SRI LANKA STANDARD 740 : 1986

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SPECIFICATION FOR
AUTOMOTIVE RADIATOR CORES

SRI LANKA STANDARDS INSTITUTION

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SLS 740:1986

Gr. 5

SRI LANKA STANDARDS INSTITUTION
53, Dharmapala Mawatha,
Colombo 3,
Sri Lanka.

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Sri Lanka Standards are subject to periodical revision in order to accommodate the progress made by industry. Suggestions for improvement will be recorded and brought to the notice of the Committees to which the revisions are entrusted.

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

SRI LANKA STANDARD

SPECIFICATION FOR AUTOMOTIVE RADIATOR CORES

FOREWORD

This Sri Lanka Standard was authorised for adoption and publication by the Council of the Sri Lanka Standards Institution on 1986-05-16 after the draft, finalised by the Drafting Committee on Automotive Radiators, has been approved by the Mechanical Engineering Divisional Committee.

The manufacture of automotive radiator cores is a very successful indigenous industry. In the preparation of this standard careful thought has been given to manufacturing technology and the testing facilities available in the country, and the expected quality of the radiator cores.

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 analysis, shall be rounded off in accordance with **CS 102**. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

The valuable assistance derived from the publications of the British Standards Institution, the Indian Standards Institution, the Japanese Standards Association and the Society of Automotive Engineers of the United States of America is gratefully acknowledged.

1 SCOPE

This Sri Lanka Standard covers the dimensions, general requirements and methods of test for automotive radiator cores for use on motor cars, trucks, tractors and other machinery such as earth moving equipment and stationary engines.

This does not include radiator cores for cooling oil.

2 REFERENCES

BS AU 90 Soft solders for Automobile use.

BS 2870 Rolled copper and copper and copper alloys : sheet, strip and foil.

3 DEFINITIONS AND NOMENCLATURE

For the purpose of this standard the following definitions and the nomenclature given in Fig. 1 to Fig. 3 shall apply.

3.1 Sheet : Flat material of exact length, over 0.15 mm up to and including 10.0 mm thick and over 450 mm in width.

3.2 Strip : Material over 0.15 mm up to and including 10.0 mm thick, of any width and generally not cut to length. Usually in coil, but may be flat or folded.

3.3 Foil : A material of 0.15 mm thick and under, of any width, flat or in coil.

3.4 tube and plate fin core : An assembly of water-carrying tubes, of any cross sectional form, the tubes being joined by heat conducting fins or plates common to all tubes or groups of tubes (see Fig.1).

3.5 ribbon cellular core : A number of water passages made by joining metal ribbons at the edges and grouped to form a cellular structure. Parts of the cellular structure may be of formed or flat ribbon which is not a part of the water passages (see Fig. 2)

3.6 tube and corrugated fin core : An assembly of water tubes in line in the direction of air flow and joined by corrugated conduction fins inserted between adjacent line of tubes (see Fig. 3)

4 TYPES OF RADIATOR CORES

Radiator cores shall be of the following types :

(a) Tube and plate fin core ;

(b) Ribbon cellular core ; and

(c) Tube and corrugated fin core.

5 REQUIREMENTS

5.1 Materials

5.1.1 Radiator fins shall be made of C 104 or C 106 copper foils specified in BS 2870 : 1980 or an equivalent.

5.1.2 The water tubes of radiators shall be made of CZ 106 brass foils or strips specified in BS 2870 : 1980 or an equivalent.

5.1.3 The header plates shall be made of CZ 106 brass sheets specified in BS 2870 : 1980 or an equivalent.

5.1.4 The soldering lead used shall preferably conform to BS AU 90.

5.2 Design data

The manufacturer or supplier may call for following information from the purchaser in case the radiator cores have to be designed :

(a) The brake power rating of engine ;

(b) Heat to be dissipated by cooling water at full load ;

(c) Application of the engine ;

(d) The maximum temperature of the outlet water from engine at :

i) Specified ambient conditions,

ii) Specified water flow, and

iii) Specified air flow.

(e) The dimensional limitations of the space available for fixing the radiator ; and

(f) Details of any other heat exchanger, for example, air conditioner condenser, oil cooler etc., likely to be fitted in the vehicle and its location in relation to the radiator.

5.3 Workmanship and finish

5.3.1 The radiator cores shall be free from dents, breakages or other physical defects.

5.3.2 Joints on radiator cores shall have no discontinuity and the soldering material shall be evenly distributed throughout.

5.4 Dimensions

The dimensions of radiator cores may vary according to engine requirements. These shall be subject to agreement between the purchaser and the manufacturer.

6 MARKING

Each radiator core shall be legibly and indelibly marked with ;

(a) Manufacturer's name or trade mark ;

(b) Serial number ; and

(c) Month and year of manufacture.

The radiator cores may also be marked with the certification mark (illustrated on page 4) on permission being granted for such marking by the Sri Lanka Standards Institution.

7 METHODS OF TEST

7.1 Internal cleanliness test

7.1.1 *Visual inspection*

The core assemblies shall be visually inspected as received for presence of zinc salts or any other harmful chemicals on the extension surfaces. The presence of such chemicals shall not be permitted. The paint on the outer surfaces of core assemblies may be removed by using organic solvents.

7.1.2 The radiator core assemblies shall be cleaned to remove flux residues by flushing or other suitable method after soldering operations have been completed. Both inside and outside of the assemblies shall be cleaned.

7.1.3 The quantities of zinc salts and chloride content present in the cleaned core (see 7.1.2) shall be determined by an approved procedure subject to agreement between the purchaser and the manufacturer. The presence of salts containing more than 0.025 g of zinc or chloride per litre of radiator core volume capacity shall be considered unsatisfactory and sufficient cause for rejection.

7.2 Pressure/Leakage test

7.2.1 *Testing arrangements*

This test shall be conducted in a suitably sized tank full of water sufficient to immerse the radiator core. Provision shall be made for connecting the radiator core to a compressed air line.

7.2.2 *Procedure*

The radiator core shall be immersed in water at normal temperature and subjected to an internal air pressure of twice the cap pressure for at least one minute.

Note - The applicable cap pressure shall be agreed between the purchaser and the manufacturer.

7.2.3 *Evaluation*

During the test no sign of air leakage shall be noticeable.

8 SAMPLING

For the purpose of testing radiator cores, the sampling scheme for tests shall be as agreed to between the purchaser and the manufacturer.

9 CONFORMITY TO STANDARD

The manufacturer shall satisfy himself that the radiator cores conform to the requirements of this standard and shall furnish a certificate to this effect from a recognized body or an institution to the purchaser or his representative if requested.

Certification Mark of the Sri Lanka Standards Institution.

Note - The use of the Sri Lanka Standards Institution Certification Mark (SLS Mark) is governed by the provisions of the Sri Lanka Standards Institution Act, and the regulations framed thereunder. The SLS Mark on products covered by a Sri Lanka Standard is an assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by the Institution and operated by the producer. SLS marked products are also continuously checked by the Institution for conformity to that standard as further safeguard. Details of conditions under which a permit for the use of the certification Mark may be granted to manufacturers or processors may be obtained from the Sri Lanka Standards Institution.

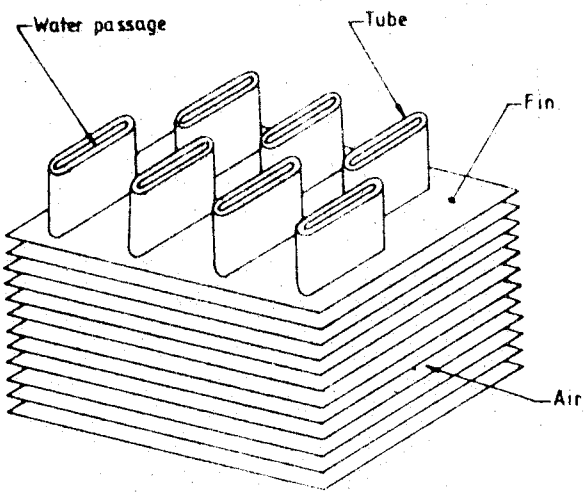

FIGURE 1 - Tube and plate fin core

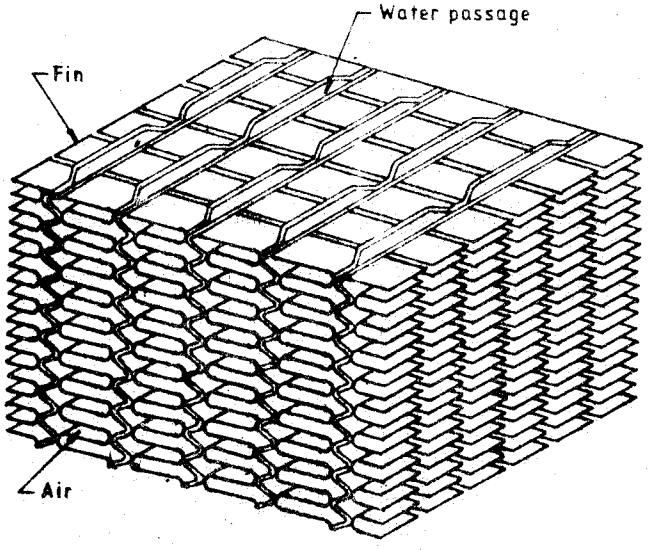

FIGURE 2 - Ribbon cellular core

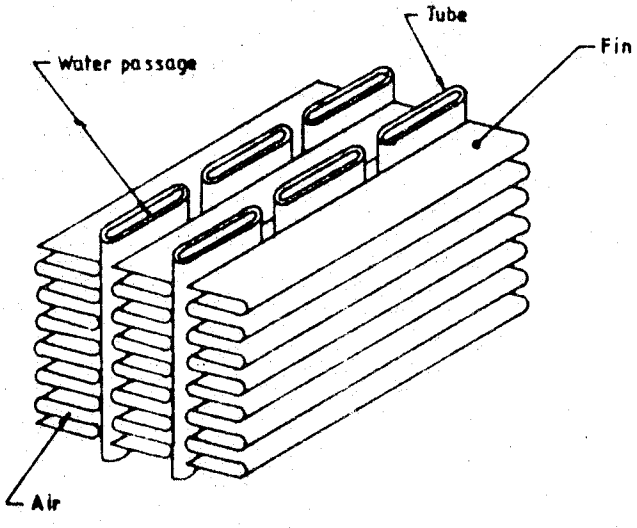

FIGURE 3 - Tube and corrugated fin core

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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.*

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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.

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