



CORPORATE STANDARD

AA 049 00 02

Rev. No. 02

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PRESERVATION, PACKING AND MARKING OF HEAT EXCHANGER TUBES

1.0 SCOPE:

This standard stipulates the requirements of preservation, packing and marking of ferrous and non ferrous heat exchanger tubes.

2.0 PRESERVATION:

2.1 End Caps/Guides:

All the tubes shall be provided with plastic end caps of conical shape on both sides, in order to avoid ingress of water and other foreign matter and to serve as a guide for tube insertion through the support plates during assembly of the Heat exchangers.

A typical figure of the plastic guide is shown in the fig 2 for guidance.

2.2 Rust prevention:

All carbon steel tubes shall be applied with suitable temporary rust preventive on the outer surface of the tubes and required quantity of rust inhibitive powder shall be inserted inside the tubes before end capping.

3.0 PACKING:

3.1 The tubes shall be wrapped with polythene sheet in order to avoid movements and rubbing and packed in wooden cases (as an alternate bubble sheet and thermocol also acceptable) with suitable cushioning materials. The bottom of the case shall be rigid to enable the tubes to maintain straightness. Special lifting tackles, including beams, wherever necessary shall be provided with each case to avoid damage during transit. The case shall be fastened with corner metal plates and nailed at all cleats. The reinforcing bolts shall be bound with band steel.

A suitable amount of desiccant such as silica gel shall be placed in each packing box.

3.2 Each package shall be of convenient weight for ease in handling. The weights shall not exceed 2000 kg (Gross) when tubes longer than 7000 mm are ordered.

3.3 The recommended packing case design and the method of packing is illustrated in Fig. No.1 Any alternate method of packing shall be submitted to BHEL for approval.

Revisions :

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**4.0 MARKING:****4.1** Each tube shall be stenciled with the following information:

- a) BHEL order number:
- b) BHEL Specification No.
- c) Melt/Heat No:
- d) Size of tube:
- e) Supplier 's mark

4.2 A metal label shall be securely attached to each packing case, punched with the following details :

- a) BHEL order number:
- b) BHEL Specification No.
- c) Consignment or Identification No.
- d) Size of the tubes and Total weight
- e) Supplier's Name

4.3 The packing case shall be marked with the following symbols in order to avoid damage during transit:

- a) A mark indicating UP-DOWN position of the case.
- b) A mark indicating that the case shall not be given any impact.
- c) A mark indicating that the case shall be kept free from contact with moisture.
- d) A mark showing the slinging position.

5.0 HANDLING AT PORT, SITE, SHOP, ETC., 9INCLUDING TRANSPORTATION):**5.1 Procedure:**

If the tube length is more than 7000 mm invariably beams are ordered by BHEL, two in numbers which are supplied with first consignment by the vendor.

On receipt of consignment at port, boxes and lifting beams shall be inspected. If boxes are found broken, inspection of tubes shall be carried out. Broken box shall be suitably repaired before sending to site. Boxes shall be inspected before loading on the truck/trailer at supplier's works. Repair shall be carried out if required.

Invariably lifting beam shall be used for handling of boxes.

Boxes shall be placed on the floor on supports (at least 300 mm above the floor). Distance between supports shall not be more than 500 mm. While handling /stacking, vertical direction as marked on the box shall be followed.

Boxes shall be stacked on each other in such a way that are upright, straight and not projecting outside the lower box. Normally not more than 3 boxes shall be kept on each other.



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5.2 Loading of boxes on trailers/trucks:

Preferably trailer shall be of flat floor and its length shall not less than the box. However, in case it is not feasible, following is recommended:

<u>Box length max. in metres</u>	<u>Floor length not less than in metres</u>
20	18.5
15	14
10	9.5
8	7.6

In case, the floor of trailer/truck is not flat, following procedure shall be adopted:

- Packers of suitable strength shall be placed on the floor such that when boxes are placed, the packer's bottom of the boxes is horizontal.
- Packers shall be placed such that at the driver end, the box projects maximum 300 mm from the support and on the opposite end, it is 300 mm less than end of the floor such that total projection from last support shall not be more than as specified above.
- Boxes shall be placed on each other as specified in clause 5.1. The each vertical row shall be secured tight using ropes /wires and tightened with each other and secured with the trailer floor suitably. The gap between the tightening rope/wire shall not be more than 2 metres.
- Out of two lifting beams, one number shall be sent with first consignment and the second lifting beam with the last consignment.
- Boxes shall be covered with tarpaulin and tightened suitably so as to prevent seepage of water.

5.3 Receipt at site:

The boxes shall be again inspected at the site for any breakage, if found shall be reported back to concerned unit.

The boxes from trailer/truck shall be lifted using lifting beam only supplied with the first and last consignment and stacked in the store in line with clause 5.1.

The boxes shall be covered with tarpaulin to prevent water seeping in the boxes.

6.0 REFERRED STANDARDS (LATEST PUBLICATIONS INCLUDING AMENDMENTS):

NIL

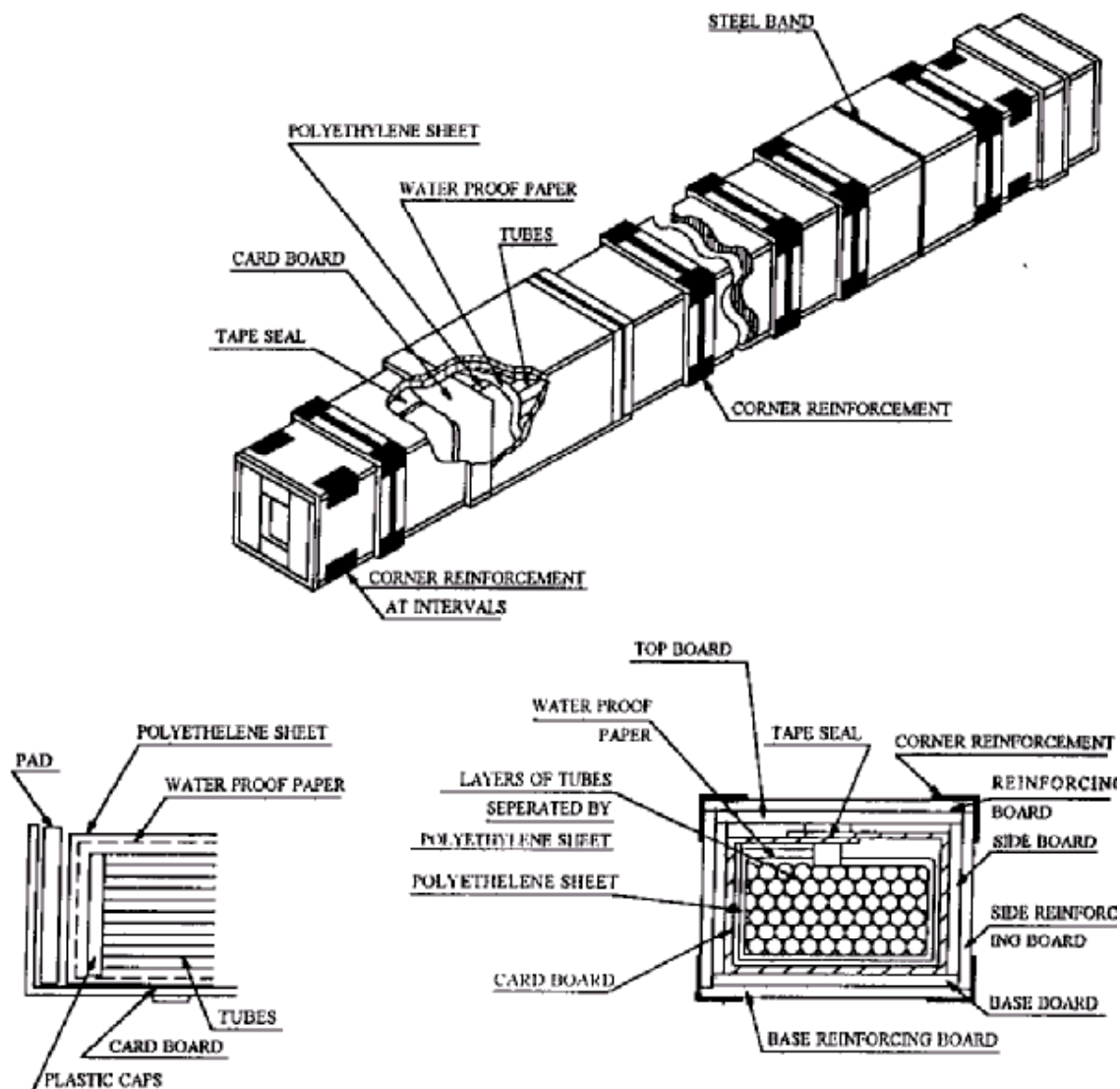


FIG. 1 TYPICAL PACKING OF HEAT EXCHANGER TUBES

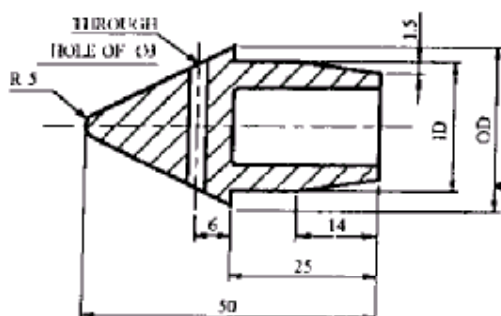


FIG. 2 TYPICAL DRAWING OF CAP FOR TUBE END

(All dimensions are in mm)