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मानक

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“पुराने को छोड़ नये के तरफ”

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“Step Out From the Old to the New”

IS 11329 (1985): Specification for Finned Type Heat Exchanger for Room Air Conditioner [MED 3: Refrigeration and Air Conditioning]



“ज्ञान से एक नये भारत का निर्माण”

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“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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Indian Standard

SPECIFICATION FOR
FINNED TYPE HEAT EXCHANGER FOR ROOM
AIR CONDITIONER

1. Scope — Covers the design, construction, inspection and testing of finned type heat exchangers for heating and cooling applications in room air conditioners.

2. Types and Nomenclature

2.1 Types — Finned type heat exchangers can be classified as follows:

- a) Plate fin and tube type;
- b) Plate fins with collars and tube type; and
- c) Corrugated plate fins with collars and tube type.

2.2 Nomenclature — For the purpose of this specification, the different parts of a heat exchanger shall be designated in accordance with the following table:

- a) Straight tube;
- b) 'U' type tube;
- c) Plain plate fin;
- d) Plain plate fins with collars;
- e) Corrugated plate fin with collars;
- f) Return bends;
- g) Tube sheet;
- h) Inlet header;
- i) Outlet header;
- k) Inlet connection; and
- m) Outlet connection.

3. Terminology

3.1 Design Pressure — The pressure used in design calculations for the purpose of determining the minimum thickness of the various component parts. It is obtained by adding a minimum of 10 percent for any other figure as may be agreed to between the purchaser and the manufacturer to the maximum working pressure.

3.2 Design Stress — The maximum stress from all sources permitted for the materials of construction at the design temperature.

3.3 Design Temperature — The temperature used in design of the exchanger for determining the minimum thickness of the component parts of the exchanger. It is taken as 10°C higher than the maximum temperature that any part of the exchanger is likely to attain in course of operation.

Adopted 25 June 1985

© December 1985, ISI

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3.4 Nominal Width — Nominal width shall be width of the heat exchanger between two tube sheets in millimetres rounded off to nearest integer.

3.5 Nominal Height — Nominal height shall be the height of the finned surface in millimetres (in case of plate fin type it shall be height of individual fin).

3.6 Nominal Depth — Nominal depth shall be depth of heat exchanger-finned coil, in millimetres (in case of plate fin type coil it shall be the width of individual fin).

3.7 Nominal Tube Diameter — Nominal tube diameter shall be the outside diameter of the individual tube.

4. Fluid Temperature Limitation for Pressure Part — The maximum permissible operating fluid temperature for pressure parts is 160°C.

5. Corrosion — Due consideration shall be given to the selection of material and to other anti-corrosion measures, especially in the case of fin and the like joints.

6. Tube Arrangements

6.1 Tubes shall be laid out either on equilateral triangular pitch or on square pitch.

6.2 Tube Pitch — Tubes shall be placed with a minimum centre-to-centre distance 1-1/3 times the outside diameter of the tube.

6.3 Tube Expansion — In order to achieve mechanical bonding between tube and plate fins, tubing shall be expanded by hydraulic or any other expansion method.

7. Material

7.1 Copper Tubes — The material for copper tube shall be deoxidized high residual phosphorous copper.

7.2 Aluminium Tubes — All aluminium tubes material shall conform to IS : 737-1974 'Wrought aluminium and aluminium alloys, sheet and strip (for general engineering purposes) (Grade 19000 — H4 or 'O' (second revision))'.

7.3 Aluminium Fins — Material for aluminium fins shall conform to IS : 737-1974 (Grade 19000 — 'H2').

8. Fin Tightness — After expansion each coil shall be checked for fin tightness which shall be checked manually for each coil. Correct fin spacing (1.7 to 2.5 fins per mm) depending upon design requirement shall be checked.

9. RAC Coils

9.1 Cleanliness Requirements — After cleaning all surfaces shall be free of oil, grease or other solvent — insoluble dirt to the staining or smudges can be detected on the cloth.

Note — Excessive hard rubbing of aluminium or zinc surfaces may give metallic smudges on the cloth, which are not to be confused with oil lines.

9.2 Dehydration — The completed coils shall be cleaned in accordance with 9.1. Hot air shall be passed through the coil for a specified period, so that moisture content is kept within limits specified in 9.3.

9.3 Contamination Limits

9.3.1 Moisture content — Moisture content shall not exceed the equivalent of 7°C dew point air.

9.3.2 Referee check method — Gas within the device to be recirculated through dew point until the dew point stabilizes.

10. Pressure Test — Each coil shall be checked at a pressure not less than that given below:

<i>Refrigerant Used</i>	<i>Test Pressure</i> (Tolerance : + 0.35 bar)
R 12	16.8 bar
R 22	24.6 bar

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

AMENDMENT NO. 1 APRIL 1995
TO
IS 11329 : 1985 SPECIFICATION FOR FINNED TYPE
HEAT EXCHANGER FOR ROOM AIR CONDITIONER

(*Page 2, clause 6.1*) — Substitute the following for the existing clause:

‘6.1 Tubes shall be laid out either on equilateral triangular pitch or on isosceles triangular pitch or on square pitch.’

(*Page 2, clause 8*) — Insert the following after the last sentence:

‘The copper tube should be expanded to $D+0.1$ mm minimum to get a firm bonding between aluminium fin and copper tube, where D is the hole diameter of the aluminium fin.

8.1 To check proper bonding between copper tube and fin take out a sample coil out of a batch of 100 coils. Cut out a piece of 50 mm × 50 mm and pull out the aluminium fins. The tube should be checked visually. If there is clear scoring marks on the tube, the bonding is proper.’