



AEROSPACE STANDARD

AS 1130C

Society of Automotive Engineers, Inc.

400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

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AIR-LAND CARGO PALLETS

1. PURPOSE

This Aerospace Standard (AS) provides dimensional, structural and environmental requirements for 8 ft (2,44 m) wide pallets to be used in freighter versions of high capacity fixed wing aircraft and is intended to be compatible with the 8 x 8 ft (2,44 x 2,44 m) cross-section containers described in AS 832, Air-Land Demountable Cargo Containers. The Type C adapter pallet is intended to be compatible with 8 x 8 ft (2,44 x 2,44) cross section containers described in ANSI MH 5.1, Cargo Containers & ISO 1496 Series 1, Freight Containers. Pallet nets used in conjunction with these pallets are described in AS 1131. The minimum essential criteria are identified by use of the key word "shall". Recommended criteria are identified by use of the key word "should", and while not mandatory, are considered to be of primary importance in providing serviceable, economical and practical air transport pallets. Deviation from recommended criteria should occur only after careful consideration, extensive testing and thorough service evaluation have shown alternate methods to be satisfactory.

2. SCOPE

- 2.1 This AS establishes three classes of pallets: Type A, Air only; B, Air/Land; and C, Adapter.
- 2.2 Pallets will have nominal dimensions of 8 ft wide and lengths of 10, 20, 30 and 40 feet (2,44 x 3,05/6, 10/9, 14/12, 2 m).
- 2.3 Air-Only pallets (Type A) will normally be on aircraft equivalent roller conveying systems and/or on similarly equipped ancillary ground handling devices.
- 2.4 Air/Land Pallets (Type B) are suitable for Air Land handling and transport systems. Supplementary requirements for Type B version are found in Section 4.
- 2.5 Air Adapter Pallets (Type C) are for use to adapt 8 x 8 ft surface mode only containers for air transport. Supplementary requirements for Type C version are found in Section 5.

NOTE: Use of the adapter pallet with surface mode only 8 x 8 ft containers may require uniform load distribution on the base cross members of these containers for carriage on certain aircraft. The airframe manufacturer should be referred to for loadability procedures and/or limitations.

3. BASIC REQUIREMENTS

- 3.1 External dimensions and pallets shall be as specified in Table I and Fig 1. Diagonal tolerances shall be as specified in Table II.
- 3.2 Construction:
 - 3.2.1 Pallet construction shall be rugged, weatherproof, minimizing maintenance and original cost by having no moving parts.

SAE Technical Board rules provide that: "All technical reports, including standards approved and practices recommended, are advisory only. Their use by anyone engaged in industry or trade or their use by governmental agencies is entirely voluntary. There is no agreement to adhere to any SAE standard or recommended practice, and no commitment to conform to or be guided by any technical report. In formulating and approving technical reports, the Board and its Committees will not investigate or consider patents which may apply to the subject matter. Prospective users of the report are responsible for protecting themselves against liability for infringement of patents."

3.2.2 All fittings and appurtenances shall be within the maximum outside dimensions of the pallet.

3.2.2.1 Mating devices that support, transfer position and secure pallets shall be provided by transportation carriers, transferring equipment or terminal facilities.

3.2.3 Pallet construction shall have sufficient structural strength to withstand without permanent deformation the static and dynamic loads and the impact shock encountered in normal carrier service.

3.3 Pallet Surfaces:

3.3.1 The top and bottom surface of the pallet shall be parallel, flat and continuous.

3.3.1.1 For the length of the pallet the bottom surface shall have a smooth to a flat plane within .0625 in. (1,6 mm). This shall allow for a waviness factor of crest to crest at a pitch of 36 in. (914 mm) minimum.

3.3.2 No structure shall protrude below the lower surface.

3.3.3 Construction:

3.3.3.1 The pallet edges (Length "L") shall have a nominal thickness of 2 in. (50,8 mm) from the lower surface. This thickness may be varied when the design employed results in a lighter and more durable structure capable of accepting uniform loading of 400 lb per sq ft (1 953 kg per sq meter) when supported on conveying system per 3.3.3.3.

3.3.3.2 The pallet shall be enclosed on all four sides by an edge member conforming to Figs. 2, 3 and 4. The vertical surface of the pallet edge between the restraint provisions shown in Figs. 2, and 3 shall be smooth and continuous to provide automatically latching aircraft systems interface.

- The pallet bottom skin shall be enclosed by its edge extrusion.

- The bottom surface shall be flush with the edge member.

- The lower edge of the edge members shall be as shown in Figs. 4 or 4A.

- The pallet corners shall have a $2.50 \pm .50$ (63,5 \pm 12,7 mm) radius in the plane of the pallet.

- Pallet corners should be readily replaceable.

3.3.3.3 The pallet design shall provide for support and ease of movement at the rated distributed load on minimum conveyor systems as described in the following:

- Four rows of rollers approximately equally spaced over a minimum width of 76 in. (1 930,4 mm) measured between centers with each row composed of 1.5 in. (38 mm) diameter rollers 3 in. (76,2 mm) long uncrowned with edge radius of 0.06 in. (1,6 mm) R. spaced on 10 in. (254 mm) centers. Pallet travels perpendicular to roller axis.

- Swivel casters with 1 in. (24,4 mm) diameter wheels having a contact length of 2 in. (50,8 mm) located on a 12 x 12 in. (305 x 305 mm) grid pattern. Pallet travel is in all directions across grid.

- Ball transfer units with 1 in. (25,4 mm) diameter balls located on a 5 x 5 in. (127 x 127 mm) grid pattern. Pallet travel is in all directions across grid.

- For design purposes it may be assumed that while supported on these systems and being transported over the road, the pallet will be subjected to vertical loads of approximately 1.8 g (dynamic) with a frequency of 180 cycles per minute and amplitude of 3 in. (76,2 mm).

3.3.3.4 The pallet lower surface shall comply with the following conditions:

- Ball indentation per 5.2.
- Ball casters per 5.3.
- Abrasion per 5.4.

3.3.4 Net attachments shall be compatible with the configuration per Figs. 1 and 5.

3.4 Aircraft Restraint Provision: Restraint provision as shown in Figs. 2, 3 and 4 shall be provided.

3.5 Complete Assembly:

3.5.1 Pallet shall be capable of traversing a 2 deg (0.035 rad) crest or valley with no permanent deformation or damage.

3.5.1.1 To meet this condition pallets uniformly loaded to gross weight shall be capable of being supported at the cresting point through a roller contact of 80 in. (2,03 m) minimum width with a roller of 1.5 in. (38 mm) maximum diameter.

3.5.2 Pallet construction shall be free of any recesses or voids in which cargo (or other material) can be concealed. To meet agricultural requirements all pallet surfaces should be as free as possible of recesses and protuberances, where pests can hide, or where soil or other residues can accumulate.

3.5.3 The pallet shall withstand without permanent deformation a forklift wheel load of 6000 lb (2 721,5 kg) on each of two wheels on 30 in. (762 mm) centers anywhere on the pallet and 9000 lb (4 082,5 kg) per wheel within 1.5 ft (457,2 mm) of any edge while resting on a surface of sufficient strength and continuity to adequately support the pallet.

3.6 Ratings:

3.6.1 The pallet shall be designed for the following gross weights:

3.6.1.1 10 ft pallet 12,500 lb (5 670 kg).

3.6.1.2 20 ft pallet 25,000 lb (11 340 kg).

3.6.1.3 30 ft pallet 35,000 lb (15 876 kg).

3.6.1.4 40 ft pallet 45,000 lb (20 412 kg).

3.6.2 Pallets over 10 ft (3,05 m) length shall be designed for a gross weight of 14,900 lb (6 758,5 kg) in any 10 ft (3,05 m) section of the pallet.

3.7 Design Loads:

3.7.1 Operational Loads:

3.7.1.1 Setting a design case where the pallet is supported on a roller system in accordance with 3.3.3.3. The pallet shall be designed to the following operational loads with the cargo center of gravity located at any point in the range specified in 3.7.6 and under these loads shall exhibit no permanent deformation.

PALLET SIZE	MAXIMUM UNIT GROSS WEIGHT-LB.	OPERATIONAL LOADS									
		FORWARD		AFT		SIDE		UP		DOWN	
		Lb	daN	Lb	daN	Lb	daN	Lb	daN	Lb	daN
10 ft	12,500	12,500	5 560	12,500	5 560	12,500	5 560	12,500	5 560	37,500	16 681
20 ft	25,000	25,000	11 121	25,000	11 121	25,000	11 121	25,000	11 121	75,000	33 362
30 ft	35,000	35,000	15 569	35,000	15 569	35,000	15 569	35,000	15 569	105,000	46 706
40 ft	45,000	45,000	20 017	45,000	20 017	45,000	20 017	45,000	20 017	135,000	60 051

3.7.2 **Ultimate Loads:** Under the roller system support in accordance with 3.3.3.3 the pallet shall be designed for the following ultimate loads with the cargo center of gravity located at any point in the range specified in 3.7.6, the pallet may exhibit permanent deformation, but shall not rupture to the extent of discharging cargo.

PALLET SIZE	MAXIMUM UNIT GROSS WEIGHT-LB	ULTIMATE LOADS									
		FORWARD		AFT		SIDE		UP		DOWN	
		Lb	daN	Lb	daN	Lb	daN	Lb	daN	Lb	daN
10 ft	12,500	18,750	8 340	18,750	8 340	18,750	8 340	31,250	13 901	62,500	27 801
20 ft	25,000	37,500	16 681	37,500	16 681	37,500	16 681	62,500	27 801	25,000	55 603
30 ft	35,000	52,500	23 353	52,500	23 353	52,500	23 353	87,500	38 922	175,000	77 844
40 ft	45,000	67,500	30 025	67,500	30 025	67,500	30 025	112,500	50 042	225,000	100 085

3.7.3 All loads are mutually exclusive except that a down load equal to the maximum unit gross weight may be considered to act concurrently with the forward, aft and side loads.

3.7.4 Up, fore and aft loads shall be reacted by a fitting inserted in the restraint slots as shown in Figs. 3 and 4.

3.7.4.1 10 ft pallet - 2 slots

3.7.4.1.1 20 ft pallet - 5 slots

3.7.4.1.2 30 ft pallet - 8 slots

3.7.4.1.3 40 ft pallet - 11 slots

3.7.4.2 The ultimate fore and aft load for any slot shall be 18,750 lb (8340 daN).

3.7.4.3 The fore and aft load bearing slots shall be considered to be either on one or both sides of the pallet.

3.7.4.4 Up load shall be reacted by a fitting as shown in Fig. 12 inserted in the side restraint slots.

3.7.4.4.1 The pallet shall be designed to be restrained against vertical loads by between 50% and 60% of the total number of slots equally distributed on each side.

3.7.5 End slots shall be provided in accordance with Fig. 2.

3.7.5.1 Slots shall be designed to restrain a 10 ft (3.05 m) pallet for ultimate forward, aft and vertical up loads when used in conjunction with restraint fittings in accordance with Fig. 10.

3.7.5.2 Slots to be used for ground transport restraint are shown in Fig. 2. Each side of outward slots (or blocks located at same dimension) should be capable of restraining 75 percent of the maximum unit gross weight when loaded against a ground transport system.

3.7.6 Center of gravity shall be assumed to vary:

3.7.6.1 Plus and minus 10% of the pallet width measured from the centerline.

3.7.6.2 Plus and minus 5% of the pallet length measured from the centerline.

3.7.6.3 Forty-eight in. (1 219,2 mm) vertically measured from pallet bottom surface.

3.7.6.4 To achieve above asymmetric conditions, cargo density shall be assumed to vary linearly.

3.7.7 Each of the four base corners of the pallet shall be capable of reacting a 18,750 lb (8340 daN) in either the longitudinal or lateral direction.

3.7.8 The cargo net attachment fittings shall include the provision for attaching a cargo tie down fitting, each capable of reacting a 5000 lb (2 224 daN) ultimate load in any direction.

4. SUPPLEMENTAL REQUIREMENTS FOR AIR/LAND PALLETS

4.1 B Pallet Types:

4.1.1 Type IB shall incorporate fittings at the four corners conforming to Fig. 7 or 7A.

4.1.2 Type IIB are 10 and 20 ft pallets only and shall incorporate forklift tineways located per Fig. 9 and fittings at the four corners conforming to Fig. 7 or 7A.

4.2 Design Ground Operational Loads (Dynamic):

4.2.1 For design purposes, the Type B pallet base under the following operational design load criteria, supported at the corner fittings, and being transported over the road, will be subjected to these loads at a frequency of 180 cycles per minute and amplitude of 3 in. (76.2 mm).

4.2.1.1 10 ft pallet 22,500 lb (10 008 daN)

4.2.1.2 20 ft pallet 45,000 lb (20 017 daN)

4.2.1.3 30 ft pallet 63,000 lb (28 024 daN)

4.2.1.4 40 ft pallet 81,000 lb (36 030 daN)

4.2.2 Due to the flat bottom configuration, for surface transport ISO type adapter fittings or other separator means should be attached to the corner fittings.

4.3 Ground Operational Loads (Static):

CONTAINER SIZE	MAXIMUM UNIT GROSS WEIGHT LB	GROUND OPERATIONAL LOADS	
		lb	daN
10 ft	12,500	25,000	11 121
20 ft	25,000	50,000	22 241
30 ft	35,000	70,000	31 137
40 ft	45,000	90,000	40 032

- 4.3.1 The Type B pallets shall be capable of withstanding without permanent deformation a uniformly distributed down load equal to those shown in 4.2 while supported by slings or frame connected to the four corner fittings.
- 4.3.2 Type IIB pallets shall be capable of withstanding a down load equal to 4.3 while supported by a forklift truck.
- 4.3.3 Each of the four corners shall be capable of reacting at least an 18,750 lb (8340 daN) load in either the longitudinal or latitudinal direction.
- 4.4 The pallet edges (length "L") shall have a minimum thickness of 5.5 in. (139,7 mm) from the lower surface.

5. SUPPLEMENTAL REQUIREMENTS FOR AIR ADAPTER PALLETS

5. C Pallet Type

- 5.1.1 The pallet shall incorporate alignment pegs at the four corners conforming to Fig. 14. Each of the alignment pegs shall be capable of reacting at least an 18,750 lb. (8340 daN) load in the longitudinal, lateral and vertical (down only) direction.
- 5.1.2 The pallet shall incorporate side slots and strap receptacles conforming to Fig. 13. See Fig. 15 for typical usage of restraint straps to secure a surface mode container to adapter pallet.
- 5.1.2.1 The strap receptacle fitting shall include the provision for attaching a tie-down fitting, each capable of reacting a 5000 lb. (2224 daN) ultimate load in the longitudinal and vertical direction.
- 5.1.3 The pallet edges shall have a nominal thickness of 2.25 in. (57,2 mm) from the lower surface.
- 5.1.4 The pallet shall be enclosed on all four sides by an edge member conforming to Figs. 2, 3, 4 & 13.
- 5.1.5 The pallet corners shall have a .56 inch (14.5 mm) radius.
- 5.1.6 Aircraft restraint provisions as shown in Figs. 2, 3, 4, & 13 shall be provided.
- 5.1.7 Up, fore & aft loads shall be reacted by a fitting inserted in the restraint slots shown in Figs. 3, 4, & 13.

6. ENVIRONMENTAL CRITERIA

6.1 Materials:

- 6.1.1 The pallet should be designed and built using materials which will provide maximum serviceability and protection of contents under intended environmental conditions.
- 6.1.2 The structural and operational integrity of the pallet shall be maintained in a temperature environment from -65°F to +160°F (-54°C to +71°C).
- 6.1.3 All components of the pallet shall be protected against deterioration or loss of strength in service due to weathering, corrosion or other causes where the type of material used required such protection.
- 6.1.4 The pallet shall be so designed that it will withstand handling common to air/land freight terminal and ramp operations.

6.2 Ball Load Capability: The pallet base surface or a representative portion thereof shall be subjected to 900 lb (408 kg) on a one-inch (25,4 mm) diameter steel ball without permanent indentation in excess of 0.020 in. (0,51 mm).

6.3 Ball Caster Load Capability: The base or a representative portion thereof shall be subjected to a uniformly distributed load of 210 lb (95,5 kg), supported by four 1-in. (25,4-mm) diameter steel ball casters on a 5 in. (127 mm) grid pattern. The base shall be moved over the casters for a minimum of 5,000 passes along a fixed line in each of two directions, 90 deg. (1.57 rad.) to, and intersecting each other. The length of the stroke shall be approximately 12 in. (304,8 mm). At the conclusion of the test, there shall be no evidence of deterioration of the base/ball caster interface surface.

6.4 Abrasion Resistance for Plastic Coated or Magnesium-Base Materials: Three samples of the pallet base assembly material will be subjected to a test method equivalent to United States Federal Test Method Standard No. 406, Method 1091, except the abrasion wheel shall be dressed every 1,000 cycles. A CS-10 wheel with a load of 500 grams shall be used for all tests. The average of weight loss shall not exceed the following values:

- After 1,000 Revolutions - 0.015 Grams
- After 2,000 Revolutions - An additional 0.005 Grams
- After 5,000 Revolutions - An additional 0.030 Grams
- Up to a TOTAL OF 0.050 Grams

6.5 Weight Limits: The tare weight of the pallet assembly shall be a minimum consistent with the requirements and within limits of sound design practices.

6.6 Materials and Processes:

- 6.6.1 The materials and processes selected should give consideration to the extremely hard usage to which the pallet will be subjected to provide for maximum service life. All metal parts should be suitably protected against corrosion. All non-metallic materials which are liquid absorbent should be sealed or treated to prevent liquid absorption.
- 6.6.2 Materials shall be flame resistant in accordance with the regulatory requirements.
- 6.6.3 All fasteners should be of aircraft standard and the number of sizes, styles and strengths shall be kept to a minimum. No slotted head screws shall be used.

7. TESTING REQUIREMENTS

7.1 Scope:

- 7.1.1 The tests are static in nature to minimize complexity and cost of required testing facilities. As far as practical, applied static loads take into account the combined static and dynamic loads anticipated in service.
- 7.1.2 It is intended that tests shall be non-destructive in nature and not result in damage to the pallet unless ultimate load conditions are employed.
- 7.1.3 Test equipment and methods of testing described are not meant to be restrictive. Alternate equivalent methods to accomplish the desired result may be employed.
- 7.1.4 In selected cases, tests may be repeated under ultimate load conditions when required for substantiation of analytical data. If this becomes necessary, the pallet so tested may not be used in service until all component parts are inspected and those that exhibit permanent deformation are replaced.

7.2 Test Criteria:

- 7.2.1 A pallet shall be considered satisfactory if, upon inspection before and after testing, its dimensions fall within those specified in Tables I and II and in applicable manufacturing drawings.
- 7.2.2 Permanent deformation is permitted under ultimate load conditions. A pallet shall be considered within acceptable limits if it exhibits permanent deformation but does not rupture to the extent of discharging cargo or break free from the restraint system.

7.3 Recommended Test Equipment:

- 7.3.1 When restraint or movement on an aircraft system is evaluated, the test system shall be in accordance with 3.3.3.3. Latches and guide-rails of suitable strength shall be provided to guide the pallet along the conveyor and secure it at its latch points. The test system shall be of sufficient length to permit cycling of the longest pallet to be tested.
- 7.3.2 When conducting structural test, sufficient payload to meet test load requirements shall be provided. Where appropriate, water or load producing devices may be used.
- 7.3.3 An industrial truck or equivalent equipment capable of a maximum load of 12,000 lb (5 443 kg) on one axle with a minimum wheel width of 7 in. (177,8 mm) and a maximum footprint area of 22 sq in. (141,9 sq cm) per wheel on 30-in. (762-mm) wheel centers shall be provided.
- 7.3.4 A net per AS 1131 shall be provided.
- 7.3.5 For Type B pallets a crane or lifting means with capacity to lift twice the gross weight of the loaded pallet shall be provided. Sufficient height shall exist under the hook to permit positioning the pallet vertically on either side or end. Bridle chains, cables or spreaders with capacity to lift the loaded pallet at the four corners with appropriate capacity hooks or shackles shall be provided.

7.4 Test Procedure - Operational Loads:

7.4.1 Test #1 - Lifting:

7.4.1.1 Type B pallets shall be loaded to twice gross weight and lifted vertically from the four corner fittings. After lifting, the pallet shall be suspended for not less than five minutes and then lowered to the ground. Permanent deformation shall not occur.

7.4.1.2 Type IIB pallets shall be loaded to twice gross weight and lifted clear of the ground by using a forklift truck of suitable capacity. After lifting, the pallet shall be suspended for not less than five minutes and then lowered to the ground. Permanent deformation shall not occur.

7.4.2 Test #2 - Pallet Strength:

7.4.2.1 Pallets shall have the base resting on a surface of sufficient strength and continuity to adequately support the pallet. An industrial forklift loaded to an axle weight of not less than 12,000 lb (5 443 kg) (including the weight of the truck) or 6,000 lb (2 721,5 kg) per wheel, applied to a contact area not greater than 22 sq in. (141,9 sq cm) assuming a wheel width of not less than 7 in. (177,8 mm) and wheel centers of 30 in. (762 mm) shall then be maneuvered over the entire pallet top surface to load the pallet to maximum gross weight. An industrial forklift loaded to 9,000 lb (4 082,5 kg) per wheel shall then be maneuvered over the area extending 1.5 ft (457,2 mm) from any edge.

7.4.2.1.1 No permanent deformation or failure shall occur.

7.4.2.2 While retained on the aircraft loading system or its equivalent, the pallet shall be uniformly loaded to 1,200 lb per sq ft (5 864 kg/m²). The load shall be applied to an area 5 ft (1,52 mm) wide centered in the pallet and the load shall equal but not exceed three times maximum payload.

7.4.2.2.1 No permanent deformation or failure shall occur.

7.4.2.3 The pallet under test shall be latched to the aircraft system or its equivalent. The number of latches shown in paragraph 3.7.4.1 shall be engaged on one side and adjusted by suitable means to assure contact with the end of the latch receptacle slot. With a net per AS 1131 attached to the pallet, a uniformly distributed load equal to the gross weight shall be applied to one 96 in. (2,438 m) end of the net. The center of gravity of the load shall be 48 in. (1,219 m) vertically measured from the pallet bottom surface and within the lateral and longitudinal limits specified in 3.7.6.

7.4.2.3.1 No permanent deformation or failure shall occur.

7.4.2.3.2 Repeat 6.4.2.3 for 10 ft (3,05 m) pallet using only restraints in fore and aft slots in accordance with Fig. 10.

7.4.2.4 With the pallet on the aircraft system or its equivalent, 50% to 60% of all the latches per Fig. 12 equally distributed on both sides shall be engaged and adjusted by suitable means to assure vertical restraint. With a net per AS 1131 attached to the pallet, a uniformly distributed load equal to the gross weight shall be applied to one side of the net. The center of gravity of the load shall be 48 in. (1 219 mm) vertically measured from the pallet bottom surface and within the lateral and longitudinal limits specified in 3.7.6.

7.4.2.4.1 No permanent deformation or failure shall occur.

7.4.2.5 The pallet shall be suspended upside down from the aircraft loading system or its equivalent. Between 50% and 60% of the total number of latches equally distributed on both sides shall be engaged and adjusted by suitable means to assure contact when the load is applied. The pallet shall have a load equal to the gross weight uniformly distributed tied down with a net per AS 1131.

- 7.4.2.5.1 No permanent deformation or damage shall occur.
- 7.4.2.6 Test per 6.4.2.5 shall be repeated for 10 ft pallets using only restraint in accordance with Fig. 10.
- 7.4.2.7 The pallet shall be uniformly loaded to gross weight and cycled one hundred times over a substantially level test system per 3.3.3.3 at a minimum speed of 60 ft (18,3 m) per minute.
- 7.4.2.7.1 The test section shall be supported on a rigid, welded steel, wood or concrete structure.
- 7.4.2.7.2 The rollers used in the test section shall conform to 3.3.3.3. Shell of the roller shall be a high quality aluminum alloy. Bearing used in rollers shall be selected to ensure test set-up coefficient of friction does not exceed .02 at 1.0g loading.
- 7.4.2.7.3 Maximum displacement of roller top from a theoretical plane should be varied randomly to a maximum of $\pm .03$ in. ($\pm,76$ mm).
- 7.4.2.7.4 Each cycle shall be equal to twice container length.
- 7.4.2.7.5 At test speed, draw-bar pull shall be recorded during the first and last cycle. Maximum allowable draw-bar pull shall be 3% gross weight. Maximum variation of draw-bar pull from the first to the last cycle shall not exceed 0.5% of gross weight.
- 7.4.2.8 Attachment Receptacle Test:
- 7.4.2.8.1 Cargo Tie Down: A two stud bulk cargo tiedown fitting shall be used to fit the receptacle shown in Fig. 5. With the pallet latched to the aircraft system or its equivalent, 50% to 60% of all the latches equally distributed on both sides shall be engaged and adjusted by suitable means to assure vertical restraint. The pallet receptacle shall be tested by applying a 5,000 lb (2224 daN) tension load in all directions, horizontal to vertical. The load application point shall be 0.83 in. (21 mm) or less from the head of the stud.
- 7.4.2.8.2 Net Attachment: A one-stud net attachment fitting as shown in Fig. 5 shall be engaged in the net attachment receptacle shown in Fig. 5. The pallet receptacle shall be tested by applying a 3,000 lb (1 334 daN) tension load in all directions, horizontal to vertical. The load application point shall be 0.83 in. (21 mm) or less from the head of the stud.
- 7.4.2.8.3 Strap Attachment, Type C Pallet: A two stud bulk cargo tie-down fitting shall be used to fit the receptacle shown in Figs. 5 and 13.
- 7.4.2.9 For Type B pallets while supported at the four corners:
- 7.4.2.9.1 Repeat Test 6.4.2.1.
- 7.4.2.9.2 The pallet shall be unloaded under 4.2.1; no permanent deformation shall occur.
- 7.4.3 Subject any parts that cannot be adequately protected against corrosion to a test duplicating the anticipated environment. Subsequent corrosion shall not preclude the parts from performing their design functions or incur failure of container during the design life of the container.
- 7.4.4 The pallet shall be placed empty in a suitable test chamber at 160°F (71°C) ambient temperature for 48 hours.
- 7.4.4.1 At the end of 48 hr, its condition shall be evaluated while the structure is at or near the test temperature.

7.4.4.2 The pallet shall then be placed empty in a suitable test chamber in a -65°F (-54°C) ambient temperature for 48 hours.

7.4.4.3 At the end of 48 hr, its condition shall be evaluated while the structure is at or near the test temperature.

7.5 Production Pallets: To show compliance with its specification standard, commercial inspection and quality control methods and practices shall be used to assure that production units are not inferior to the article tested. Where changes are made to production units and product similarity cannot be clearly established, the first product so changed shall be retested to show compliance with its specification.

8. MARKING REQUIREMENTS

8.1 All pallets covered by this specification shall be marked in accordance with the following minimum requirements. The markings shall be permanently engraved onto the top surface not more than 1 in. (2.54 cm) from the outer edge of the aircraft pallet. The engraving should be positioned on two sides diagonally opposite to one another within 12 in. (30 cm) from the corner.

Reg. No. _____
(IATA/ATA) (COUNTRY OF OWNERSHIP)

Actual Wt. Tare _____ kg _____ lb

Max. Gross Wt. _____ kg _____ lb

Certification(s) _____
(AUTHORITY)

ID Code: _____
(Owner's Name and Serial Number)

The letters and numbers shall be not less than 0.19 in (4,83 mm) high.

Notes: (i) The IATA registration specifies the type of item and for member airline owned equipment includes two letter carrier code.

(ii) All weights to be rounded off to the next highest 1/2 kilogram or full pound. Forces have been rounded off to next half deka newton (daN).

(iii) Certification shall be indicated by listing this specification number (AS 1130) and other standards under which the pallet has been approved.

8.2 The following additional manufacturer's markings shall be permanently indicated on the top surface not more than 1 in. (2.54 cm) from the outer edge of the aircraft pallet. The letters and numbers shall be not less than 0.19 in. high.

Manufacturer _____
(Name) (Country)

Part Number _____

9. NOTES

9.1 Marginal Indicia: Revised areas of the text are denoted by a vertical bar in the border.

TABLE I

PALLET DIMENSIONS 

OVERALL LENGTH		OVERALL WIDTH		NOMINAL THICKNESS	DIM. A.		DIM. B.		DIM. C.		DIM. D.	
in.	mm	in.	mm		in.	mm	in.	mm	in.	mm	in.	mm
+0	12 192	+0	2 438		9.42	239,27	15.43	391,92	9.37	238,00	16.50	419,10
-3/8	-9,5	-3/16	-4,8		9.42	239,27	15.43	391,92	9.37	238,00	16.90	429,26
+0	9 125	+0	2 438		9.42	239,27	15.43	391,92	9.37	238,00	17.02	432,31
-3/8	-9,5	-3/16	-4,8		9.42	239,27	15.43	391,92	9.37	238,00	16.47	418,34
+0	6 058	+0	2 438		9.42	239,27	15.43	391,92	9.37	238,00		
-1/4	-6,4	-3/16	-4,8		9.42	239,27	15.43	391,92	9.37	238,00		
+0	2 991	+0	2 438		9.42	239,27	15.43	391,92	9.37	238,00		
-3/16	-4,8	-3/16	-4,8		9.42	239,27	15.43	391,92	9.37	238,00		

See Figure 1 for dimension locations.

For Type A 2.0 inches (50.8 mm)
 For Type B 5.5 inches (139.7 mm)
 For Type C 2.25 inches (57.2 mm)

TABLE II

DIAGONAL TOLERANCES - TYPE B & C PALLETS

OVERALL LENGTH		S		P		K ₁ MAX	
in.	mm	in.	mm	in.	mm	in.	mm
480	12 192	472	11 988,8	89	2 260,6	3/4	19
359-1/4	9 125	351-1/4	8 921,7	89	2 260,6	5/8	15,9
238-1/2	6 058	230-1/4	5 848,4	89	2 260,6	1/2	12,7
117-3/4	2 991	109-3/4	2 787,6	89	2 260,6	3/8	9,5

For definitions of S, P and D, see Figure 8

$$K_1 = D_1 - D_2$$

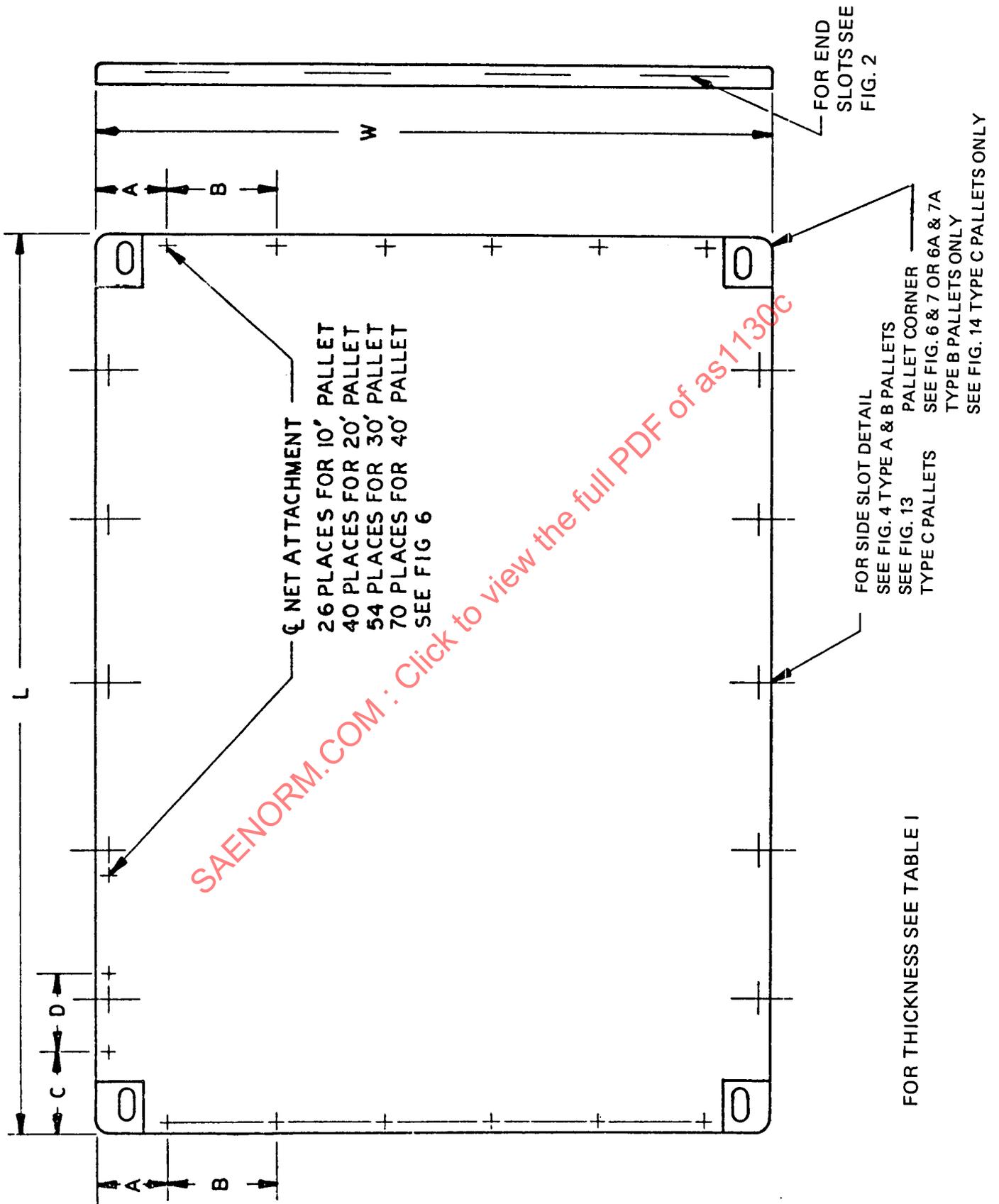
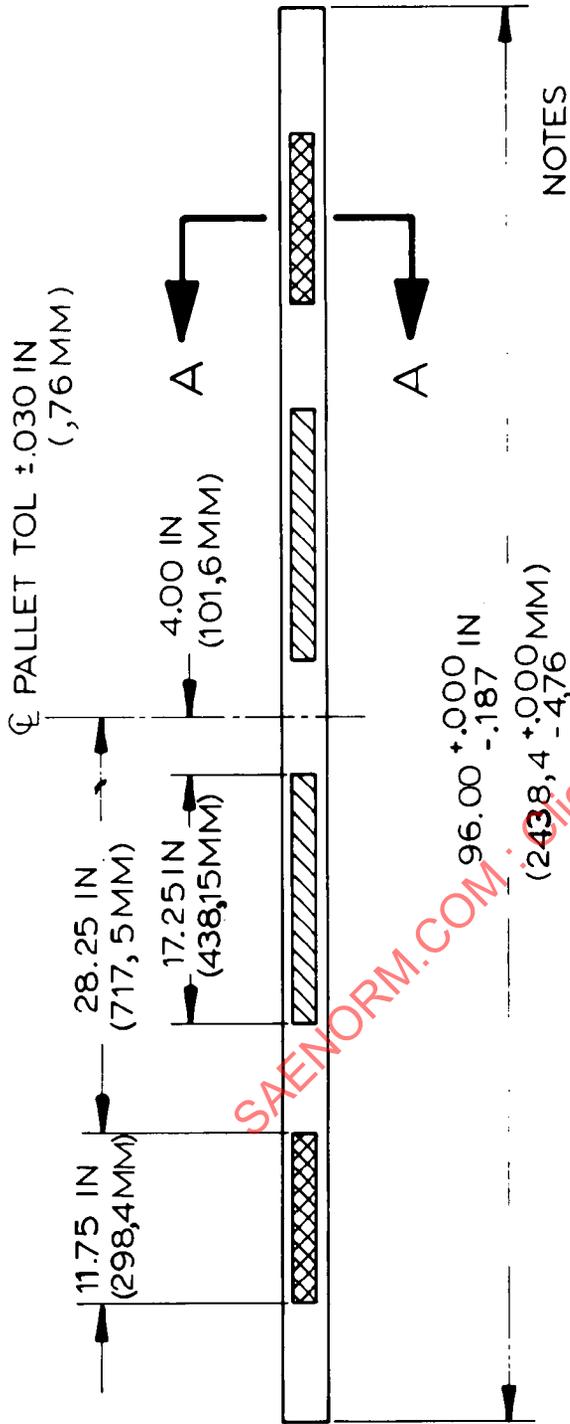


FIGURE 1

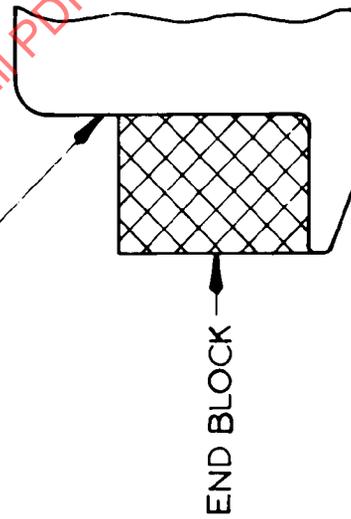


NOTES

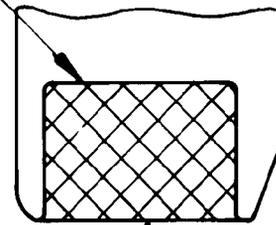
TOL $\pm .030$ IN UNLESS OTHERWISE NOTED
($\pm .76$ MM) NOTED

-  SLOTS OR CLEAR AREA
-  SLOTS TO BE USED FOR GROUND TRANSPORT RESTRAINT. AREA SHOWN TO BE CLEAR FOR AIRCRAFT/GROUND EQUIPMENT LOCK INTERFACE.

FOR PROFILE SEE
SECT AA FIG 3



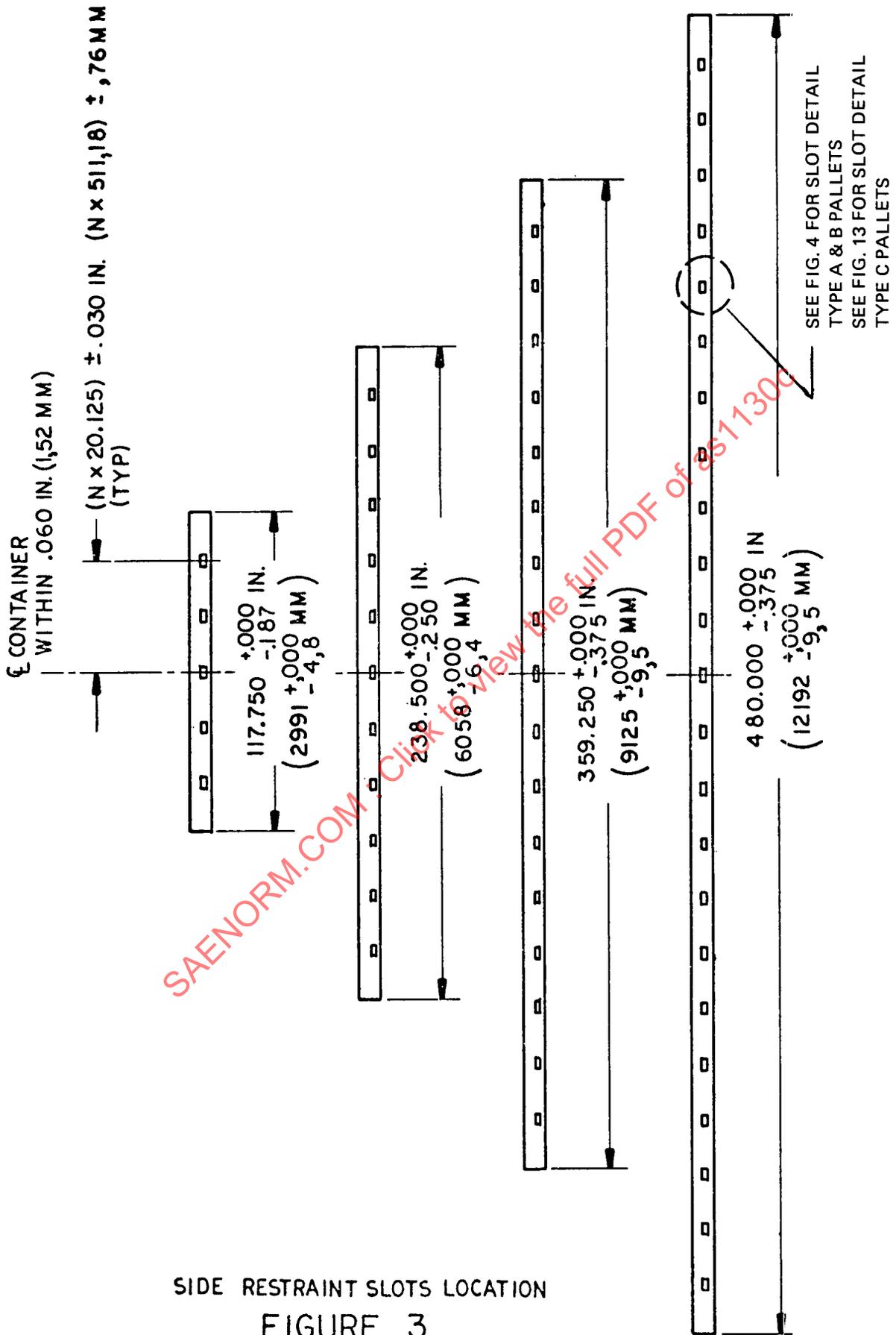
SECTION A-A TYPE C PALLETS
OPTIONAL TYPE A & B PALLETS



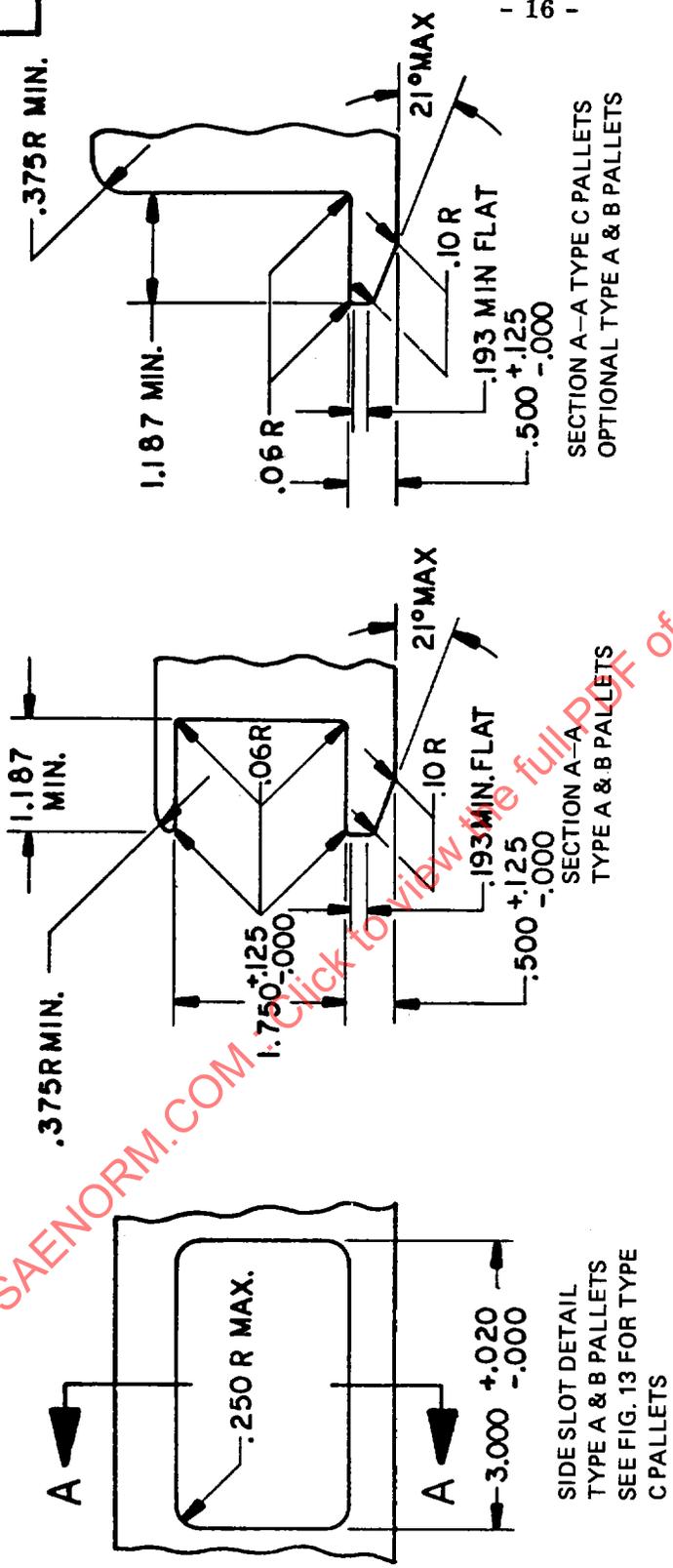
SECTION A-A
TYPE A & B PALLETS

END BLOCK
OR SIDE OF
SLOT PROFILE

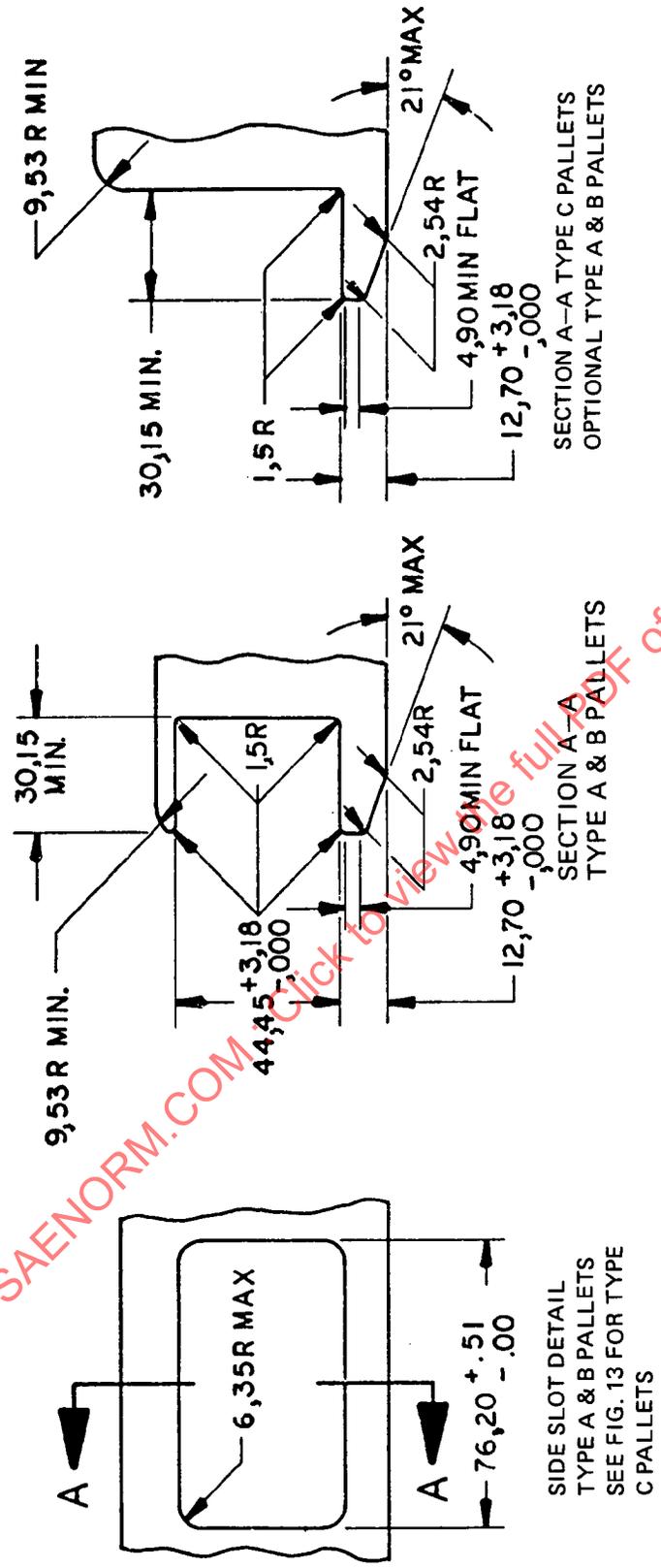
Ø FIGURE 2 : END SLOTS OR BLOCKS
(BOTH SIDES)



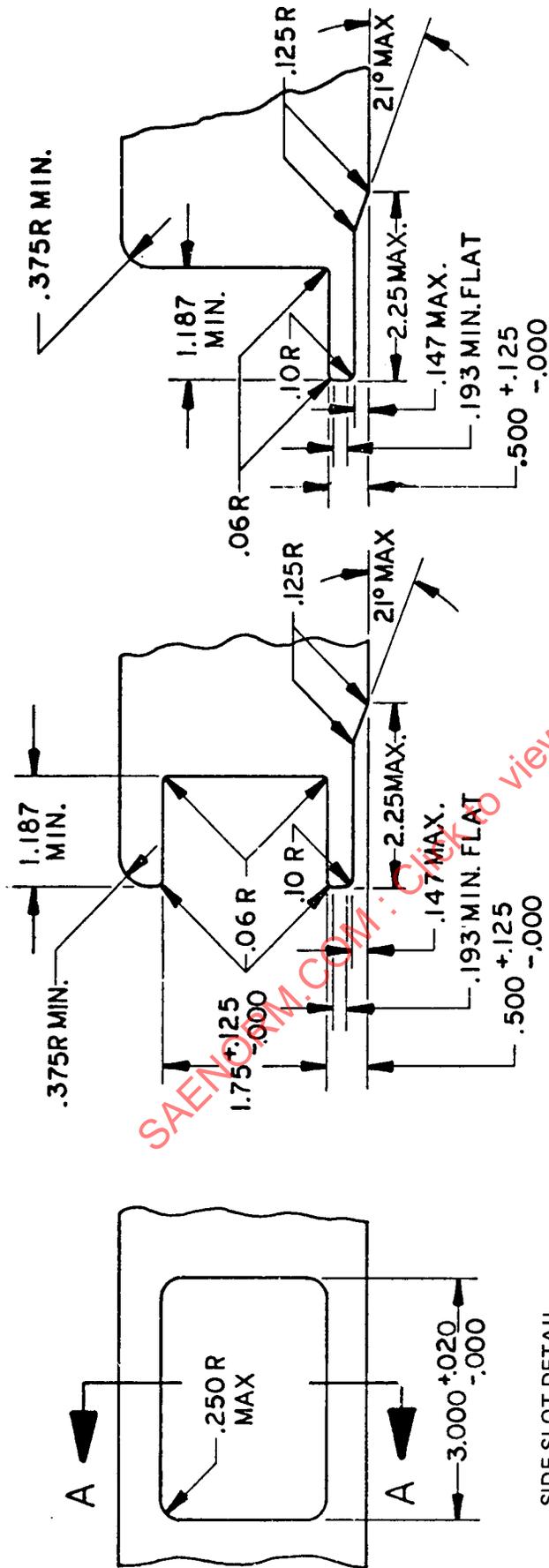
SIDE RESTRAINT SLOTS LOCATION
FIGURE 3



SIDE SLOT DETAIL
FIGURE 4
DIMENSIONS IN INCHES



SIDE SLOT DETAIL
FIGURE 4 (SI)
DIMENSIONS IN MILLIMETERS

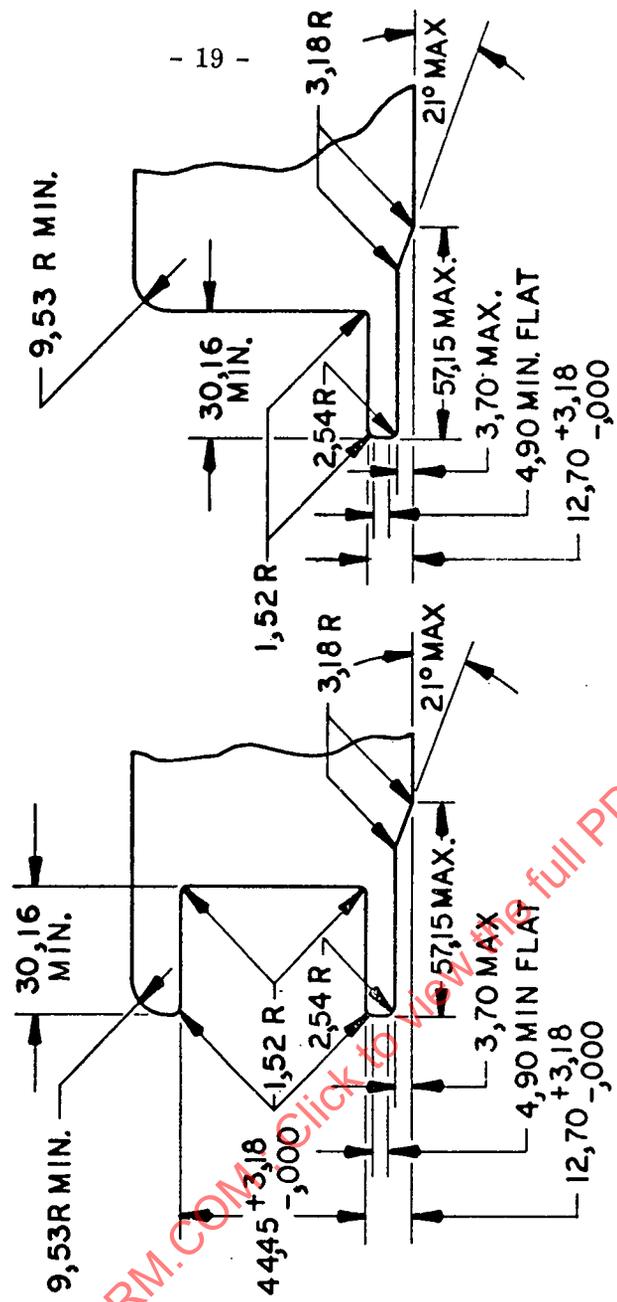


SIDE SLOT DETAIL
TYPE A & B PALLETS
SEE FIG. 13 FOR TYPE
C PALLETS

SECTION A-A
TYPE A & B PALLETS

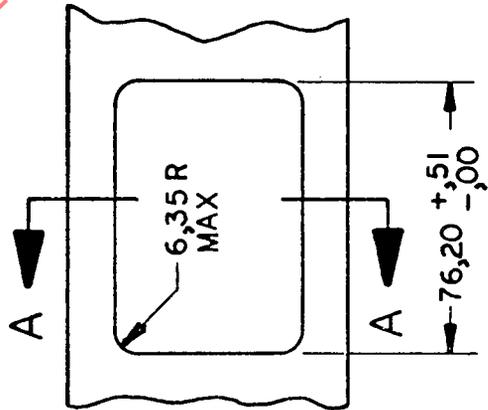
SECTION A-A TYPE C PALLETS
OPTIONAL TYPE A & B PALLETS

SIDE SLOT DETAIL
RECESSED EDGE OPTION
TYPE A PALLET
FIGURE 4A
DIMENSIONS IN INCHES



SECTION A-A TYPE C PALLETS
OPTIONAL TYPE A & B PALLETS

SECTION A-A
TYPE A & B PALLETS



SIDE SLOT DETAIL
TYPE A & B PALLETS
SEE FIG. 13 FOR TYPE
C PALLETS

SIDE SLOT DETAIL
RECESSED EDGE OPTION
TYPE A PALLET
FIGURE 4A (SI)
DIMENSION IN MILLIMETERS

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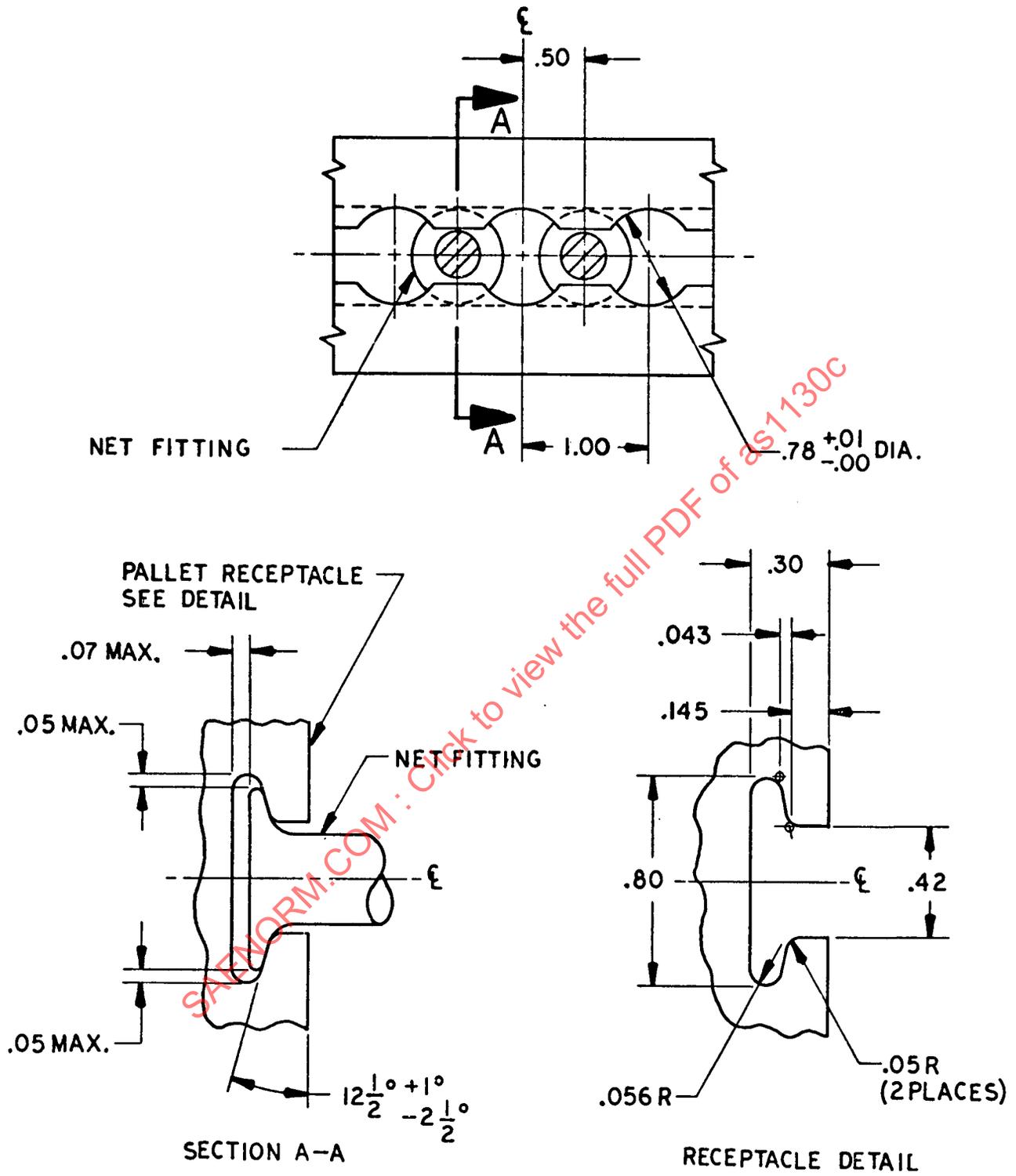


FIGURE 5

CARGO NET TIE-DOWN RECEPTACLE

DIMENSION IN INCHES

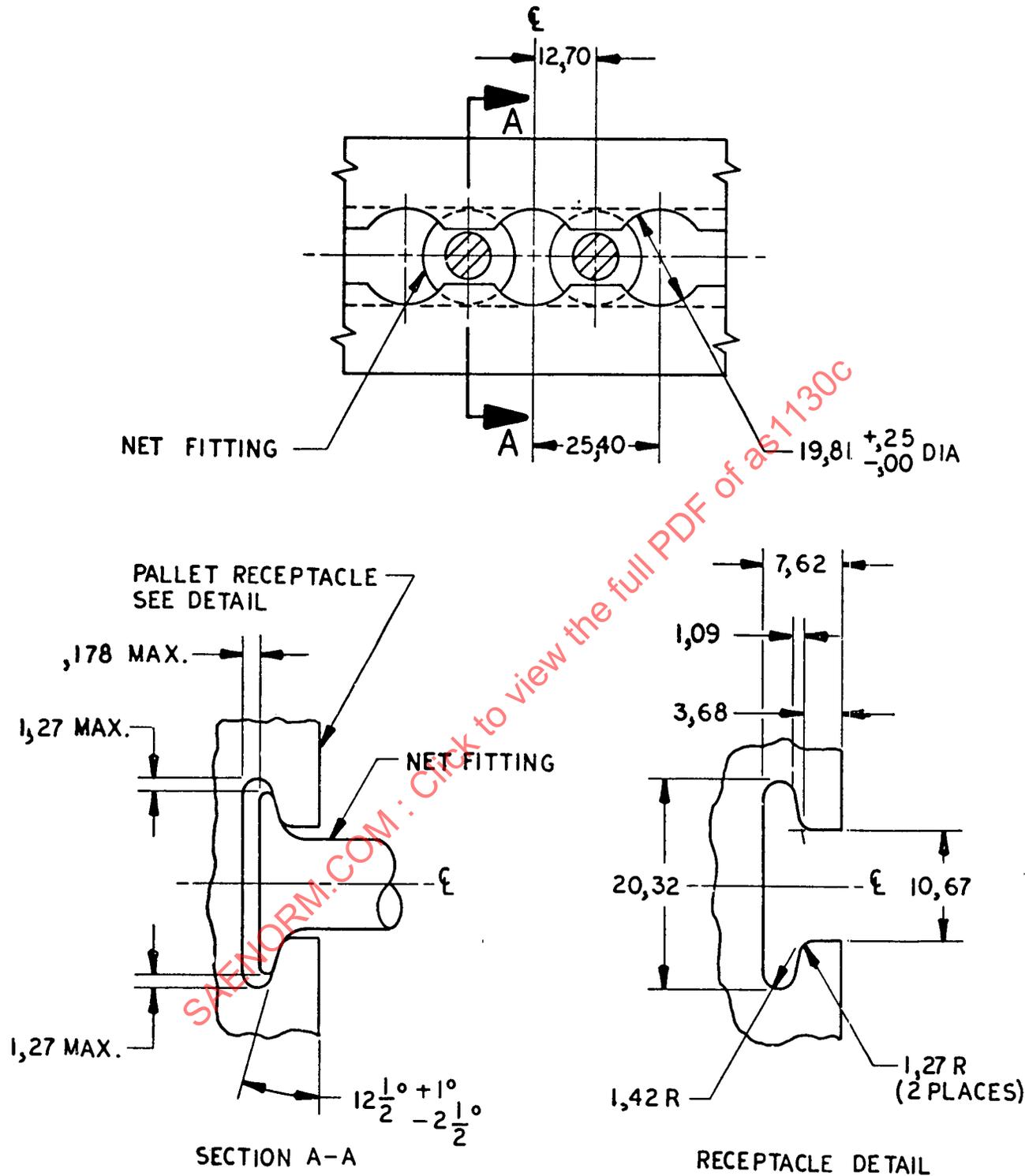
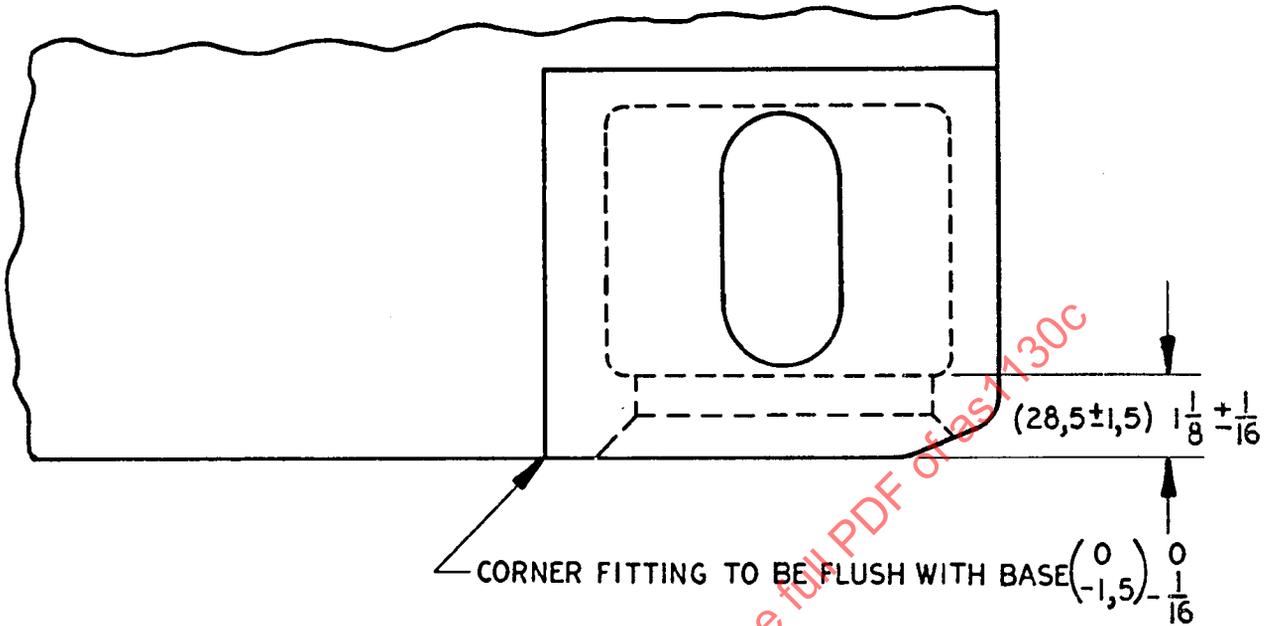
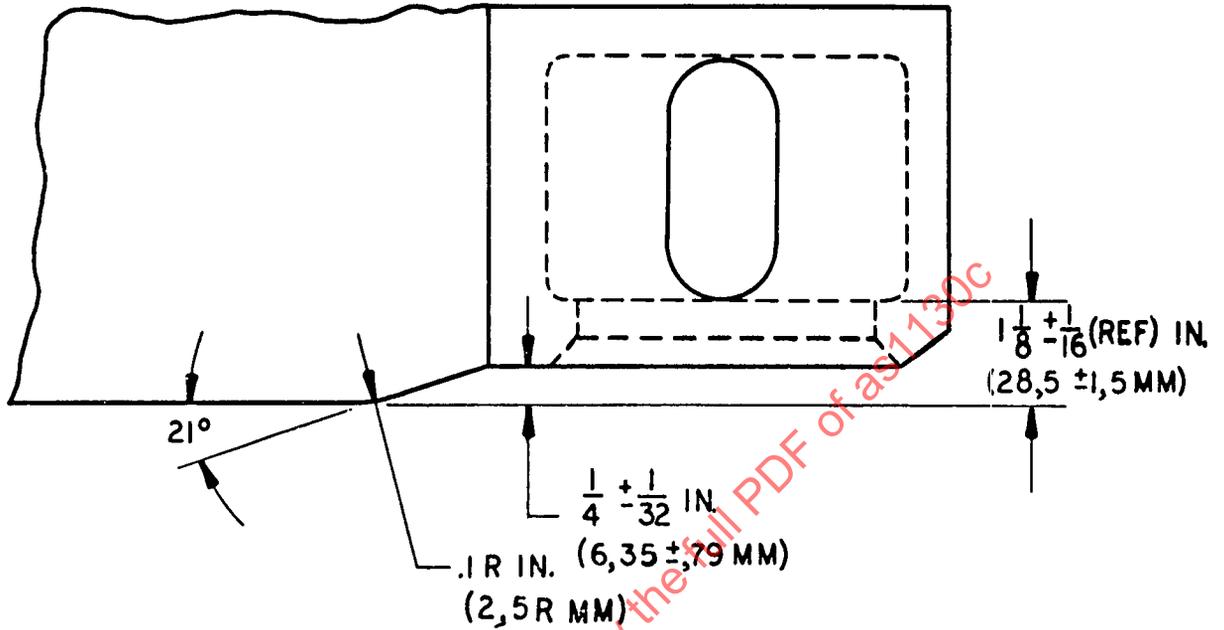


FIGURE 5 (SI)
CARGO NET TIE-DOWN RECEPTACLE
DIMENSION IN MILLIMETERS



LOCATION OF BOTTOM CORNER FITTING
TYPE B PALLET
DIMENSIONS IN INCHES
(DIMENSIONS IN MILLIMETERS SHOWN IN PARENTHESES)

FIGURE 6



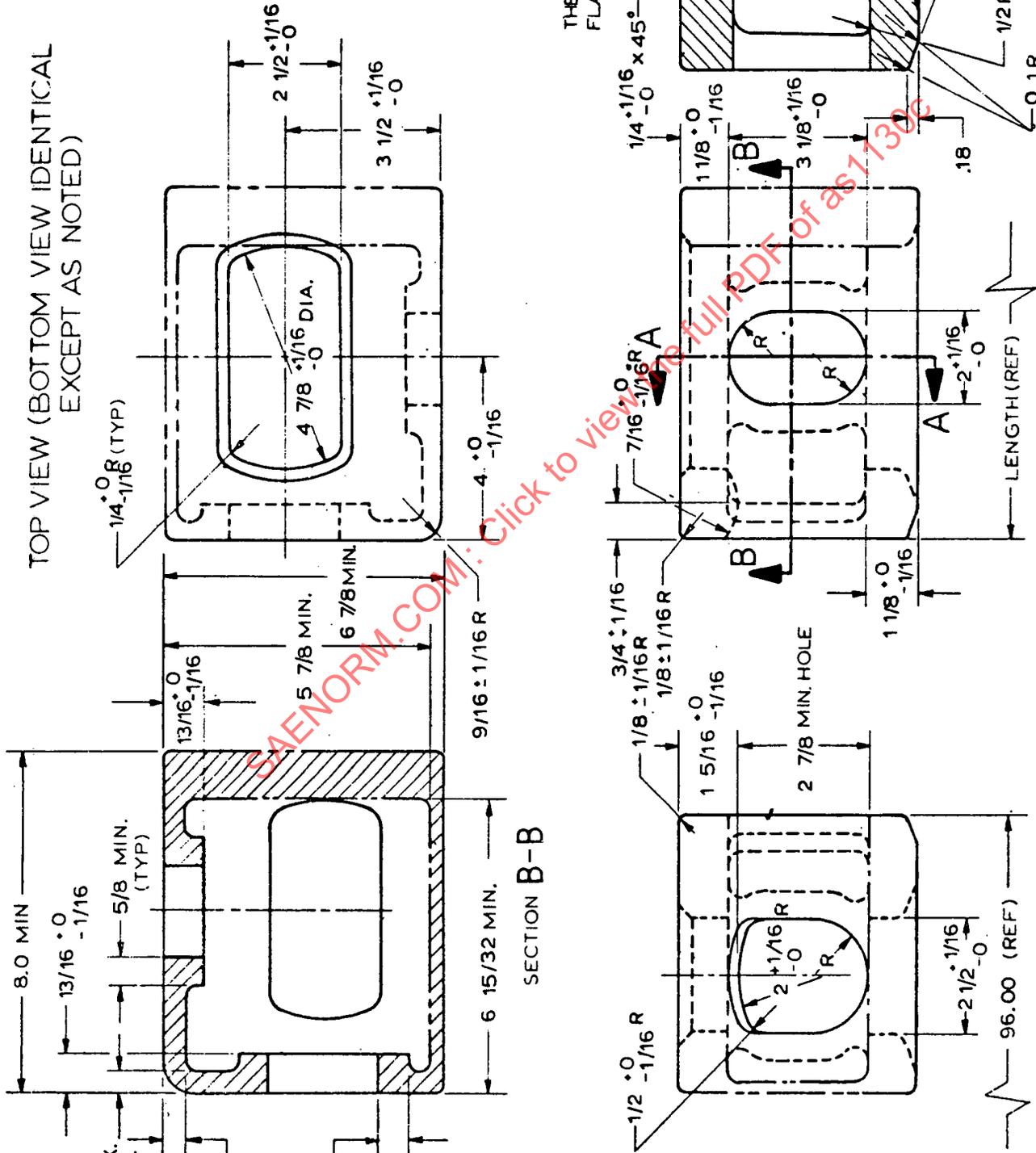
NOTE 1:
This typical configuration is constant
all around the juncture of the corner
fitting with the base rail

NOTE 2:
Blend all lower edges with a minimum
.1 radius (2,5mm)

RECESSED CORNER FITTING OPTION
TYPE B PALLET
FIGURE 6A

NOTES:

1. Solid and dotted lines (—) show surfaces and contours which must be physically duplicated in the fitting
2. Phantom lines (---) show optional walls which may be used to develop a boxed shaped fitting
3. Outside and inside corner radii where sharp corners are shown must be 1/8 in. max except as noted
4. Four fittings required per pallet
2 L.H. and 2 R.H.
5. Outside surfaces shall have a casting surface of C30 or better



FLUSH MOUNTED CORNER FITTING
DIMENSIONS IN INCHES
FIGURE 7 (SEE FIG 6)

SECTION A-A

SECTION B-B

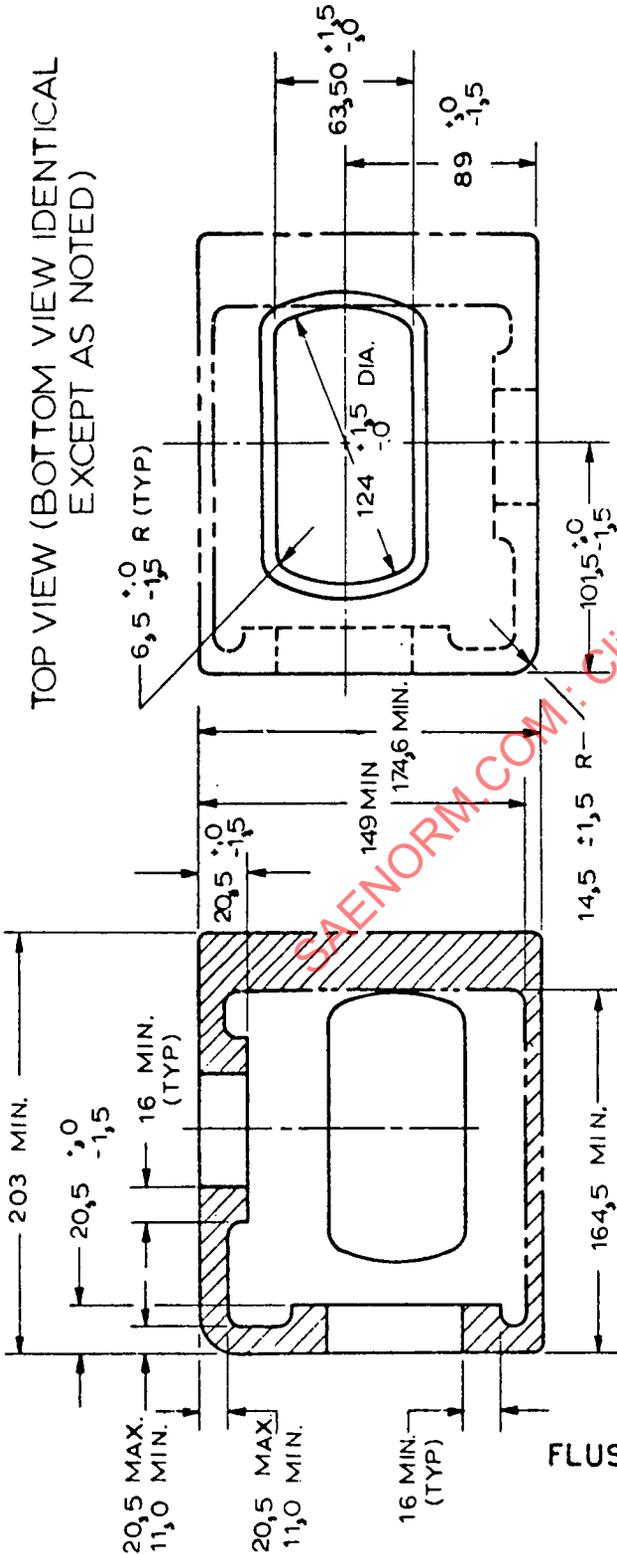
THESE SURFACES TO BE
FLAT WITHIN 1/16

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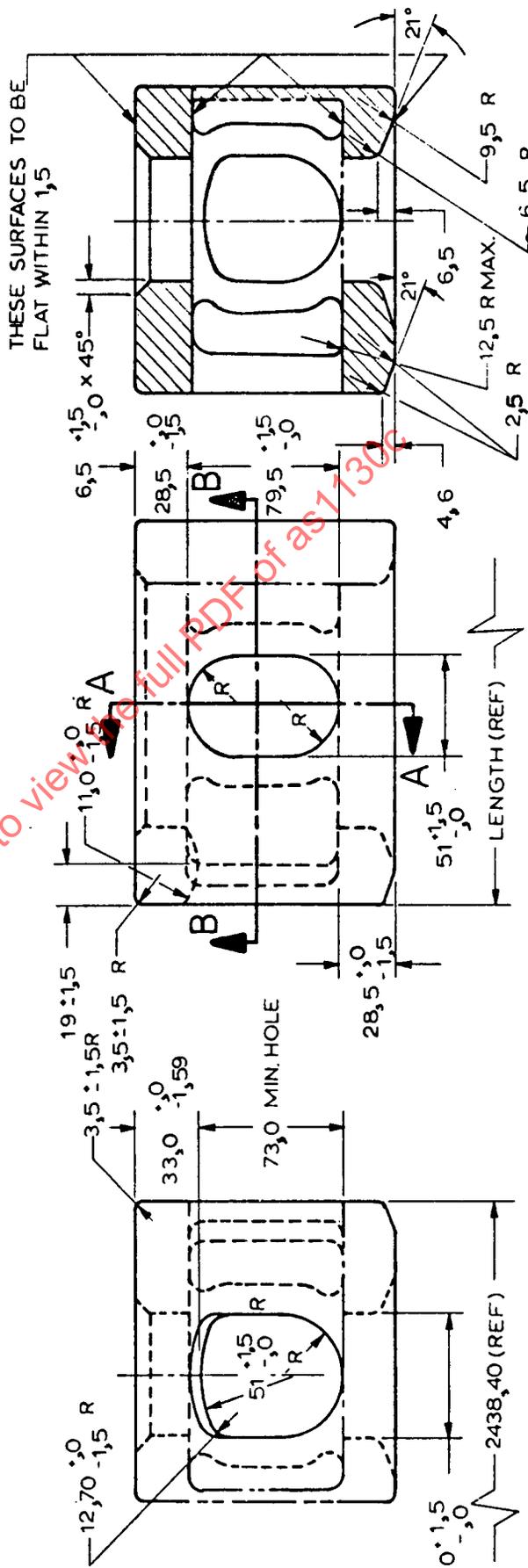
NOTES:

1. Solid and dotted lines (---) show surfaces and contours which must be physically duplicated in the fitting
2. Phantom lines (----) show optional walls which may be used to develop a boxed shaped fitting
3. Outside and inside corner radii where sharp corners are shown must be 3 mm max except as noted
4. Four fittings required per pallet
2 L.H. and 2 R.H.
5. Outside surfaces shall have a casting surface of C30 or better

TOP VIEW (BOTTOM VIEW IDENTICAL EXCEPT AS NOTED)



SECTION B-B



SECTION A-A

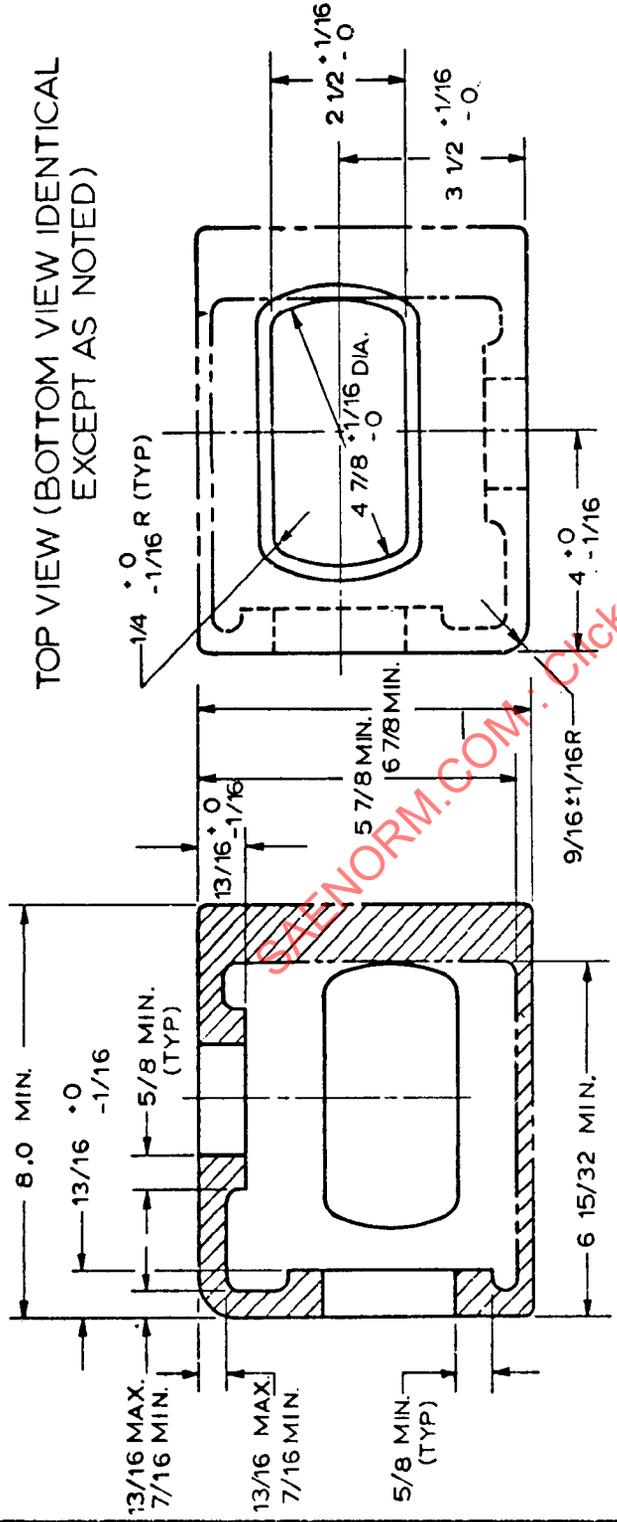
FLUSH MOUNTED CORNER FITTING
DIMENSIONS IN MILLIMETERS

FIGURE 7 (SI) (SEE FIG 6)

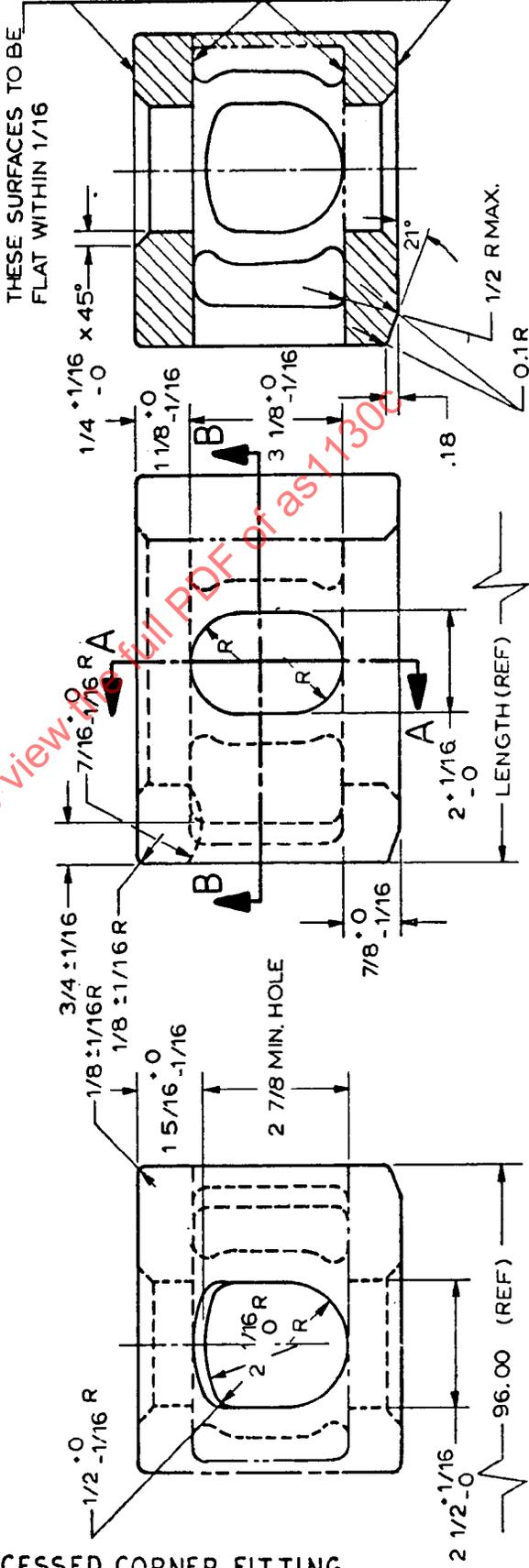
NOTES:

1. Solid and dotted lines (---) show surfaces and contours which must be physically duplicated in the fitting
2. Phantom lines (----) show optional walls which may be used to develop a boxed shaped fitting
3. Outside and inside corner radii where sharp corners are shown must be 1/8 in. max except as noted
4. Four fittings required per pallet
2 L.H. and 2 R.H.
5. Outside surfaces shall have a casting surface of C30 or better

TOP VIEW (BOTTOM VIEW IDENTICAL EXCEPT AS NOTED)



SECTION B-B



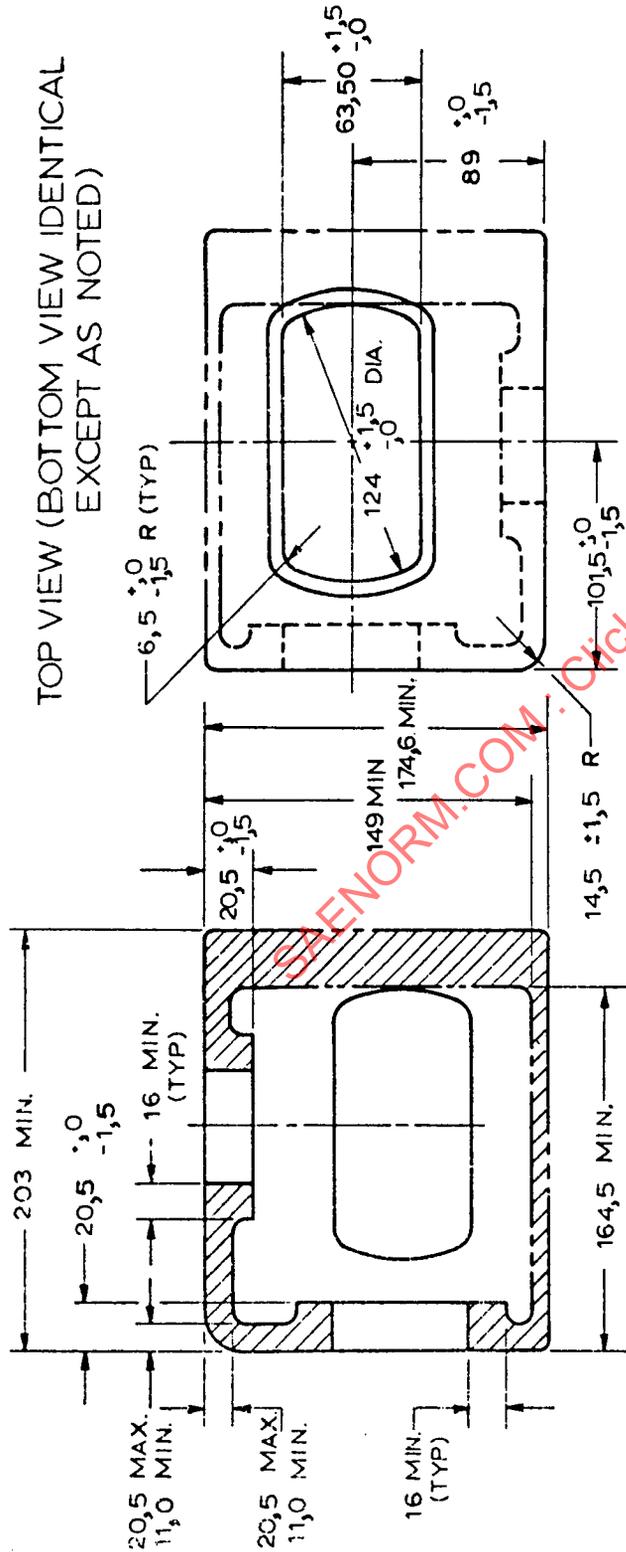
SECTION A-A

RECESSED CORNER FITTING
DIMENSIONS IN INCHES
FIGURE 7A (SEE FIG 6A)

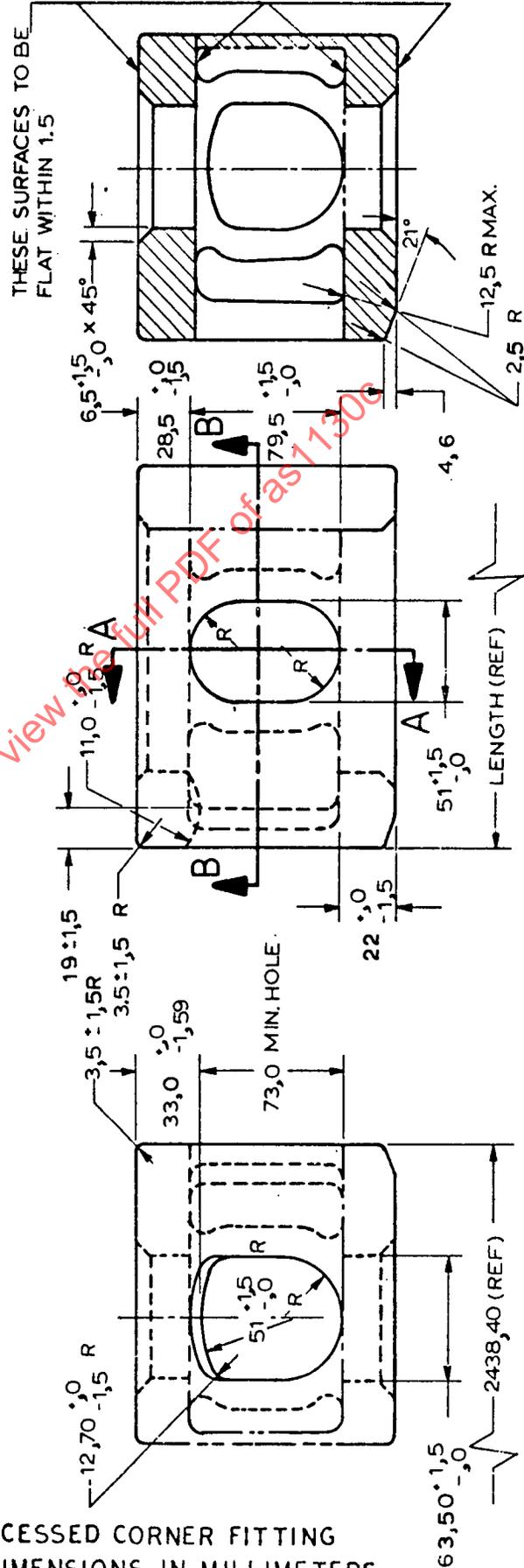
NOTES:

1. Solid and dotted lines (— · — · —) show surfaces and contours which must be physically duplicated in the fitting
2. Phantom lines (---) show optional walls which may be used to develop a boxed shaped fitting
3. Outside and inside corner radii where sharp corners are shown must be 3 mm,max except as noted
4. Four fittings required per pallet
2 L.H. and 2 R.H.
5. Outside surfaces shall have a casting surface of C30 or better

TOP VIEW (BOTTOM VIEW IDENTICAL EXCEPT AS NOTED)

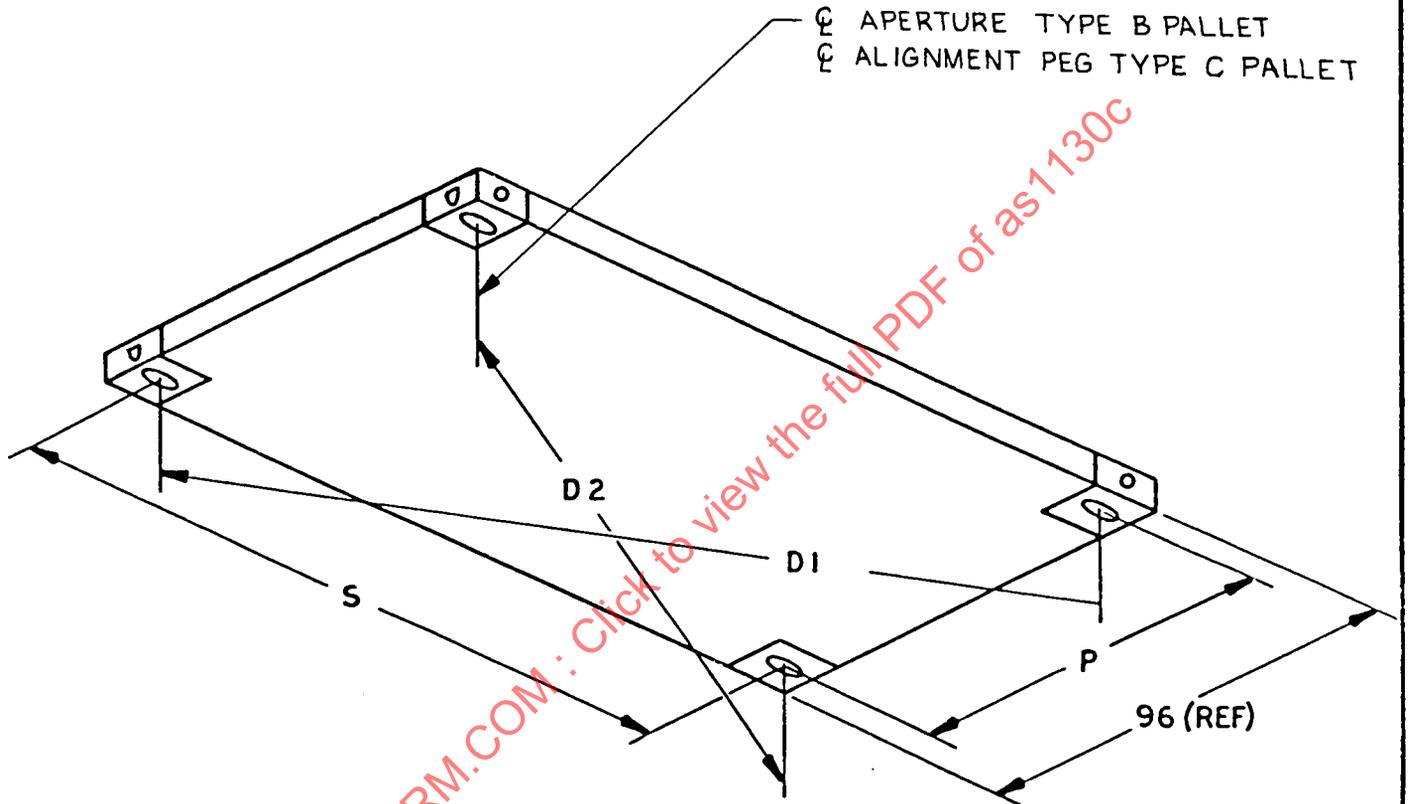


SECTION B-B



SECTION A-A

RECESSED CORNER FITTING
DIMENSIONS IN MILLIMETERS
FIGURE 7A (SI) (SEE FIG 6A)



TYPE B & C PALLET

FIGURE 8