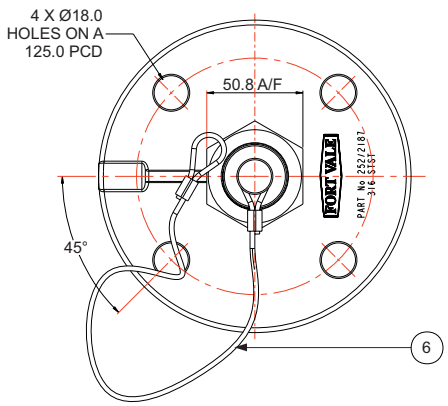
Description	Part No.
DN25 1¾" ACME thread	252/2187
DN50 3¼" ACME thread	252/2177

Spare Parts

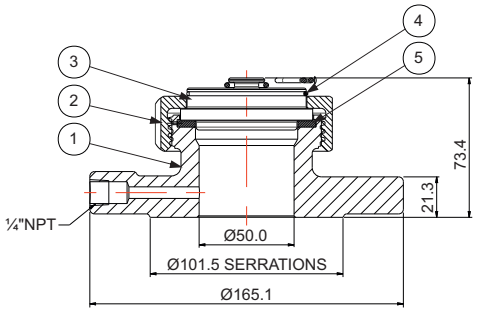
Item	Description	Part No. 1¾" ACME	Part No. 3¼" ACME
1.	Outlet flange	252/2084	252/2069
2.	ACME cap	252/2085	252/2075
3.	ACME plug	252/2086	252/2076
4.	Retaining ring clip	5120-028	5120-027
5.	PTFE seal	5005-878	5005-877
6.	Retaining wire	425/0009	425/0004

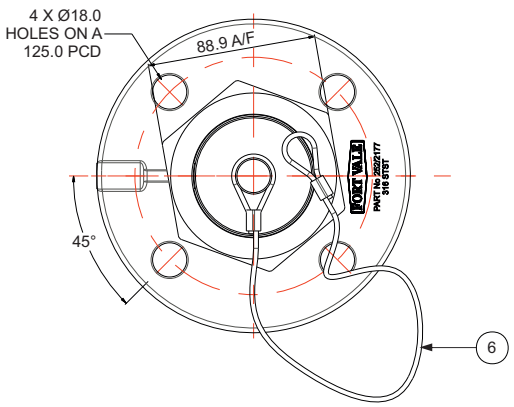
Section View - 1¾", Part No. 252/2187

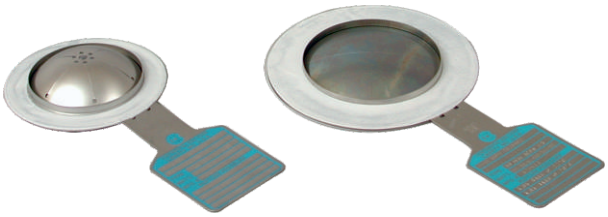




Section View - 3¼", Part No. 252/2177







Specification

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

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

Nominal sizes

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

Disc options

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

Materials

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

65mm XL Burst Discs

Compatible with general purpose tank containers and road tankers.

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

NOTE: The specification changes the part no.

80mm XL Burst Discs

Compatible with general purpose tank containers and road tankers.

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

NOTE: The specification changes the part no.

89mm Reverse Acting Burst Discs

Compatible with compressed liquefied gas tank containers.

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

NOTE: The specification changes the part no.

250mm Standard Burst Discs

Compatible with hydrogen peroxide service.

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

Example: 8 6 X / X 0484 020 X X

Disc Size

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

Disc Manufacturer

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

Burst Pressure in kPa

0484 484 kPa (4.84 Bar)

Burst Temperature in °C

020 20°C

Disc Type

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

Special Material/Service: Disc Type A & B Only

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

Special Material/Service: Disc Type G Only

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

Standard Pressure Gauge

Tell-Tale Pressure Gauge

Specification

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

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

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

Material options - internal parts
Brass, stainless steel

Standard Pressure Gauge

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

Tell-Tale Pressure Gauge

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

FORT VALE

APPENDIX

Catalogue

Flange Bolting

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

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

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

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

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

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

Bolt Torque

Bolt Torque Values

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

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

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

Bolt Torque Procedure

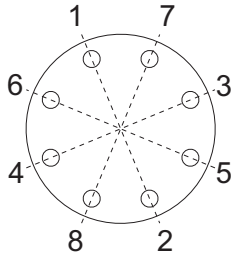
To install flanged parts correctly:

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

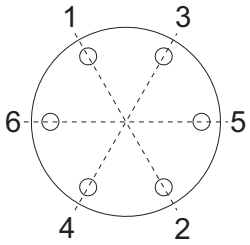
Table BT1

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

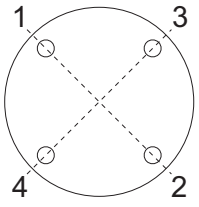
Figure BT1



8 HOLE PATTERN



6 HOLE PATTERN



4 HOLE PATTERN

Step Loading Procedure

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

Install

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

Round 1

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

Round 2

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

Round 3

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

Round 4

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

Round 5

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

Compatibility

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

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

Maintenance

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

Visual checks at regular intervals:

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

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

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

Checks after 2½ years of service:

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

Checks after 5 years of service:

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

Replacement Parts

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

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

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

External Fire

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

Compatibility of Accessories

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

Mis-use

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

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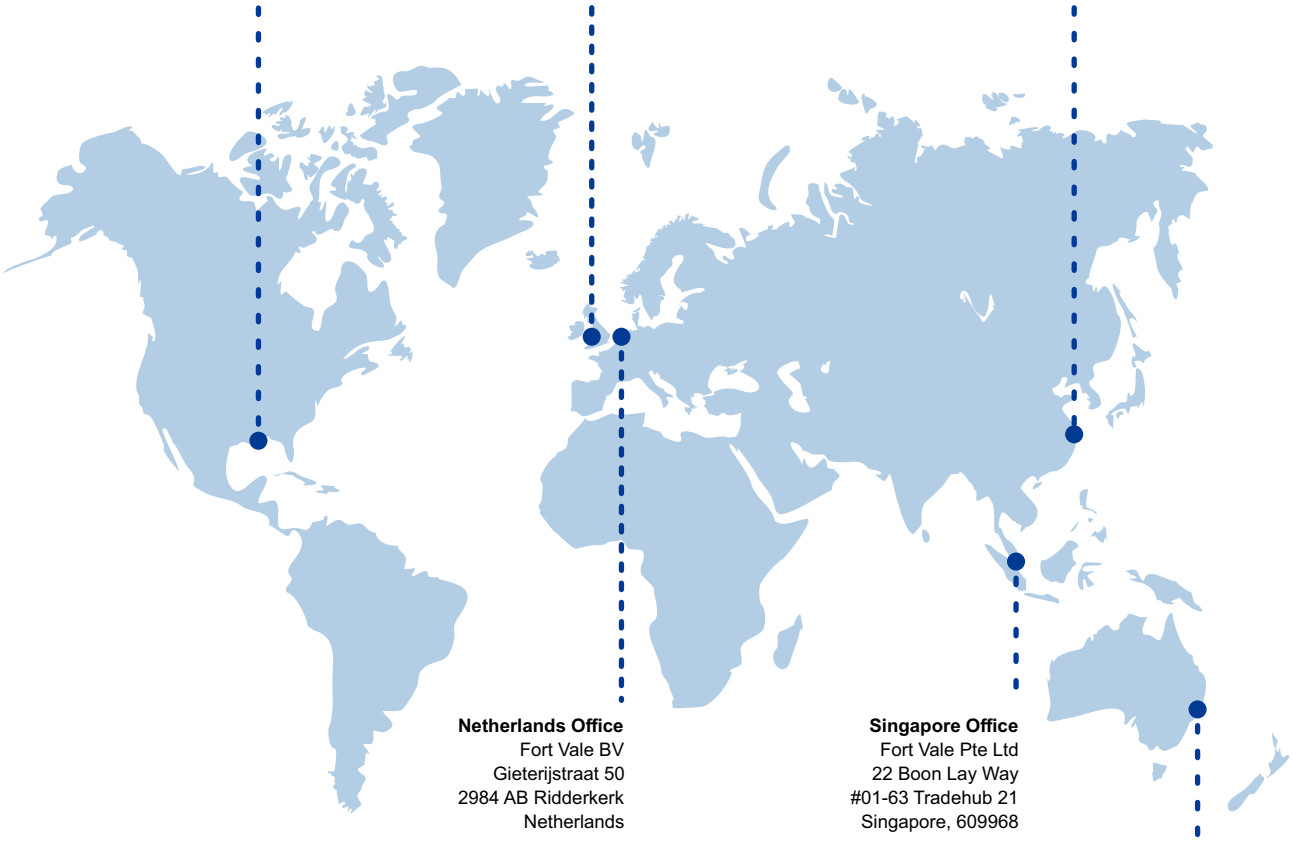

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We also have Authorised Distributors around the world to provide you with product sales and after-market services.
To find your nearest distributor, please visit our website - **www.fortvale.com**

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