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Air cargo — Double stud tie-down fittings — Design and testing requirements

Fret aérien — Ferrures d'arrimage à pion double — Exigences de conception et d'essais

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

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

This second edition cancels and replaces the first edition (ISO 9788:1990), which has been technically revised.

The main changes compared to the previous edition are as follows:

— change in title to reflect the amended scope;

— expansion of scope to cover complete double-stud fittings, regardless of material used, instead of only their cast components;

— new Figure 4, examples of ring shapes;

— drawing attention in 4.2.4 to zinc chromate's toxicity; and

— addition of a new Clause 8 on Quality Control.

Introduction

This document specifies the design, performance and testing requirements for double stud tie-down fittings intended to be used for cargo restraint on board civil transport aircraft. At the time of publication, no formal Civil Aviation Authority approval (certification) procedure applicable to tie-down fittings.

The civil aviation requirements referred to in this document are those concerning certification of transport aircraft and appliances to be installed aboard them, and constitute the set of design and operation requirements internationally agreed in application of International Civil Aviation Organization (ICAO) Annexes 6, *Operation of aircraft* and 8, *Airworthiness of aircraft*, to the Convention on International Civil Aviation. This document provides one means of compliance for double stud tie-down fittings.

Throughout this document, 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 restraint arrangements on board aircraft. 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.

Dimensions and tolerances are expressed in millimetres.

Air cargo — Double stud tie-down fittings — Design and testing requirements

1 Scope

This document specifies the geometry, performance and testing requirements for a double stud tie-down fitting assembly, having a load capacity of 22 250 N (5 000 lbf), when installed in rail or track conforming to ISO 7166.

Other materials than those specified can alternatively be used, provided the performance and testing requirements of this document are complied with.

Double stud tie-down fittings are intended to be used as either:

a) loose items to be attached to an air cargo pallet's track or an aircraft's floor rail in order to constitute a tie-down arrangement together with cargo restraint straps meeting the requirements of ISO 16049-1 or cargo restraint slings (steel cables) meeting the requirements of ISO 20291-1,

b) or permanently attached tie-down components of pallet nets meeting the requirements of ISO 4115 or ISO 4170.

In this case, where deemed appropriate, the stud geometry can alternatively conform to ISO 7166, and the breaking strength requirement can be limited to the value necessary to meet the net's airworthiness approval/certification in accordance with ISO 21100.

Single stud tie-down fittings are not covered by this document.

They nevertheless can, where deemed appropriate, use the same stud geometry alternatively to the stud configuration specified in applicable ISO 7166.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 2859-1, *Sampling procedures for inspection by attributes — Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

ISO 3951, *Sampling procedures and charts for inspection by variables for percent nonconforming*

ISO 5922, *Malleable cast iron*

ISO 6982, *Metallic materials — Tensile testing*

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

ISO 10254, *Air cargo and ground equipment — Vocabulary*

ISO 16049-1:2013, *Air cargo equipment — Restraint straps — Part 1: Design criteria and testing methods*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 10254 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
casting
part shaped by solidification of molten metal in a mould

3.2
rough casting
casting which has not been machined or not yet been finished

3.3
rail
<floor> rail conforming to ISO 7166, which is part of an aircraft's floor and designed to take passenger seats, tie-down fittings, or other devices

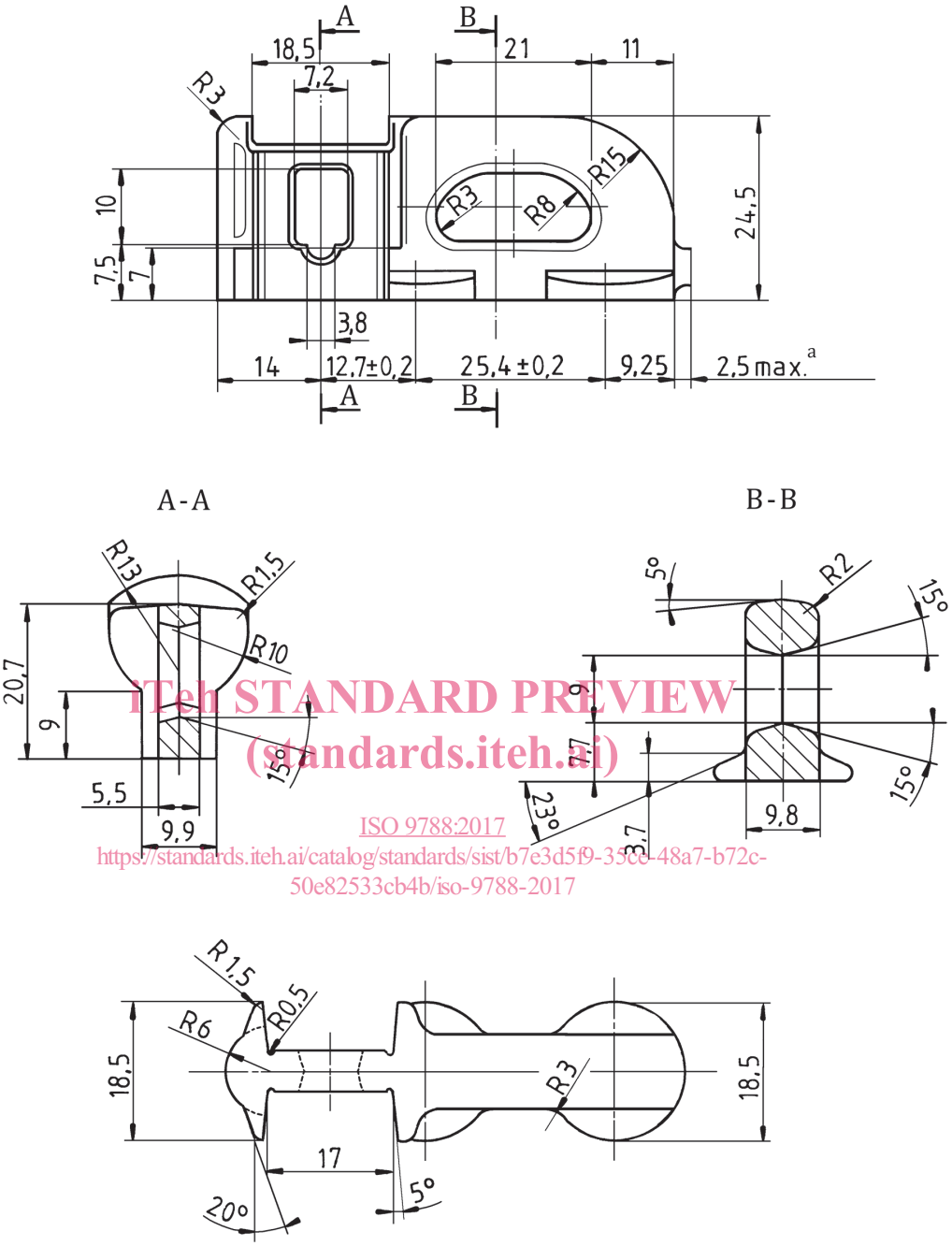
3.4
track
<pallet> track conforming to ISO 7166, which is part of a unit load device and designed to take tie-down fittings

4 Requirements

4.1 Configuration

4.1.1 The configuration geometry shall comply with Figures 1 to 3. Only maximum envelope dimensions and those affecting interchangeability are imposed. The minimum dimensions are limited by the strength requirements.

Dimensions in millimetres



Tolerances: ±0,3 unless otherwise stated
The edges shall be broken (R 0,5)
Draft angle: 2° ± 0,5°
Radii: 1,5 unless otherwise stated

[a] Ingate area.

Figure 1 — Double stud body