

Indian Standard

**SPECIFICATION FOR
FLASH BACK ARRESTOR
(FLAME ARRESTOR)**

(Incorporating Amendment Nos. 1 & 2)

1. Scope — This specification covers flash back arrestors or flame arrestors for use in open vent pipes, vent valves, delivery pipe lines, acetylene generators, petroleum, oil and gasoline or liquefied petroleum storage or processing or piping system.

2. Terminology

2.1 Flame Arrestor or Flash Back Arrestor — It is a device to stop or arrest or prevent the return of the flame which can result in an explosion or of the blow back of the oxygenated gas from damaging whatever it is intended to protect.

2.2 Hydraulic Back Pressure Valve or Wet Type Flash Back Arrestor or Flame Arrestor — It is a flash back arrestor where the sealing is done by the help of liquid.

2.3 Dry Type Flame Arrestor or Flash Back Arrestor — It is a device where the sealing is done by help of sintered metal or perforated discs or ceramic cartridge or by any means other than employing a liquid to arrest the flame.

2.4 Safety Seals — The flame arrestors or flash back arrestors are at times also referred as safety seals.

2.5 Safety Relief Device — It is a device intended to prevent rupture of the flame arrestor due to sudden built-in pressure which can be in a form of safety valve, bursting disc or liquid seals connected to atmosphere.

2.6 Deflagration — It is a flame that travels into the unburnt gas at almost any velocity less than sonic.

2.7 Detonation — It is a flame that travels into the unburnt gas at a rate that is above the speed of sound.

2.8 Flash Back — It is the return of the flame into an apparatus or line and its propagation against the flow of the gas.

3. Material

3.1 The device shall be of a metal, resistant to corrosion or chemical reaction under condition of use. Where corrosion cannot be avoided suitable corrosion allowance shall be included in its thickness.

3.2 Gaskets shall be made of compressed asbestos fibre or metal spiral wound type or synthetic rubber which is compatible with the process gas.

4. Casing

4.1 The casing or housing shall be of non-fragmenting type made of forged steel, carbon steel or alloy steel pipe tube or plates, cast stainless steel, forged or extruded non-ferrous material or equivalent.

4.2 The casing or housing shall withstand the internal pressure resulting from explosion without damage.

4.3 The casing and the flat joints in a device or a flat surface in the device shall be free from any burrs or irregular surface or defects and shall preferably be machined to a fine finish.

4.4 If the flash back arrestor or flame arrestor does not prevent a reversal of flow, a separate non-return wall shall be fitted. It may be mechanical non-return or check valve, but this alone is not satisfactory as a flash back arrestor.

5. Flanged or Threaded Connections — The device shall have provisions for flanged or threaded connection to standard pipe which shall conform to relevant Indian Standards for pressure rating to withstand the hydrostatic tests.

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Price Group 2

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6. Sealing Medium

6.1 The sealing medium can be a liquid, or sintered or perforated metal or ceramic cartridge and shall be so constructed that, with the gas flowing at 30 percent above the rated flow or with a rise in pressure on the delivery side or with a fall in pressure on the supply side it does not render the device ineffective.

6.2 The sealing medium shall be such that it does not react with the gas with which it is intended to be used and is safe for use under the operation condition.

Note — Normally water is used as a sealing medium.

6.3 Where a device relies wholly or partly on liquid sealing medium, means shall be provided for readily filling, observing and adjusting the level of the medium without introducing air into the system during the operation.

7. Vent Pipe — Vent pipe or blow off outlet when provided, shall be designed and constructed to prevent any choking or obstruction which could interfere with adequate venting. The discharge shall be safely dispersed.

8. Safety Valves/Bursting Discs — If safety valves and bursting discs are provided they shall be designed for full flow type and set at a pressure not more than 10 percent of the working pressure.

9. Internal Parts — The internal parts of the device shall be so constructed that the condition of the internal parts can be examined and maintained if any maintenance is required.

10. Routine Tests

10.1 Hydrostatic Tests — The device fully assembled, minus safety vent line which is to be plugged during this test, shall be leak-proof and shall withstand in the case of petroleum gas; a hydrostatic pressure of 17.5 kgf/cm² or twice the working pressure, whichever is more for one minute without rupture or permanent distortion. In the case of acetylene gas, the value of above hydrostatic test pressure shall be 25 kgf/cm².

10.2 Flow Capacity — The flow capacity of the device shall be determined at the operating pressure specified for it by the manufacturer by installing a flow meter at the outlet or inlet of the system.

10.3 Pressure Drop — The drop in pressure across the device shall not be more than 10 percent of the inlet pressure at its rated flow.

11. Type Tests

11.1 Explosion Test

11.1.1 The device shall be installed in a pipe line of the diameter and strength for which it is designed. The pipe connector to the inlet is to be at least 1.5 m long (see Fig. 1). The outlet of the device is to be connected to at least 1.5 m long pipe of high pressure schedule 160, seamless pipe or any pipe which will withstand the bursting pressure. At the inlet end a valve shall be fixed to isolate the test arrangements for testing. At the outlet end of the pipe a block shall be installed, threaded to accommodate a spark plug. A device for recording peak explosion pressure shall be connected in the inlet end and another in the outlet end of the test installation. The spark plug block shall be fitted with a valve to displace the original air present in the test chamber and system.

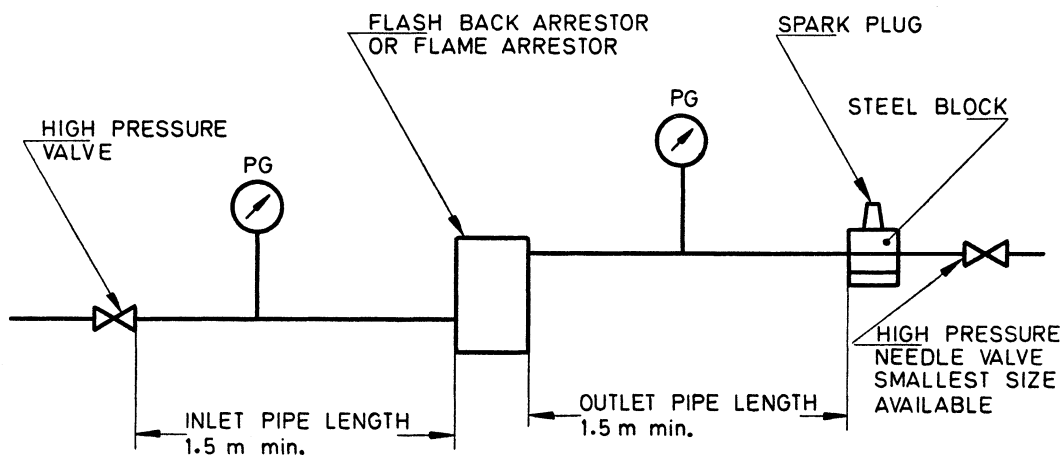


FIG. 1 EXPLOSION TEST

11.1.2 After the spark plug is energised no damage to the pipe line inlet side of the flash back arrestor or flame arrestor shall take place.

11.1.3 At the conclusion of the test, the test chamber and system shall be purged of residual gas with a stream of air or nitrogen.

11.1.4 The device shall not permit the passage of sparks or flame that will ignite the explosive mixture from the outlet end of the flash back arrestor or flame arrestor when subjected to at least 5 explosion tests within the flammable range using a mixture of flammable gas and air or only the gas, for which the gas, for which the device is intended, at a pressure of 1 bar gauge or the working pressure whichever is higher.

11.2 Continuous Flame Tests

11.2.1 The device shall resist without flash back the flame of continuous burning at the outlet end of a pipe connected to the outlet of the device having a length of not less than 1.5 m and of the size for which the flash back is designed (See Fig. 2).

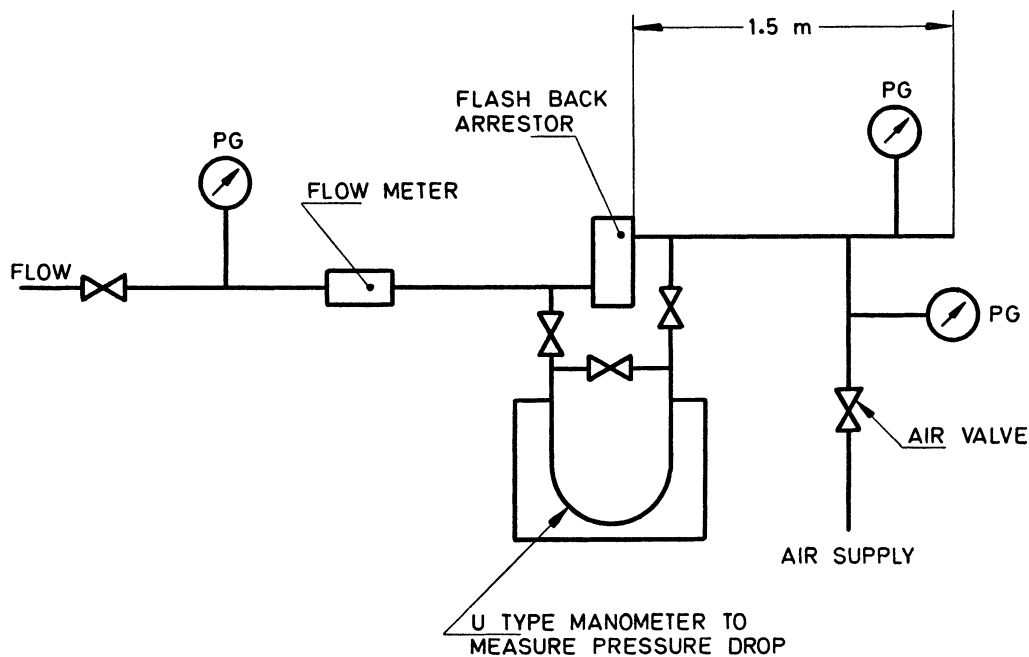


FIG. 2 FLAME TEST

Note — Manometer shown in figure shall not be connected during the flame test.

11.2.2 Flame test shall be conducted at the rated flow and pressure of the arrestor. The flow shall be stopped for 15 s every ten minutes after initiation of the test. There shall be no flash back even after 6 such stoppages.

12. Marking

12.1 The flash back arrestor shall be marked with the following if it is not forming an intricate part of the equipment or system supplied by the same manufacturer:

- Flash back arrestor or flame arrestor,
- Flammable gas for which it is intended like 'Acetylene' or 'LPG',
- Maker's name or registered trade mark,
- Maker's type and serial number,
- Maximum working pressure,
- Rated delivery (m^3/h) measured at 15°C and 760 mm of mercury,
- Nature of sealing material, if any, and
- Direction of flow.

12.2 ISI Certification Marking — Details available with the Indian Standards Institution.

E X P L A N A T O R Y N O T E

The main purpose of the flash back arrestors or flame arrestors is to prevent the propagation of flame through it or any thing that is desired to be protected like storage tank, pipe line or generator.

A flash back arrestor or flame arrestor is investigated for the installation for which it is designed and for a general application.

In the preparation of this specification considerable assistance has been taken No. UL 525 Standard for safety of flame arrestors, Underwriter Laboratories, U.S.A.

This edition 1.2 incorporates Amendment No. 1 (March 1988) and Amendment No. 2 (January 1999). Side bar indicates modification of the text as the result of incorporation of the amendments.