

Specification for

Flame arresters for general use

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Fire Standards Policy Committee (FSM/-) to Technical Committee FSM/13, upon which the following bodies were represented:

- Association of Metropolitan Authorities
- British Automatic Sprinkler Association
- British Fire Protection Systems Association Ltd.
- British Fire Services' Association
- British Nuclear Fuels Limited
- Chief and Assistant Chief Fire Officers' Association
- Convention of Scottish Local Authorities
- Department of Health
- Department of the Environment (Building Research Establishment)
- Department of the Environment (Property Services Agency)
- Department of Transport (Marine Directorate)
- Electricity Supply Industry in England and Wales
- Engineering Equipment and Materials Users Association
- Fire Brigades Union
- Fire Extinguishing Trades Association
- Health and Safety Executive
- Hevac Association
- Home Office
- Incorporated Association of Architects and Surveyors
- Institution of Fire Engineers
- Lloyds Syndicates Survey Department
- London Fire and Civil Defence Authority
- Loss Prevention Council
- Ministry of Defence
- Royal Institute of British Architects
- Society of Fire Protection Engineers
- Society of Motor Manufacturers and Traders Limited
- United Kingdom Atomic Energy Authority
- Warrington Fire Research Centre
- Water Research Centre

The following bodies were also represented in the drafting of the standard, through subcommittees and panels:

- Institute of Petroleum
- Society of British Gas Industries

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Foreword

This British Standard has been prepared under the direction of the Fire Standards Policy Committee.

It establishes a system for classifying arresters to provide a general means of describing flame arresters and assessing their suitability for use in a particular environment. Previously there was no such agreed system. The specification should be of use to plant designers, users and those concerned with the safety of process plant, storage tanks and road or rail tankers.

Although arresters complying with this specification may be suitable for marine applications, attention is drawn to the relevant provisions of the Merchant Shipping (Cargo Ship Construction and Survey) Regulations 1984, as amended.

Its requirements and recommendations are made in the light of the best technical data known to the committee at the time of writing, but since a wide field is covered it has been impractical to consider every possible factor or circumstance that might affect implementation of the recommendations.

To comply with this standard, the user has to comply with all its requirements. He may depart from recommendations, but this would be on his own responsibility and he would be expected to have good reasons for doing so.

This British Standard describes test methods which involve the use of substances and/or procedures that may be injurious to health if adequate precautions are not taken. It refers only to technical suitability and does not absolve the user from legal obligations relating to health and safety at any stage.

It has been assumed in the preparation of this standard that the execution of its provisions is entrusted to appropriately qualified and experienced people.

Product certification. Users of this British Standard are advised to consider the desirability of third party certification of product conformity with this British Standard based on testing and continuing surveillance, which may be coupled with assessment of a supplier's quality systems against the appropriate Part of BS 5750.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 10, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

This British Standard specifies requirements for deflagration and detonation flame arresters suitable for general use in venting vessels, storage or transport tanks, protection of the fuel/air supply to gas burners and in industrial plant at temperatures not above 200 °C. It describes test methods which are used to classify arresters in terms of their performance so that they can be correctly matched to the intended application.

While arresters complying with this specification may be suitable for marine applications, additional requirements may apply for such use.

It does not cover arresters for welding equipment; these are covered in BS 6158.

NOTE 1 Unless otherwise specified in the text all pressures are gauge pressures and are expressed in bars.

1 bar = 10^5 N/m² = 10² kPa

NOTE 2 The titles of the publications referred to in this standard are listed on the inside back cover.

WARNING. The test methods of Appendix A, Appendix B, Appendix C and Appendix D involve the use of hazardous materials and procedures. It is assumed that only experienced persons familiar with the procedures and taking appropriate safety precautions will undertake such testing.

2 Definitions

For the purposes of this British Standard the following definitions apply.

2.1

arrestor (flame arrestor) (flame trap)

a device consisting of an arrestor element, an arrestor housing and associated fittings, used to prevent the passage of a flame (deflagration or detonation)

2.2

arrestor element

a permeable matrix with any associated immediate mounting which under specified conditions will prevent the transmission of flame

2.3

arrestor housing

a frame retaining the arrestor element as a unit for mounting on the appropriate plant or apparatus assembly

2.4

auto-ignition temperature

the ignition temperature of a gas or vapour as defined in BS 5501-1

2.5

deflagration

reaction in a combustion wave propagating at subsonic velocity by the process of heat transfer and diffusion

NOTE A deflagration may be confined, i.e. propagating within a container with a speed influenced by the container, or unconfined, i.e. propagating freely through an unobstructed atmosphere.

2.6

deflagration arrestor

an arrestor used to prevent the transmission of a deflagration

2.7

detonation

reaction in a combustion wave propagating at supersonic velocity

NOTE A detonation may be stable with a velocity equal to the velocity of sound in the burnt gas, or may be unstable (over-driven), with a higher velocity and pressure.

2.7

detonation arrestor

an arrestor used to prevent the transmission of a detonation

2.9

endurance burning

steady burning of a stabilized flame at or close to the arrestor element

2.10

hydraulic arrestor

an arrestor in which the element is formed by a continuous liquid phase through which discrete bubbles of gas pass as a discontinuous phase

NOTE The liquid is usually water.

2.11

maximum experimental safe gap (MESG)

the maximum gap of a joint of 25 mm width which prevents any transmission of an explosion in ten tests made under the conditions specified in BS 5501-5

2.12

quenching diameter

diameter of the largest circular aperture which will prevent flash-back of flame, in a premixed and stationary gas mixture, at a given temperature and pressure

NOTE It is customary to give values for the mixture having the minimum quenching diameter.