

SRI LANKA STANDARD 724 : 1985

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**SPECIFICATION FOR
GAS CARTRIDGES FOR PORTABLE
FIRE EXTINGUISHERS**

SRI LANKA STANDARDS INSTITUTION

SPECIFICATION FOR GAS CARTRIDGES FOR
PORTABLE FIRE EXTINGUISHERS

SLS 724:1985

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This standard does not purport to include all the necessary provisions of a contract.

SRI LANKA STANDARD
SPECIFICATION FOR GAS CARTRIDGES FOR
PORTABLE FIRE EXTINGUISHERS

FOREWORD

This Sri Lanka Standard was authorised for adoption and publication by the Council of the Sri Lanka Standards Institution on 1985-11-20 after the draft, finalised by the Drafting Committee on Fire Protection and Fire Fighting, had been approved by the Mechanical Engineering Divisional Committee.

All values in this standard have been given in metric units.

The gas cartridges specified in this standard are used in portable fire extinguishers.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or observation shall be rounded off in accordance with CS 102. Number of figures to be retained in the rounded off value shall be the same as that of the specified value in this standard.

The assistance derived from the publications of the Standard Association of Australia, the British Standards Institution and the Indian Standards Institution in the preparation of this standard is gratefully acknowledged.

1 SCOPE

This standard deals with gas cartridges made from low carbon steel for both high-pressure and low-pressure, intended for the storage of liquefiable/compressed gases having a nominal water capacity which do not exceed 500 ml.

This standard lays down the requirements for the materials to be used in the manufacture, design and construction, performance requirements, marking and testing of gas cartridges.

2 REFERENCES

CS 102 Presentation of numerical values.

3 DEFINITIONS

For the purpose of this specification the following definitions shall apply:

3.1 filling ratio : The ratio of the mass of gas introduced into a cartridge to the mass of water at 15 °C that fills the cartridge.

3.2 gas cartridge : A pressure container which fits into the fire extinguisher and which contains a liquefied or compressed gas, or a mixture of both, which is used to expel the extinguishing agent from the extinguisher. (see Fig.1)

4 TYPES

Gas cartridges shall be of the following types :

Type 1 : Low pressure gas cartridge. (Internal pressure not exceeding 3.5 MPa at 15 °C).

Type 2 : High pressure gas cartridge. (Internal pressure exceeding 3.5 MPa at 15 °C).

5 REQUIREMENTS

5.1 Material

The steel used in the manufacture of the body of the gas cartridges shall comply with the requirements of Tables 1 and 2.

TABLE 1 - Chemical composition of steel

Element	Analysis per cent max.
Carbon	0.25
Manganese	0.80
Silicon	0.30
Sulphur	0.06
Phosphorus	0.06

TABLE 2 - Mechanical properties of steel

Property	Value min.
Tensile strength	352 MPa
Yield strength	245 MPa
Percentage elongation (gauge length = $5.65 \sqrt{S_0}$)	25

NOTE - S_0 original cross-sectional area of the test piece in square millimetres.

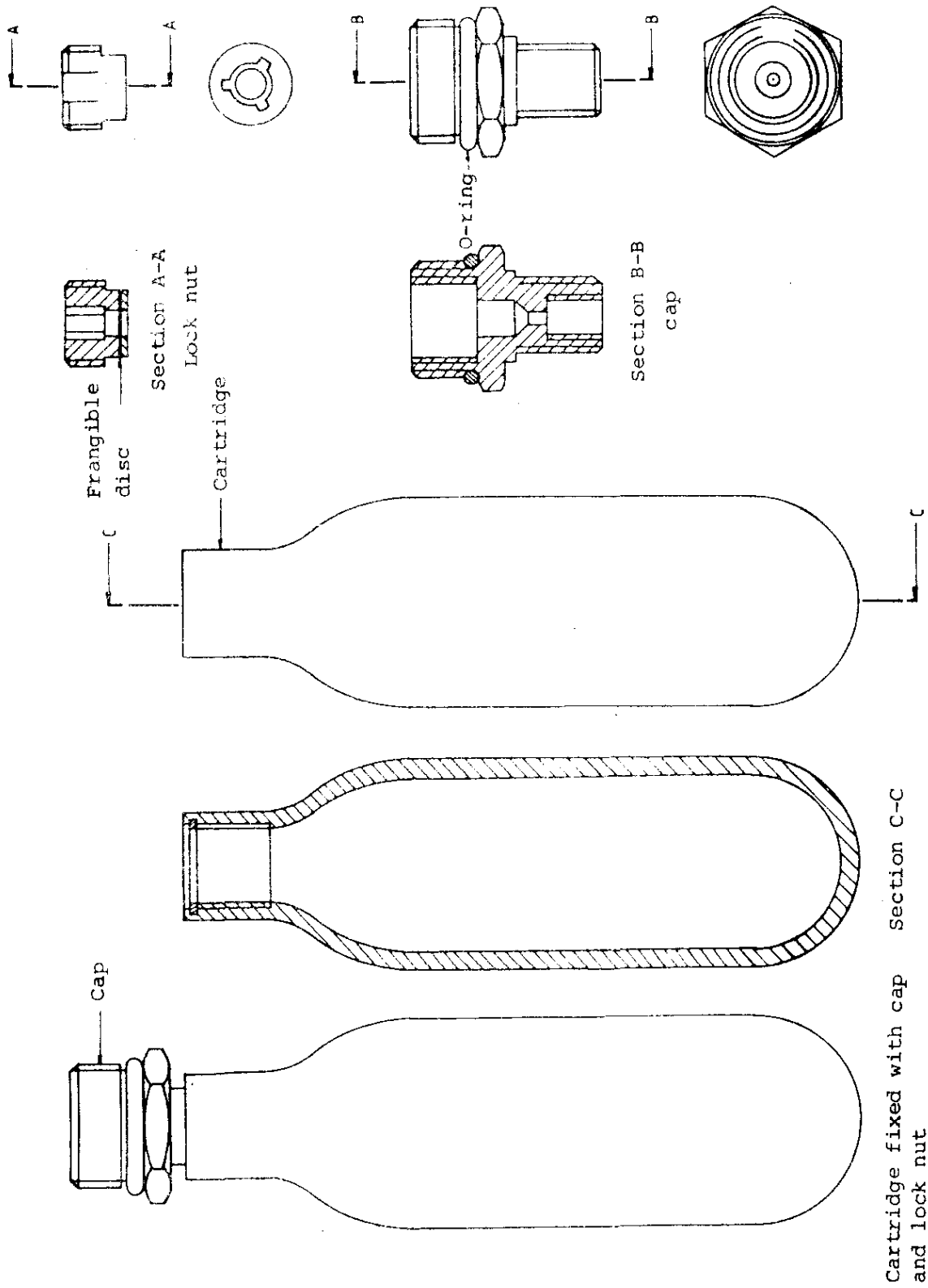


FIGURE 1 - Typical gas cartridge

5.2 Design

The calculation of the thickness of the pressure parts of the gas cartridge shall be in accordance with the following formula:

$$t = \frac{P D_o}{100R_o + P}$$

where,

- t is minimum finished thickness, in mm;
- P is nominal working pressure, in MPa;
- D_o is outer diameter, in mm; and
- R_o is yield strength of the material (value specified in 5.1).

5.2.1 The thickness of the shell shall in any case be not less than 2.5 mm.

5.2.2 When the ends (heads as well as bottoms) are formed by the forging of the cylindrical parts, the finished thickness in the centre of the formed end shall be as follows:

- a) It shall be not less than $1.5 t$ if the height of the domed part is greater than $0.25 D$ but less than $0.5 D$.
- b) It shall be at least $2 t$ when the height of the domed part is less than $0.25 D$.

5.2.3 The low pressure type gas cartridge shall be designed to withstand a test of twice the vapour pressure at 15°C or 5.25 MPa whichever is the greater.

5.2.4 The high pressure type gas cartridge shall be designed to withstand a rupture pressure of not less than 1.25 times the vapour pressure at 65°C or 25 MPa whichever is the greater.

5.2.5 The cartridge shall not exceed 50 mm nominal outside diameter nor 300 mm overall length and shall have a rounded base.

5.2.6 The cartridge and its assembly shall be such that it shall be capable of being securely fitted into the fire extinguisher.

5.2.7 All fittings of the cartridge shall either be of non-ferrous metal or of stainless steel.

5.3 Construction

5.3.1 The cartridge shall be constructed either by forging or drop-forging from a solid ingot or from seamless tube or by pressing from a flat plate. The end shall not be welded nor shall metal be

added in the process of closing. The hole in the bottom of the cartridge may be permitted to be welded provided the cartridge is annealed after welding.

5.3.2 Each cartridge shall be examined before closing in operation for external and internal surface defects, finished thickness and circularity of the cylindrical shell.

5.4 Corrosion protection

Gas cartridges shall be chemically unaffected by their contents and by the extinguishing medium. Any anticorrosion treatment given shall remain effective within the temperature range of efficient operation for which the gas cartridges are designed. The gas cartridges shall be protected externally against normal atmospheric influence.

5.5 Fittings

The discharge fittings of the cartridge shall be as given in 5.5.1 and 5.5.2.

5.5.1 *Frangible disc*

The cartridge may be sealed by a frangible disc retained in position by a lock-nut in such a manner that the disc may be easily pierced by the piercer fitted to the fire extinguisher head cap.

5.5.2 *Cap*

All cartridges shall be fitted with a removable cap to the threaded neck. The cap shall have ports at right angle to the axis of the cartridge so that the latter will not be violently propelled in case of accidental rupture of the frangible disc of the seal while in transit or storage.

5.6 Contents of cartridge

The gas contained in gas cartridges as defined in 3.2 shall be either carbon dioxide or nitrogen, or a mixture of both. Tracers may be added to facilitate leakage detection. The permissible deviation on nominal charges in gas cartridges shall be ± 2 g for cartridges of up to and including 70 g nominal charge and ± 5 g for those of over 70 g nominal charge.

6 MARKING

Each gas cartridge shall be clearly and permanently marked with the following information, preferably by embossing or punching, near its neck:

- a) Name and address of manufacturer or the trade mark;
- b) Name of gas/gases used in the cartridge and the nominal charge;
- c) The mass when empty and tolerance on the mass, in grams;

- d) The mass when full and tolerance on the mass, in grams;
- e) The date of manufacture; and
- f) The test pressure, in MPa.

7 TESTS

7.1 Tests for high pressure gas cartridge

7.1.1 *Proving test*

One cartridge in every 500, or one in the batch whichever is the smaller, shall be tested to destruction by internal hydrostatic pressure. Rupture shall not occur at a pressure of less than 1.5 times the design pressure, or 25 MPa whichever is the greater.

Should any container so tested rupture at a pressure of less than 1.5 times the design pressure of 25 MPa whichever is the greater the total batch represented by it shall be rejected.

Every cartridge subjected to this proof test shall be rejected.

7.1.2 *Routine test*

Every cartridge shall be subjected for a period of not less than 30 s to a pressure equal to the design pressure, i.e. 1.25 times the developed pressure of the gas at 65 °C. The container shall not show signs of leakage or permanent distortion.

7.2 Tests for low pressure gas cartridge

7.2.1 *Routine test*

Every cartridge shall be subjected for a period of 30 s to a pressure equal to twice the filling pressure of the gas at 15 °C or 5.25 MPa, whichever is the greater. The container shall not show signs of leakage or permanent distortion.

7.3 Test for leakage of gas

Care shall be taken to ensure that the container and the gas are free from moisture.

Every gas container shall be correctly charged and shall be tested for leakage of gas by one of the following methods:

- a) When the contents are checked by mass, the mass of the container shall be determined before and after a bond period of not less than 21 days.
- b) When a leak detector is used to check the contents, it shall give results at least as accurately as the 21-day bond period.

c) When the immersion method is used to check the contents, the container shall be filled and be completely immersed in a tank of clean water for 24 h. Means shall be provided for trapping escaping gas.

Containers showing loss of contents in excess of 0.05 per cent per day subject to a maximum loss of 10 per cent at any given time in any of the above tests shall be rejected.

7.4 Periodic hydraulic test

Every gas cartridge (high-pressure type and low-pressure type) shall be tested in accordance with 7.1.2 and 7.2.1 respectively at the end of ten years from the date of manufacture and thereafter at intervals of not exceeding five years.

SLS CERTIFICATION MARK

The Sri Lanka Standards Institution is the owner of the registered certification mark shown below. Beneath the mark, the number of the Sri Lanka Standard relevant to the product is indicated. This mark may be used only by those who have obtained permits under the SLS certification marks scheme. The presence of this mark on or in relation to a product conveys the assurance that they have been produced to comply with the requirements of the relevant Sri Lanka Standard under a well designed system of quality control inspection and testing operated by the manufacturer and supervised by the SLSI which includes surveillance inspection of the factory, testing of both factory and market samples.

Further particulars of the terms and conditions of the permit may be obtained from the Sri Lanka Standards Institution, 17, Victoria Place, Elvitigala Mawatha, Colombo 08.



SRI LANKA STANDARDS INSTITUTION

The Sri Lanka Standards Institution (SLSI) is the National Standards Organization of Sri Lanka established under the Sri Lanka Standards Institution Act No. 6 of 1984 which repealed and replaced the Bureau of Ceylon Standards Act No. 38 of 1964. The Institution functions under the Ministry of Science & Technology.

The principal objects of the Institution as set out in the Act are to prepare standards and promote their adoption, to provide facilities for examination and testing of products, to operate a Certification Marks Scheme, to certify the quality of products meant for local consumption or exports and to promote standardization and quality control by educational, consultancy and research activity.

The Institution is financed by Government grants, and by the income from the sale of its publications and other services offered for Industry and Business Sector. Financial and administrative control is vested in a Council appointed in accordance with the provisions of the Act.

The development and formulation of National Standards is carried out by Technical Experts and representatives of other interest groups, assisted by the permanent officers of the Institution. These Technical Committees are appointed under the purview of the Sectoral Committees which in turn are appointed by the Council. The Sectoral Committees give the final Technical approval for the Draft National Standards prior to the approval by the Council of the SLSI.

All members of the Technical and Sectoral Committees render their services in an honorary capacity. In this process the Institution endeavours to ensure adequate representation of all view points.

In the International field the Institution represents Sri Lanka in the International Organization for Standardization (ISO), and participates in such fields of standardization as are of special interest to Sri Lanka.