
TECHNICAL ORDER

PACKAGING, PACKING, AND STORAGE OF ALUMINUM ALLOY SHEET AND PLATE

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NOTE

If material is scratched, nicked or otherwise damaged during the packaging and handling process, it shall be resubmitted for inspection as to serviceability prior to completion of the packaging process. This action is necessary to assure delivery of usable material.

1. **PURPOSE.** To outline procedures for the preservation, packing, handling, and storage of aluminum alloy sheet and plate.
2. **GENERAL.** To prevent damage to aluminum alloy sheet and plate in shipment, handling, storage and from the packaging material, the metal must be protected from scratching, nicks, gouges, chafing, moisture, corrosive packaging material and other corrosion inducing environments and conditions. In most instances, where the material is allowed to be scratched, nicked, gouged or etched (corroded), it is disposed of as unserviceable. Disposal action is taken because such damage provides an easy path for corrosion attack and acts as notches (stress riser) which will cause fatigue failure when the material is under stress.

3. **CLEANING.**

- a. Before preservation and packaging, contaminants such as grease, oil, dirt, moisture, condensation, frost or other foreign matter known to be injurious to the material, will be removed.

NOTE

An evenly dispersed clean oily film on the sheet strip or plate which was applied by the manufacturer shall not be considered a contaminant when re-packing directly from the manufacturer's original container/package.

WARNING

Provide adequate ventilation when using cleaning solvent (Federal Specification P-D-680, Type II). Avoid prolonged breathing of vapors and minimize skin contact.

b. When a solvent is required to remove contaminants, method C-3 of TO 00-85-3 should be applied using solvent conforming to Federal Specification P-D-680, Type II. Cleaning will be accomplished by brushing, soaking, scrubbing or wiping. Materials that would scratch or abrade the surface will not be used. Metal should be dry before applying preservatives or packaging materials.

4. PRESERVATION, PACKAGING AND PACKING.

a. PRESERVATION AND PACKAGING. For the purpose of preservation and packaging, aluminum alloy sheet and plate is divided into three groups:

- Clad surfaces
- Bare (nonclad) surfaces
- Roofing and siding sheet

(1) Clad surfaces - A clad surface is a thin coating of pure aluminum applied over the surface of the aluminum alloy metal. Material with a clad coating is usually identifiable by the trade name Clad, Alclad or Pure Clad stamped on the surface of the metal. The clad surface provides adequate protection against corrosion provided the material is kept dry; therefore, a contact preservative (oil-ing) is not required. It is essential, however, that clad surfaces be protected against scratches or abrasion since such damage will permit corrosion of the alloyed metals under the clad coating. To protect against this type damage clad surfaces must be interleaved with minimum 15 pound basis weight paper conforming to type I, Specification MIL-P-17667, between each two sheets of metal and between the metal and wood of the box. Interleaving will be accomplished concurrent with the packing process outlined in subparagraph b. below.

(2) Bare (nonclad) Surfaces. Aluminum alloy which do not have clad coatings are less resistant to corrosion and therefore require coating of the surfaces to impair corrosion attack. The plate, sheet/strip (including edges) shall be evenly coated with oil conforming to Specification MIL-L-7870. Interleaving with paper is not generally required. The oil may be applied by spray, dip or

by soaking a lint free cloth such as FED Spec DDD-C-301 (cheese cloth) in the oil and swabbing a thin, evenly dispersed coating over the surface of the sheet.

CAUTION

After the oil is applied, the metal shall be packaged immediately or stored where it is protected from dust particles and other contaminants.

(3) Roofing and Siding Sheet - Because of material composition and end use, preservation of this material is not required.

b. PACKING. Sheet and plate will be separated according to kind, size, and condition. Aluminum alloy sheet and plate shall not be mixed with other metals in the same container. To prevent movement of the material within the container, boxes will be of dimensions just sufficient to accommodate the material and, when applicable, the case liner. Whenever such dimensions are not practicable, the material will be blocked firmly to prevent movement in any direction. Paper conforming to Type I, Specification MIL-P-17667 will be used to prevent direct contact of the metal with the top or bottom of the container, the case liner, or with any hygroscopic blocking and bracing material.

(1) Containers - Sheet and plate will be packed in domestic or export type containers, as applicable, constructed in accordance with TO 00-85-5 and TO 00-85-6, instructions from the local packaging control office or other appropriate staff level. Unless otherwise authorized gross weight of containers when packed for shipment shall not extend 350 pounds. Manufacturers' original containers already prepared for the type shipment required (domestic or export) will be utilized whenever possible and not opened and repacked solely for compliance with this technical order.

NOTE

For general packaging and shipment, it is recommended that packs be limited from 5 to 8 sheets depending on thickness/weight.

(2) Case Liner - Export type containers will be provided case liners fabricated from water-proof barrier material conforming to class H-2, Specification UU-P-271. Sufficient sheets of the barrier material will be joined together by overlapping and sealing with adhesive conforming to Specification MIL-A-140 or tape conforming to type 1, class 3, Specification PPP-T-60, providing a continuous waterproof sheet. This sheet must cover the entire bottom, ends, and sides of the box and must be in place before the first sheet of metal is placed in the container.

Pads formed by folding Specification MIL-P-17667 paper should be placed between the corners of the sheet metal and the waterproof barrier to prevent puncture of the barrier material. After the last sheet of metal is placed in the container, the case liner will be completed and all seams sealed with the adhesive or tape specified above.

(3) Coiled Sheet Pack - This pack is for immediate use and is limited to aluminum sheets not exceeding 0.016 inch in thickness. The use of commercial fiber drums, minimum 6 ply, telescope type or equal with fiber ends is authorized. The number of sheets to be packed will be restricted to the maximum quantity that can be rolled without distortion, except the gross weight of the packed drum shall not exceed 150 pounds. Paper referenced in subparagraph a. above will be interleaved between the sheets and placed between the metal and the container walls. The ends of the sheets may be secured with tape conforming to Specification PPP-T-60.

5. STORAGE AND HANDLING.

a. All aluminum alloy sheet and plate will be stored in a dry, fully enclosed space and will not be exposed to weather and other corrosion-inducing conditions which would render the material unserviceable for use.

b. Aluminum should never be stored when it is wet and should not be placed where it is liable to become wet later. If aluminum is wet when it is delivered, it should be dried thoroughly before storing. This may be done by evaporation in air or by dry air currents. Once safety dry, the metal

should not be stored near such obvious sources of moisture as steam pipes or water pipes and should be kept at a reasonable distance from open doors and windows. Even if the package is wrapped with waterproof paper, the improbability of obtaining a perfect seal makes outdoor storage highly undesirable. So-called waterproof packages are designed solely for the protection of the metal during shipment and are not meant to withstand any extended exposure to the weather.

c. It is desirable to avoid contact between aluminum and other materials since this sometimes results in scratches or other marks on the aluminum. Sheet and plate stored on racks for issue purposes will be interleaved with paper as prescribed in paragraph 4.a. It is also good practice to keep aluminum away from such chemicals as caustics, nitrates, phosphates, and most acids. In the continuous use of large quantities of metal, the oldest stock should be used first. Occasional checking of the stock on hand will help eliminate any serious corrosion. Aluminum has a high natural resistance to corrosive conditions normally encountered during shipment and storage, and with a little care the metal will keep its original appearance for a long time. In handling, care will be exercised to prevent creasing, wrinkling, bending, and scratching material. Under no circumstances will unboxed sheet metal be dragged across floors or transported on hand truck or trailer, etc., without being adequately protected.

6. MARKING. In addition to any special markings required, marking will be in accordance with the requirements of Standard MIL-STD-129.

