

INSTALLATION AND MAINTENANCE INSTRUCTIONS

General Mechanical Mounting Instructions

EXPLOSION PROTECTION



Doc. 8.8665.00.9
Rev. February 2020

Fike[®]

SOLUTIONS

- / Fire Protection
- / Explosion Protection
- / Overpressure Protection
- / Pressure Activation

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REVISION HISTORY

ORIGINAL RELEASE DATE:June, 2017

REVISION / DESCRIPTION OF CHANGE	REVISION DATE
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1. INSTALLATION OF A FIKE EXPLOSION PROTECTION SYSTEM

This document describes in general the mechanical mounting of Fike explosion protection components.

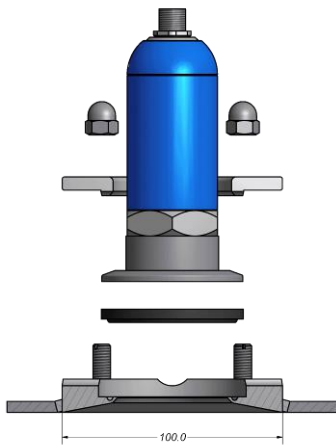
The components should be installed according to the Fike system specific drawings which can be found in the Project Manual sent to the Project Manager. Any deviation will need to be issued to Fike in writing and a written approval by Fike must be obtained prior to stallation.



ONLY QUALIFIED FIKE PERSONNEL HAVE THE AUTHORITY TO INSTALL ACTUATORS.

2. EXPLOSION PRESSURE DETECTOR

2.1. N/A Connect



Inspect the process flange for mechanical damage before installation.

Drill a 104 mm hole in the process vessel.

Align and spot-weld the process flange into the hole.

Ensure that it is completely flush with the inside edge of the process and there are no lips of the flange protruding internally.

Complete welding in accordance with good welding practice / standards.

Clean threads of the detector flange prior to detector installation.

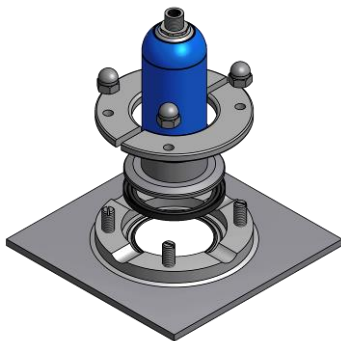
Screw the detector in the tri-clamp detector flange, turn clockwise until the detector bottoms out (do not over tighten).

Do not use PTFE tape or similar.

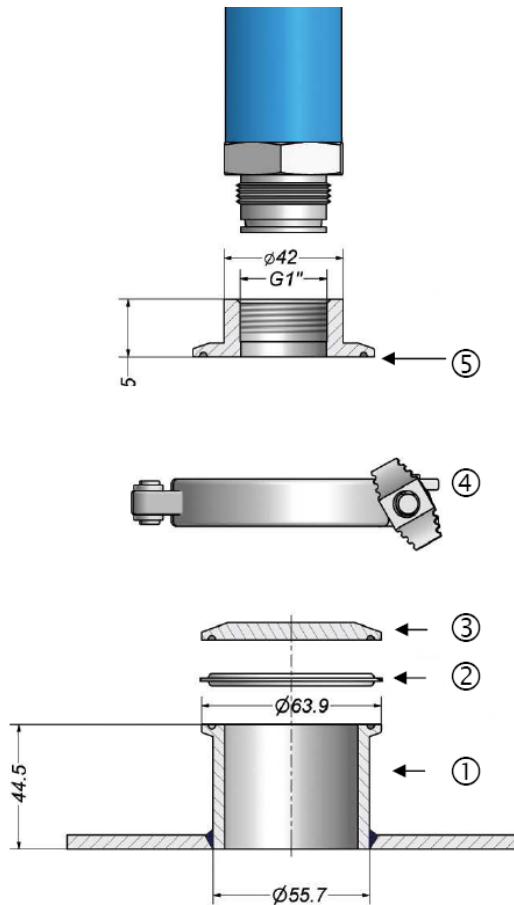
Insert assembly into the process flange with gasket.

Insert the detector assembly into the NA-connect process flange with Gasket.

Slide the NA-Connect clamps over the studs and tighten M8 nuts.



2.2. Tri-Clamp Flat



Inspect the weld ferrule (①) for mechanical damage before installation.

Drill a 60 mm hole in the process vessel.

Align and spot-weld the weld ferrule into the hole. Ensure that it is completely flush with the inside edge of the process and there are no lips of the flange protruding internally.

Complete welding in accordance with Good Welding Practice / standards (GWP).

Clean threads Of the detector flange item 5 prior to detector installation.

Screw the detector in its flange, turn clockwise until the detector bottoms out (do not overtighten).

Do not use PTFE tape or similar.

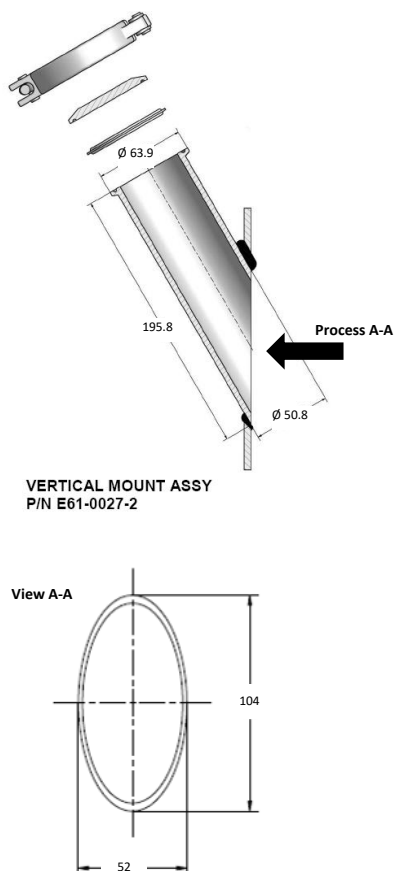
Place assembly onto the process flange with gasket.

Tighten the clamp around the assembly.

Note:

Item ③ is provided as a process shut-off. It should be removed prior to installing the detector.

2.3. Tri-Clamp 30°



Inspect weld ferrule for mechanical damage before installation.

Cut an oval hole in the process: 106 x 54 mm.

.. Ensure that it is completely flush with the inside edge of the process and there are no lips of the flange protruding internally

Complete welding in accordance to Good Welding Practice / standards (GWP).

Clean threads of the detector flange prior to detector installation.

Screw the detector in its flange, turn clockwise until the detector bottoms out (do not overtighten). Do not use PTFE tape or similar.

Place assembly onto the process flange with gasket and fix to weld flange.

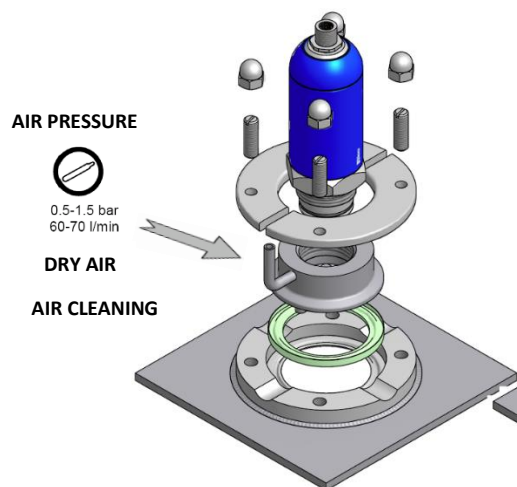
Tighten the clamp around the assembly.

Note:

Item ③ is provided as a process shut-off. It should be removed prior to installing the detector.

2.4. Detector Cleaning

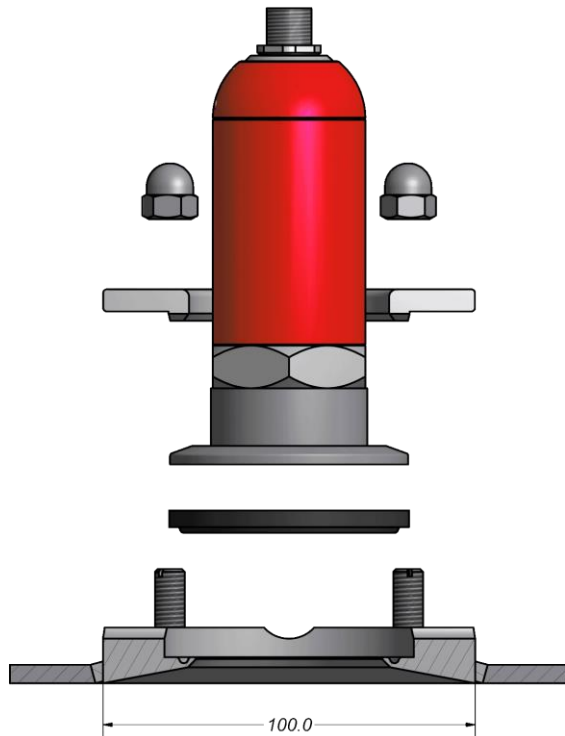
Item ⑤ from § 2.2 above, is replaced by an “Air clean nozzle”.



Apply continuous air pressure (water and oil free) between 0.5 – 1.5 barg.

3. OPTICAL EXPLOSION DETECTOR

3.1. N/A Connect



Inspect the process flange N/A connect DN50 for mechanical damage before installation.

Drill a 104 mm hole in the process vessel.

Align and spot-weld the process flange into the hole.

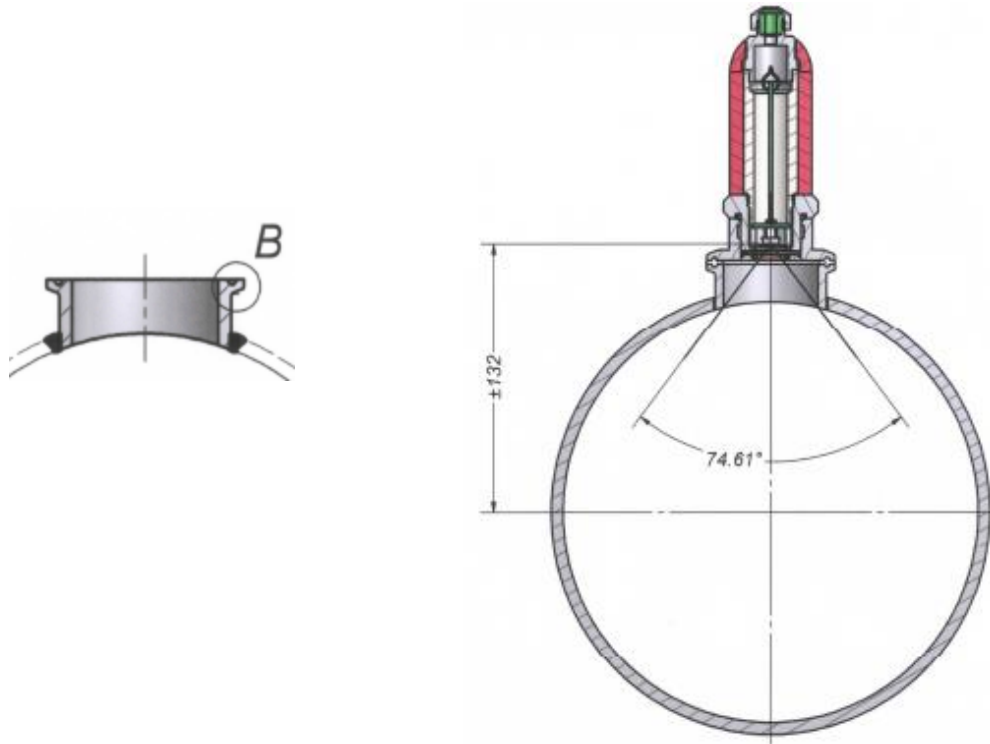
Ensure that it is completely flush with the inside edge of the process and there are no lips of the flange protruding internally.

Complete welding in accordance to Good Welding Practice / standards (GWP).

Insert the detector assembly into the NA-connect process flange with Gasket.

Slide the NA-connect clamps over the studs and tighten M8 nuts.

3.2. Saddled Tri-Clamp



Inspect the weld ferrule for mechanical damage before installation.

Drill a 60 mm hole in the process vessel. Align and spot-weld the weld ferrule into the hole.

Ensure that it is completely flush with the inside edge of the process and there are no lips of the flange protruding internally.

Complete welding in accordance to Good Welding Practice / standards (GWP).

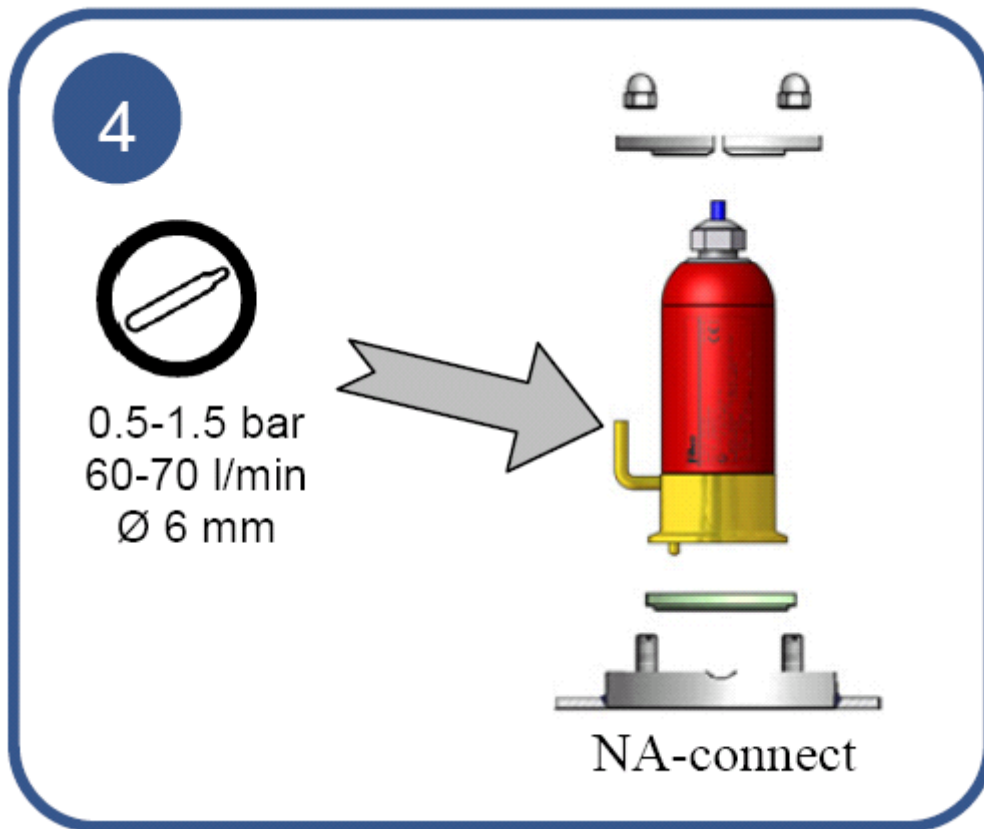
Insert the detector assembly into the saddled tri-clamp process flange with Gasket.

Slide the clamp over the flange and tighten.

3.3. Detector Cleaning

On NA-connect flanges, and in some application on tri-clamp flat and 30° flanges, air-flush cleaning of the detectors is possible.

Apply continuous air pressure (water and oil free) between 0.5 – 1.5 barg.



3.4. Fiber Optics – Light Guides

3.4.1. Process Flanges

Inspect the weld ferrule for mechanical damage before installation.

Drill a 32 mm hole in the process vessel. Align and spot-weld the weld ferrule into the hole.

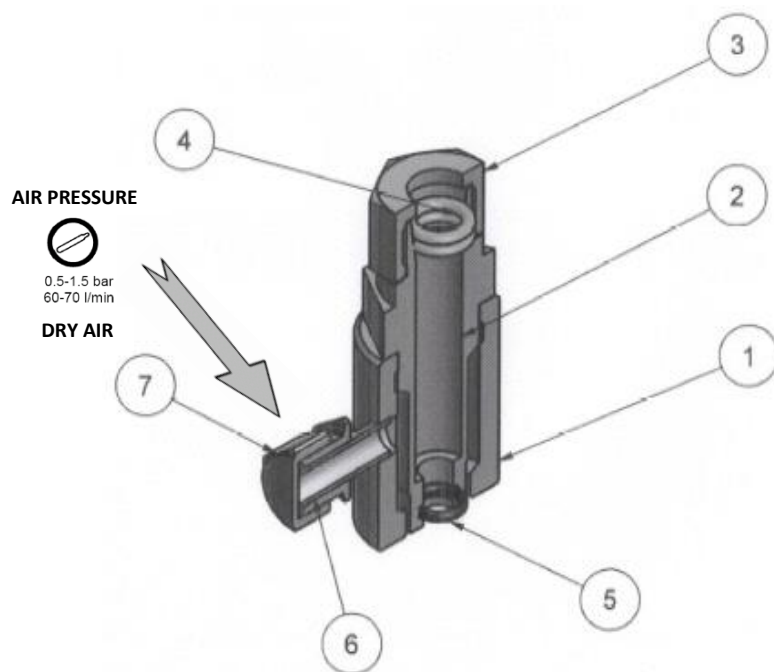
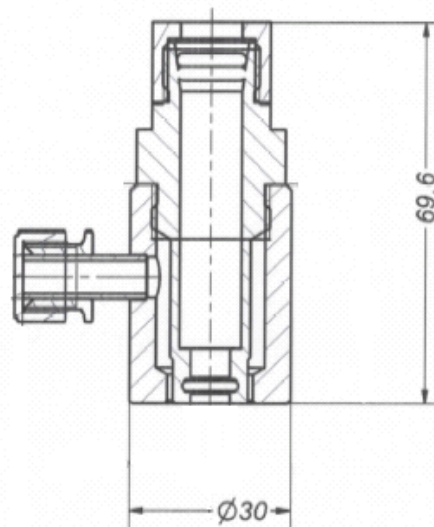
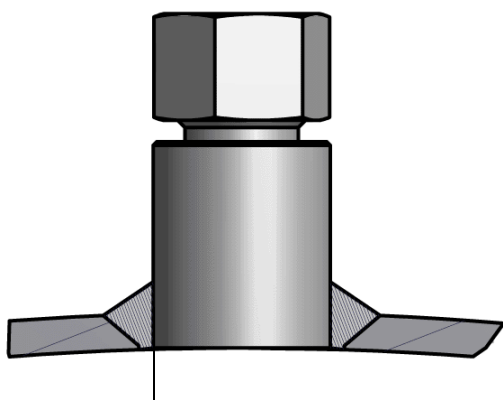
Ensure that it is completely flush with the inside edge of the process and there are no lips of the flange protruding internally.

Complete welding in accordance with Good Welding Practice / standards (GWP).

Clean threads prior to fiber installation.

Screw the fiber in its flange turn clockwise until tight (do not overtighten). Do not use PTFE tape or similar.

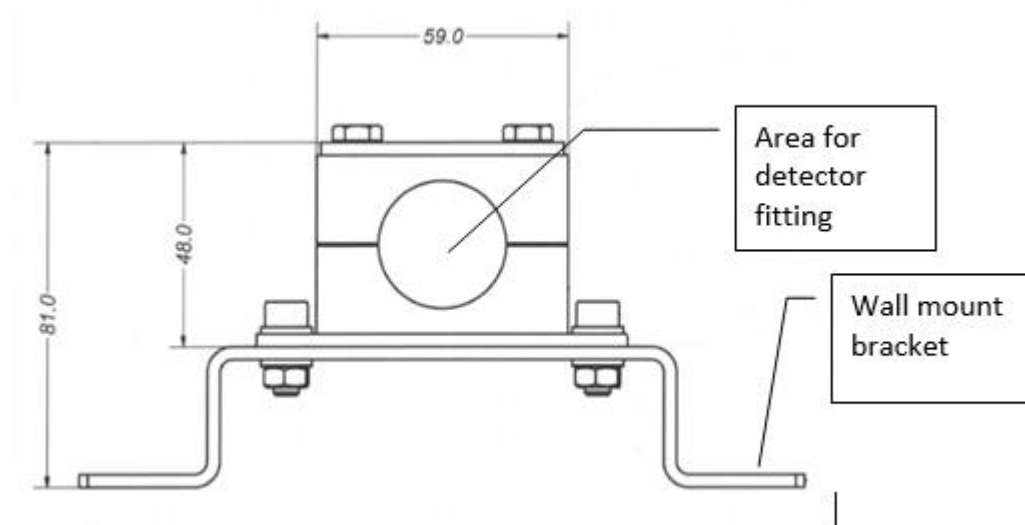
Fix the detector on a stable, vibration free bracket or wall using support (④).



1. Weld connection
2. Insert connection to fibre
3. Nut
4. O-ring 8mm x 3 mm
5. O-ring 6.75 mm x 1.78 mm
6. Pipe 8 mm x 6 mm x 23 mm
7. Lock cap

3.4.2. Detector Mounting

When optical fibers are used, the detector needs separate support. Mount the bracket to a stable, non vibrating wall or process item.



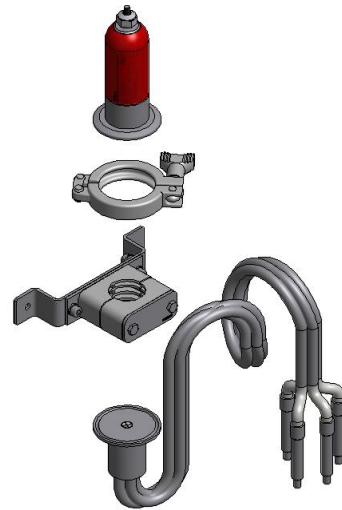
3.4.3 Mount Detector onto Fibres



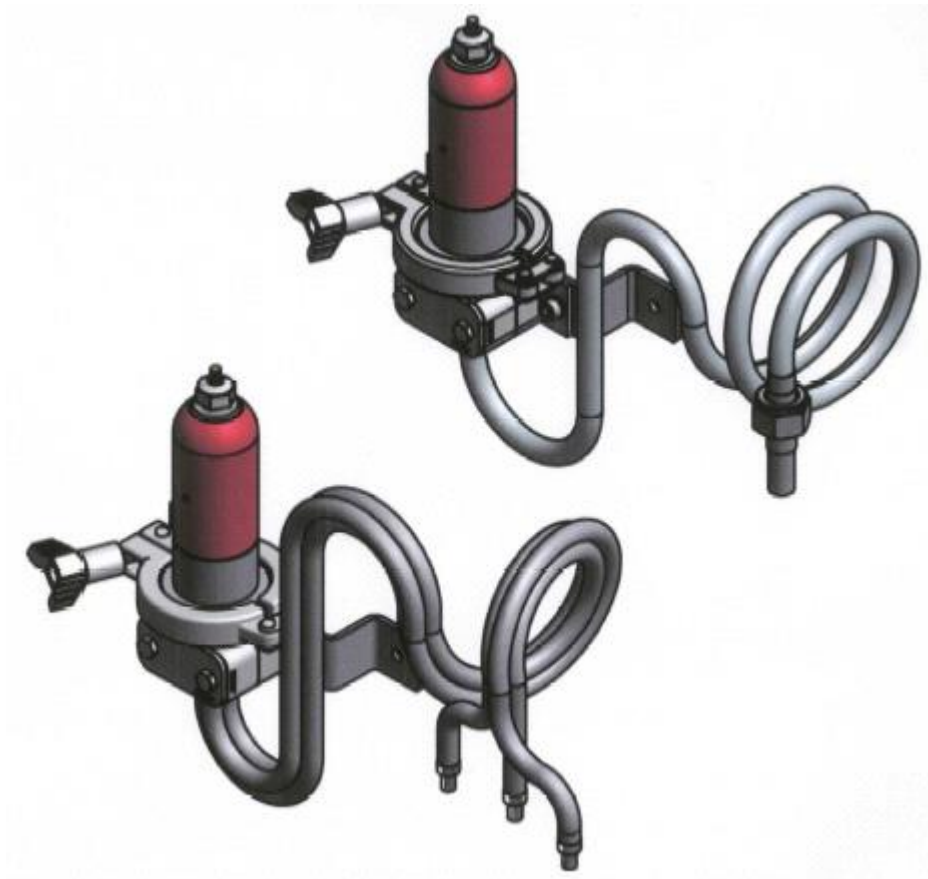
Triple Light Guide



Single Light Guide



Quadruple Light Guide

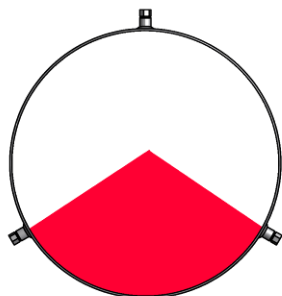


Detector mounted on support with fiber optics

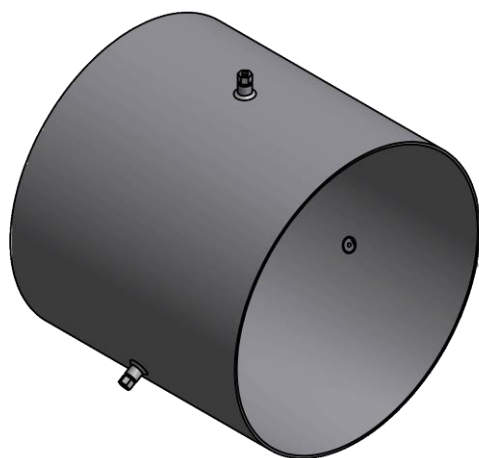
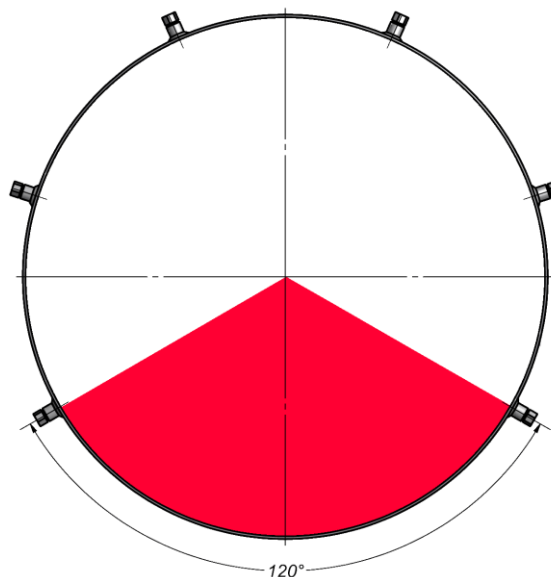
3.5. Mounting on Pipes

For horizontal pipes, mounting in red areas is not advisable.



Pipe diameter < 750 mm

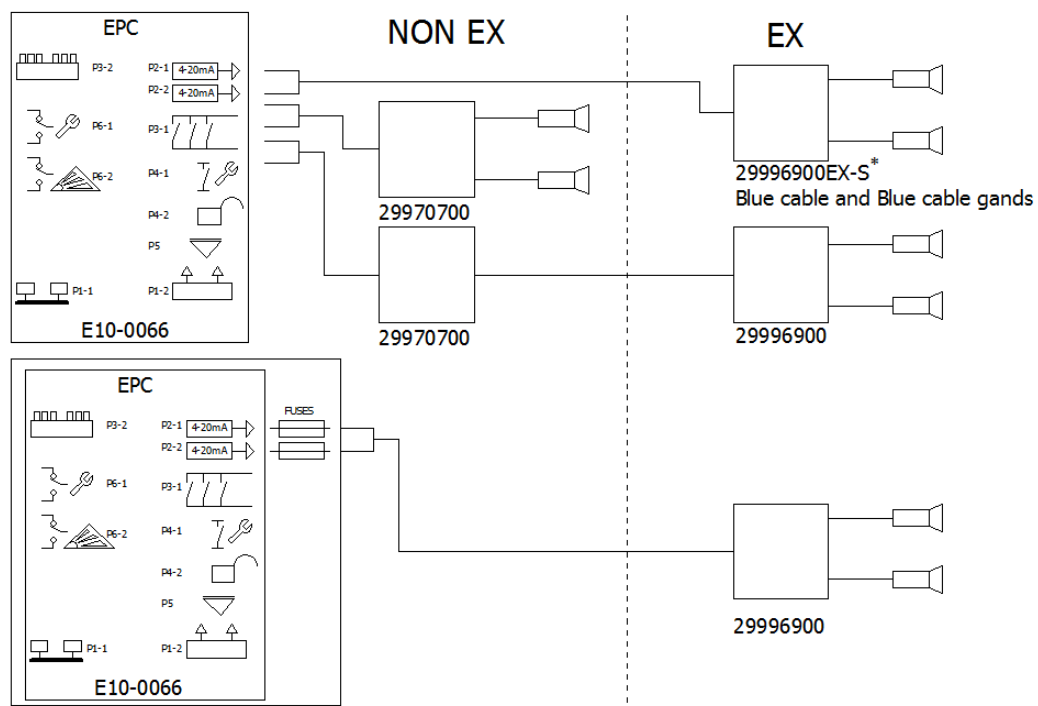


Pipe diameter > 750 mm



3.6. Junction boxes

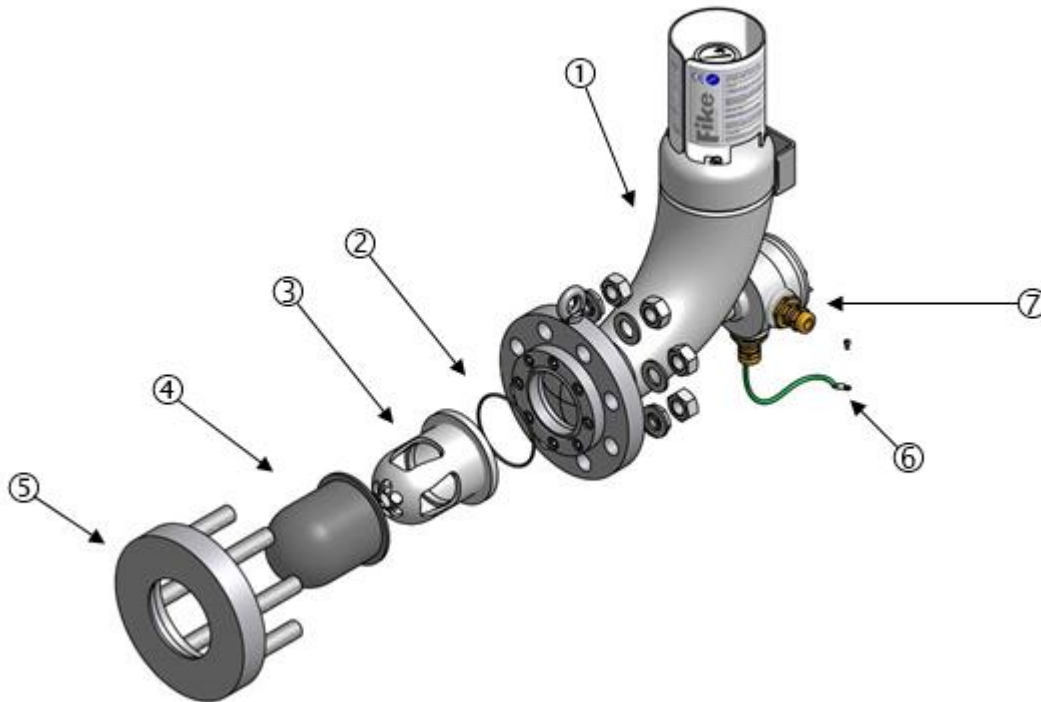
Pressure detection		Optical detection
		
Black cable JB: 29996900-S		Black cable JB: 29970700-S



*Junction box 29996900EX-S always requires barriers.

4. EXPLOSION SUPPRESSION - HRD

4.1. Parts and Components



① HRD container, already filled with suppressant powder, not pressurized. Container will be pressurized (N₂ @ 62 barg; 22°C) on site.

② O-ring 110 x 3.5

③ Nozzle – in this case “Standard” nozzle

④ Nozzle cover – in this case Standard nozzle cover neoprene

⑤ Weld flange, Insert studs into the process flange using Loctite, lubricant threads (friction coefficient 0.12) and torque to 81 Nm.

⑥ Equipotential connection on the outer casing of the junction box to be connected to suitable equipotential point.

⑦ Junction box

4.2. Welding Procedure

Welders should be certified (ASME or EN 287).

Refer to attachments for detailed instructions.

The pWPS delivered by FIKE are preliminary WPS's (Welding Procedure Specification) which can be used as guidance when welding the specific parts. Welding process, filler metal, shielding gas and other essential and non-essential variables are mentioned on these documents.

Welding parameters as current, torch angle, welding speed can be adjusted by the welder. Welders should be certified (ASME or EN 287) for the specific welding tasks (material, welding process, etc.).

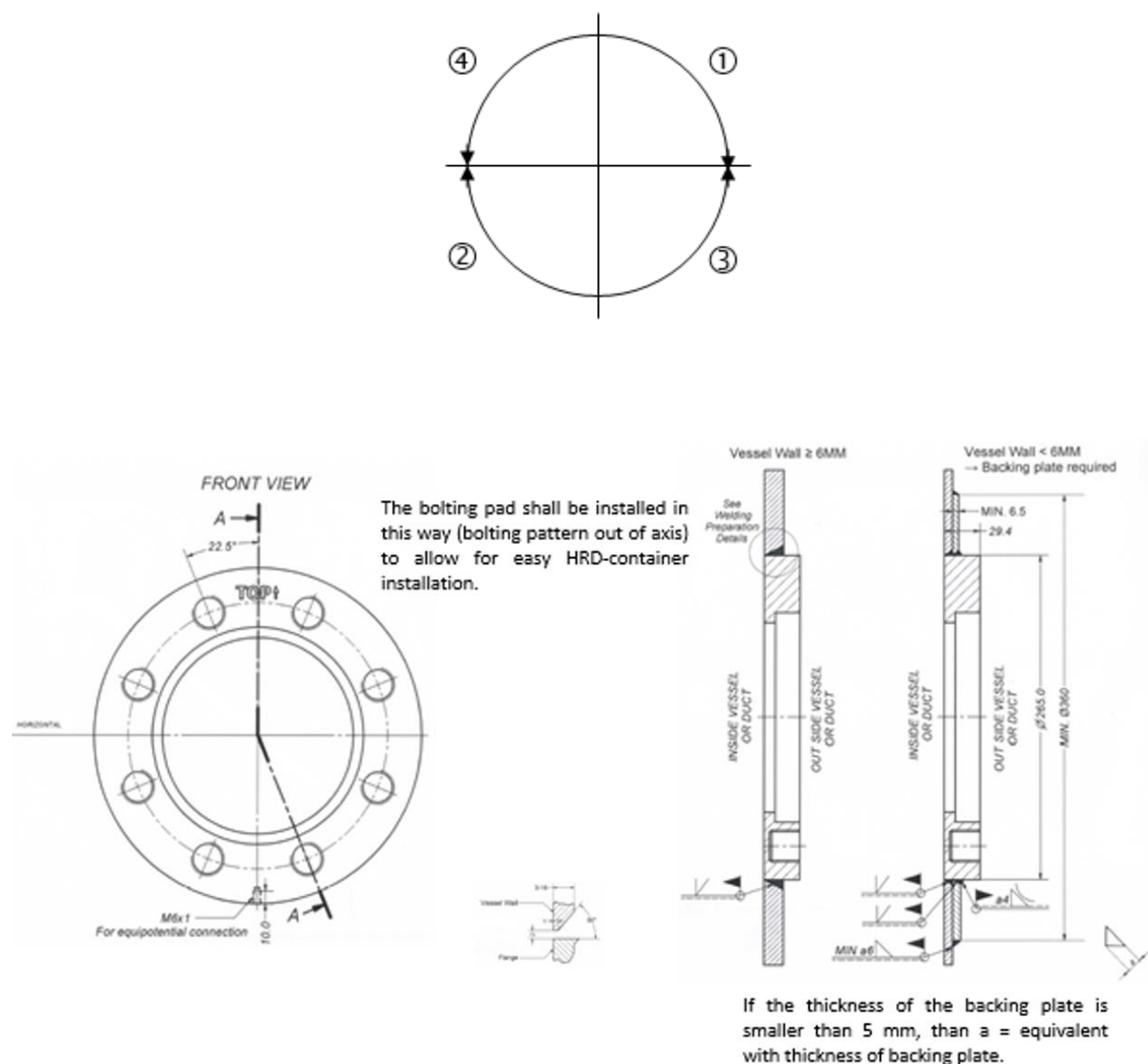
In order to have a final WPS, a PQR (Procedure Qualification Record, ISO 15614-1 or ASME) should be set up. Since PQR's are only valid for the company who carries out the welding, FIKE cannot deliver these PQR's.

Fike WPS - Welding Procedure Specification - can be used as guidance when welding the specific parts – refer to attachments.

In order to minimize weld distortion some precaution should be taken:

- provide 'decent' tack welds
- weld symmetrically (divide round welds in 4 or 8, see sketch)
- minimize heat-input (avoid 'heavy welds')
- release clamping of the welded parts only after complete cooling of the part

Sketch symmetrical welding and welding sequence



To provide stiffness for thin wall vessels less than 6 mm (1/4") a backing plate should be used. All welds should be 6 mm X 6 mm (1/4" X 1/4") minimum fillet welds.

All welds, etc. should be able to resist the reaction forces.

Backing plate dimensions for 4" containers with 3" nozzles:

- 6.5 mm thick (minimum)
- 360 mm OD (minimum)
- 125 mm ID (= OD Fike weld flange 3" + 4 mm)

Backing plate dimensions for 4" containers:

- 6.5 mm thick (minimum)
- 360 mm OD (minimum)
- 269 mm ID (= OD Fike weld flange 4" + 4 mm)

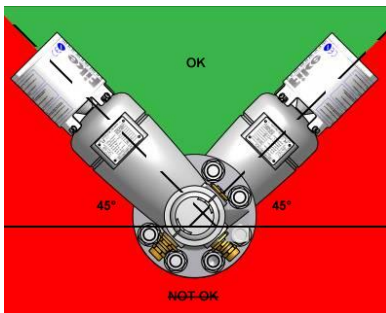
Backing plate dimensions for 6" containers (50 liter):

- 6.5 mm thick (minimum)
- 410 mm OD (minimum)
- 359 mm ID (= OD Fike weld flange 6" + 4 mm)

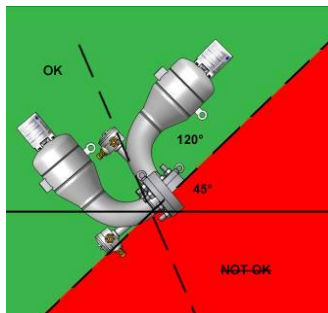
4.3. Mounting

Suppression discharge must not be restricted by internal partitions, diverters etc.

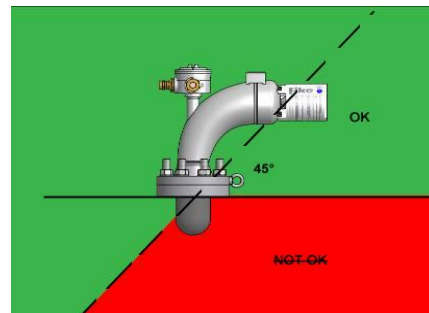
HRD's are placed on protected volume in such a manner as to provide the most complete distribution of agent possible.



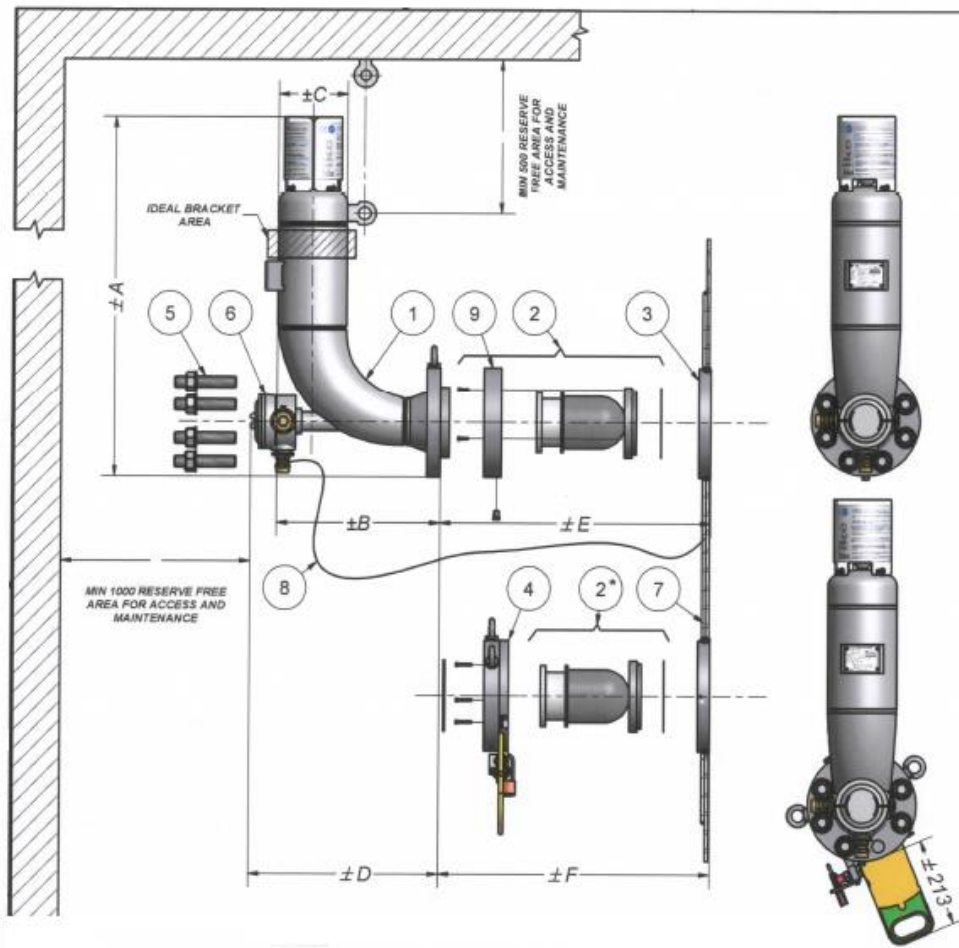
All types



All types



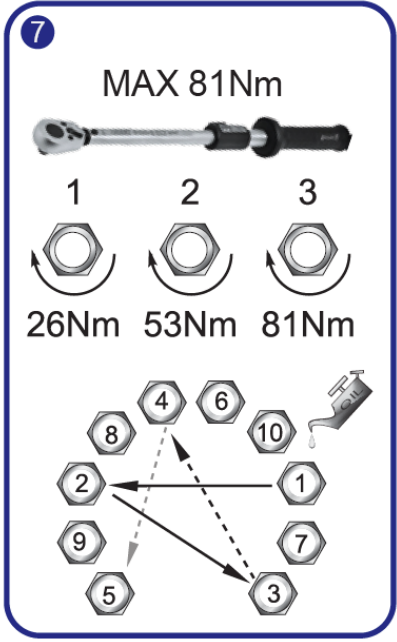
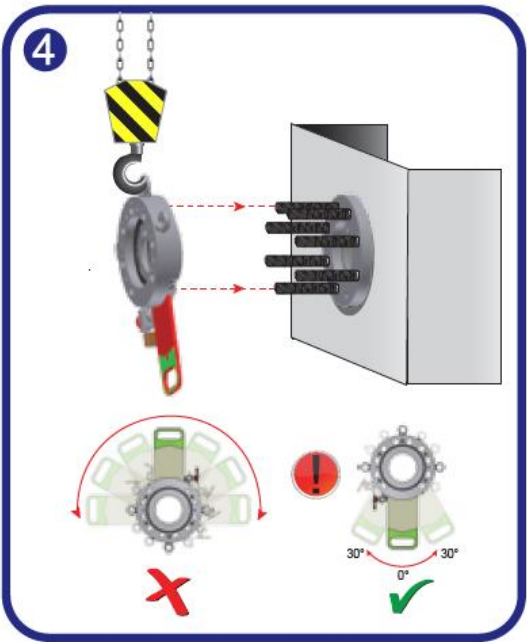
2,5; 5; 10; 50L only



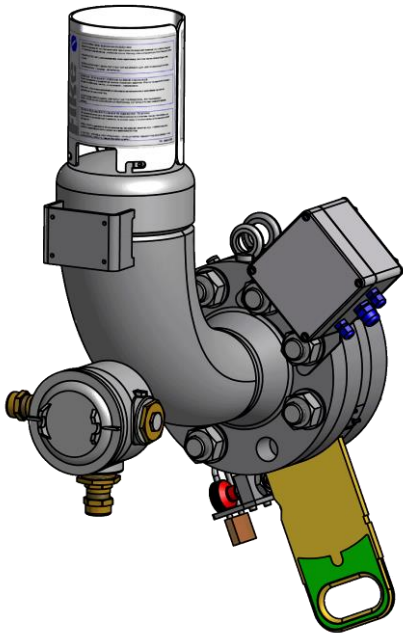
9	45029010	1	INSPECTION RING WITH 1/4NPT HOLE	1.0570 / NI-PLATED
8		1	EQUIPOTENTIAL CONNECTION	BY CUSTOMER
7		1	BACKING PLATE	BY CUSTOMER
6	29976200	1	INITIATOR JUNCTION BOX ASSY 4 X 5/4" ATEX	
5	25227310	8	STUD M27 X 150MM ASTM A193	B7 ZINC
4		1	MECHANICAL LOCK ASSY HRD DN100/4"	1.0570 / NI-PLATED
3	450098..	1	UNIVERSAL PROCESS FLANGE DN100/4"	1.4404 OR 1.0570
2	45012500/45012600	1	INSPECTION SPR. ASSY DN100/4	NEOPRENE/VITON
1		1	HRD CONTAINER	
ITEM	PART NUMBER	QTY	DESCRIPTION	MATERIAL

Container						Spreader Assy (process flange incl.)				Thrust (N)
Type / Volume (liter)	Max. Dimensions (mm)				Weight (approx) (kg)	Standard		Optional		
								With Mech.		
						Dim (mm)	Weight (kg)	Dim (mm)	Weight (kg)	
	E		F							
2.5	500	310	Ø114	430	32.5	73	22.6	89	32	8900
5	610	400	Ø168	470	47					13345
10	870	400	Ø168	470	56					22241
20	950	470	Ø273	470	95					40034
30	1160	470	Ø273	470	115					44482

4.4. Mechanical Lock



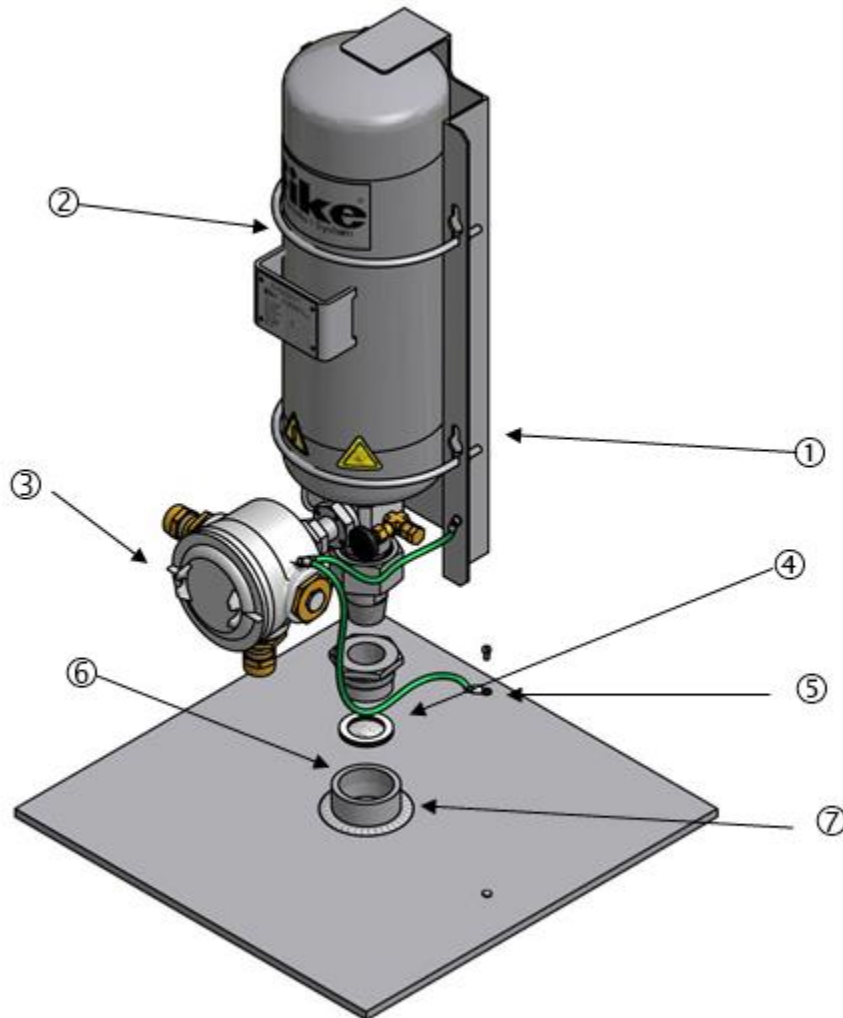
Above torque scheme for info. Number of bolts depends on flange size.



5. CHEMICAL EXPLOSION ISOLATION

5.1. Parts and Components

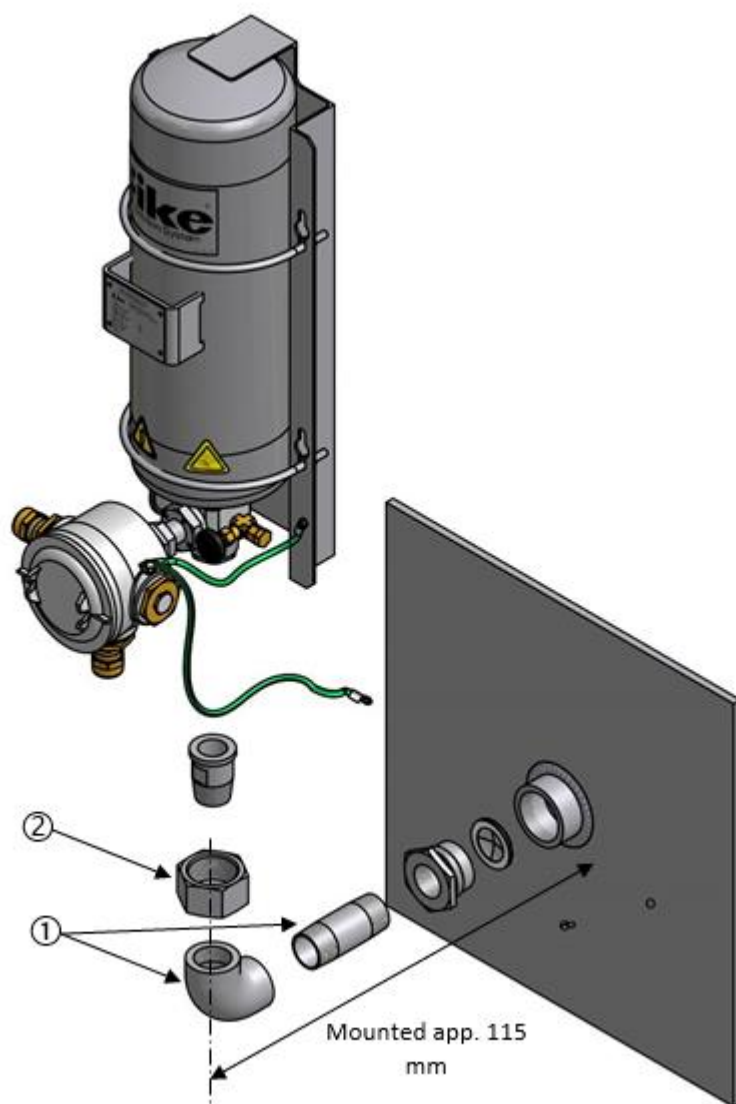
5.1.1. Rigid Straight Connection



- ① Backing plate
- ② SRD container, already filled with suppressant powder, not pressurized. Container will be pressurized (N₂ @ 34 barg, 22°C) on site.
- ③ Junction Box
- ④ Bursting disc 1 ¼ " NPT
- ⑤ Equipotential connection
- ⑥ Process flange
- ⑦ Nozzle plug assembly

Remark: approximate container weight 35 kg.

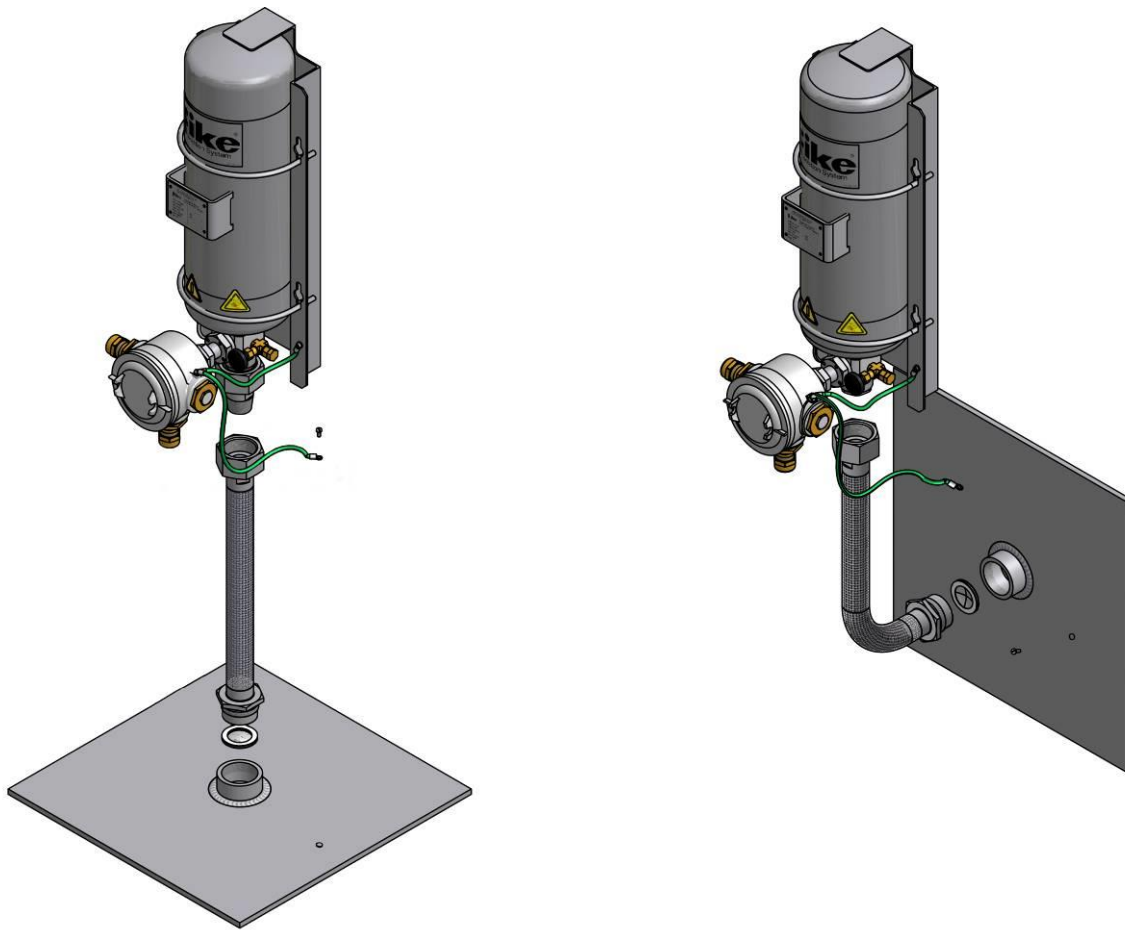
5.1.2. Rigid 90° Connection



① Rigid mounting nipple elbow & nipple

② Lock nut

5.1.3. Flexible Connection



500 mm or 1000 mm flexible

5.2. Welding

Refer to WPS in attachment.

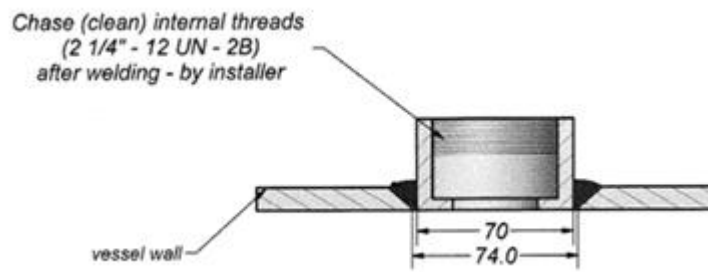
Inspect the process flange for mechanical damage before installation.

Drill a 74 mm hole in the process vessel or duct.

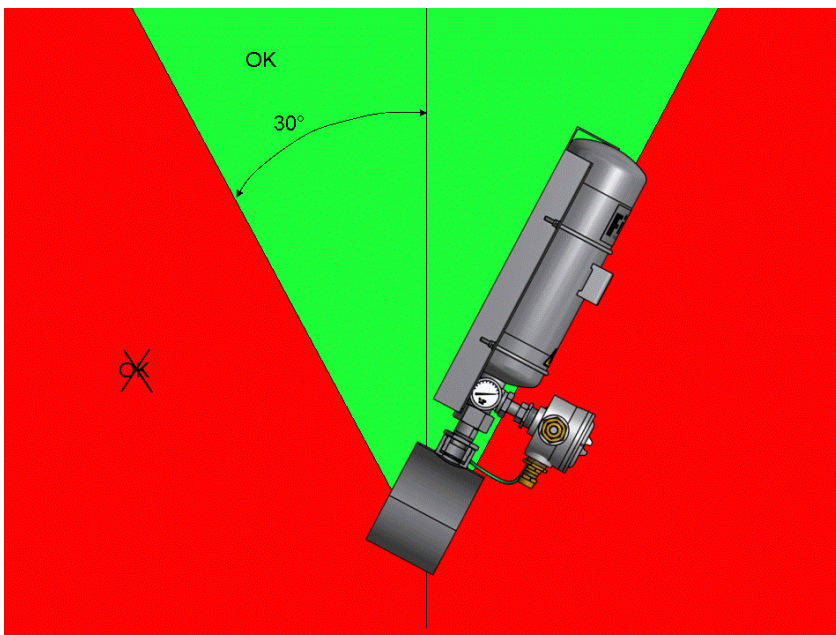
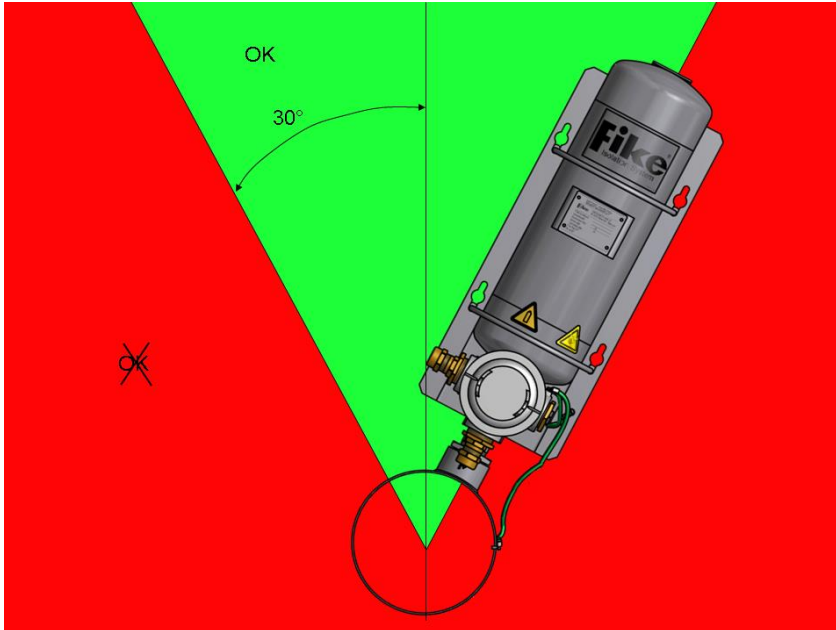
Align and spot-weld the process flange into the hole.

Ensure that it is completely flush with the inside edge of the process and there are no lips of the flange protruding internally.

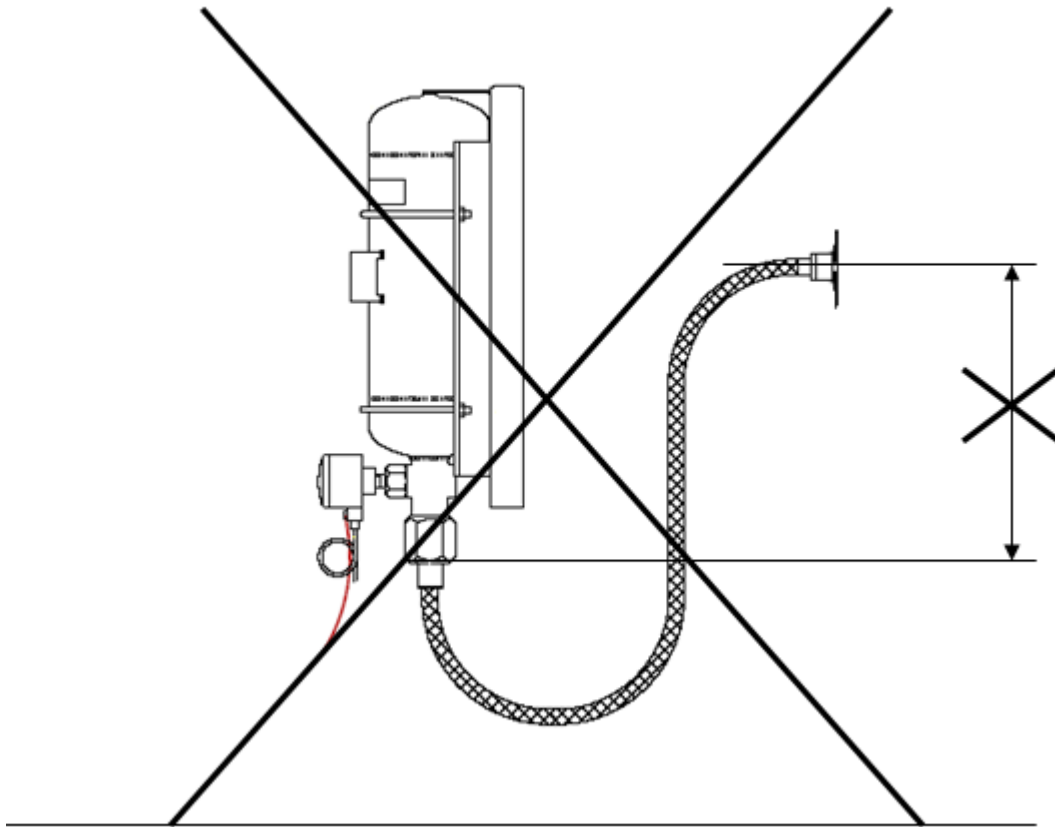
Complete welding in accordance to Good Welding Practice / standards (GWP).

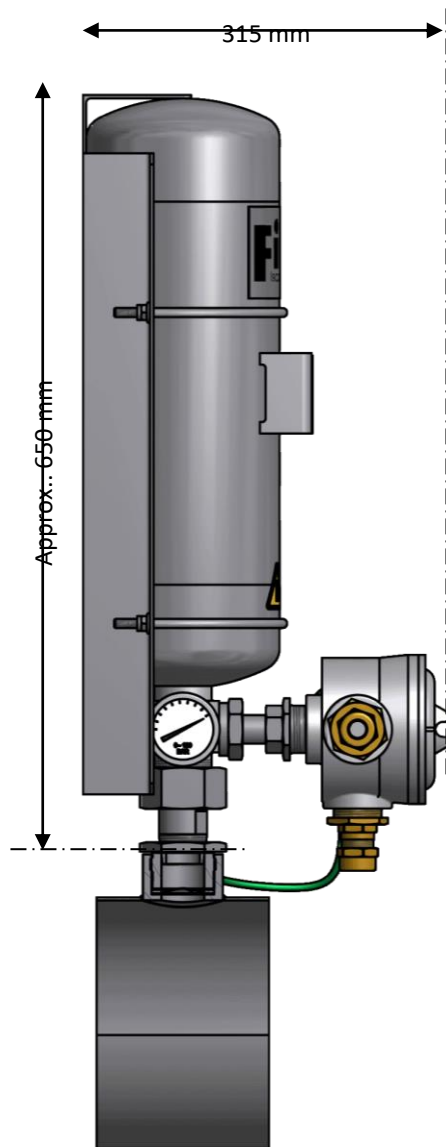


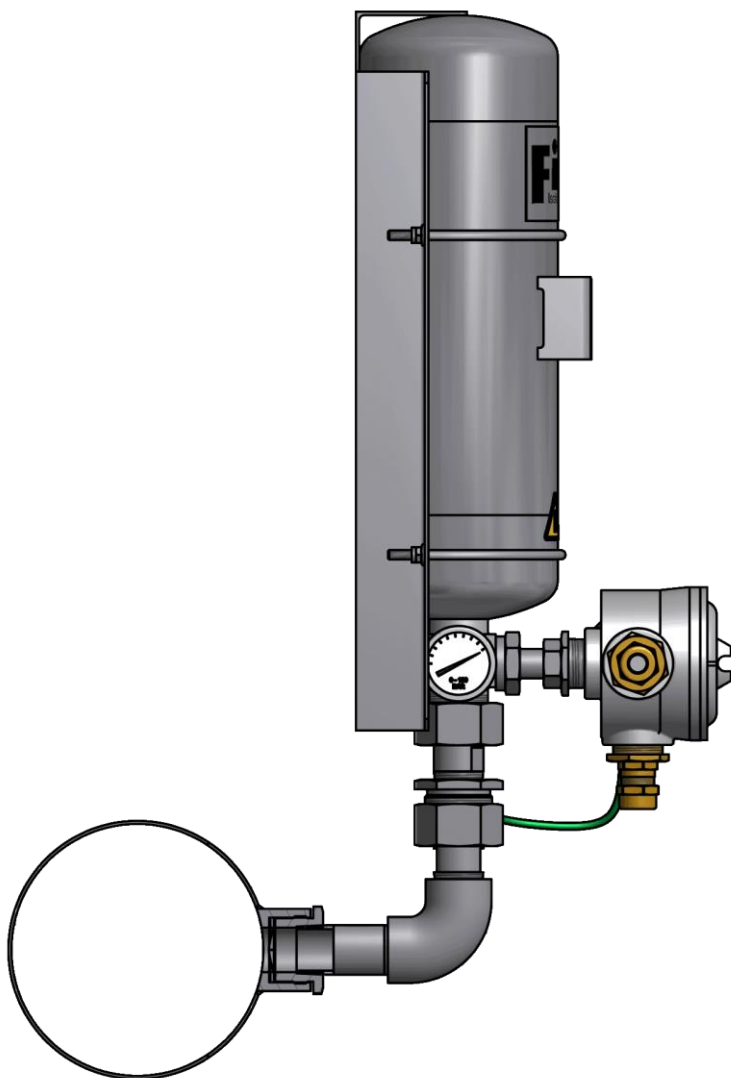
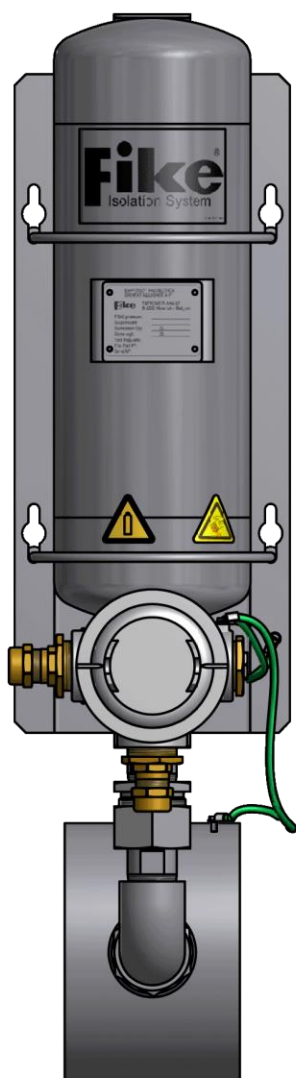
5.3. Mounting



If flexible is used, the SRD outlet must be higher than the inlet into the process.

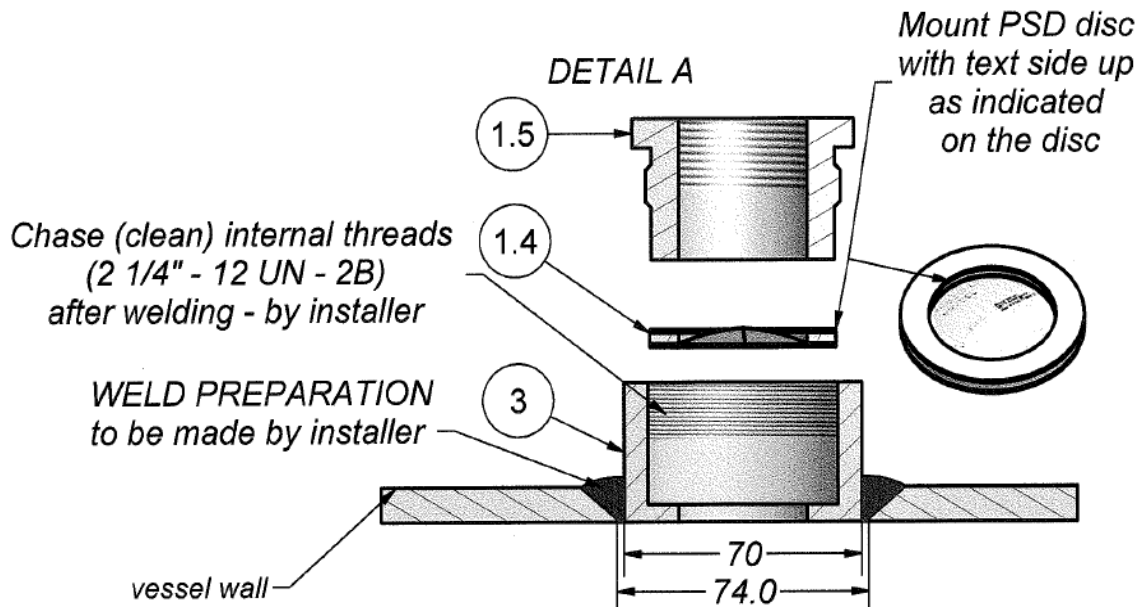






Mount backing plate to wall or other support.

Fix SRD to backing plate.



Connect SRD to process flange using flexible or rigid mount, install disc correctly.

5.4. Specifications

Remark: approximate container weight 35 kg.

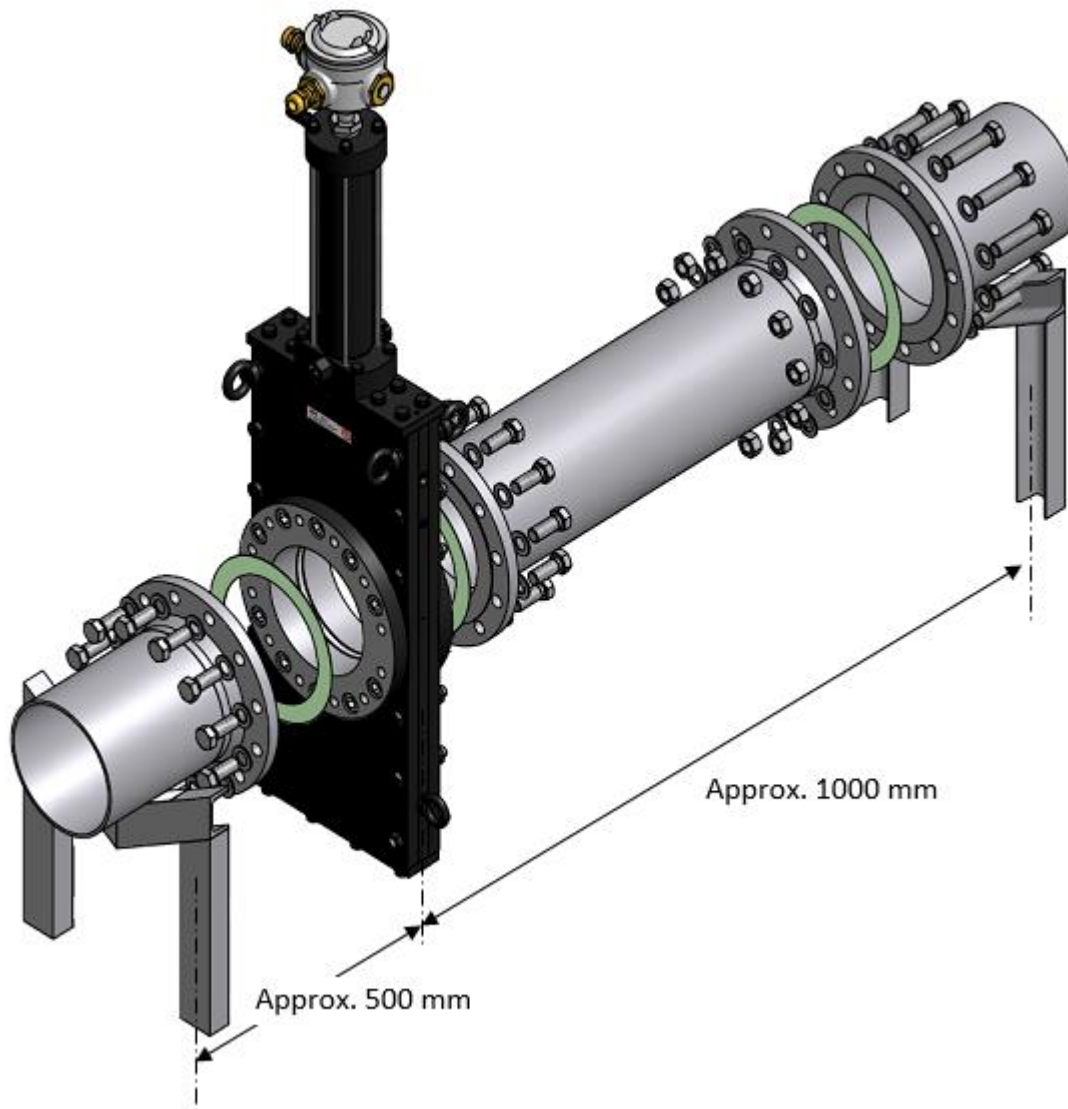
6. MECHANICAL EXPLOSION ISOLATION

6.1. Parts and Components



- ① Junction box
- ② Process flange
- ③ Lifting lug

6.2. Mounting

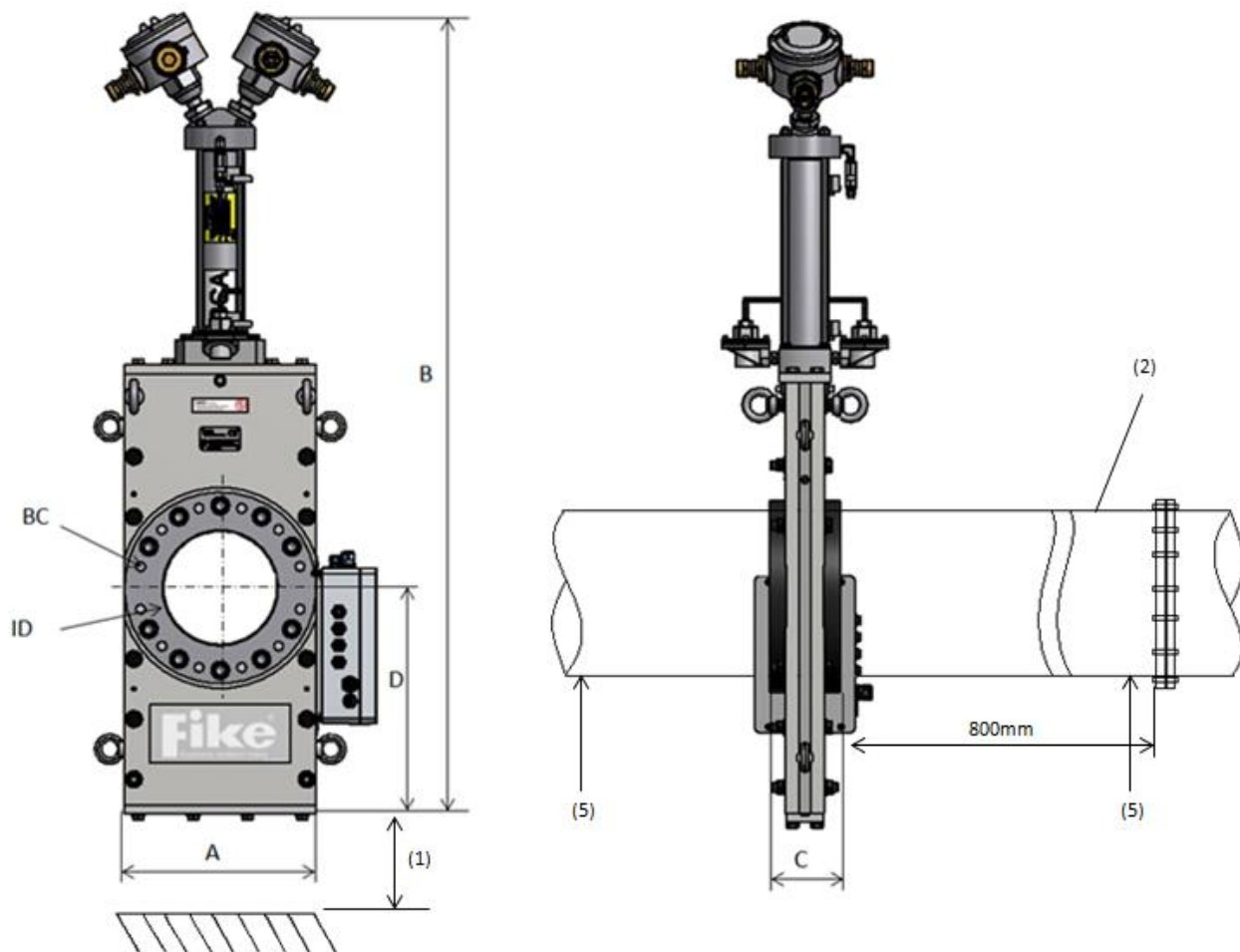


The FAV is a valve which makes one valve applicable for stopping explosions from both directions (Bi-directional).

Side A of the valve is the side where the nameplate is mounted. Side B is installed against the removable tube.

Reaction forces on piping

- If the pipe to which a valve is connected is rigid (cannot move), then the forces on the valve body are transferred to the pipe!
- If the pipe is flexible, so it can move without resistance to the maximum displacement of the valve, no reaction forces are transferred to the pipe!



1. Reserve free space ($2 \times D$) for access and maintenance (1)
2. Removable duct/pipe length app. 800mm, to allow for maintenance purposes (2)
3. Equipotential connection, by installer, bolt M8
4. Valve/pipe support – by installer. The valve should be supported on both sides whilst supporting the pipe using good piping practice, taking into account the valve weight. Flexible (rubber) lining of the supports is recommended allowing movement at valve closure. (5)
5. Installer to supply and insert studs into piping flange using lock-tite, lubricate threads and torque value in table 2. Example M16/195: torque M16 bolt to 195Nm. Recommended gasket AFM 2mm.

Note:

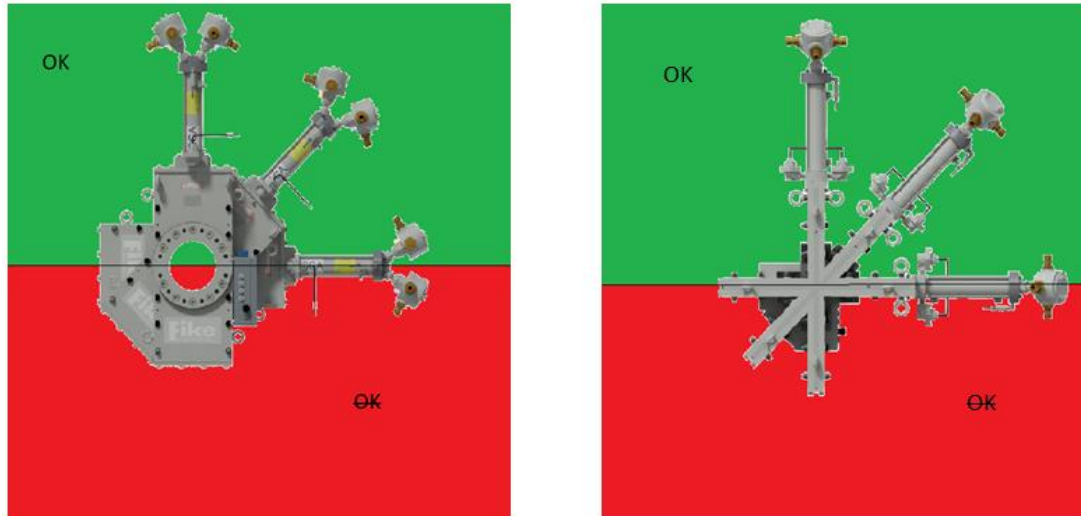
The closure of the valve depends strongly on the way the valve is positioned in the pipe. If the pipe is not correctly aligned, the valve is under tension. Fike therefore advises the installation of a flexible spool piece. This spool piece should be able to withstand the pressure of an explosion.

Valve Size	Valve Actuator Assembly Qty	ANSI bolting	Bolt diameter	Max. torque (Nm)	ID (mm)	BC (mm)	A (mm)	B (mm)	C (mm)	D (mm)	Weight (kg)
		DIN Bolting									
2"	1	150	5/8 –11 UNC	190	50.8	120.6	165	786	112	122	45
DN50		PN10/16	M16 x 2	195	50.8	120.6					
3"	1	150	5/8 –11 UNC	190	78.6	180.0	229	994	111	238	80
DN80		PN10/16	M16 x 2	195	82.5	180.0					
4"	1	150	5/8 –11 UNC	190	101.6	180.0	229	994	111	238	80
DN100		PN10/16	M16 x 2	195	101.6	180.0					
5"	1	150	¾ - 10UNC	360	131.7	210.0	285	1271	126	329	80
DN125		PN10/16	M20 x 2.5	380	152.4	240.0					
6"	1	150	¾ -10 UNC	360	152.4	241.4	285	1271	126	329	100
DN150		PN10/16	M20 x 2.5	380	152.4	240.0					
8"	2	150	¾ -10 UNC	360	202.7	298.4	343	1481	126	405	180
DN200		PN16	M20 x 2.5	380	203.2	295.0					
10"	2	150	7/8 –9 UNC	640	254.0	361.9	406	1679	126	483	220
DN250		PN16	M24	660	254.0	355.0					
12"	2	150	7/8 -9 UNC	640	304.8	410.0	533	1924	195	608	350
DN300		PN16	M24	660	304.8	410.0					
14"	2	150	1 – 8 UNC	809	356.0	476.2	584	2209	209	692	450
DN350		PN16	M24	617	356.0	470.0					
16"	2	150	1 – 8 UNC	809	356.0	476.2	635	2350	209	784	500
DN400		PN16	M27	960	406.4	525.0					
20"	2	150	1 1/8 -8UNC	1426	406.4	635.0	777	2939	210	942	700
DN500		PN16	M30	1200	492.0	650.0					

REMARK: Valve sizes **DN125** and **DN500** are outside the ATEX certification and do not bear CE marking. Therefore these sizes may not be installed within the European Economic Area (EEA).

The valve must be oriented so that the gate is not moving upwards while closing. For ease of maintenance a removable process line section (800 to 1000 mm depending on the valve size) may optionally be installed on one side of the valve. Additionally, an area of approximately two feet (0.5 m) around the FAV should be left clear to allow access to FAV components for maintenance and rebuild procedures.

The valve shall be positioned according to the figure below: The valve can be mounted from an upright vertical position to a horizontal position. It shall not be mounted at an angle below a horizontal position. Note that the DN500 valve needs to be mounted vertically.



Valve orientation options

Do not mount in red areas!

7. ATTACHMENTS

- FIKE EN ISO 2 pWPS-std-1.05-1.95
- FIKE EN ISO 2 pWPS-std-1.75-3.25
- FIKE EN ISO 2 pWPS-std-3-16
- Fike ASME pWPS-1-2
- Fike ASME pWPS-1.5-16
- Fike ASME pWPS-3-6

Notes:



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