Tech Sheet #126
Heat Exchange Institute
1300 Sumner Avenue • Cleveland, Ohio 44115-2851 • 216-241-7333 • Fax: 216-241-0105 • www.heatexchange.org

ACCEPTED PRACTICES FOR PACKAGING, TRANSPORTATION, SHIPPING, AND HANDLING OF U-BEND AND STRAIGHT FEEDWATER HEATER TUBES & STRAIGHT CONDENSER TUBES

1.0 SCOPE

1.1 This guideline defines the recommended requirements for Packaging, Transportation, Storage & Handling of Copper, Copper Alloy, Monel, Carbon Steel, and Stainless Steel U-bent and Straight feedwater heater tubes, as well as straight condenser tubes. These parameters are designed to minimize the risk of damage to the packaging and tubes.

2.0 GENERAL

2.1 All products shall be handled at all times in a safe and cautious manner to prevent damage to the material.

2.2 Finished tubes must be protected from chlorides, halides, heavy metals and other sources of contamination.

2.3 Personnel are cautioned against bringing foreign objects in contact with the product such as rings and belt buckles including bare skin. Protective gloves are recommended for those who will be handling the finished product.

2.4 Equipment used to lift, store or transport all products shall be periodically inspected to ensure safe conditions.

3.0 SHIPPING CONTAINER FOR DOMESTIC & INTERNATIONAL SHIPMENTS

3.1 The inside of the box may be fully lined with plastic and overlapped to reduce water contact with tubular surfaces. When wooden boxes are used, they shall be reinforced with vertical battens. Tubes shall be packed in such a manner to prevent tube fretting. Boxes shall comply with applicable domestic and foreign government standards.

3.2 In the case of U-tubes, each row of tubes shall be tightly fastened to prevent tube movement. Sturdy row dividers, or combs, should be employed to separate the various tube schedule bends.

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3.3 The maximum box gross size, weight, and number of tubes per box shall be agreed upon by the manufacturer and purchaser and be suitable for commercial shipping practices.

3.4 Optional plastic end caps or plugs can be specified by the customer.

3.5 Unnecessary flexing of the straight lengths and U-bends shall be minimized.

3.6 Desiccant packs maybe included inside plastic sheeting to reduce the possibility of condensate forming in the box.

4.0 BOX CONSTRUCTION

4.1 Box construction shall minimize the amount of nails, staples, screws, or similar fasteners. No nails, staples, or sharp protruding objects shall be present on the inside of the box, which may come in contact with the tubes.

4.2 Lids are to be secured using flat steel bands or other suitable material.

4.3 The maximum number of tubes per box shall be in accordance with the manufacturers' packaging capabilities and customers' requirements.

5.0 BOX MARKING

5.1 Box marking and identification labels such as "Lift Points", "No Forklift", "This End Up", "Fragile", "Keep Dry", "Center of Gravity", etc., shall be clearly marked and visible.

5.2 Customer requirements such as packing lists, order numbers, etc., shall be clearly marked and securely attached to each box as required.

5.3 In the case of feedwater heater tubes, the U-bend end of the box shall be identified.

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6.0 HANDLING, LOADING, & UNLOADING

6.1 To prevent damage during loading and unloading of tubes from a truck or rail car, the boxes should be adequately supported to prevent excessive deflection.

6.2 Handling of U-bend and straight tube boxes with a forklift only is not recommended.

6.3 Manufacturer and freight handler shall load boxes in a safe manner to prevent damage during transit.

6.4 Partial boxes should be positioned appropriately to prevent damage.

6.5 If boxes cannot be fully supported, extra bracing maybe needed to prevent damage.

7.0 BOX STORAGE

7.1 It is recommended that all storage be indoors and in a clean, dry environment.

7.2 When outdoor storage is necessary, the boxes shall be stored flat and elevated to keep them protected from rain, snow, etc.

7.3 Boxes that are stored outdoors shall be adequately covered and protected.

7.4 Stacking height shall be reviewed by the manufacturer upon customer request.

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