

# SLOVENSKI STANDARD

## SIST EN 2549:2001

01-januar-2001

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**Aerospace series - Bolts, normal hexagonal head, close tolerance normal shank, short thread, in titanium alloy, anodized, MoS2 lubricated - Classification: 1 100 MPa (at ambient temperature) / 315°C**

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Luft- und Raumfahrt - Sechskant-Paßschrauben, kurzes Gewinde, aus Titanlegierung, anodisiert, MoS2-geschmiert - Klasse 1 100 MPa (bei Raumtemperatur) / 315 °C

Série aérospatiale - Vis à tête hexagonale normale, tige normale à tolérance serrée, filetage court, en alliage de titane, anodisées, lubrifiées MoS2 - Classification: 1 100 MPa (à température ambiante) / 315 °C

**Ta slovenski standard je istoveten z: EN 2549:1995**

**ICS:**

49.030.20 Sorniki, vijaki, stebelni vijaki Bolts, screws, studs

**SIST EN 2549:2001**

**en**

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EUROPEAN STANDARD

EN 2549

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 1995

ICS 49.040.20

Descriptors: aircraft industry, aircraft equipment, screw, hexagonal head screw, titanium alloy, screw thread, specification, characteristic, dimension, mass, dimensional tolerance, surface treatment, designation, marking

English version

**Aerospace series - Bolts, normal hexagonal head,  
close tolerance normal shank, short thread, in  
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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

The European Standards exist 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 Central Secretariat has the same status as the official versions.

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# CEN

European Committee for Standardization  
Comité Européen de Normalisation  
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

**Foreword**

This European Standard has been prepared by the European Association of Aerospace Manufacturers (AECMA).

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

This standard was submitted for Formal Vote, and the result was positive.

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 December 1995, and conflicting national standards shall be withdrawn at the latest by December 1995.

According to the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard:  
Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.

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DYNAMIC IDENTIFICATION OF STRUCTURES

## 1 Scope

This standard specifies the characteristics of bolts, normal hexagonal head, close tolerance normal shank, short thread, in titanium alloy, anodized, MoS<sub>2</sub> lubricated.

Classification : 1 100 MPa <sup>1)</sup> / 315 °C <sup>2)</sup>

## 2 Normative references

This European Standard incorporates by dated or undated reference provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- ISO 3193 Aerospace - Bolts, normal hexagonal head, normal shank, short or medium length MJ threads, metallic material, coated or uncoated, strength classes less than or equal to 1 100 MPa - Dimensions
- ISO 3353 Aerospace - Rolled threads for bolts - Lead and runout requirements
- ISO 5855-2 Aerospace - MJ threads - Part 2 : Limit dimensions for bolts and nuts
- ISO 7913 Aerospace - Bolts and screws, metric - Tolerances of form and position
- ISO 9152 Aerospace - Titanium alloy bolts, strength class 1 100 MPa, MJ threads - Procurement specification <sup>3)</sup>
- EN 2000 Aerospace series - Quality assurance - EN aerospace products - Approval of the quality system of manufacturers
- EN 2424 Aerospace series - Marking of aerospace products
- EN 2491 Aerospace series - Molybdenum disulphide dry lubricants - Coating methods <sup>3)</sup>
- EN 3042 Aerospace series - Quality assurance - EN aerospace products - Qualification procedure
- EN 4016 Aerospace series - Oversized bolts <sup>3)</sup>
- TR 3775 Aerospace series - Bolts and pins - National materials <sup>4)</sup>
- TR 4070 Aerospace series - Molybdenum disulphide dry lubricants - List of commercial products <sup>3)</sup>

1) Minimum tensile strength of the material at ambient temperature

2) Maximum temperature that the bolt can withstand without continuous change in its original characteristics, after return to ambient temperature. The maximum temperature is determined by the surface treatment.

3) In preparation at the date of publication of this standard

4) Published as AECMA Technical Report at the date of publication of this standard

### 3 Required characteristics

#### 3.1 Configuration - Dimensions - Masses

See figure 1 and table 1.

Dimensions and tolerances are : in conformity with ISO 3193, expressed in millimetres and apply after anodizing but before lubricating.

Details of form not stated are left to the manufacturer's discretion.

#### 3.2 Tolerances of form and position

ISO 7913

#### 3.3 Materials

TR 3775 (titanium alloy, classification 1 100 MPa)

#### 3.4 Surface treatment

Lubrication :

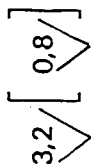
- lubricant : see 4 ;

- application : EN 2491 : 5  $\mu\text{m}$  to 10  $\mu\text{m}$ .

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Values in micrometres apply prior to surface treatment.

Break sharp edges 0,1 to 0,4

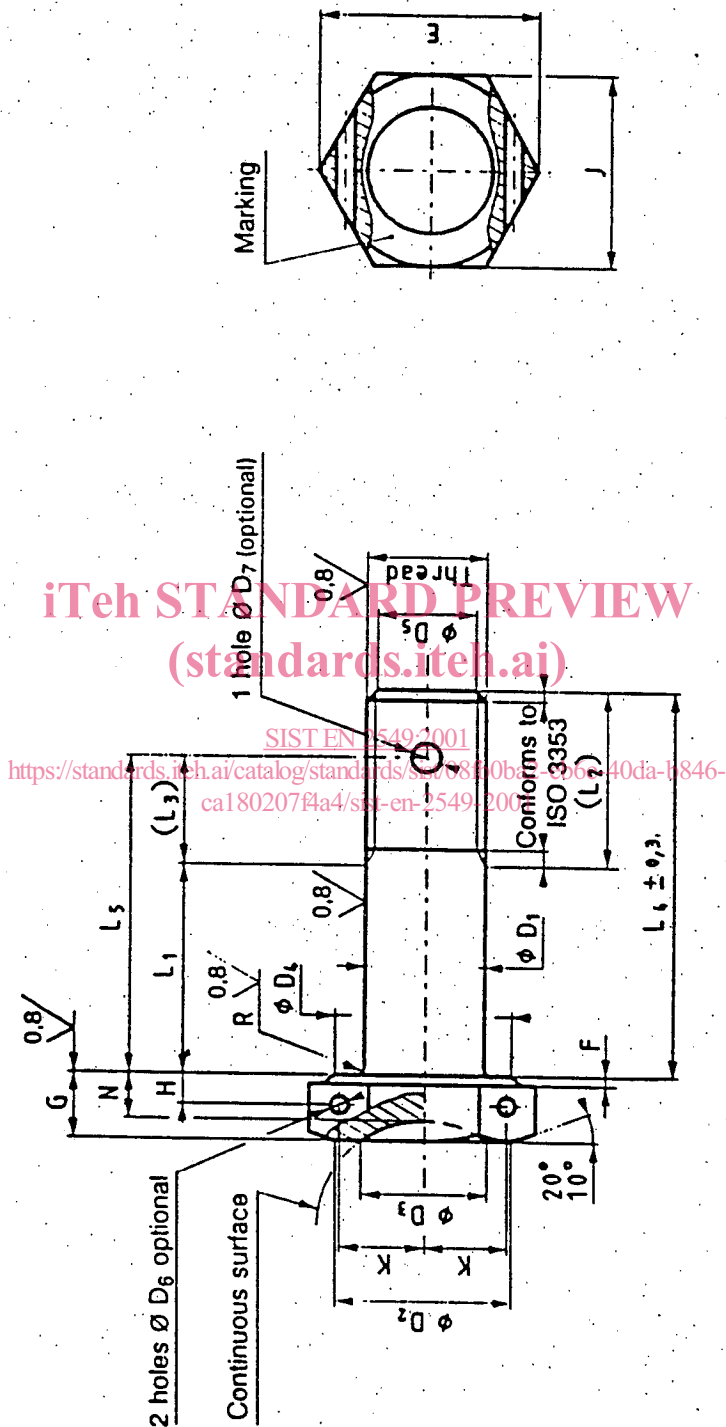


Figure 1

Table 1

Diameter code	Thread <sup>1)</sup>	D <sub>1</sub>	D <sub>2</sub> min.	D <sub>3</sub> 0 -0,5	D <sub>4</sub> <sup>2)</sup> min.	D <sub>4</sub> <sup>2)</sup> nom.	D <sub>5</sub> Tol.	D <sub>6</sub> H13	D <sub>7</sub> H13	E		F		G	H
										min.	max.	min.	max.		
030	MJ3x0,5 - 4h6h	3	5,5	—	5,4	2,3	0	—	—	6,5	0,4	—	—	0	—
040	MJ4x0,7 - 4h6h	4	6,4	—	6,4	3	-0,5	—	—	7,6	—	—	—	-0,3	—
050	MJ5x0,8 - 4h6h	5	7,4	—	7,4	3,4	—	—	1,1	—	—	—	2,5	2	—
060	MJ6x1 - 4h6h	6	9,4	5,25	9,3	4,2	—	1	1,5	8,7	—	—	3	3	1,35
070	MJ7x1 - 4h6h	7	10,3	6,25	10,2	5,2	—	1,4	1,9	10,9	0,5	0,2	3,5	4	1,6
080	MJ8x1 - 4h6h	8	12,3	7,25	12,2	6,2	—	—	—	12	—	—	4	4	1,85
100	MJ10x1,25 - 4h6h	10	16,3	8,25	16	7,9	±0,5	—	—	14,3	—	—	4,5	4,5	2,1
120	MJ12x1,25 - 4h6h	12	18,3	10,25	18	9,8	—	—	2,4	18,9	—	—	5	5	2,35
140	MJ14x1,5 - 4h6h	14	21,3	12,25	21	11,5	—	—	—	21,1	—	—	6	6	2,85
160	MJ16x1,5 - 4h6h	16	23,3	14,25	23	13,5	—	1,6	3	24,5	0,6	0,3	7	7	3,35
180	MJ18x1,5 - 4h6h	18	26,3	16,25	26	15,5	—	—	—	26,8	—	—	8	8	3,85
200	MJ20x1,5 - 4h6h	20	29,3	18,25	29	17,5	—	—	3,8	30,2	—	—	9	9	4,35
				20,25	29	17,5	—	—	—	33,6	—	—	10	10	4,85

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Table 1 (concluded)

Diameter code	J		K	L <sub>1</sub> ± 0,2 3) 4)		L <sub>2</sub>	L <sub>3</sub>	N	R		Mass 5)	
	nom.	Tol.		Code	nom.				max.	min.	6)	7)
030	6		—	002 to 030	2 to 30	6	—	—	0,4	0,2	0,50	0,03
040	7	h12	—	002 to 040	2 to 40	7,5	5	—	0,5	0,3	0,95	0,06
050	8		3,25	003 to 050	3 to 50	9	6	2	0,7	0,5	1,67	0,09
060	10		4,1	003 to 060	3 to 60	10	7	2,3	0,8	0,5	3,18	0,13
070	11		4,5	004 to 070	4 to 70	11	7	2,7	0,9	0,5	4,27	0,17
080	13		5,35	004 to 080	4 to 80	11,5	7,5	3	1,0	0,5	6,43	0,23
100	17		7,1	005 to 100	5 to 100	14,5	9	3,4	1,1	0,6	12,49	0,36
120	19	h13	7,9	006 to 120	6 to 120	16	10	4	1,2	0,6	19,96	0,51
140	22		9,2	007 to 140	7 to 140	19	12	4,7	1,3	0,8	30,73	0,70
160	24		10,05	008 to 160	8 to 160	20,5	13	5,4	1,4	0,8	44,95	0,90
180	27		11,3	009 to 180	9 to 180	22,5	14,5	6	1,5	0,8	63,33	1,14
200	30		12,6	010 to 200	10 to 200	24,5	15	6,7	1,6	1	86,64	1,41

1) In accordance with ISO 5855-2, except the thread major diameter "d max." which shall be equal to  $D_1$  min. - 0,025.

2)  $D_4$  max. shall be less than  $J$ .

3) Increments:

1 for  $L_1 \leq 30$

2 for  $30 < L_1 \leq 100$

4 for  $L_1 > 100$

4) If greater lengths are required, they shall be chosen using the above increments. The length code corresponds to length  $L_1$ , completed by one or two zeros to the left, where necessary, to obtain a three digit code.

5) Approximate values (kg/1 000 pieces), calculated on the basis of 4,45 kg/dm<sup>3</sup>, for information purposes only. They apply to bolts without holes.

6) Value for head and first  $L_4$

7) Increase for each additional millimetre of  $L_4$ .