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**Aeronavtika - Konektorji, električni, okrogli, zaščiteni kontakt, hitra spojka z navojem, stalna delovna temperatura 175 °C ali 200 °C - 002. del: Specifikacija lastnosti in razporeditev kontaktov**

Aerospace series - Connectors, electrical, circular, scoop-proof, triple start threaded coupling, operating temperature 175 °C or 200 °C continuous - Part 002: Specification of performance and contact arrangements

Luft- und Raumfahrt - Elektrische Rundsteckverbinder, kontaktgeschützt, dreigängige Gewinde-Schnellkupplung, Betriebstemperatur 175 °C oder 200 °C konstant - Teil 002: Leistungsdaten und Kontaktanordnungen

Série aérospatiale - Connecteurs électriques circulaires, à contacts protégés, à accouplement par filetage, à pas rapide à trois filets, température d'utilisation 175 °C ou 200 °C continu - Partie 002: Spécification de performances et d'arrangements des contacts

**Ta slovenski standard je istoveten z: EN 3645-002:2024**

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This European Standard was approved by CEN on 15 October 2023.

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

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## European foreword

This document (EN 3645-002:2024) 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 document has received the approval of the National Associations and the Official Services of the member countries of ASD STAN, 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of an identical text or by endorsement, at the latest by August 2024, and conflicting national standards shall be withdrawn at the latest by August 2024.

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

This document supersedes EN 3645-002:2015

EN 3645-002:2023 includes the following significant technical changes with respect to EN 3645-002:2015:

- description of connector models V and Z in Table 1 updated;
- Table 2 — Hexavalent chromium compound list added;
- values for models K and Y in Table 9 (shielding effectiveness) updated;
- Table 12 – Housing size and contact arrangements updated.

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

**EN 3645-002:2024 (E)**

## **Introduction**

This family of connectors is derived from MIL-DTL-38999 series III, with which it is intermateable and interchangeable.

**iTeh Standards**  
**(<https://standards.iteh.ai>)**  
**Document Preview**

[SIST EN 3645-002:2024](https://standards.iteh.ai/catalog/standards/sist/22f915dd-e5d1-48ac-9a4a-8f3f9a7d6650/sist-en-3645-002-2024)

<https://standards.iteh.ai/catalog/standards/sist/22f915dd-e5d1-48ac-9a4a-8f3f9a7d6650/sist-en-3645-002-2024>

## 1 Scope

This document specifies the performances and contact arrangements for threaded ring coupling circular connectors, fire resistant or non-fire resistant, intended for use in a temperature range from  $-65\text{ °C}$  to  $175\text{ °C}$  or  $200\text{ °C}$  continuous.

## 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.

EN 2591-209, *Aerospace series — Elements of electrical and optical connection — Test methods — Part 209: Current temperature derating*

EN 3155-001:2016, *Aerospace series — Electrical contacts used in elements of connection — Part 001: Technical Specification*

EN 3197, *Aerospace series — Design and installation of aircraft electrical and optical interconnection systems*<sup>1</sup>

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

EN 3645-003, *Aerospace series — Connectors, electrical, circular, scoop-proof, triple start threaded coupling, operating temperature  $175\text{ °C}$  or  $200\text{ °C}$  continuous — Part 003: Receptacle square flange mounting — Product standard*

EN 3645-004, *Aerospace series — Connectors, electrical, circular, scoop-proof, triple start threaded coupling, operating temperature  $175\text{ °C}$  or  $200\text{ °C}$  continuous — Part 004: Receptacle, hermetic, square flange mounting — Product standard*

EN 3645-005, *Aerospace series — Connectors, electrical, circular, scoop-proof, triple start threaded coupling, operating temperature  $175\text{ °C}$  or  $200\text{ °C}$  continuous — Part 005: Receptacle, hermetic, round flange, solder mounting — Product standard*

EN 3645-006, *Aerospace series — Connectors, electrical, circular, scoop-proof, triple start threaded coupling, operating temperature  $175\text{ °C}$  or  $200\text{ °C}$  continuous — Part 006: Protective cover for receptacle — Product standard*

EN 3645-007, *Aerospace series — Connectors, electrical, circular, scoop-proof, triple start threaded coupling, operating temperature  $175\text{ °C}$  or  $200\text{ °C}$  continuous — Part 007: Protective cover for plug — Product standard*

EN 3645-008, *Aerospace series — Connectors, electrical, circular, scoop-proof, triple start threaded coupling operating temperature  $175\text{ °C}$  or  $200\text{ °C}$  continuous — Part 008: Non release plug with grounding ring — Product standard*

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<sup>1</sup> Published as ASD-STAN Standard at the date of publication of this document by ASD-STAN, <https://www.asd-stan.org/>.

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EN 3645-009, *Aerospace series — Connectors, electrical, circular, scoop-proof, triple start threaded coupling, operating temperature 175 °C or 200 °C continuous — Part 009: Receptacle, round flange, jam nut mounting — Product standard*

EN 3645-010, *Aerospace series — Connectors, electrical, circular, scoop-proof, triple start threaded coupling, operating temperature 175 °C or 200 °C continuous — Part 010: Receptacle, hermetic, round flange, jam nut mounting — Product standard*

EN 3645-011, *Aerospace series — Connectors, electrical, circular, scoop-proof, triple start threaded coupling, operating temperature 175 °C or 200 °C continuous — Part 011: Lanyard release plug with grounding fingers — Type 1 — Product standard*

EN 3645-012, *Aerospace series — Connectors, electrical, circular, scoop-proof, triple start threaded coupling, operating temperature 175 °C or 200 °C continuous — Part 012: Lanyard release plug with grounding fingers — Type 2 — Product standard*

EN 3645-013, *Aerospace series — Connectors, electrical, circular, scoop-proof, triple start threaded coupling, operating temperature 175 °C or 200 °C continuous — Part 013: Dummy receptacle — Product standard*

EN 4529-002, *Aerospace series — Elements of electrical and optical connection — Sealing plugs — Part 002: Index of product standards*

**3 Terms and definitions**

For the purposes of this document, the terms and definitions given in EN 3645-001 apply.

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

**4 Description and codification of class** EN 3645-002:2024

<https://standards.iteh.ai/catalog/standards/sist/22f915dd-e5d1-48ac-9a4a-8f3f9a7d6650/sist-en-3645-002-2024>

According to Table 1.

**Table 1**

Model		Description
Connector	W	Receptacles and plugs, cadmium-plated aluminium alloy, olive drab — 500 h salt spray — Plug with grounding spring — Crimp, removable contacts — Maximum operating temperature 175 °C continuous
	J	Receptacles and plugs, cadmium-plated composite, olive drab — 2 000 h salt spray — Plug with grounding spring — Crimp, removable contacts — 1 500 matings — Maximum operating temperature 175 °C continuous
	V	Receptacles and plugs, zinc-nickel plated composite, non reflective dark — with Zero hexavalent chromium compounds (see Table 2 list) added by any actor of the Supply Chain or used in the manufacturing process. — The coating shall consist of a zinc nickel alloy that has a minimum of 120 g/kg and maximum 200 g/kg of nickel, the balance being zinc — 2 000 h salt spray — Plug with grounding spring — Crimp, removable contacts — 1 500 matings — Maximum operating temperature 175 °C continuous



Model	Description
<b>Connector</b>	<b>Z</b> Receptacles and plugs, zinc-nickel plated aluminium alloy, non-reflective dark — with zero hexavalent chromium compounds (see Table 2 list) added by any actor of the supply chain or used in the manufacturing process — The coating shall consist of a zinc nickel alloy that has a minimum of 120 g/kg and maximum 200 g/kg of nickel, the balance being zinc — 500 h salt spray — Plug with grounding spring — Crimp, removable contacts — Maximum operating temperature 175 °C continuous
	<b>K</b> Receptacles and plugs, passivated stainless steel — 500 h salt spray — Plug with grounding spring — Fire-resistant — Crimp, removable contacts — Maximum operating temperature 200 °C continuous
	<b>F</b> Receptacles and plugs, nickel-plated aluminium alloy — 48 h salt spray — Plug with grounding spring — Crimp, removable contacts — Maximum operating temperature 200 °C continuous
	<b>M</b> Receptacles and plugs, nickel-plated composite — 2 000 h salt spray — Plug with grounding spring — Crimp, removable contacts — 1 500 matings — Maximum operating temperature 200 °C continuous
	<b>Y</b> Hermetic receptacle, passivated stainless steel — Solder contacts — Maximum operating temperature 200 °C continuous
	<b>T</b> Receptacles and plugs, nickel fluorocarbon polymer plated aluminium alloy, non-reflective — 500 h salt spray — Plug with grounding spring — Crimp, removable contacts — Maximum operating temperature 175 °C continuous
<b>Protective cover</b>	<b>K</b> Protective cover for plug in passivated corrosion resisting steel — Maximum operating temperature 200 °C continuous
	<b>F</b> Protective cover for receptacle or plug in nickel-plated aluminium alloy — Maximum operating temperature 200 °C continuous
	<b>Z</b> Protective cover for receptacle or plug, zinc-nickel plated aluminium alloy, non-reflective dark — with zero hexavalent chromium compounds (see Table 2 list) added by any actor of the supply chain or used in the manufacturing process — The coating shall consist of a zinc nickel alloy that has a minimum of 120 g/kg and maximum 200 g/kg of nickel, the balance being zinc — Maximum operating temperature 175 °C continuous
	<b>W</b> Protective cover for receptacle or plug in olive-green cadmium-plated aluminium alloy — Maximum operating temperature 175 °C continuous
	<b>T</b> Protective cover for receptacle or plug in nickel fluorocarbon polymer plated aluminium alloy, non-reflective — Maximum operating temperature 175 °C continuous
<b>Dummy receptacle</b>	<b>K</b> Dummy receptacle in passivated stainless steel — Maximum operating temperature 200 °C continuous
	<b>F</b> Dummy receptacle in nickel-plated aluminium alloy — Maximum operating temperature 200 °C continuous

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Model		Description
Dummy receptacle	Z	Dummy receptacle, zinc-nickel plated aluminium alloy, non-reflective dark — with zero hexavalent chromium compounds (see Table 2 list) added by any actor of the supply chain or used in the manufacturing process — The coating shall consist of a zinc nickel alloy that has a minimum of 120 g/kg and maximum 200 g/kg of nickel, the balance being zinc — Maximum operating temperature 175 °C continuous
	W	Dummy receptacle in olive-green cadmium-plated aluminium alloy — Maximum operating temperature 175 °C continuous
	T	Dummy receptacle in nickel fluorocarbon polymer plated aluminium alloy, non-reflective — Maximum operating temperature 175 °C continuous

Table 2 — Hexavalent chromium compound list

Substance name	CAS number
Acids generated from chromium trioxide and their oligomers. Names of the acids and their oligomers: chromic acid, dichromic acid, oligomers of chromic acid and dichromic acid.	7738-95-5 13530-68-2
Chromium trioxide	1333-82-0
Potassium dichromate	7778-50-9
Sodium chromate	7775-11-3
Sodium dichromate	7789-12-0 10588-01-9
Dichromium tris(chromate)	24613-89-6
Pentazinc chromate octahydroxide	49663-84-5
Potassium hydroxyoctaoxidizincatedichromate	11103-86-9
Strontium chromate	7789-06-2

## 5 Operating conditions

### 5.1 Combinations of plugs and receptacles

Table 3 shows the combinations marked by X which achieve the characteristics specified for each model. For other combinations, the characteristics of the pair of connectors are those of the component with the lowest performance.

Other combinations may be used subject to the approval of the design authority.

Table 3

Receptacle model	Plug model							
	W	F	J	V	M	K	Z	T
W	X	—	X	X	—	—	X	—
F	—	X	—	—	X	—	—	—
J	X	—	X	X	—	—	X	—
V	X	—	X	X	—	—	X	—
M	—	X	—	—	X	—	—	—
Y	—	—	—	—	X	X	—	—
K	—	—	—	—	—	X	—	—
Z	X	—	X	X	—	—	X	—
T	—	—	—	—	—	—	—	X

## 5.2 Combinations of protective covers and connectors

According to Table 4.

Table 4

Flight cap for receptacle	Receptacle model	Dummy receptacle Flight cap for plug	Plug model
W	J/V	W	J/V
	W		W
	Z		Z
F	M	F	M
	F		F
K	Y	K	K
	K		
Z	Z	Z	Z
	W/J/V		W/J/V
T	T	T	T

## 5.3 Permissible cables

The sealing performance of these connectors is achieved with the cables of dimensions given in Table 5, using the accessories and wiring tools specified.

Table 5

Dimensions in millimetres

Contact size	Outer diameters of cables	
	min.	max.
22	0,75	1,37
20	1,01	2,11
16	1,65	2,77
12	2,47	3,61
10	3,42	5,21
8	a	a
<sup>a</sup> The cables for size 8 contacts are specified in the contact product standard.		

The use of cables exceeding the maximum diameter indicated is prohibited. Cables smaller than the minimum diameter may be used, subject to a concession, provided that the requirements of EN 3197 are observed.

## 5.4 Operating characteristics

### 5.4.1 Electrical conditions

#### 5.4.1.1 Withstand voltage

According to Table 6.

Table 6

Pressure	Rating M		Rating N		Rating I		Rating II	
	Mated	Unmated	Mated	Unmated	Mated	Unmated	Mated	Unmated
	$V_{rms}$	$V_{rms}$	$V_{rms}$	$V_{rms}$	$V_{rms}$	$V_{rms}$	$V_{rms}$	$V_{rms}$
Sea level	1 300	1 300	1 000	1 000	1 800	1 800	2 300	2 300
12,1 kPa (15 000 m)	800	550	600	400	1 000	600	1 000	800
4,7 kPa (21 000 m)	800	350	600	260	1 000	400	1 000	500
1,1 kPa (30 000 m)	800	200	600	200	1 000	200	1 000	200

#### 5.4.1.2 Insulation resistance

At ambient temperature, the insulation resistance shall be  $\geq 5\,000\text{ M}\Omega$ .

#### 5.4.1.3 Maximum permissible current

The maximum current is shown in Table 7.

The heating caused by passage of the current shall not cause the maximum temperature to be exceeded.

Test EN 2591-209 shall be taken into account.

**Table 7 — Test current in the contacts for hermetic connectors as a function of the cables**

Size		Cable size		Current hermetic connector A
Contact	Barrel	ASD code	AWG <sup>a</sup> code	
22	22	004	22	3
		002	24	3
		001	26	2
20	20	006	20	5
		004	22	5
		002	24	3
16	16	012	16	10
		010	18	10
		006	20	7,5
12	12	030	12	17
		020	14	10
10	10	050	10	—
		030	12	

<sup>a</sup> AWG – American Wire Gauge.

#### 5.4.1.4 Housing electrical continuity

According to Table 8.

**Table 8**

Model	Maximum resistance mΩ
F	1
W, Z	2,5
Model Y with plug Models F, W	10
J, V and M	3
K	10
T	2,5

#### 5.4.1.5 Shielding effectiveness from 100 MHz to 1 GHz

According to Table 9.

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Table 9

Frequency MHz	Minimum attenuation dB	
	Models F, J, V, M, Z, T and W	Models K and Y
100	90	80
200	88	75
300	88	73
400	87	71
800	85	66
1 000	85	65

#### 5.4.1.6 Transfer impedance

Under study.

#### 5.4.2 Climatic conditions

Operating temperatures:

- minimum temperature:  $-65\text{ }^{\circ}\text{C}$ ;
- maximum temperature: according to Table 1. Furthermore, the connector operating temperature shall be limited to the maximum operating temperature indicated in the product standards for contacts.

Corrosion resistance and fluid resistance: according to EN 3645-001.

#### 5.4.3 Mechanical conditions

Mechanical endurance:

- 1 500 cycles for models J, V and M;
- 500 cycles for all other models;
- 250 cycles for type 1 lanyard release plug.

## 6 Type codes

According to Table 10.