

INTERNATIONAL STANDARD

ISO
11241

First edition
1994-08-15

Aircraft — Aircraft engine transport devices

*Aéronautique et espace — Dispositifs de transport des moteurs
d'aéronefs*



Reference number
ISO 11241:1994(E)
AVA Documents
Document Sharing Hub

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 11241 was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 9, *Air cargo and ground equipment*.

© ISO 1994

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher

International Organization for Standardization
Case Postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

Introduction

Aircraft engines can be transported as outsize bulkloads restrained to the requirements of the applicable Weight and Balance Manual.

This International Standard, however, covers their transport as aircraft engine transport devices, as a unit being secured in the aircraft by a Class II ISO 8097 restraint system.

Aircraft — Aircraft engine transport devices

1 Scope

This International Standard specifies functional, dimensional, structural and environmental requirements for the design of aircraft engine transport devices, used to transport aircraft engines in wide-body aircraft. These devices are intended to be used in conjunction with pallets compatible with ISO 8097 Class II restraint requirements. The restraint system parameters and requirements are also to be met for those devices where the pallet structural capability is an integral part of the design. Design parameters specified for air transport of engine transport devices should enable interline capability where feasible with respect to dimensions and loads.

This International Standard specifies minimum air and ground handling features and is intended to ensure interchangeability and compatibility with present and future air transport and ground handling system. The devices specified herein should be designed primarily for air transport and alternatively for surface transport, stowage and maintenance purposes.

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 4116:1986, *Air cargo equipment — Ground equipment requirements for compatibility with aircraft unit load devices.*

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

ISO 4171:1993, *Air cargo equipment — Interline pallets.*

ISO 8097:1993, *Aircraft — Minimum airworthiness requirements and test conditions for certified air cargo unit load devices.*

ISO 9031:1987, *Air cargo equipment — Handling systems for unit load devices (ULDs) — Symbols for pictorial representation.*

IATA, *Unit Load Devices (ULD) Technical Manual* 8th Edition.¹⁾

Motor Carriers Safety Regulations. Part 393.100, Subpart 1, *Protection Against Falling or Shifting Cargo.* United States Department of Transportation.²⁾

3 Types of engine transport devices

This International Standard defines two types of engine transport devices as follows:

- Type A: For split engine pack transport (mainly lower deck);
- Type B: For full engine transport (mainly upper deck).

1) Can be obtained from the International Air Transport Association, 2000 Peel St, Montreal, Quebec, Canada H3A 2R4, or Route de l'Aéroport 33, case postale 672, 1215 Geneva 15, Switzerland.

2) Can be obtained from the US Government Printing Office, Washington, DC 20402, USA (Stock No. 5004-00010).

3.1 Type A is used for shipping of split engine packs, e.g. core-engine packs and fan-engine packs

or additional equipment required on air cargo pallets of the below sizes, as applicable.

1 534 mm × 3 175 mm (60,4 in × 125 in)

2 235 mm × 3 175 mm (88 in × 125 in)

2 438 mm × 3 175 mm (96 in × 125 in)

The transport device shall be compatible with ISO 8097 Class II restraint systems.

3.2 Type B is used for shipping full engine packs, generally referred to as "quick engine change" (QEC) kits, compatible with the allowable aircraft volume on integrated air cargo pallets/stands or air cargo pallets of the following sizes:

2 235 mm × 3 175 mm (88 in × 125 in)

2 438 mm × 3 175 mm (96 in × 125 in)

2 438 mm × 4 064 mm³⁾ (96 in × 160 in)

2 438 mm × 4 978 mm³⁾ (96 in × 196 in)

2 438 mm × 6 058 mm (96 in × 238,5 in)

The transport device shall be compatible with ISO 8097 Class II restraint systems.

3.3 The restraint of the engine transport device onto the pallet shall use mechanical links providing load paths, which are compatible with ISO 8097, Class II restraint requirements (e.g. turn buckles at net restraint points). For both types of engine transport devices, the use of pallet nets is not recommended.

4 Design objectives

This International Standard is intended to establish design objectives for an aircraft engine transport devices for quick engine change (QEC) packs and split engine packs with consideration of the following interfaces.

4.1 The manufacturer shall take into account and specify in a formal document the following criteria:

— cargo envelope, pallet configuration;

3) These sizes are not currently included in ISO 8097.

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

— maximum gross weights⁴⁾, centre of gravity (CG) limits, maximum local loads;

— equipment strength (aircraft g-load envelope);

— loading procedure/requirements, pallet sequence.

NOTE 1 Total aircraft engine transport devices should be submitted to the appropriate airframe manufacturers who will evaluate the total engine transport device, and pallet interface as pertains to technical and operational requirements

4.2 The aircraft engine manufacturers shall consider the following information in a relevant document:

— engine data;

— engine transport device requirements (hoist/crane lift);

— tests;

— ground handling capabilities (forklift tineways);

— total QEC system requirements;

— road/ground transport capability;

— stowage and maintenance capabilities.

NOTE 2 Transport device designs should be submitted to the appropriate engine manufacturers who will evaluate the total engine/transport device package as pertains to technical and operational requirements.

5 Requirements

5.1 Dimensions

Type A shall adapt to a pallet length of 3 175 mm (125 in) and a width of 1 534 mm (60,4 in), 2 235 mm (88 in) or 2 438 mm (96 in).

Type B shall adapt to a pallet length of 3 175 mm (125 in) and a width of 2 235 mm (88 in) or adapt to pallet lengths of 3 175 mm (125 in), 4 064 mm (160 in), 4 978 mm (196 in) and 6 058 mm (238,5 in) and a width of 2 438 mm (96 in).