

Air cargo equipment — Air cargo pallets — Utilization guidelines

ICS 55.180.30

National foreword

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The UK participation in its preparation was entrusted to Technical Committee ACE/57, Air cargo and ground support equipment, which has the responsibility to:

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- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep UK interests informed;
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Summary of pages

This document comprises a front cover, an inside front cover, the ISO title page, pages ii to v, a blank page, pages 1 to 23 and a back cover.

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 28 February 2006

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ISBN 0 580 47884 X

Amendments issued since publication

Amd. No.	Date	Comments

INTERNATIONAL STANDARD

ISO
16412

First edition
2005-05-01

Air cargo equipment — Air cargo pallets — Utilization guidelines

*Équipement de fret aérien — Palettes de fret aérien — Directives
d'utilisation*



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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 16412 was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 9, *Air cargo and ground equipment*.

Introduction

Air cargo pallets and their cargo restraint nets constitute aircraft unit load devices (ULD), defined by industry standards and airworthiness certified to technical standard order (TSO) C90c in accordance with the requirements of ISO 8097. This guarantees their design to be intrinsically safe for flight on board compatible aircraft types. However, actual flight safety also requires these certified pieces of equipment to be properly used: numerous occurrences have demonstrated a certified ULD can nevertheless jeopardize flight safety if loaded or restrained in an inadequate manner.

Accordingly, this International Standard aims at providing recognized industry standard methods to achieve the best attainable level of safety when preparing air cargo pallets for loading on board aircraft, taking into account the requirements to be met as a result of the pallet's airworthiness certification requisites, the general requirements expressed in the Aircraft Manufacturers' Weight and Balance Manuals, as well as the various potential areas of concern identified based on experience.

The practical means of compliance with flight safety objectives recommended in this International Standard, are intended to be available as a common base for air carriers (operators) as well as shippers and cargo handling agents when establishing their own in-house publications and staff training programmes.

Throughout this International Standard, 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 safe pallet build-up arrangements. Deviation from recommended criteria should only occur after careful consideration and thorough service evaluation have shown alternate methods to provide an equivalent level of safety.

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Air cargo equipment — Air cargo pallets — Utilization guidelines

1 Scope

This International Standard specifies utilization guidelines to be applied when preparing air cargo pallets for carriage on board civil transport aircraft. It identifies the various concerns to be taken into consideration to ensure flight safety, and provides recognized industry standard methods to achieve it. Commercial requirements in order to ensure protection of the goods carried may also be addressed where applicable, but do not constitute the document's primary goal. It is intended as a guide toward standard practice, and is subject to change to keep pace with experience and technical advances.

NOTE In all countries, standing government regulations apply to air cargo unit load devices airworthiness, continuous airworthiness, and air carriers (operators) certification and operations. This International Standard does not, under any circumstance, supersede the requirements of applicable regulations or the aircraft manufacturer's authority approved weight and balance manual.

This International Standard is applicable to any certified air cargo pallet built up from either a single or a number of pieces of commercial cargo, intended to be loaded on lower, main or upper deck of a civil transport aircraft, whether a freighter or a passenger-carrying aircraft. Its field of application includes all pallets prepared within ground premises, whether at a shipper's facilities or an airport cargo warehouse, including those intended to be loaded into the aircraft in a "floating" position. Its provisions may not entirely apply in the event of "pre-embarked" pallets. In such a case, it is up to the operator to identify and implement the applicable criteria.

This International Standard is not intended to apply to air cargo pallets prepared for military transport aircraft, and does not take into account any specific criteria for military aircraft. Nothing, however, precludes it being used for guidelines in this case, it being the military operator's responsibility to identify and implement any additional applicable criteria.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

ISO 4171, *Air cargo equipment — Interline pallets*

ISO 8097:2001¹⁾, *Aircraft — Minimum airworthiness requirements and test conditions for certified air cargo unit load devices*

ISO 10046, *Aircraft — Methodology of calculating cargo compartment volumes*

ISO 16049-1, *Air cargo equipment — Restraint straps — Part 1: Design criteria and testing methods*

1) Endorsement of NAS 3610 10th edition.

ISO 16049-2, *Air cargo equipment — Restraint straps — Part 2: Utilization guidelines and lashing calculations*

FAR²⁾ 14CFR Part 25, *Airworthiness Standards: Transport category airplanes*

FAR²⁾ 14CFR Part 121, *Air Carriers certification and operation*

Federal Aviation Administration Advisory Circular (AC) 120-59 — *Air Carriers internal evaluation program*

JAR³⁾ Part 25, *Airworthiness Standards: Transport category aeroplanes*

JAR³⁾-OPS 1, *Commercial air transportation (aeroplanes)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

air cargo pallet

any type and size of Class II airworthiness certified aircraft pallet in accordance with ISO 8097:2001

NOTE An air cargo pallet may meet the requirements of either ISO 4117 [heavy duty, stiff, typically 50 mm (2 in) thick, units] or ISO 4171 (most units consist of an aluminium plate base). Used in conjunction with an appropriate pallet net, which may meet the requirements of either ISO 4115 or ISO 4170, it constitutes a complete unit load device.

3.2

pallet net

any type or size of Class II airworthiness certified aircraft pallet net in accordance with ISO 8097:2001

3.3

operator

airline

carrier

entity authorized by an Air carrier Operator Certificate (AOC) from its national Civil Aviation Authority to operate civil transport aircraft flights for commercial carriage of passengers, cargo or mail

NOTE The operator holds responsibility for compliance with Civil Aviation Authorities Regulations on its flights, including when the relevant tasks are performed by sub-contractors.

3.4

floating pallet

air cargo pallet loaded into the aircraft over more than one pallet position, and not fully restrained by the aircraft restraint system

NOTE A floating pallet requires cargo tie-down directly on to the aircraft's structure instead of the pallet's tracks.

3.5

pre-embarked pallet

air cargo pallet loaded empty into the aircraft to be used as a floor on which cargo is later brought and palletized inside the cargo compartment

2) FAR, *Federal Aviation Regulations*. FAR 14CFR Part 25 constitutes the U.S.A. government transport aircraft airworthiness Regulations, and Part 121 its Regulations applicable to air carriers certification and operation. They can be obtained from the US Government Printing Office, Mail Stop SSOP, Washington DC 20402-9328, U.S.A.

3) JAR, *Joint Aviation Regulations*. JAR Part 25 constitutes the European government's transport aircraft airworthiness regulations and JAR-OPS 1 its regulations applicable to carriers certification and operation. They can be obtained from JAA Headquarters, Saturnusstraat 8-10, P.O. Box 3000, NL 2130 KA Hoofddorp, Netherlands.