SLOVENSKI STANDARD
SIST EN 4645-001:2010

01-marec-2010

Aeronavtika - Konektorji, optiļ ni, okrogli, z enim ali veļ zatiļ i, priključ eni z navojnim obroļ kom, samozapiralni, s premerom kapice 1,25, s snemljivo centrirno puġo - 001. del: Tehniļ na specifikacija

Aerospace series - Connectors, optical, circular, single and multipin, coupled by threaded ring, self-locking 1,25 mm diameter ferrule with removable alignment sleeve holder - Part 001: Technical specification

Luft- und Raumfahrt - Optische Rundsteckverbinder mit Schraubkupplung, selbstsichernd, Einzel- und Multipin, Ferrulendurchmesser 1,25 mm, demontierbarer Zentrierhülsenhalter - Teil 001: Technische Lieferbedingungen

Série aérospatiale - Connecteurs optiques circulaires à accouplement par bague filetée, auto-freinante ferrule 1,25 équipés d' un porte sleeve démontable - Partie 001: Spécificaton technique

Ta slovenski standard je istoveten z: **EN 4645-001:2010**

ICS:

49.060	Letalska in vesoljska elektriļ na oprema in sistemi	Aerospace electric equipment and systems

SIST EN 4645-001:2010 **en**

EUROPEAN STANDARD

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EN 4645-001

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ICS 49.090

English Version

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This European Standard was approved by CEN on 10 October 2009.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (EN 4645-001:2010) has been prepared by the Aerospace and Defence Industries Association of Europe - Standardization (ASD-STAN).

After enquiries and votes carried out in accordance with the rules of this Association, this Standard has received the approval of the National Associations and the Official Services of the member countries of ASD, prior to its presentation to CEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by July 2010, and conflicting national standards shall be withdrawn at the latest by July 2010.

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

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

This family of fibre optic connectors is derived from MIL-DTL-38999 series III and EN 3645-001. It is suitable for use on aerospace onboard applications. It provides easy access for optical contact end face cleaning.

Standards for optical contacts are defined in EN 4639-002.

The connectors with shell size 11 and 13 are 100 % scoop proof. The optical contacts are capable of accepting single cable sizes up to a maximum of 2 mm outside diameter.

1 Scope

This standard specifies the general characteristics, the conditions for qualification, acceptance and quality assurance, as well as the test programs and groups for threaded ring coupling circular fibre optic self-locking connectors, fire-resistant or non fire-resistant, intended for use in a temperature range from − 65 °C to 150 °C continuous.

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 68-1:1998, *ISO general purpose screw threads — Basic profile — Part 1: Metric screw threads*

ISO 261:1998, *ISO general purpose metric screw threads — General plan*

ISO 262:1998, *ISO general purpose metric screw threads — Selected sizes for screws, bolts and nuts*

ISO 965-1:1998, *ISO general-purpose metric screw threads — Tolerances — Part 1: Principles and basic data*

EN 2591-100*, *Aerospace series — Elements of electrical and optical connection — Test methods — Part 100: General.*

EN 3197, *Aerospace series — Installation of aircraft electrical and optical interconnection systems*[1)]

EN 3645-001, *Aerospace series — Connectors, electrical, circular, scoop-proof, triple start threaded coupling, operating temperature 175 °C or 200 °C continuous — Part 001: Technical specification*

EN 4531-002, *Aerospace series — Connectors, optical, circular, single and multipin, coupled by threaded ring — Flush contacts — Part 002: Specification of performance and contact arrangements*

EN 4639-002, *Aerospace series — Connectors, optical, rectangular, modular, multicontact, 1,25 diameter ferrule, with removable alignment sleeve holder — Part 002: List of product standards*

EN 4639-101, *Aerospace series — Connectors, optical, rectangular, modular, multicontact, 1,25 diameter ferrule, with removable alignment sleeve holder — Part 101: Optical contact for cable EN 4641-100 — Operating temperatures between − 65 °C and 125 °C — Product standard*

EN 4639-102, *Aerospace series — Connectors, optical, rectangular, modular, multicontact, 1,25 diameter ferrule, with removable alignment sleeve holder — Part 102: Optical contact for cable EN 4641-102 — Operating temperatures between − 55 °C and 100 °C — Product standard*

EN 4645-003, *Aerospace series — Connectors, optical, circular, single and multipin, coupled by threaded ring, self-locking 1,25 mm diameter ferrule with removable alignment sleeve holder — Part 003: Square flange receptacle — Product standard*

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* And all parts quoted in this standard.

1) Published as ASD Prestandard at the date of publication of this standard.

EN 4645-004, *Aerospace series — Connectors, optical, circular, single and multipin, coupled by threaded ring, self-locking 1,25 mm diameter ferrule with removable alignment sleeve holder — Part 004: Jam nut receptacle — Product standard*

EN 4645-005, *Aerospace series — Connectors, optical, circular, single and multipin, coupled by threaded ring, self-locking 1,25 mm diameter ferrule with removable alignment sleeve holder — Part 005: Plug — Product standard*

EN 9133, *Aerospace series — Quality management systems — Qualification procedure for aerospace standard parts*

MIL-DTL-38999, *Connector, electrical circular, miniature, high density quick disconnect (bayonet, threaded and breech coupling), environment resistant, removable crimp and hermetic solder contacts, general specification for*[2)]

MIL-STD-1373, *Screw thread, modified, 60°, stub, double*[2)]

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 2591-100 apply.

4 Description

4.1 General

This document describe optical connector arrangements for plug and receptacle housings.

Plug and receptacle housings conform to EN 3645-001 standard.

The connectors use rear removable optical contacts with a ferrule diameter of 1,25 mm.

The receptacles connector with male arrangement as specified EN 4645-003 and EN 4645-004.

The plug connector with female arrangement as specified EN 4645-005.

The female arrangement is equipped of a removable alignment sleeve holder as specified EN 4645-005.

The sleeve holder is delivered with the female arrangement. It is considered as a part of the female arrangement (specific design per manufacturer).

The sleeve holder can be supplied separately only for repair purpose.

The connectors are polarized by means of keyways and keys; polarization is obtained before the male contacts enter the insert of the female contacts and before the coupling ring is engaged. The position of the keying arrangement is given in EN 3645-001.

The visual check of coupling is obtained by masking of a red coloured band on the receptacle.

4.2 Receptacle

The receptacle may be attached by:

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2) Published by: Department of Defense (DoD), the Pentagon, Washington, DC 20301, USA.

— square flange;

— jam nut.

The receptacle contains five keyways in which the keys of the plug engage. The main keyway is fixed and is wider than the others. Polarization is ensured by the different positions which the secondary keyways may take. The position of the insert is fixed relative to the main keyway.

4.3 Plug

The plug contains five keys which engage in the keyways of the receptacle. The main key is wider than the others. Polarization is ensured by the different positions which the secondary keys may take. The position of the insert is fixed relative to the main key.

The coupling ring permanently fitted on the plug enables the connectors to be coupled and uncoupled. The mating torque shall be lower than the unmating torque. The internal thread of the coupling ring may be treated with a suitable lubricant compatible with the performance required in this standard.

4.4 Materials and surface treatment

4.4.1 General

When dissimilar metals are in close contact, adequate protection against corrosion shall be used for the electromotive force of the cell not to exceed 0,25 V (see EN 3197).

4.4.2 Housings

The material of the connector housings and fittings shall be of suitable material protected against corrosion by passivation, nickel or cadmium plating (see EN 3197) as specified in the product standard.

4.4.3 Optical contacts and alignment sleeves

The material of the optical contacts and alignment sleeves shall be of suitable materials as specified in the product standard.

The optical contacts in both plug and receptacle are sprung-loaded. The spring force is defined in the product standard.

4.4.4 Metallic or non-metallic materials

The materials used for insert, seals and grommets shall have hardness and mechanical characteristics consistent with the required use.

The material used for guiding pins shall have hardness and mechanical characteristics consistent with the required use.

5 Design

5.1 Housings

The connector housings shall be in one unit. They contain teeth at the rear over the entire periphery and shall accommodate the cable outlets and other fittings. The receptacle shall be fitted with a seal for sealing the coupled housings.

The jam nut receptacle housing shall contain an O-ring seal (panel seal). The lock nut shall be provided with wire locking holes.

Threads shall conform to standards ISO/R 68:1973, ISO/R 261:1973, ISO/R 262:1973 and ISO/R 965:1973, except for the triple start threads, which shall conform to standard MIL-STD-1373.

The coupling ring shall be designed so that the optical contacts engage when it is screwed clockwise and disengage when it is unscrewed counter clockwise. The coupling ring shall be designed to provide a hand grip profile.

Full locking of the connectors shall occur at approximately 360°. On completion of tightening of the coupling ring, mechanical contact shall exist between the receptacle and plug shells. Masking of a red colour band on the receptacle shall show that the connectors are correctly mated.

The front face of the plug shell shall seal when fully mated with the receptacle connector.

5.2 Inserts

The insert carrying the optical contacts shall be in hard material and have a cross section and radii such that no cracks, flaking or breaks can occur in normal operation.

The insert for contacts shall be non-removable; it shall be mechanically held in the housing. Sealing shall be provided between the housing and insert.

The mechanical contacts retention system shall be integrated in the hard insert.

The design shall permit individual installation of the contacts without removal of the connector.

Fitting and removal of the contacts shall be from the rear. For ease of operation, tools as per MIL-I-81969/1-03 standard (P/N for size 16) may be used.

Contact position identification shall be permanent and contrasted on the rear and the front face of the insert or grommet.

The female insert (mounted into the plug connector), including the sleeve holder, shall incorporate two alignment pins for multiway connectors.

The male insert (mounted into the receptacle connector) shall incorporate two alignment holes for multiway connectors.

5.3 Removable sleeve holder

The removable sleeve holder shall be assembled onto the plug connector.

6 Definition drawings and masses

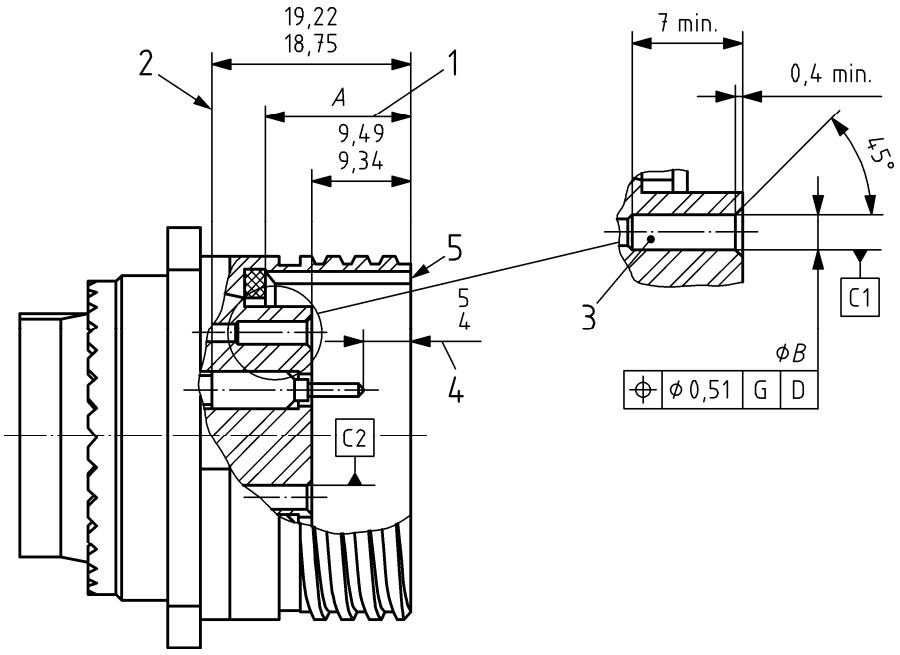
6.1 General

The general dimensions and the masses of receptacles, plugs and protective covers are given in the product standards.

6.2 Mating dimensions of receptacles with male insert

The mating dimensions of receptacles with the male insert are shown in Figure 1 for shell sizes 11, 13, 15, 17, 19, 21, 23 and 25 and in Table 1.

Dimensions and tolerances are in millimetres.



Key

1 Initial contact with static seal.

2 Optical contact rear limit stop onto the insert

3 Alignment pin hole

4 Unmated position

5 Mechanical bottom of the receptacle onto the plug

NOTE Other dimensions are in accordance with EN 3645-001.

Figure 1

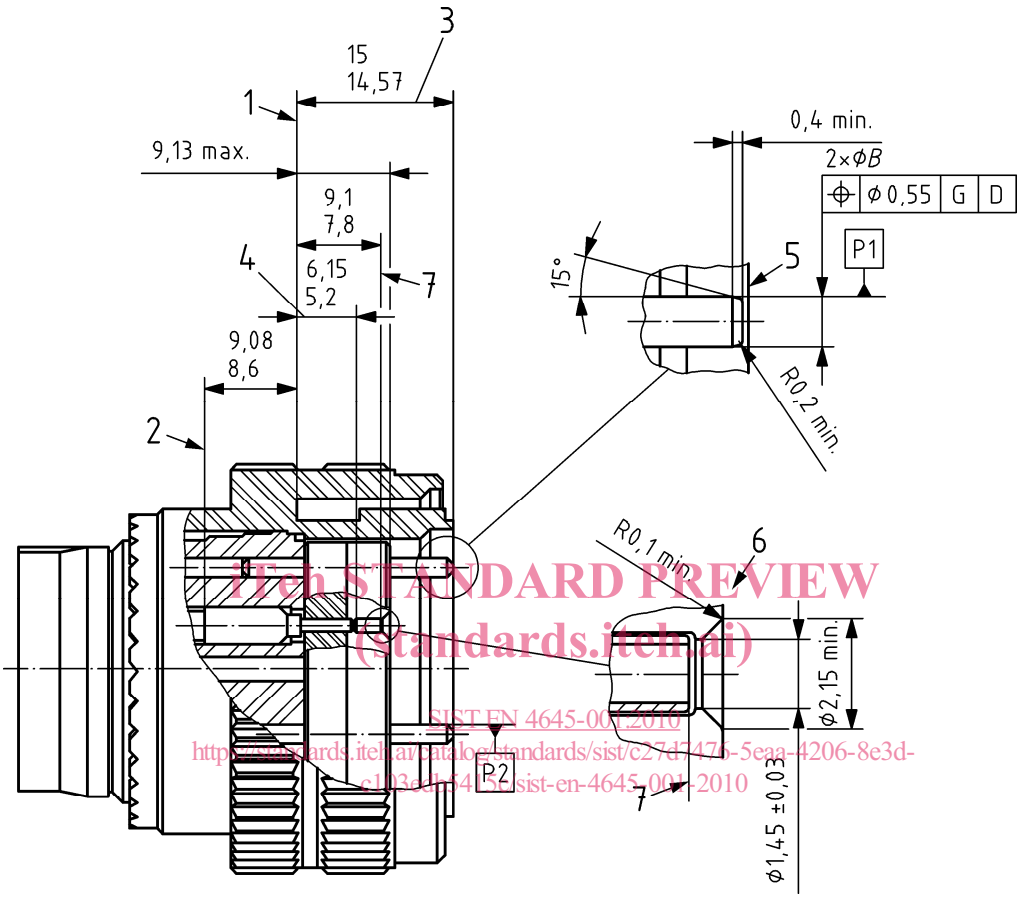
Table 1

Housing size	*A* **Gask loc**	Ø *B*
11	14,73 14,50	1,615 1,565
13		2,20 2,15
15		
17		
19		
21		
23		
25		

6.3 Mating dimensions of plugs with female insert

The mating dimensions of plugs with the female insert are shown in Figure 2 for shell sizes 11, 13, 15, 17, 19, 21, 23 and 25 and in Table 2.

Dimensions and tolerances are in millimetres.



Key

1 Mechanical bottom of the receptacle onto the plug
2 Optical contact rear limit stop onto the insert
3 Alignment pins
4 Unmated position
5 Detail of the two alignment pins extremity
6 Detail of the alignment sleeve holder cavities
7 Alignment sleeve extremity

NOTE Other dimensions are in accordance with EN 3645-001.

Figure 2