

[1] **EC-TYPE EXAMINATION CERTIFICATE**
according to Directive 94/9/EC, Annex III



- Translation -

[2] Equipment or protective systems intended for use
in potentially explosive atmospheres, **Directive 94/9/EC**

[3] EC-Type Examination Certificate Number: **IBExU16ATEX2081 X**

[4] Protective system: **In-line detonation flame arrester Model 20503**
Sizes: DN 50 to DN 300

[5] Manufacturer: **PRESSURE & FLOW CONTROL INDUSTRIES**

[6] Address: **823, GIDC Estate, Makarpura 390010**
Vadodara, Gujarat
INDIA

[7] The design of the protective system mentioned in [4] and any acceptable variation thereto is specified in the schedule to this EC-Type Examination Certificate.

[8] IBExU Institut für Sicherheitstechnik GmbH, NOTIFIED BODY number 0637 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that the protective system mentioned in [4] has been found to comply with the essential health and safety requirements relating to the design and construction of protective systems intended for use in potentially explosive atmospheres given in Annex II to the directive.
The test results are recorded in the Test Report IB-15-2-123/3 of 19 April 2016.

[9] Compliance with the essential health and safety requirements has been assured by compliance with EN ISO 16852:2010 and EN 1127-1:2011.

[10] If the sign "X" is placed after the certificate number, it indicates that the protective system is subject to special conditions for safe use specified in [17] in the schedule to this EC-Type Examination Certificate.

[11] This EC-Type Examination Certificate relates only to the design and construction of the specified protective system. If applicable, further requirements of this directive apply to the manufacture and supply of this protective system.

[12] The marking of the protective system mentioned in [4] shall include the following:



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Authorized for certifications
- Explosion protection -

Freiberg, 19 April 2016

By order

(Dipl.-Ing. Willamowski)



Certificates without signature and seal are not valid.
Certificates may only be duplicated completely and unchanged.
In case of dispute, the German text shall prevail.

Schedule

[13]

Schedule

[14]

to the EC-TYPE EXAMINATION CERTIFICATE IBExU16ATEX2081 X

[15]

Description of the protective system

The in-line detonation flame arresters of the type mentioned in [4] are used to prevent a flame transmission at stable detonations and deflagrations without restriction (type 4) of flammable gas- and/or vapour/air-mixtures of the Explosion Group IIB3, MESH ≥ 0.65 mm, from both sides (bi-directional). They can be used under atmospheric conditions and up to an operating pressure of 1.1 bar absolute and a maximum temperature of 60 °C.

The in-line detonation flame arresters of the type mentioned in [4] consist of filter discs with the specifications as per table 1 and an explosion-pressure-resistant housing with a connecting flange for the respective pipe diameter. The filter discs are tightly fixed in an enclosing cage. They are constructed of a crimped and a flat ribbon of stainless steel and they are 20 mm wide. The superimposed ribbons are spirally rolled on top of each other in compact layers. In this manner, channels with a height (gap width) as specified in table 1 are formed. Through these channels the gas- and/or vapour/air-mixtures can flow. A flame transmission must be prevented.

The in-line detonation flame arresters are not suitable for a stabilized burn on the flame arrester element.

Table 1: Specifications of the in-line detonation flame arresters Model 20503 depending on connection size

Connection size	Number of filter discs	Gap width	Gap length	Spacers
		mm	mm	mm
DN50	3	0.6	20	2 x 8
> DN50 to DN100	4	0.5	20	3 x 1.5
DN150	4	0.6	20	3 x 1.5
> DN150 to DN300	7	0.5	20	6 x 1.5

The constructive design, used materials and dimensions of the in-line detonation flame arresters and further technical details are specified in the test documents which are part of the Test Report IB-15-2-123/3 of 19 April 2016.

[16]

Test Report

The test results are recorded in the Test Report IB-15-2-123/4.

Summary of the results:

The models of the in-line detonation flame arrester of the type mentioned in [4], which were submitted for the examination, have in tests carried out in accordance with EN ISO 16852:2010 with a test mixture of the Explosion Group IIB3 (ethylene/air-mixture, safe gap of 0.67 ± 0.02 mm) prevented a flame transmission at stable detonations and deflagrations without restriction on the protected side (Initial conditions: $p_0 = 1.1$ bar absolute, normal ambient temperature).

In accordance with EN ISO 16852:2010 and in compliance with chapter [17] the in-line detonation flame arresters of the type mentioned in [4] can be used under atmospheric conditions (maximum permissible temperature of the flame arrester of 60 °C) as well as a maximum permissible operating pressure $p_0 \leq 1.1$ bar absolute for the protection against stable detonations without restriction on the protected side of explosive gas- and/or vapour/air-mixtures with the characteristics as mentioned above.

Test documents

The test documents are listed in Test Report IB-15-2-123/3.

[17]

Special conditions for safe use

1. Routine check

In accordance with EN ISO 16852:2010 the manufacturer is obliged to carry out routine checks.

The manufacturer must guarantee by a routine check of each in-line detonation flame arrester that

- a. the dimensions, fits, used materials, and number of screws comply with the specifications in the drawings listed in the test report and the model codings in the operating manual,
- b. the flame arrester is designed in accordance with the drawings listed in the test report and the model codings in operating manual,
- c. all parts are manufactured from faultless materials,
- d. welded connections are faultless,
- e. the flame arrester is tested on mechanical resistance and tightness.

2. Restriction of use

The in-line detonation flame arresters of the type mentioned in [4] may only be used if their materials resist, under the respective operating conditions, the mechanical and/or chemical effects and corrosion, so that the explosion protection is always maintained. This applies particularly to the filter discs of the flame arrester element, whose protection against flame transmission can be compromised by corrosion among others.

It is pointed out that the in-line detonation flame arresters Model 20503 are not tested on safety against a flame transmission at a stabilized burn on the flame arrester element. In accordance with sec. 11.2.1.2 of EN ISO 16852:2010 "Warning information" they have to be marked with "c" for "no burn time". The in-line detonation flame arresters must therefore not be used, if a burn on the flame arrester element is anticipated due to the plant and process conditions.

The specifications in the Instruction, Operation and Maintenance Manual of 4 April 2016 apply for the use of the in-line detonation flame arresters of the type mentioned in [4].

3. Installation instructions

The maximum admissible nominal size of the pipes to be connected to the in-line detonation flame arresters of the type mentioned in [4] is indicated in this EC type examination certificate. Pipes with a smaller nominal size may be connected, if the construction of the flame arrester and the flame arrester housing remains unchanged.

The in-line detonation flame arresters of the type mentioned in [4] have to be installed in accordance with the specifications in the Instruction, Operation and Maintenance Manual of 4 April 2016. They shall be used in accordance with the specifications in sec. 7.4.1, 7.4.2, and 7.4.4 of the standard EN ISO 16852:2010.

4. Inspection

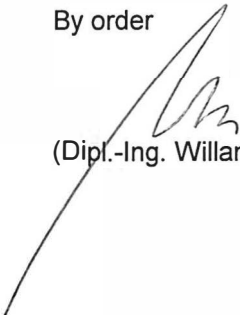
The operating company is obliged to adhere to the specifications in the Instruction, Operation and Maintenance Manual regarding inspections of the in-line detonation flame arresters in regular intervals. Primarily, the flame arrester element has to be checked for contamination, damage and corrosion. It has to be handled according to the specifications of the manufacturer (Instruction, Operation and Maintenance Manual).

The manufacturer is obliged, pursuant to EN ISO 16852:2010, sec. 11.2, to label each in-line detonation flame arrester and to enclose a correct documentation with each in-line detonation flame arrester.

[18] **Essential health and safety requirements**
Confirmed by compliance with standards (see [9]).

By order

Freiberg, 19 April 2016


(Dipl.-Ing. Willamowski)