This Instruction for Operation and Maintenance is applicable for the following flame arrester model:

Table 1: Type description

Size	Type	EU-Type Examination Certificate Number
DN10 / 3/8“	931-B 0.375/3x0.5/D4IIAP1T2.2	IBExU22ATEX2022 X
DN15 / 1/2“	931-B 0.500/3x0.5/D4IIAP1T2.2	

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

1. Use

The flame arrester types listed in this document meet the requirements of the European Guideline 2014/34/EU and the harmonised standard for flame arresters EN ISO 16852:2016 as autonomous protection system for intended use in potentially explosive atmospheres.

Its general suitability as **in-line stable detonation flame arrester** for use with inflammable gas/air mixture and vapour/air mixture of inflammable liquids of the explosion group IIA (MESG ≥ 0.90 mm) has been verified by tests performed at the Institut für Sicherheitstechnik GmbH IBExU Freiberg, EUROPEAN NOTIFIED BODY no. 0637 according to Article 9 of the Guideline 2014/34/EU. Always use it within the purview of the entire safety concept of the corresponding system and combine additional explosion safety measures, if required.

For preventing a flame transmission, these detonation arresters in the pipes can be used in atmospheric conditions [pressure: 0,8 bar (absolute) to 1,1 bar (absolute), temperature: -20°C to +140°C] for protection against stable detonations and deflagrations at the flame arrester for explosive vapour/gas-air mixtures of the explosion group IIA.

Furthermore, the limit values listed in Table 1 are the maximum permissible operating pressure (p_0) and maximum permissible operating temperature (T_0), customer shall never operate beyond these limits:

Table 2: Limits for Operation

Size	p_0 MPa (absolute)	T_0 °C
DN10 / 3/8“	0.11	140
DN15 / 1/2“		

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 16852 and EN 1127-1, as well as compliance with the ATEX directive 2014/34/EU.

2. Construction

The flame arrester consists of Housing (item 1) with a Cover (2) which is secured in place by a Retaining Ring (3).
The sealing against leaks to the atmosphere is provided by the O-ring (12).
The housing is fitted with Arrester Elements (4 and 5) which have different winding direction to divert the flow of the gas mixture passing through the unit. The Arrester Elements are kept apart a certain distance by the Element Spacers (7) and held together at the ends by the Stars (6), all this series of Elements are secured together by the Central Screw (9) and Hex Nut (10). The Hex Nut is provided with a Safe Lock Washer (11) and installed with Thread Locker adhesive which helps ensuring long term protection against vibration and loosening.

The inlet and outlet connections of the Flame Arrester are supplied with Closure Sealing Plugs (15) to assure protection against impurities and moisture during transport and storage and this protection must be kept by the customer.

The 931-B Flame Arrester is available in the Standard version and also in a version with a Mounting Hex Nut (16) for installation where the Flame Arrester can be inserted to a support/mount and be secured by the Mounting Nut.

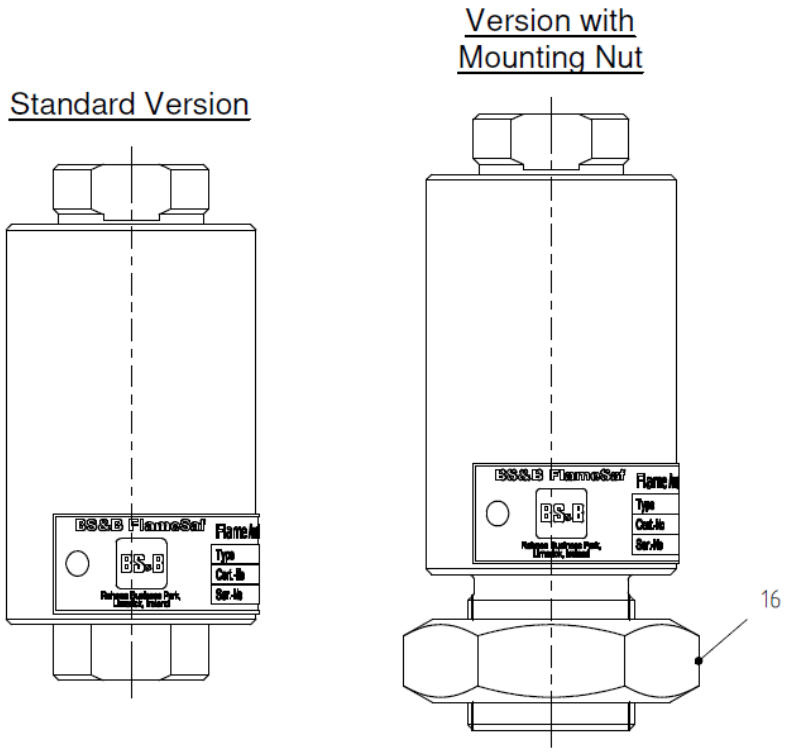

Figure 1 – 931-B Body Versions

3. Marking

The product is supplied with nameplate (25) and label (26) 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:

- **Warning** **Flame arresters have installation and application limits**
  Type designation in accordance with ISO 16852
- Flame Arrester Type mark: **DET4**
  (Stable Detonation without restrictions)
- Burn rating mark BC: **c**
  (No burning time)
- Explosion Group: **IIA**
- Maximum Operational Temperature T_0: **140°C**
- Maximum Operational pressure p_0: **0.11 MPa**

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-0.5-1.4571-R**

4. Installation

The positioning and installation of the flame arrester in the plant must take place under the purview of the directives applicable at the place of use; it is particularly imperative to follow the accident prevention directives of the area of installation.

The connection ports' protections must be removed from the unit before installation in the pipeline.
The 931-B Flame Arrester is Bi-directional, it can be installed to the process with either of its sides connected to the unprotected side (side from where a flame might come from).
The 931-B Flame Arrester may be installed in a vertical or horizontal orientation.

The Flame Arrester may only be installed in pipelines where the connection diameter:

- on the unprotected side is not greater than the flame arrester connection size
- on the protected side is not smaller than the pipe diameter of the unprotected side

The Flame Arrester body may be held to the customer equipment and/or plat structure by using pipe clamps to hold its body (outside diameter: 45mm). The clamps must be properly sized and anchored.
The version with Mounting Nut can be mounted to a panel or to an existing structure using the Mounting Nut.

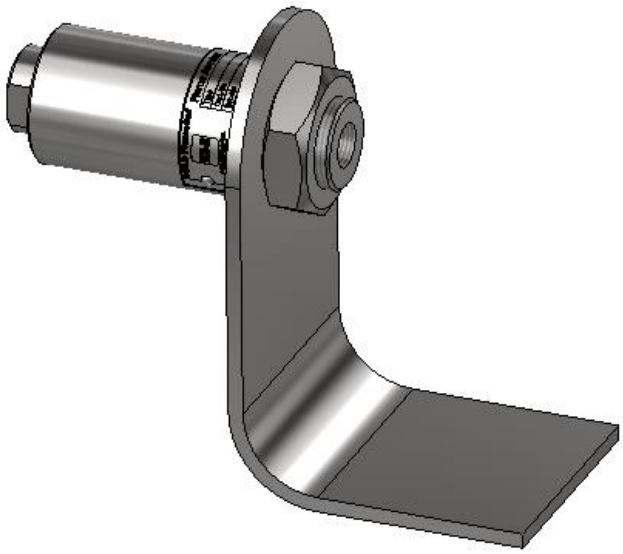

Figure 2 – Version with Mounting Nut mounted to a support illustration

The Flame Arrester is supplied with threaded process connections with specification as per customer request, standard types are Rp, Rc, BSP, BSPT and NPT. Other type may be offered under request.

For the connection, the appropriate sealing method must be used, according to the type of thread connection chosen by the customer. Some types of thread may require the use of additional sealant, please follow the technical recommendations for the threads in use.

After installation and before operation the Flame Arrester must be checked against leaks.

The Flame Arrester must not be installed under pipe/structure stress.

The Flame Arrester shall never be exposed to pressures above its operation and design limits.

5. Maintenance

The Flame Arrester must be periodically maintained, and the periodic maintenance shall include 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 spec. 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 customer/end user.

For the inspection, the Flame Arrester shall be completely removed from process/pipeline.

The Flame Arrester shall never be dismantled or have its Retaining Ring (3) removed or loosened!

During the periodic inspections the Retaining Ring (3) shall be checked against deformations and/or damages. Furthermore, the proper connection/engagement between the Central Screw (9) and Hex Nut (11) must be checked and for this an Allen Wrench may be used (M6 screw/nut torque: 6 N-m)

The level of contamination/blockage on the Arrester Elements shall be checked by using a torch attached to each connection port, to check each side.

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 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), Cover (2) or the Retaining Ring (3) 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 Element

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

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.

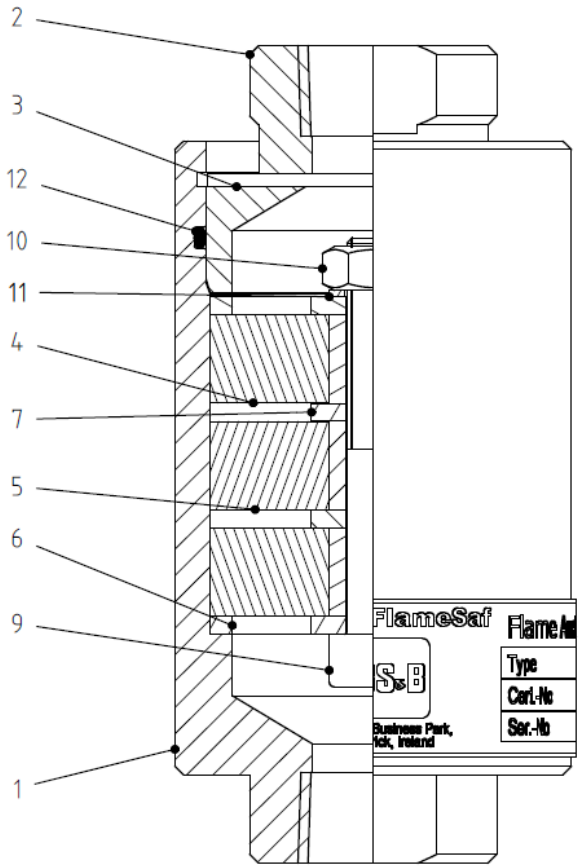

Figure 3 – Identification of parts

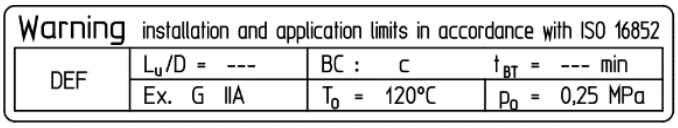

Figure 4 – Hazard Sign / Warning Label