INTERNATIONAL STANDARD

ISO 4115

Third edition
1997-12-01

Air cargo equipment — Air/land pallet nets

Équipement pour le fret aérien — Filets de palettes pour le transport aérien et de surface

Reference number
ISO 4115:1997(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 4115 was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 9, *Air cargo and ground equipment*.

This third edition cancels and replaces the second edition (ISO 4115:1987), of which it constitutes a technical revision.

Annex A of this International Standard is for information only.

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Printed in Switzerland

Air cargo equipment — Air/land pallet nets

1 Scope

This International Standard specifies dimensional, structural and environmental requirements for pallet nets up to 3 m (10 ft) in height to be used in freighter versions of high capacity fixed-wing aircraft and is intended to be used in conjunction with 2,44 m (8 ft) wide air only and air/land pallets described in ISO 4117.

This International Standard establishes five basic sizes of pallet nets as given in table 1.

Table 1 — Sizes of pallet nets

Pallet net size		Dimensions of the maximum load to be restrained by pallet net		Code (in accordance with ISO 8097)
m	ft	m	in	
3	10	2,44 × 2,99 × 3	96 × 117,75 × 118	2F1N
5	16	2,44 × 4,94 × 3	96 × 196 × 118	2R1N
6	20	2,44 × 6,05 × 3	96 × 238,5 × 118	2G1N
9	30	2,44 × 9,12 × 2,44	96 × 359,95 × 96	2H1N
12	40	2,44 × 12,19 × 2,44	96 × 480 × 96	2J1N

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 4117:1993, *Air and air/land cargo pallets — Specification and testing.*

ISO 7166:1985, *Aircraft — Rail and stud configuration for passenger equipment and cargo restraint.*

ISO 8097:1995, *Aircraft — Minimum airthworthiness requirements and test conditions for certified air cargo unit load devices.*

ISO/TR 8647:1990, *Environmental degradation of textiles used in air cargo restraint equipment.*

ISO 9788:1990, *Air cargo equipment — Cast components of double stud fitting assembly with a load capacity of 22 250 N (5 000 lbf), for aircraft cargo restraint.*

IATA, *Unit Load Devices (ULD) Technical Manual*, 8th edition.[1)]

3 Basic requirements

3.1 Configuration

The net assembly shall include netting, adjustment hardware and pallet attachment fittings. Configuration shall be as specified in figure 1.

3.2 Construction

3.2.1 Weatherproofing

Net construction shall be rugged and weather-resistant, thus minimizing maintenance and original cost.

3.2.2 Fittings and appurtenances

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

NOTE 1 The IATA *ULD Technical Manual* may be referred to for specific contours.

1) Available from International Air Transport Association, 2000 Peel Street, Montreal, Canada H3A 2RA or Route de l'Aéroport 33, Case postale 672, 1215 Geneva 15, Switzerland.

3.2.3 Structural strength

Net construction shall have sufficient structural strength to withstand, without permanent detrimental deformation, the static loads and impact shock encountered in normal carrier service.

3.2.4 Assembly construction

The net assembly shall be constructed so that it adequately encompasses the pallet load and attaches to fittings on all four edges of the pallet as shown in figure 2.

3.2.5 Hardware

3.2.5.1 The net hardware shall be designed and constructed so that it can be easily operated in confined areas.

3.2.5.2 All hardware shall be securely attached to prevent it being lost.

3.2.5.3 Free ends that pass through adjusting buckles shall be equipped with stops.

3.2.5.4 Provision shall be made to enable the net to be tensioned evenly over the cargo. If a mechanical advantage facility is provided to achieve the tension, the release of the tensile force shall be achieved by an operating force not greater than 16 % of the tensioning force and it shall be possible to release the force using a gloved hand.

3.2.5.5 Pallet attachment fittings shall conform with ISO 7166 or ISO 9788.

3.2.6 Netting mesh and configuration

3.2.6.1 The net design shall ensure a minimum installation time and shall be of a configuration such as to minimize the possibility of incorrect installation.

3.2.6.2 The net shall be constructed in such a manner that entanglement during installation and storage is minimized.

3.2.6.3 Nets shall be adequately treated to minimize shrinkage.

3.2.6.4 All netting ends shall be suitably prepared to prevent fraying.

3.2.6.5 The material used for netting shall meet the appropriate regulatory standards for polyamide or polyester and its treatment. If other materials are used, they shall meet equivalent standards for material and treatment.

3.2.6.6 If netting is made from polyamide, polyester or other textile material, consideration should be given to take account of strength degradation resulting from wear and exposure to ultraviolet radiation. See ISO/TR 8647.

3.2.6.7 The net mesh shall be capable of restraining boxes with dimensions of 250 mm × 300 mm × 300 mm (10 in × 12 in × 12 in).

3.2.7 Reefing adjustment

The net shall be constructed so as to provide adjustment in the vertical range from 610 mm (24 in) to a maximum height of 3 m (118 in) for 3 m, 5 m and 6 m units.

For 9 m and 12 m units, there shall be provision for adjustment facilities for heights up to 2,44 m (96 in).

3.2.8 Colour

The colour of the net material and hardware shall be optional. However, contrasting colours may be used to distinguish net components for simplifying attachment of the net to the pallet.

3.2.9 Special marking

In addition to the marking requirements specified in clause 6, the net shall be clearly marked to facilitate rigging on the pallet. If the net operation is not omnidirectional, top and bottom, and inside and outside shall be indicated. Character markings or colour coding may be used to facilitate rapid attachment of net fittings to the pallet.

3.2.10 Weight limits

The tare weight of the net assembly shall be kept to a minimum consistent with the requirements and limits of sound design practices.

3.3 Ratings

The net shall be designed to restrain the gross weight[2] specified in table 2 when attached to the pallet.

Table 2 — Gross weights to be restrained by nets

Nominal length of pallet		Gross weight	
m	ft	kg	lb
3	10	5 670	12 500
5	16	11 340	25 000
6	20	13 600	30 000
9	30	15 875	35 000
12	40	20 410	45 000

2) The term "weight" is used throughout this International Standard, instead of the correct technical term "mass", in order conform to current commercial usage.

3.4 Performance requirements

3.4.1 The net assembly shall be tested to show compliance with the performance requirements specified in ISO 8097.

The net configuration shall be tested for each of the load and restraint conditions applicable to that configuration, unless the critical combination is beyond doubt, in which case the net need only be tested for the most critical conditions.

3.4.2 Alternatively, compliance with ISO 8097 may be proven by analytical methods.

3.5 Airworthiness

The airworthiness requirements specified in ISO 8097 shall be applicable.

4 Environmental criteria

4.1 Materials

4.1.1 The net design and construction should take into consideration environmental degradation which will occur over the service life. See ISO/TR 8647.

4.1.2 The structural and operational integrity of the net shall be maintained at temperatures from – 55 °C to +70 °C (– 65 °F to +160 °F).

4.1.3 All components of the net shall be protected against deterioration or loss of strength in service due to weathering, corrosion or other causes where the type of material used requires such protection.

4.1.4 The net shall be designed so that it will withstand handling common to air/land freight terminal and ramp operations.

4.2 Materials and processes

4.2.1 In order to provide for maximum service life, consideration should be given to the materials and processes used in the construction to take into account the extremely hard usage to which the net will be subjected. 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.

4.2.2 The materials used shall be flame-resistant in accordance with appropriate regulatory requirements.

5 Production nets

In order to show compliance with its specification standard, commercial inspection and quality control methods and practices shall be used to ensure 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 prove compliance with its specification.

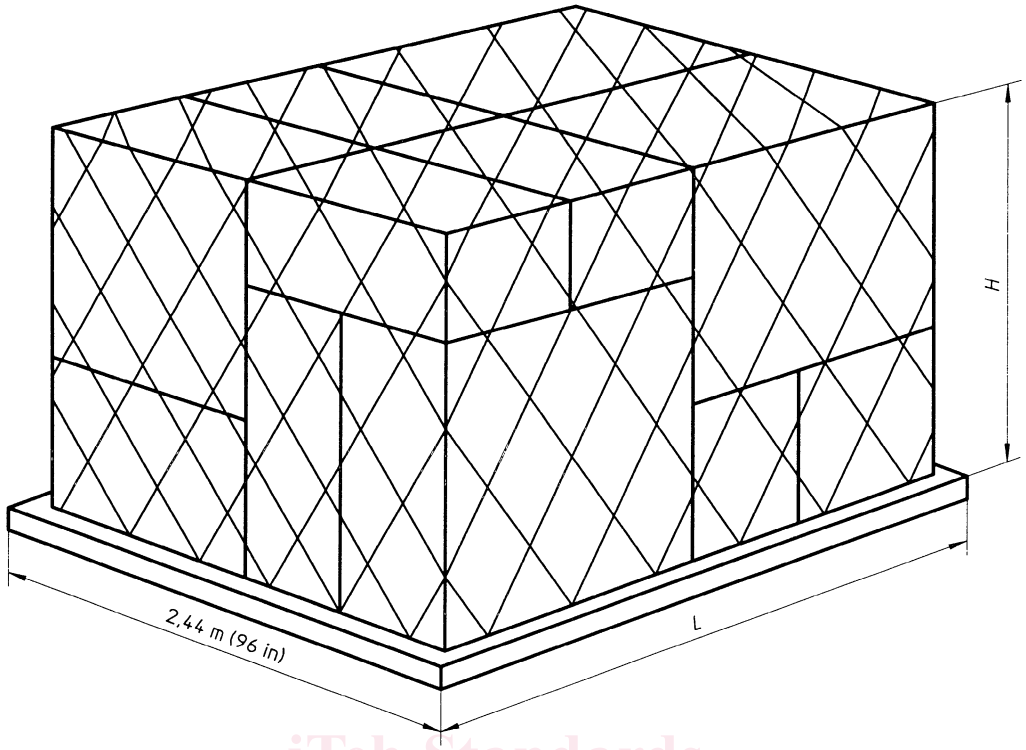
6 Marking requirements

All nets covered by this International Standard shall be marked in accordance with the following requirements.

Manufacturer: .... (Name) (Country)
Part number: .....
Date of manufacture: .....
Service life: .....
Tare weight: ..... kg ..... lb

The markings shall be shown on the outside of the net in such a manner that good readability is ensured under all phases of handling.

All weights shall be rounded off to the next highest 0,5 kg or full pound.



Pallet net size		**Length, *L***		**Height, *H***			
				max.		min.	
m	ft	m	in	m	in	m	in
3	10	2,9	117,75	3	118	0,61	24
5	16	4,9	196				
6	20	6	238,5				
9	30	9,1	359,25	2,44	96	0,61	24
12	40	12,2	480				

Figure 1 — Net assembly (typical design — pattern optional)