	<b>FLAME ARRESTER</b> <b>931-CA 100/0720/IIAP1T1 to 200/0720/IIAP1T1</b> <b>INSTRUCTIONS FOR OPERATING AND MAINTENANCE</b>	REV 1.0
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This Instruction for Operating and Maintenance is applicable for the following flame arrester models:

Table Type description

Nominal width	Type	EC-Type Examination Certificate Number
100	931-CA 100/0720/IIAP1T1	IBExU17ATEX2049 X
125	931-CA 125/0720/IIAP1T1	
150	931-CA 150/0720/IIAP1T1	
200	931-CA 200/0720/IIAP1T1	

The data sheet with dimensions and the pressure drop/volume flow rate diagram are available.

## 1. Use

The flame arrester type 931-CA complies with the requirements of the European Guideline 2014/34/EU and the harmonised standard for flame arresters EN ISO 16852:2016 as the autonomous protection systems for correct use in explosive zones.

Its general suitability as an **in-line deflagration flame arrester** for use in inflammable gas/air mixtures and vapour/air mixtures of inflammable liquids of explosion group IIA (standard gap width  $\geq 0.90$  mm) was proved in a test at the Institut für Sicherheitstechnik GmbH IBExU Freiberg as EUROPEAN NOTIFIED BODY no. 0637 according to Article 9 of the Guideline 2014/34/EU. The results of it were confirmed by the issued EC prototype test certificate **IBExU17ATEX2049 X**.

The application of the flame arrester must be in accordance to the safety arrangements of the respective equipment.

For preventing a flame transmission, these in-line deflagration flame arresters can be used in atmospheric conditions [pressure: 0,8 bar (absolute) to 1,1 (absolute), temperature: -20°C to +60°C] for protection against deflagrations for explosive vapour/gas-air mixtures of the explosion group IIA.


On principle, for all cases of use the placement conditions, especially the following limits for operating pressure and temperature and permissible distance for potential source of ignition  $L_u$  have to be considered:

– maximal permissible operating pressure for deflagration	DN100-DN200	1,1 bar (absolute) (P1)
– maximal permissible operating temperature:		60°C (T1)
– maximal permissible distance to ignition source:	DN100	5,00 m (meter)
	DN125	6,25 m (meter)
	DN150	7,50 m (meter)
	DN200	10,00 m (meter)

With the delivery of the flame arrester, the technical parameters are documented along with the EC-Type Examination Certificate Number in the respective factory test certificate.

In the declaration of compliance, the adherence to the Essential Health and Safety Requirements are confirmed in accordance with the standards EN ISO 16852:2016 and EN 1127-1:2011.

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## 2. Construction

The flame arrester consists of two covers (3) and (4) between a metal foil element (1) is mounted. Sealing between covers is made by an o-ring (32).

The metal foil element is made of one crimped and one flat ribbon of 20 mm width and 0,15 mm thickness. The ribbons are rolled along each other in compact layers and build triangular channels in the centre with a maximum height of 0,7 mm. The centre of the metal foil element is closed by a grooved pin (2).

## 3. Marking

The information for marking the vent is arranged on the nameplate and on an additional hazard sign (page 5/5). 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.)
- number of relevant standard - ISO 16852
- specific mark for prevention of explosions in connection with the mark indicating 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

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 flame arrester)
- ratio  $L_w/D$  (distance to ignition source): **50**
- burn rate „BC“: **c** (no burn time)
- burn time  $t_{BT}$  (only for „BC“ b): **---** (not applicable)
- explosion group: **IIA**
- operational temperature  $T_0$ : **60°C**
- maximum operational pressure  $p_0$ : **0.11 MPa**

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

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

Example: BS&B-0,7-1.4571-L

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#### 4. Installation

The arrangement and the installation of the flame arrester shall be carried out under observance of the applicable rules; especially the instructions for accident prevention have to be maintained.

The connection of the flame arrester into the pipe line is carried out independently from the direction of the starting flame (bi-directional flame arrester).

The flange covers must be removed before installing in the pipeline.

The criteria mentioned in the EC-Type Examination Certificate under Point [17] - Special conditions for safe use - related to the installation must be adhered to.

The flame arrester shall only be installed in pipelines whose nominal width

- on unprotected side is smaller or equal the connection nominal width of the flame arrester.
- on protected side is not smaller than the nominal width on unprotected side.

The distance between ignition source and flame arrester must not exceed the ratio  $L_w/D = 50$  (see point 1).

**Caution:** In case of using for endurance burning, the flame arrester must not be put in housing or insulated. Unrestricted heat discharge must be ensured!

The flame arrester is equipped with connecting flanges according to ISO 7005-1 in the pressure level PN10.

Flat seals with sealing rated value of  $k_D \leq 25b_D$  are recommended for the flange connections. While installing flanges, it must be ensured that the seal faces are not damaged and there are no foreign bodies or dust between the flanges so that there are no gaps. The system should be checked thoroughly for proper sealing before commissioning it. The test pressures of the flame arrester specified in the test certificate must not be exceeded.

Vertical as well as horizontal installation on the system is permissible.

The flame arrester should be installed without stress preferably.

There should be always a leak test before putting the plant into operation.

The proving pressures of the flame arrester according to the test certificate EN 10204 must not be exceeded.

#### 5. Maintenance

The maintenance is restricted to a periodical visual examination of the flame arrester, especially of the metal foil elements with regard to contamination and appearance and the cleaning of minor contamination of the metal foil elements.


In case of minor contamination the metal foil element shall be blown out with compressed air or hot vapour in a direction contrary to the operational flow.

In case of major contamination or stickily adhering impurities on the metal foil element a rinsing in a cleaning agent may be carried out. After cleansing works with a special cleaning agent all part which had been wetted shall be blown dry.

During the cleansing works no mechanical modification on the metal foil elements and on the housing of the flame arrester may be done. The tight position of the grooved pin (2) shall be checked.

The occurrence of explosions with a succeeding stabilised burning at the flame arrester element leads to major mechanical and thermal stresses. If due to a fire at the flame arrester element changes in its structure will appear or winds were loosened the flame arrester element has to be replaced.

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On principle, the flame arrester element has to be replaced by a new one, if

- a fire occurred on the flame arrester element
- loosening or distortions in the structure of the metal foil element have been recognised
- corrosion damages at the metal foil element 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 the cleaning and replacement of the arrester element shall be executed only by trained and authorised skilled personnel.

In case of replacement of the O-rings (32) it shall be paid attention to that before reinstallation they must be slightly greased with silicone grease (order-no. 00027079).

The threaded bolts (20) and nuts (24) shall be slightly lubricated in the thread with a high pressure lubricate (order-no. 00027079) tightened with a torque acc. to the following table:

DN		100	125	150	200
Torque	Nm	50	50	70	90

The external leak proofness of all pressure loaded flanged and thread joints shall be checked.

It is recommended to have the appropriate metal foil element for all operating flame arrester available for exchange.

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 4 : spare parts

Item No.	Designation	No.	Material	DN100 Order No.	DN125 Order No.	DN150 Order No.	DN200 Order No.
1*	Metal foil element 0,7 inclusive grooved pin (2)	1	NSt	FET993171600	FET993171700	FET993171800	FET993171900
20	Hexagon bolt	6	St	222603500	222603500	222057739	222057739
	Hexagon bolt	6	NSt	222051100	222051100	222091300	222091300
24	Hexagon nut	12	St	200124623	201358739	201472339	201472339
	Hexagon nut	12	NSt	342013223	340050623	200124523	200124523
32*	O-ring	1	NBR	802001700	802066000	802070800	802074000
	O-ring	1	FPM	802002500	802067700	802071600	802075700
	O-ring	1	FEP	802014600	802068500	802072400	802076500
	O-ring	1	FMP/FEP	802003300	802069300	802073200	802076900
33	Protecting cap	12	K	700044000	702048500	702029200	702030700

Attention : Parts marked with \* shall be available for maintenance works.

### Material marks

St ... steel	LM ... light metal	KG ... gummy plastic
NSt ... stainless steel	K ... plastic	KV ... Viton

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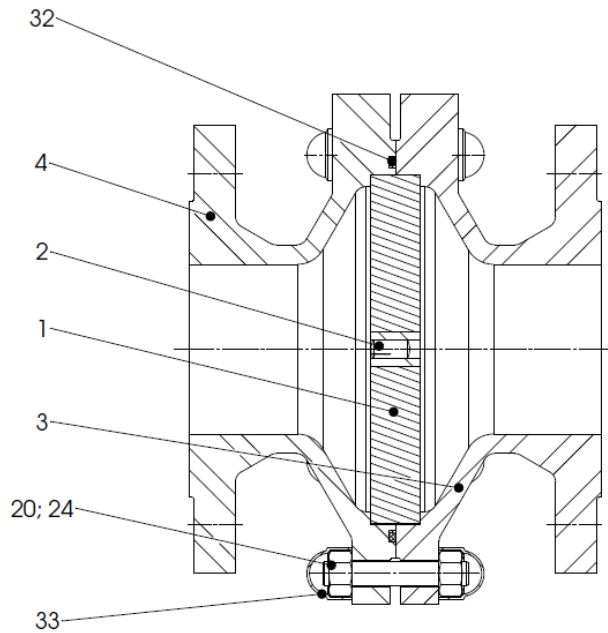


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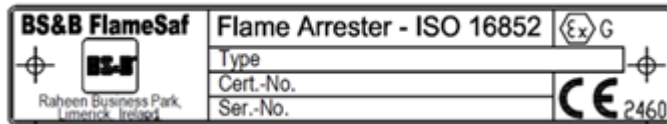
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Assembly Drawing:



Nameplate:



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