
PACKAGING FOR ELECTRONIC CONSOLES

1.0 SCOPE

This standard provides methods for the protection of electronic consoles subject to damage from environmental conditions (i.e., shock, vibration, humidity, etc.) and from field forces (i.e., electrostatic, electromagnetic, radioactive, etc.).

2.0 REFERENCE

2.1 LMSC Documents

<u>Title</u>	<u>Reference</u>
2.1.1 Barrier, Electrostatic Free	QPL MIL-B-81705
2.1.2 LMSC Packaging Standard	LPS 40-001

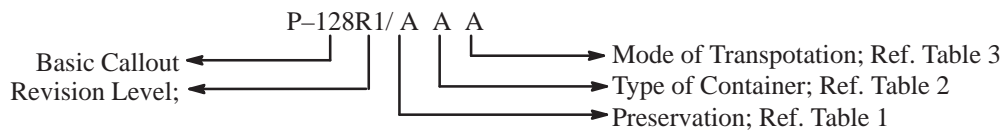
2.2 Government/Military Documents

<u>Title</u>	<u>Reference</u>
2.2.1 Barrier, Electrostatic Free	QPL MIL-B-81705, Type I
2.2.2 Box, Fiberboard	PPP-B-636
2.2.3 Box, Wood-Cleated	PPP-B-601
2.2.4 Boxes, Wood-Cleated, Skidded, Loadbearing Boxes	MIL-B-26195
2.2.5 Desiccant, Bagged	MIL-D-3464
2.2.6 Marking for Shipment and Storage	MIL-STD-129
2.2.7 Preservation-Packaging Methods of	MIL-P-116
2.2.8 Quality of Wood Members	MIL-STD-731

3.0 REQUIREMENTS

3.1 PACKAGING CALLOUT

- 3.1.1 Unit packaging shall be in accordance with the designated requirements selected from Table 1, Table 2 and Table 3, as invoked by the Lockheed Packaging Standard (LPS) callout on the procurement document. The LPS suffix letters following the basic callout (P-128R1) identifies the preservation (Table 1), type of container (Table 2), and mode of transportation (Table 3).



3.2 GENERAL

- 3.2.1 The design and construction standards specified herein are minimum requirements. Deviations to these requirements may be permitted, providing that such actions meet or exceed the minimum provisions of this standard, and result in no additional cost to LMSC.

3.2.2 Selection of cushioning to protect all parts of the console should include the following considerations:

- a. Rough handling and shipping environment associated with the shipment
- b. Proper thickness, density, and load bearing characteristics of the cushioning material
- c. Fragility of the article to be shipped
- d. Load bearing surface area of the article in relation to the gross weight of the loaded article (pounds/square inch) vs. the cushioning load bearing and creep characteristics under continual load
- e. Maximum deflection of load anticipated during handling/shipment
- f. Capability of the bonding adhesive to adhere to the cushioning material, floating deck, and container base
- g. Adequacy of lateral shear/tensile strengths of the cushioning material

3.2.3 Console parts and components identified in the procurement document, specification, or drawing as being susceptible to damage by field forces, may be removed and packaged in accordance with Paragraphs 3.2.3.1, 3.2.3.2, and 3.2.3.3.

3.2.3.1 Static sensitive item(s) – use only static protective material (QPL MIL-B-81705) to wrap or bag each item.

3.2.3.2 Electromagnetic sensitive item(s) – wrap each item in a neutral material and enclose in a bag fabricated from MIL-B-81705, Type I material. Close by heat seal or tape allowing sufficient material for two additional heat seals.

3.2.3.3 Magnetic sensitive item(s) – wrap each item in a material of ferrous/ferritic composition of sufficient thickness to provide the degree of protection required. Since damaging influence of magnetic fields varies with the degree of susceptibility, shielding effectiveness should be verified prior to shipment.

3.2.4 Shock sensitive, delicate items identified in the procurement document, specification, or drawing as being susceptible to damage may be removed from the console and packaged in wood/corrugated containers with suitable cushioning/dunnage (Ref. PPP-B-601 and PPP-B-636).

3.2.5 When the major assembly consists of multiple subassemblies not normally attached to the major unit, such equipment may be packaged in wood/corrugated containers with suitable cushioning/dunnage (Ref. PPP-B-601 and PPP-B-636).

3.2.6 Any separate item(s) required per part shall be enclosed in separate plastic bag(s) and/or container(s) with suitable cushioning/dunnage and secured within unit container. If separate item(s) are too large to be packed in unit container, a second wood/corrugated container shall be provided with suitable cushioning/dunnage (Ref. PPP-B-601 and PPP-B-636).

3.2.7 All attached cables, cords, wiring, etc., shall be taped and/or strapped and secured to the console. If cables, cords, etc., are too large, they shall be packed in a separate wood/corrugated container with suitable cushioning/dunnage (Ref. PPP-B-601 and PPP-B-636).

3.3 UNIT PACKAGING

3.3.1 The quantity per unit package shall be one (1) each.

3.3.2 The console shall be clean and free of foreign matter.

- 3.3.3 A console that is subject to damage from moisture and corrosion shall be enclosed in a waterproof shroud of sufficient thickness to withstand the environmental conditions normally encountered. When applicable, the console shall be enclosed in a water-vaporproof bag/container. Determine the number of units of bagged desiccant (Ref. MIL-P-116, MIL-D-3464) required and distribute the units as evenly as possible around the console. A humidity indicator, placed in a visible location, shall be included to monitor the level of humidity within the barrier. A plug type indicator is preferred as it allows the monitoring of the humidity level without opening the barrier bag. Place indicator away from desiccant. Evacuate excess air and heat seal opening. Allow sufficient barrier material to permit at least two additional reseals.

CAUTION: DO NOT PLACE DESICCANT IN DIRECT CONTACT WITH ITEM (USE BARRIER MATERIAL BETWEEN DESICCANT AND ITEM).

- 3.3.4 A console containing discrete microcircuits (semiconductors, integrated circuits, printed wiring boards, etc.) susceptible to damage from electrostatic, electromagnetic, or radioactive forces shall be protected with suitable materials, shielding, or through component design precautions to prevent console failure. Static producing materials (i.e., polyethylene, polystyrene, nylon, etc.) shall not come in direct contact with an item which is susceptible to degradation by static charges. (See Paragraph 5.1 for list of acceptable static protective materials.)

- 3.3.5 A console having electrical connectors shall be protected with plastic caps of appropriate size and type. SOFT plastic caps are not acceptable. (See Paragraph 5.1 for list of acceptable types of caps.)

CAUTION: PLASTIC CAPS SHALL NOT BE USED ON ELECTRICAL CONNECTORS WHERE STATIC CHARGE BUILDUP COULD RESULT IN DAMAGE TO ASSOCIATE COMPONENT(S). STATIC PROTECTIVE MATERIAL WRAPS SHALL BE USED IN LIEU OF PLASTIC CAPS. (SEE PARAGRAPH 5.1.)

- 3.3.6 Precautions shall be taken to avoid placing excessive strain on the console.

- 3.3.7 Sufficient clearance shall be provided between the console and the inside surfaces of the container to prevent damage to the console.

3.4 UNIT CONTAINER

- 3.4.1 A console having irregular shapes, projections, or appendages shall be padded and/or blocked and braced to prevent damage to the console or container. Protect open ports, connectors, fittings, etc. with proper size and style of protective caps, plugs, and closures. (See Paragraph 5.1 for list of acceptable types of caps, plugs, and closures.)

- 3.4.2 The console shall be properly secured to the container base with a minimum of two straps and/or blocking to prevent movement during handling/shipment. Load spreaders shall be placed between straps and console to prevent damage.

- 3.4.3 A console with wheels shall either be blocked clear of the floor of the container and shall not be load-bearing, or blocked on the floor of a container that will withstand the load-bearing force of the wheels. The wheels shall not be load-bearing if this will cause the wheels to flatten.

- 3.4.4 The console shall be uniformly loaded and secured to the container in accordance with the provisions of this standard.

- 3.4.5 Unless otherwise specified in the procurement document or this standard, selection of the style or type of container design shall be optional, providing that the general requirements of this standard are met.

- 3.4.6 Lumber used to fabricate containers/skids shall meet or exceed construction grade for Wood Group II, III or IV of MIL-STD-731. Workmanship shall be of good commercial quality and free from defects which may affect the containers/skids' ability to protect contents during the normal handling/shipping environment.

- 3.4.7 Guideline for construction and assembly of wood-cleated, skidded load-bearing boxes are detailed in the MIL-B-26195 reference.

- 3.4.8 Consoles requiring impact/shock mitigation protection may use a "floating bed" style base (Figure 1) or other shock mitigating designs (i.e., shear mounts, friction damping, etc.).

- 3.4.9 The container shall provide adequate protection to its contents during handling, shipment, and storage. It shall be of suitable quality and workmanship to ensure acceptance by common carriers.
- 3.4.10 The container size shall be kept to minimum dimensions proportionate to the size/configuration of the item.
- 3.4.11 The container shall be kept to a minimum weight and shall maintain proper protection.
- 3.4.12 The container and contents with a gross weight of 150 pounds or more, or with any dimension 36 inches or larger, shall be provided with a minimum of two skids to facilitate handling.
- 3.4.13 The container may be designed for reusable purposes (demountable frame/cover using bolts in lieu of nails) when such provisions will facilitate unloading, or when a reshipment probability exists. If container is to be used with desiccant, then container shall be designed to allow easy access to check humidity indicator.

3.5 INTERMEDIATE PACKAGING

Not Applicable.

3.6 PACKING

- 3.6.1 The container as packed shall protect each item during handling/shipping and shall meet the minimum requirements of this standard and of common carriers for safe transportation at the lowest rate to the point of delivery.
- 3.6.2 The packing slip shall be attached to, or enclosed in, the container.

3.7 MARKING

3.7.1 Unit Container Marking

- 3.7.1.1 Label or mark each container to show part number per contracting document, quantity of items (number of separate items per console), LMSC contracting document number, supplier identity, and destination.
- 3.7.1.2 Special, precautionary, and handling markings shall be applied as required.
- 3.7.1.3 Apply warning label(s) (i.e., electrostatic, electromagnetic, magnetic, radioactive, etc.) to each unit package when applicable.
- 3.7.1.4 Apply center of balance or center of gravity markings to unbalanced containers when applicable (Ref MIL-STD-129).
- 3.7.1.5 Additional markings may be specified in the LMSC detail specification or drawing.

3.7.2 Intermediate Marking

Not Applicable.

3.7.3 Shipping Container Marking

- 3.7.3.1 Same as Paragraph 3.7.1 (shipping container is the unit container).

4.0 QUALITY ASSURANCE

- 4.1 The console shall be packaged so as to prevent physical damage or degradation during delivery to the using activity. It shall be the prerogative of LMSC to return a damaged console, at supplier's expense, when such damage is attributable to improper or inadequate protection.

5.0 NOTES

5.1 The following information is intended as a guide to suppliers in meeting the requirements of this standard.

<u>Title</u>	<u>Reference</u>
Barrier, water vapor proof	MIL-B-131, Class 1
Barrier, water vapor proof (transparent)	MIL-F-22191, Type I
Box, wood nailed	PPP-B-621
Crates, Wood, Open	MIL-C-3774
Crates, Wood, Open, and Covered	PPP-C-650
Crates, Wood Sheathed	MIL-C-104
Cushioning, anchoring, bracing, etc.	MIL-STD-1186
Cushioning, bound fiber	PPP-C-1120
Cushioning Material, Unicellular Polyethylene Foam	MIL-C-46842
Indicator, humidity	MS 20003
Label, static warning	Richmond Corp., Redlands, CA, L-P-378, Type I, Class 1
Lumber and allied products	MIL-HANDBOOK-7
Paper, wrapping, neutral	MIL-HANDBOOK-304
Plug, humidity	MIL-I-26860
Polyurethane foam, rigid/plastic	MIL-P-26514
Protective caps	MS 25177, 25178, 90376; NAS 813, 820
Wood Crate Design Manual	Agriculture Handbook-252

Table 1	
LPS Suffix	Preservation/Packaging Requirements
A	Console shall be wrapped and padded with shroud of sufficient durability and shall be properly secured to withstand transportation conditions.
B	Console shall have appropriate amount of desiccant and shall be padded to protect bag from being ruptured. Console shall be placed in a water-vaporproof bag and sealed, including desiccant and humidity indicator.
C	Console shall be enclosed in a waterproof shroud of sufficient durability and shall be properly secured to withstand transportation conditions.
D	Console shall be protected as specified in the procurement document or detail specification as applicable.
E	Methods of preservation shall be in accordance with supplier's commercial packaging normally provided for similar products.
F	No specific shroud/preservative is required.

Table 2	
LPS Suffix	Type of Container
A	No container is required.
B	Closed style container with a floating bed style, or similar shock mitigating design, base shall be used (Figure 1).
C	Floating bed style, or similar shock mitigating design, base that corresponds to the weight and size of the console shall be used (Figure 1 without cover).
D	Closed style container shall be used (Figure 2).
E	Load bearing skid that corresponds to the weight and size of the console shall be used (Figure 2 without cover).
F	Open style container shall be used (Figure 3).
G	Container shall be used as specified in the procurement document or detail specification as applicable.
H	Supplier's container shall be used, providing that protection of contents and general provisions of this standard are met.

Table 3	
LPS Suffix	Mode of Transportation
A	Shipment via padded, cushioned, air-ride electronic van (E-van).
B	Console shall be transported as specified in the procurement document or detail specification as applicable.
C	Supplier's common mode of transportation may be used, providing that protection of contents and general provisions of this standard are met.
D	No specific type of transportation is required.

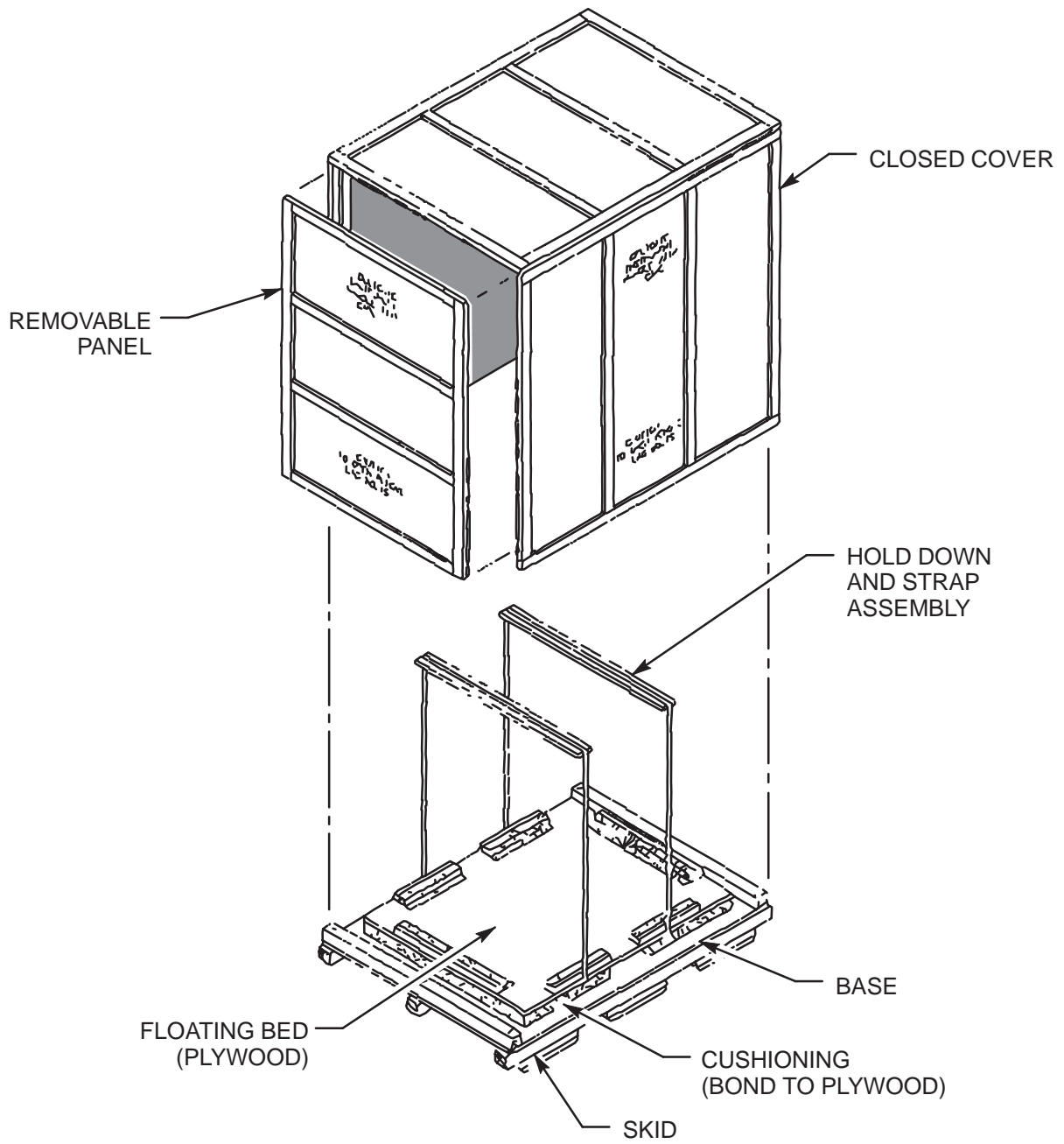


Figure 1. Floating Skid Base/Closed Cover

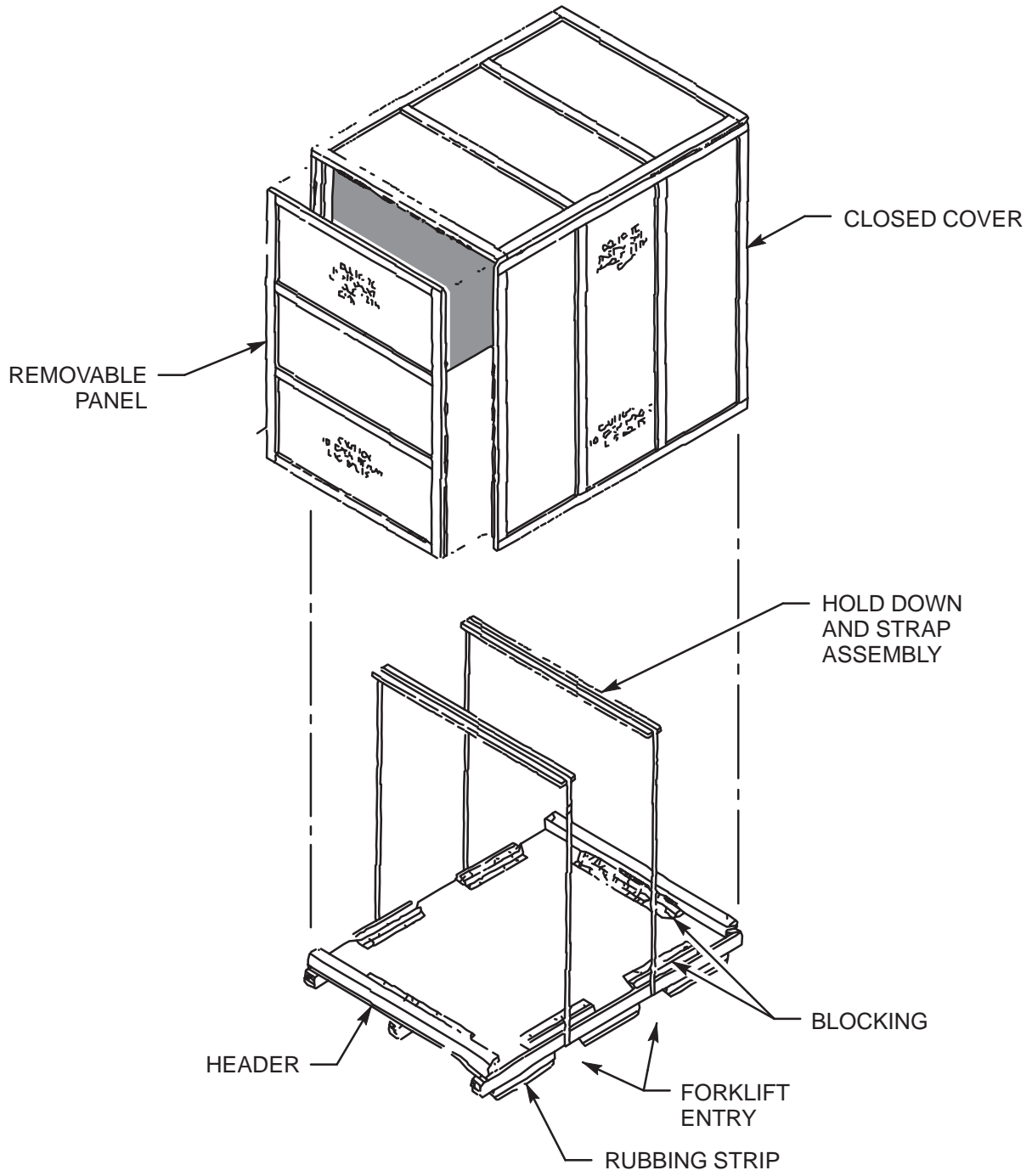


Figure 2. Skid Base/Closed Cover

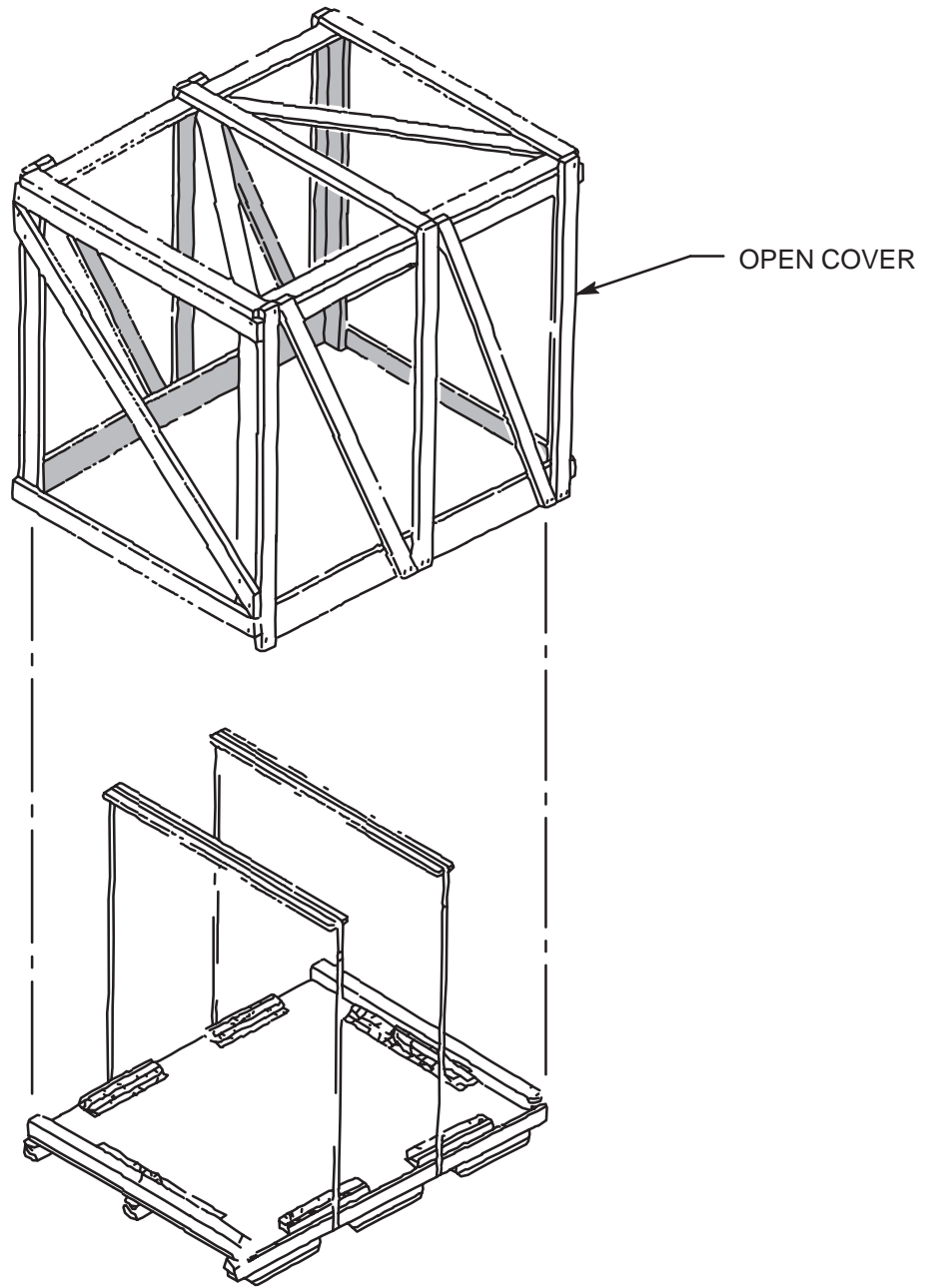


Figure 3. Skid Base/Open Cover