	<b>Flame Arrester</b> <b>937-E 50/1x0.9 to 300/1x0.9</b> <b>Instructions for Operation and Maintenance</b>	<b>REV 2</b>
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This Instruction for Operation and Maintenance is applicable to the following products:

**Table 1:** Type description

Size	Type	EU-Type Examination Certificate Number
DN50 / 2"	937-E 50/1x0.9	IBExU14ATEX2010 X
DN80 / 3"	937-E 80/1x0.9	
DN100 / 4"	937-E 100/1x0.9	
DN150 / 6"	937-E 150/1x0.9	
DN200 / 8"	937-E 200/1x0.9	
DN250 / 10"	937-E 250/1x0.9	
DN300 / 12"	937-E 300/1x0.9	

This IOM may also be accompanied by other data sheets with dimensions and pressure drop/volume flow rate diagram for consultation.

### 1. Use

The Pressure and Vacuum Vent 937-E complies with the following standards:

EN ISO 16852:2016	Flame Arresters – Performance Requirements, test methods and limits for use
EN ISO 80079-36:2016	Non-electrical equipment for potentially explosive atmospheres Basics methods and requirements
EN ISO 80079-37:2016	Non-electrical equipment for explosive atmospheres – Non-electrical type of protection constructional safety "c", control of ignition sources "b", liquid immersion "k"

The general suitability as pressure and vacuum vent and Deflagration End-of-line Flame Arrester when used with inflammable gas/air mixtures and vapour/air mixtures of inflammable liquids of explosion group IIB3 (MESG  $\geq$  0.65 mm) have been verified by tests executed at the Institute for Safety Technology IBExU GmbH Freiberg and the results were confirmed by the issued EU-type examination certificate **IBExU14ATEX2010 X**.

For all applications, the customer shall observe the operational limits of the product, with special attention to the limits for maximum allowable operating pressure and maximum allowable operating temperature:

- Max allowable operating pressure: atmospheric (0.8bar (absolute) to 1.1bar (absolute))
- Max allowable operating temperature: -20°C to 60°C  
(Max surface temperature: 80% of ignition point)

For pressure setting the following valve insert/pallet settings are available:

- Set-pressure for pressure: 2.5 up to 50 mbar \*) \*) factory pre-set default
- Set-pressure for vacuum: 2.5 up to 50 mbar \*)
- Operating temperature: -20°C to 60°C

Note: Parts surface temperature shall never exceed 80% of ignition temperature of the process fluid/media.

As part of the documentation package, the product is delivered with a factory Test Certificate according to EN 10204, which includes the technical features of the product as well as the EU-type examination certificate number. Also, as part of the documentation package, a Declaration of Conformity is issued, assuring compliance with standards EN ISO 80079-36 / 37:2016, as well as compliance with the ATEX directive 2014/34/EU.

<b>Created By:</b>	<b>T. Freitas</b>	<b>Date:</b> 14/03/22	<b>BS&amp;B FlameSaf Limited, Limerick, Ireland</b>
<b>Approved By:</b>	<b>B. Murphy</b>	<b>Date:</b> 14/03/22	



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## 2. Construction

The vent consists of a Housing (1), equipped with Pressure (6) and Vacuum Valve Pallets (8) and a Flame Arrester Element Bank (11). The Housing is closed with a Cover (2) by the use of screws (3) and an O-ring seal (10). The Vacuum Valve Pallet are guided by Guide Bush (4), mounted to the Cover. The Pressure Valve Pallet is guided by the Guide Pin (5) that is mounted to the Housing.

The Flame Arrester Element Bank is firmly mounted to the Housing by Hex Nuts (6) that are screwed to Stud Bolts that are fixed to the Housing. The Flame Arrester Element Bank is equipped with an Arrester Element produced with a 0.9 mm gap width spec.

For protection against the effects of weather, the vent is equipped with a Weatherhood (12) that is held in place by Stud Bolts (13), Spacer Tubes (14) and Hex Domed Nuts (15) that are attached to the Element Bank Housing Flange.

The Valve Pallets are pre-set for the customer's specific set-up pressure via weight discs. Valve Pallets may be supplied with FEP seals, or other type of seal upon special request.

## 3. Marking

The product is supplied with nameplates and labels that provide important information to the customer about the product and its limitations. Below are some of the information provided:

Nameplate:

- Name and address of the Manufacturer
- Product Type (including element configuration)
- EU-Type Examination Certificate Number
- Serial Number and year of manufacture
- Number of the design standard: ISO 16852
- EX mark, followed by the device group information II and the letter "G" (for classified areas where explosive gases, vapors and/or air mixtures are present)
- Explosion group
- CE mark, followed by the Notified Body number (2460)

Warning Label / Hazard Sign:

- **Warning**    **Flame arresters have installation and application limits**  
                  **Type designation in accordance with ISO 16852**
- Flame Arrester Type mark:                                **DEF** (Deflagration)
- Burn rating mark BC:    **c** (No burning time)
- Explosion Group:    **IIB3**
- Maximum Operational Temperature T<sub>0</sub>:                                **60°C**
- Maximum Operational pressure p<sub>0</sub>:                                **atm** (Atmospheric)

The Arrester Elements are marked on the outside with the following information:

- Name of the manufacturer
- Gap width
- Material designation number
- Winding direction

Example: **BS&B-0.9-1.4571-R**

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#### 4. Installation

The pipeline arrangement is defined by the customer, observing guidelines of relevant and applicable standards and the installation of the Flame Arrester shall be conducted by the customer following this IOM and the applicable standards. The customer shall observe the requirements and limitations of use outlined on relevant standards. Accident prevention measures and risk assessment to take place before installation. Health and safety guidelines to be followed. The 937-E Vent shall only be installed in the Vertical-up orientation.

Customer shall maintain a safe clearance between the Flame Arrester and any other object/obstacle that may obstruct the unit venting area and may affect its flow capacity/performance. Customer shall evaluate operating conditions and establish a safe clearance distance.

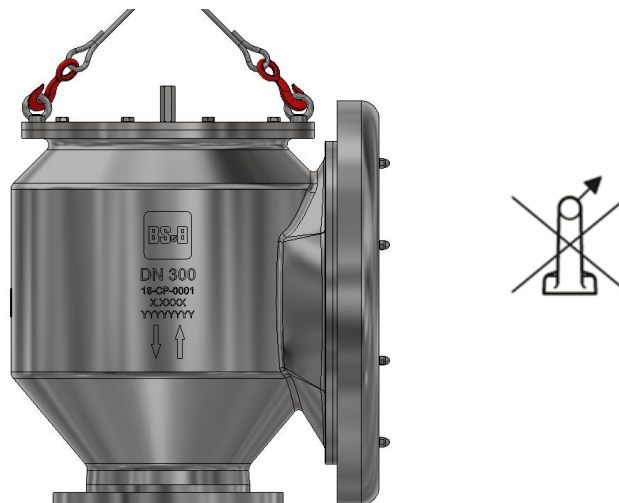
Before installation, customer must make sure the sealing surfaces are in perfect condition and free from any foreign objects, oil, or grease. Appropriate gaskets and torque shall be applied for a proper and leak tight installation.

The 937-E Vent must be included in the equipotential bonding of the vessel and/or the plant.

The 937-E Vent shall be lifted by the provided Lifting Eyes, as illustrated in Figure 1.

**WARNING:** Never apply shear tension to Lifting Eyes.

Before lifting, make sure the Lifting Eyes are aligned, properly screwed and with their shoulder/base fully setting at the surface.



**Figure 1 – 937-E Lifting Points**

**To prevent transportation damage, the valve pallets are shipped separate from the vent and need to be assembled in the valve before operation.**

The pallets are individually packed and marked with the valve serial number and a note identifying if that pallet is for the positive pressure side (P) or for the vacuum side (V).

Pressure Side Pallet (P) is the item number 6 of the drawing, and the Vacuum Side Pallet (V) is the item number 8 of the drawing (please refer to the Identification of Parts Figure).

**Pallets shall be installed as per the following steps:**

- Remove the Cover (2) by removing its Screws (3) and lifting it.  
Note: The Cover may be provided with threaded holes where the user can install lifting eyes to facilitate the removal of the Cover, but these lifting eyes shall never be used to lift the complete unit/product.
- Install the Pallets carefully on top of the Pressure and Vacuum seats (7 & 9), at this sequence
- Replace the Cover (2), making sure that the guiding hole and guiding rod of the Pressure and Vacuum Pallets are properly inserted and guided inside the Guide Pin (5) and Guide Bush (4)
- Tighten the Cover Screws (3)

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## 5. Maintenance

The Flame Arrester shall be periodically maintained, and the periodic maintenance includes a periodic visual inspection of the Flame Arrester, especially for the Arrester Elements. The Arrester Elements shall be inspected against deformation and contamination/blockage by any foreign bodies and/or process particles that may affect the gap width size. The time intervals for maintenance/inspection works depend on the operating conditions and contamination level of the process media. The maintenance/inspection frequency must be established by the user/customer.

To inspect the Arrester Elements, the Element Bank assembly (11) shall be dismantled from the Housing (1) by removing the Weatherhood Nuts (15), removing the Spacer Tubes (14) and Housing Flange Nuts (18) and pulling up the Element Bank assembly (11) from the Housing (1).

**Note: The Element Bank assembly (11) shall never be dismantled or have its Arrester Elements removed from the Element Bank Cage.**

After removing the Element Bank assembly, the Arrester Elements shall be checked against corrosion, contamination and blockage.

During the periodic inspections, if light contamination is found, the Arrester Elements can be cleaned by blowing compressed air or hot steam in the opposite direction of the normal flow direction of the Arrester Element.

If the contamination level is high or there are impurities stuck to the surface of the Arrester Elements, the customer/user may also rinse using a liquid cleaning agent/detergent. The cleaning agent/detergent must be suitable for the materials of the Flame Arrester and must not corrode or damage any of the Flame Arrester parts in anyway. After rinsing, all parts shall be blown dry with clean compressed air.

The Element Bank must be replaced if even after cleaning its flow area still presents contamination/blockage of 30% or more of its flow area.

The Flame Arrester shall be replaced if any of the situations below occur:

- If any fire occurs at the Flame Arrester Elements
- If the Housing (1), Element Bank (11) or the Weatherhood (12) show damages
- If even after cleaning the Arrester Elements still have 30% or more of the flow area contaminated/blocked
- If corrosion is detected at the Arrester Elements

The torque on the Element Bank (11) Nut (17) and Bolt (16) shall be checked at every periodic inspection and rectified as appropriate.

During the maintenance works no mechanical modification may be done to any parts of the Flame Arrester without BS&B FlameSaf Ltd written approval.

All maintenance works on the Flame Arrester shall only be performed by qualified and trained personnel.

It is recommended to always keep one spare Element Bank (11) in stock for each Flame Arrester in operation.

After finishing maintenance works the Flame Arrester must be checked against leaks.

Only genuine parts, supplied by BS&B FlameSaf Ltd, may be used for any maintenance/repair work performed on the Flame Arrester. Please refer to Table 2 (Spare Parts List) for the part numbers to be used to re-order parts.

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**6. Spare Parts List**

Item No	Designation	Qty / Vent	Material	Order Number			
				DN50 (2")	DN80 (3")	DN100 (4")	DN150 (6")
2	Cover	1	SS	842081521	842081621	842081721	842081221
3	Screws	**	SS	242035000	242035000	242032100	222075300
4	Guide Bush	1	SS	182061000	182052900	182052900	182054300
6 *	Pressure Valve Pallet ***	1	SS	FET15415118	FET15416074	FET15416567	FET15417170
8 *	Vacuum Valve Pallet ***	1	SS	FET15415115	FET15416080	FET15416572	FET15417172
10	O-ring	1	NBR	812072800	802039700	812073100	802078200
			FPM	802087800	802039800	812073400	802078300
			EPDM	812072900	802039900	812073200	802078400
			FEP Encap.	812073000	802040000	812073300	802078500
11	Element Bank Assy	1	SS	FET15415112	FET15416060	FET15416560	FET15417164
12	Weatherhood	1	Aluminium	N/A	N/A	N/A	N/A
			SS	542012200	532099700	994734000	999668200
13	Stub Bolt	**	SS	312071600	312068000	312049200	312067700
14	Spacer Tube	**	SS	182052600	182052800	182052700	182052700
15	Hex Domed Cap Nut	1	SS	202012700	202012700	202012700	202012700

**Table 2: Spare parts List DN50 to DN150**

**Notes:**

- \* Essential parts for periodic preventive maintenance
- \*\* Quantity varies according to size, please refer to Table 3 for the exact quantity for your Vent size
- \*\*\* Pressure and Vacuum Pallets are supplied without calibration weights. Part numbers listed are for standard Pallets with FEP seal.
- SS = Stainless Steel

Item No	Designation	Quantity per Size			
		DN50 (2")	DN80 (3")	DN100 (4")	DN150 (6")
3	Screws	4	6	6	8
13	Stub Bolt	3	4	4	3
14	Spacer Tube	3	4	4	3

**Table 3: Items of Multiple Quantities per Size – DN50 to DN150**

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Item No	Designation	Qty / Vent	Material	Order Number		
				DN200 (8")	DN250 (10")	DN300 (12")
2	Cover	1	SS	842081421	842082421	842082621
3	Screws	**	SS	232098200	232098200	232098200
4	Guide Bush	1	SS	182055000	182056200	182056200
6 *	Pressure Valve Pallet ***	1	SS	FET15417569	FET15418170	FET15418174
8 *	Vacuum Valve Pallet ***	1	SS	FET15417570	FET15418172	FET15418175
10	O-ring	1	NBR	802078600	802070800	792082100
			FPM	802078700	802071600	792082200
			EPDM	802078800	802072400	792082300
			FEP Encap.	802078900	802073200	792082400
11	Element Bank Assy	1	SS	FET15417573	FET15418165	FET15337559
12	Weatherhood	1	Aluminium	N/A	N/A	N/A
			SS	992728000	999679100	999676700
13	Stub Bolt	**	SS	312049200	312060600	312063800
14	Spacer Tube	**	SS	992598000	999676500	999676500
15	Hex Domed Cap Nut	1	SS	202012700	202043200	202043200

**Table 4: Spare parts List DN200 to DN300**

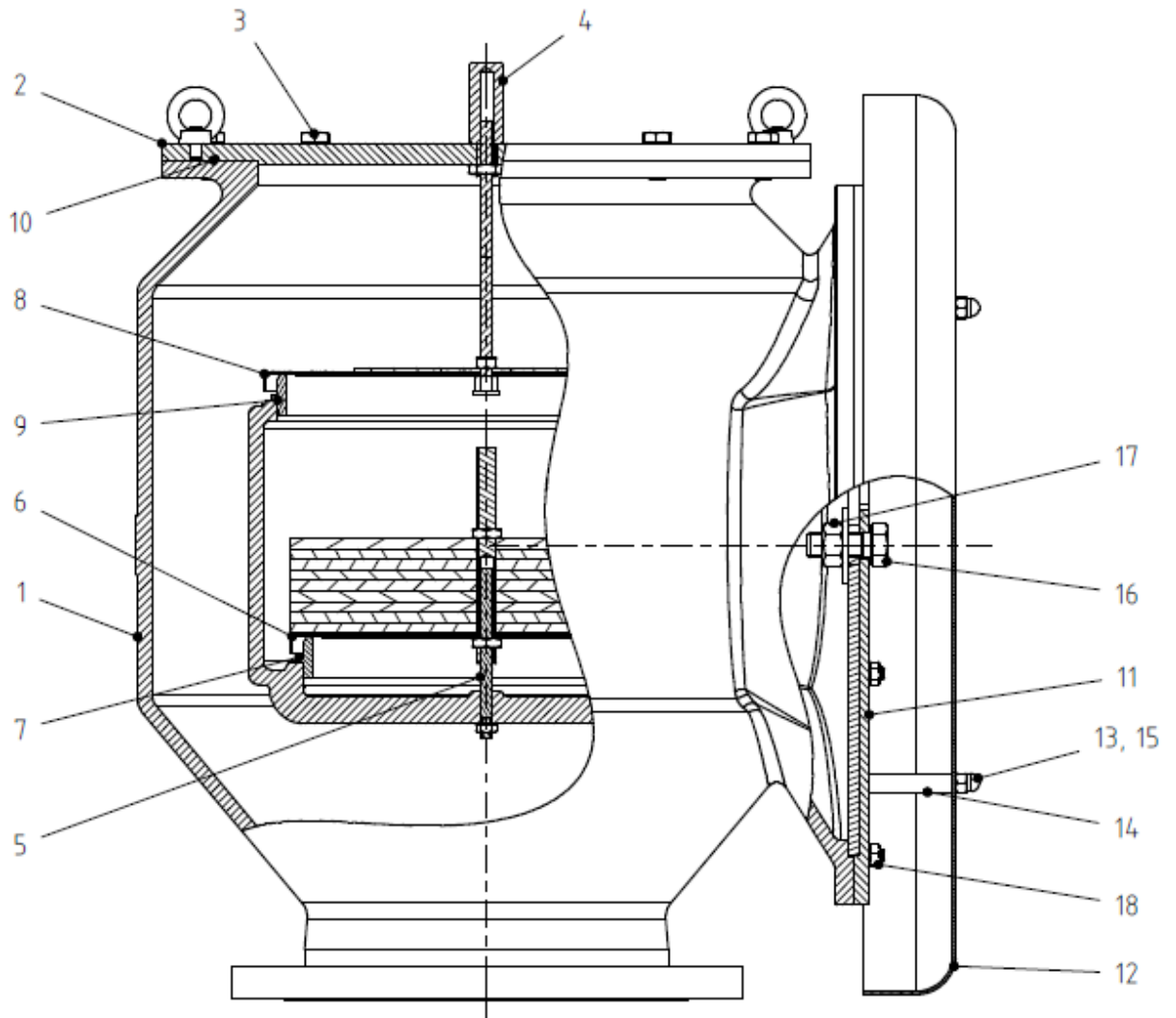
**Notes:**

- \* Essential parts for periodic preventive maintenance
- \*\* Quantity varies according to size, please refer to Table 5 for the exact quantity for your Vent size
- \*\*\* Pressure and Vacuum Pallets are supplied without calibration weights. Part numbers listed are for standard Pallets with FEP seal.
- SS = Stainless Steel

Item No	Designation	Quantity per Size		
		DN200 (8")	DN250 (10")	DN300 (12")
3	Screws	8	10	10
13	Stub Bolt	4	4	4
14	Spacer Tube	4	4	4

**Table 5: Items of Multiple Quantities per Size – DN200 to DN300**

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**Figure 2 – Identification of Parts**

<b>Warning</b> installation and application limits in accordance with ISO 16852			
DEF	$L_v/D = \text{---}$	BC :	$t_{BT} =$
	Ex. G	$T_o =$	$P_o =$

**Figure 3 – Warning Label / Hazard Sign**

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