This instruction is valid for following vacuum valves:

Table: type description

Nominal size	Type	EC prototype test certificate
DN50 / 2“	936-E 50/1x0,9/IIB3P1T1	**IBExU14ATEX2278 X**
DN80 / 3“	936-E 80/1x0,9/IIB3P1T1	
DN100 / 4“	936-E 100/1x0,9/IIB3P1T1	
DN150 / 6“	936-E 150/1x0,9/IIB3P1T1	
DN200 / 8“	936-E 200/1x0,9/IIB3P1T1	

For the vacuum vent dimension sheet and pressure drop/volume flow diagram are available.

1. Use

Vacuum vent 936-E complies with following standards

EN ISO 16852:2016	Flame Arresters – Performance requirements, test methods and limits for use
DIN EN 13463 Part 1:2009-07	Non-electrical equipment for potentially explosive atmospheres Basics methods and requirements
DIN EN 13463 Part 5:2011-10	Non-electrical equipment for potentially explosive atmospheres Protection by constructional safety "c"

The general suitability as a deflagration end of line flame arrester when used with inflammable gas/air mixtures and vapour/air mixtures of inflammable liquids of explosion group IIB3 (standard gap width ≥ 0.65 mm) had been verified by tests executed at the Institute for Safety Technology IBExU GmbH Freiberg.

On principle, for all cases of use the placement conditions, especially the following limits for the operating pressure and temperature have to be considered:

- permissible operating pressure : atmospheric (0,8bar (absolute) to 1,1bar (absolute))
- permissible operating temperature : -20°C to 60°C
  (surface temperature max. 80% of ignition point)

The following valve insert settings are possible:

- Set-pressure for vacuum: 2,5 to 50 mbar *) *) factory pre-set default

On delivery of the devices the technical parameter of the flame arrester with stating the EC prototype test certificate number are documented in the works test certificate according to EN 10204. In the declaration of compliance it is referred to the accordance with the harmonized standard EN ISO 16852. The maintenance of the basic safety requirements according to directive 2014/34/EU has been confirmed.

2. Construction

The Vent 936-E consists of a cast iron housing (1), equipped with a valve insert (11) and a flame arrester element (2). The housing is closed with a cover (3) with the assistance of screw (6). An O-ring (7) is used for sealing. The valve insert is guided by a guiding socket (4) screwed into the cover.
The flame arrester element is firmly tensioned into the assembly via stud screws (23) and cap nuts (24). It consists of a housing flange and an angular winded metal foil element with a gap width of 0.9 mm, which are firmly connected with each other by a screw and nut.

For protection against effects of weather the flame arrester is placed downwards.
The valve insert is adjusted from the manufacturer via weight load for customer’s specific set pressure. They can either be equipped with FEP foil or a metal surface.

3. Marking

The information for marking the vent is arranged on the nameplate and an additional hazard sign (page 6/6). The following data are indicated:

nameplate

- name and address of the manufacturer
- type (including version number)
- serial number and year of production
- number of the certificate (EC prototype certificate-no.)
- EN number
- specific mark for prevention of explosions in connection with the mark indicating the group of devices II, and the letter “G” (for areas where explosive gas, vapour, air mixtures are available)
- explosion group
- CE mark with the number of the indicated inspection authority, which act during production
- set-up pressure for vacuum valve
- opening pressure for vacuum valve
- volume flow at opening pressure

Hazard sign

- **Warning** **Flame arresters have installation and application limits**
  Type designation in accordance with ISO 16852
- sign for type of flame arrester: **DEF** (deflagration)
- ratio L_U/D (distance to ignition source): --- (not applicable)
- burn rate „BC“: **c** (no burn time)
- burn time t_{BT} (only for „BC“ b): --- (not applicable)
- explosion group: **IIB3**
- operational temperature T_0: **60°C**
- maximum operational pressure p_0: **atm.** (atmospheric)

The metal foil is marked at the outermost wound element, as follows:

- name of the manufacturer
- gap width
- material number
- direction of winding

example: BS&B – 0,9 – 1.4571 – R

4. Installation

The arrangement and the installation of the vent into the plant shall be done under observance of the rules applicable to the relevant range of use. Especially the instructions for accident prevention have to be observed.

A vertical installation position of the vent has to be kept under any circumstances.

A minimum distance of vent outlet to external devices has to be adhered to avoid reduction of volume flow. This minimum distance depends on local circumstances and has to be specified by operator.

The vent is equipped with a flange type according to ISO 7005-2 (cast iron flanges) in the pressure steps PN 10 and PN 20 – with flange type 21 : integral flange and sealing strip type B : RF. The pressure step PN 20 is compatible with the American flange class 150 RF according to ANSI/ASME B16.5. For the flanged joints flat gaskets with a sealing parameter $k_O k_D \leq 25 b_D$ are recommended. While flanging be careful that the sealing strips are not damaged and there is no foreign matter or dirt between the flanges, so that no gap to the atmosphere can occur.

The valve has to be included in the equipotential bonding of the vessel or plant.

ATTENTION – Remove Transportation Guard

To prevent transportation damage valve seat and valve plate are blocked. It has to be removed before start of operation. (see details to transportation guard)

5. Maintenance

The maintenance includes a periodic visual control of the flame arrester element with regard to contamination and appearance. The intervals for the maintenance works depend on the operating conditions and the kind how the individual media tend to contamination.

For cleaning purposes, the flame barrier must be uninstalled as follows:

Unscrew the cap nuts (24) to take out the flame arrester element (2).
In case of minor contamination the flame arrester element shall be blown up with compressed air or hot vapour.
In case of major contamination a flushing with a cleaning agent can be carried out. After cleaning all parts which had been wetted by a cleansing agent, shall be blown dry. The metal foil element shall not be removed from the flame arrester element (2)

The installation of the flame arrester and housing is carried out in reverse order. It has to be ensure that no gap exist between flame arrester element and housing.

During the cleansing works no mechanical modifications may be done on the flame arrester element or on the housing parts of the flame arrester.

On principle, the flame arrester element has to be replaced by a new one, if:
- loosening or distortions in the structure of the metal foil elements can be recognized;
- corrosion damages at the metal foil elements have been detected;
- in case of strongly contaminated metal foil elements, even after cleaning, a residual contamination of more than 30 % of the free flow cross-section remained.

All works in connection with repair and replacement of components shall be executed only by trained and authorized skilled personnel.

During maintenance work, valve seats and valve discs has to be checked for contamination and damages as well. The valve seat must be examined in particular for intactness of the sealing surface. Damages to the valve seat are to be eliminated by expert grinding and smoothing. Depending on the sealing system in use on the valve inserts, make sure that either the FEP seal or the metal sealing surface is not damaged. Damaged valve discs or seals must be replaced by new ones.

It is recommended to hold a spare flame arrester element and the respective seals ready for each vent.
In case of replacement of structural units only original spare parts listed in the spare parts list may be installed to ensure the required safety.

6. Spare part list

Table : Spare parts 936-E DN50, DN80, DN100

Item No.	Description	Qty.	Material	Order No. DN50	DN80	DN100
2	Flame arrester element 1x0,9	1	NSt	FET15415112	FET15416060	FET15416560
3	Cover, complete (incl. guiding socket and hexagon nut	1	St NSt	FET15415132 FET15415133	FET15416066 FET15416067	FET15416586 FET15416587
6	Cylinder screw	4 6	NSt	242035000	242035000	242032100
11*	Valve insert – FEP - Valve disc - FEP-sealing	1	NSt/FEP	FET15415115 812071200 722087800	FET15416080 812071900 722088300	FET15416572 812071500 722088100
	Valve insert – metal - Valve disc - metal-sealing	1	NSt	FET15415116 812071200 FET992784000	FET15416095 812071900 FET992876000	FET15416573 812071500 FET999657900
10	O-ring	1	NBR FPM EPDM FPM/FEP	812072800 802087800 812072900 812073000	802039700 802039800 802039900 802040000	812073100 812073400 812073200 812073300
23	Stud srew M10*20	3 4	NSt	312071200	312071200	312071200
24	Cap nut M10	3 4	NSt	202012700	202012700	

* Valve insert without additional weights

Material marks

St	... steel	LM	... light metal	FPM	... Viton	FEP . .	Fluoride plastic
NSt	... stainless steel	K	... plastic	NBR	... Perbunan(N)	PTFE ..	Fluoride plastic

Table : Spare parts 936-E DN150, DN200

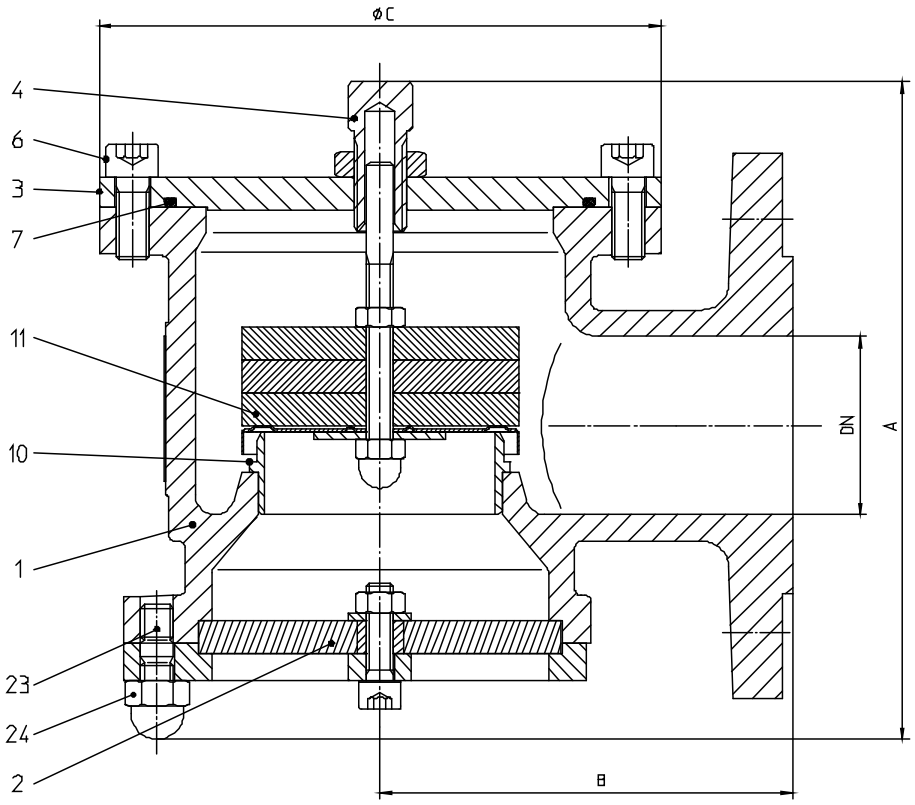
Item No.	Description	Qty.	Material	Order No. DN150	Order No. DN200	
2	Flame arrester element 1x0,9	1	NSt	FET15417164	FET15417573	
3	Cover, complete (incl. guiding socket and hexagon nut	1	St NSt	FET15417183 FET15417184	FET15417544 FET15417545	
6	Cylinder screw	8	NSt	222075300	232098200	
11*	Valve insert – FEP - Valve disc - FEP-sealing	1	NSt/FEP	FET15417172 812072100 722088700	FET15417570 812072300 722088900	
	Valve insert – metal - Valve disc - metal-sealing	1	NSt	FET15417173 812072100 FET999671400	FET15417572 812072300 FET993108100	
10	O-ring	1	NBR FPM EPDM FPM/FEP	802078200 802078300 802078400 802078500	802078600 802078700 802078800 802078900	
23	Stud srew	4 8	NSt	312071200	312066000	
24	Cap nut	4 8	NSt	202012700	202012700	

* Valve insert without additional weights

Material marks

St	... steel	LM	... light metal	FPM	... Viton	FEP . .	Fluoride plastic
NSt	... stainless steel	K	... plastic	NBR	... Perbunan(N)	PTFE ..	Fluoride plastic

Assembly drawing



DN	A [mm]	B [mm]	C [mm]	ø D [mm]
50 / 2“	311	135	165	170
80 / 3“	400	162	192	225
100 / 4“	453	190	225	290
150 / 6“	490	210	250	320
200 / 8"	595	277	295	375
250 / 10“	695	310	368	440

Hazard sign

Warning	Flame arrester have installation and application limits. Type design in accordance with ISO 16852		
DEF	L_u/D = ---	BC: C	t_{BT} = --- min
	Ex G IIB3	T_0 = 60 °C	p_0 = atm.