SAE Aerospace
An SAE International Group

AEROSPACE RECOMMENDED PRACTICE

SAE ARP1334

REV. B

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Superseding ARP1334A

Ground Equipment Requirements for Compatibility With Aircraft Unit Load Devices

1. SCOPE:

1.1 This SAE Aerospace Recommended Practice (ARP) specifies requirements for those portions of the aircraft Unit Load Device ground and terminal handling equipment that will have a direct bearing on the life of the ULD for the purpose of preventing undue wear on the ULD. Past experience has shown that in-service defects in regard to the above equipment cause high ULD cost. Greater control of maintenance is required.

1.2 Included in this document are requirements for conveyor systems, guides, stops, restraint hardware that are used on trucks, transporters, dollies, storage provisions, pallet build-up hoists, or other ULD-handling equipment.

These requirements reflect state of the art criteria applied to known successfully operated hardware. Any design deviations shall be required to demonstrate equivalency to this specification criteria.

1.3 These ULD's usually form an integral part of the aircraft and as such are subject to regulatory agencies' requirements to assure structural integrity.

1.4 Size, shape and load capacities for ULD's are not included in this document. These can be obtained from SAE or IATA specifications, the airline operator and the ULD manufacturer.

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http://www.sae.org/technical/standards/ARP1334B

2. REFERENCES:

2.1 Applicable Documents:

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of a conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.1.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

ARP1372	Minimum Requirements for Air Cargo Unit Load Device Ground Handling and Transport Systems

2.2 Reference Documents:

2.2.1 ISO Publications: Available from International Organisation for Standardisation, Case Postale 56, CH-1211, Geneva 20, Switzerland.

ISO 4116	Air Cargo Equipment - Ground Equipment requirements for Compatibility with Aircraft Unit Load Devices

2.2.2 IATA Publications: Available from International Air transport Association (IATA), 800 Place Victoria, P.O.Box 113, Montreal, Quebec, Canada H4Z 1M1.

Airport Handling Manual (AHM) 911 Ground Support equipment requirements for compatibility with Aircraft Unit Load Devices

3. EQUIPMENT REQUIREMENTS:

3.1 Conveyor Systems for Transport of ULDs:

3.1.1 Uni-directional Conveyor System (Rollers):

	Description	Requirement
a.	Roller diameter	2 inches (50 mm) minimum
b.	Roller length	4 inches (102 mm) minimum effective bearing length

NOTE: The cumulative length of any number of rollers on a common axis shall support at least 50% of the corresponding ULD dimension. Staggered pattern of rollers shall provide equivalent support.

3.1.1 (Continued):

	Description	Requirement
c.	Lateral spacing between roller ends	16 inches (406 mm) maximum.
d.	Distance between centerlines of rollers less than 4 inches (102 mm) in diameter	10 inches (254 mm) maximum
e.	Distance between centerlines of rollers between 4 and less than 6 inches (102 to 152 mm) diameter	12 inches (305 mm) maximum
f.	Distance between centerlines of rollers of 6 inches (152 mm) diameter and larger	15 inches (381 mm) maximum
g.	Radius at roller edges	0.125 inches (3,2 mm) minimum
h.	Allowable overhang (distance between roller edge and guide)	6 inches (152 mm) maximum

i. The allowable height difference for rollers is a maximum of 0.25 inches (6,4 mm) in any 5 foot x 5 foot (1,52 x 1,52 m) area and 0.12 inches (3 mm) between any two adjacent rollers. The support structure stiffness and tolerance must be designed to meet the above requirement when supporting an empty device or one loaded to its maximum payload capacity.

3.1.2 Multi-directional Conveyor:

	Description	Requirement
a.	Allowable spacing for castored rollers throughout the area castored rollers of less than 4 inches (102 mm) diameter	10 inches (254 mm) maximum in 2 directions 90° apart
b.	Allowable spacing for castored rollers throughout the area traversed by the device, for castored rollers of 4 inches (102 mm) diameter and larger	12 inches (305 mm) maximum in 2 directions 90° apart
c.	Castored roller diameter	3 inches (76 mm) minimum

3.1.2 (Continued):

d.	Castored roller width	1 inch (25 mm) minimum
e.	Edge radius	0.125 inches (3,2 mm) minimum
f.	Minimum contact area	0.75 inches (19 mm) minimum
g.	Allowable spacing for ball transfers throughout the area traversed by the device, except for those areas where supported by other means, when using balls of less than 1.2 inches (30 mm) diameter	5 inches (127 mm) maximum in 2 directions 90° apart
h.	Allowable spacing for ball transfers throughout the area traversed by the ULD, except for those areas where supported by other means, when using balls of 1.2 inches (30 mm) diameter and larger	7 inches (180 mm) maximum in 2 directions 90° apart
i.	Diameter for balls	1 inch (25 mm) minimum

j. The allowable height difference for castored rollers or unloaded ball transfers is a maximum of 0.25 inches (6,4 mm) in any 5 foot x 5 foot (1,52 x 1,52 m) area, and 0.12 inches (3 mm) between any two adjacent castored rollers or ball transfers. The support structure stiffness and tolerance must be designed to meet the above requirement when supporting an empty ULD or one loaded to its maximum payload capacity.

3.2 Flat Top Systems:

3.2.1 Conveying or storage systems that provide flat area contact supporting means (such as flat top chain traverse systems, frame rack storage areas or highway vehicles).

	Description	Requirement
a.	Percent of contact area supporting base of ULD, not otherwise supported	20% minimum
b.	Allowable overhang (unsupported such as by rollers)	12.25 inches (311 mm) maximum
c.	Allowable spacing between support surfaces lateral to movement, not otherwise supported	16 inches (406 mm) maximum
d.	If spacing exists between supports in direction of movement, this allowable spacing is:	12 inches (305 mm) maximum
e.	Edge radius	0.060 inches (1,52 mm) minimum for all edges

3.3 Conveyor Systems General Requirements:

3.3.1 The conveyor systems of two mated pieces of equipment must be relatively flat with each other consistent with the size and stiffness of the ULD so that the load is never totally supported by a single line of rollers or balls in a cresting situation or two lines in a bridging situation.

3.3.2 An edge or lead in roller shall be provided that has the maximum possible diameter commensurate with design in order to absorb the initial impact load of transferring ULD's.

3.3.3 Systems design shall provide that when a device is transferred between pieces of equipment, the maximum allowable span between roller centerlines shall be 12 inches (305 mm). Each piece of equipment shall have its conveying surfaces within 4 inches (102 mm) of the extreme projection of the bed in direction of the device movement. Any remaining structural projection must be ramped or sloped off at 45° minimum with no sharp edges.

3.3.4 All walkways, beams, or other structures must be at least 0.5 inches (12,7 mm) below the tops of the conveying surface.