Aerospace series

Bolt – Close tolerance
130° countersunk head
Short thread

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Contents

1 Scope

This standard specifies the dimensions, tolerances and requirements of short threaded close tolerance bolts, 130° countersunk head, for aerospace applications.

2 Normative references

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

ISO8080	Aerospace – Anodic treatment of titanium and titanium alloys – Sulfuric acid process[4]
EN2424	Aerospace series – Marking of aerospace products[2]
EN4473	Aerospace series – Aluminium pigmented coatings – Technical specification[3]
EN6116	Aerospace series – Threaded bolts, light weight – Inch series – Technical specification[3]
EN6117	Aerospace series – Specification for lubrication of bolts with cetyl alcohol[3]
AMS4928	Titanium alloys bars, wire, forgings, and rings 6Al-4V annealed [1]
AMS4967	Titanium alloys bars, wire, forgings, and rings 6.0Al-4.0V annealed, heat treatable 1
ANSI/ASME-B46-1	Surface texture – Surface roughness, waviness and lay 1
AS8879	Aerospace – UNJ threads – General requirements and limit dimensions 1

3 Requirements

3.1 Configuration, dimensions, tolerances and mass

The configuration, dimensions and tolerances shall be in accordance with figure 1 and table 3 and 4.
Dimensions and tolerances for oversize bolts shall be in accordance with table 5 and 6.
All dimensions and tolerances are expressed in millimeters unless stated otherwise

[1] Published by: Society of Automotive Engineers (SAE), 400 Commonwealth Drive, Warrendale, PA 15096-0001, USA
[2] Published as ASD Standard at the date of publication of this standard
[3] Published as ASD Prestandard at the date of publication of this standard
[4] Published by the ISO Central Secretariat ISO copyright office Case postale 56 CH-1211 Geneva 20.

3.2 Material and surface treatment

The material and surface treatment shall be in accordance with Table 1.

Table 1: Material and surface treatment

Material code	Material	Finish	Lubrication	Recess code		Identification
K	Titanium alloy 6Al-4V as per AMS4928 or AMS4967 R_c min. = 650 MPa	Aluminium coating as per EN4473.	Cetyl alcohol as per EN6117	Hexagonal	–	White paint at thread end [1]
F		Resin based Aluminium as per EN4473 Type II				White paint at thread end [1]
T		Sulfuric-acid anodizing as per ISO8080				None
B		Sulfuric-acid anodizing as per ISO8080 + Aluminium coating as per specification EN4473 on threads		Hexagonal [2]	–	
				5 Lobe high torque recess	E	
C		Sulfuric-acid anodizing as per ISO8080 + Aluminium coating as per specification EN4473 type II on threads		Hexagonal [2]	–	
				5 Lobe high torque recess	E	

[1] Identification becomes effective with publication of this standard. Existing stock may be depleted.
[2] Not for new design, use 5 Lobe high torque recess code E

3.3 Mechanical characteristics

The mechanical characteristics shall be in accordance with Table 2.

Table 2: Mechanical characteristics

Diameter code	Min. double shear strength (N)	Min. tensile strength (N)	Max. fatigue load (N)
2	17760	7330	2290
3	23900	8890	3550
3A	32000	11600	4060
4	41330	16450	5560
Note: Minimum fatigue loads are equal to 10% of maximum loads.			

3.4 General characteristics

Surface condition per ANSI-B46-1.

3.5 Mass

See tables 4, 6 and 8.

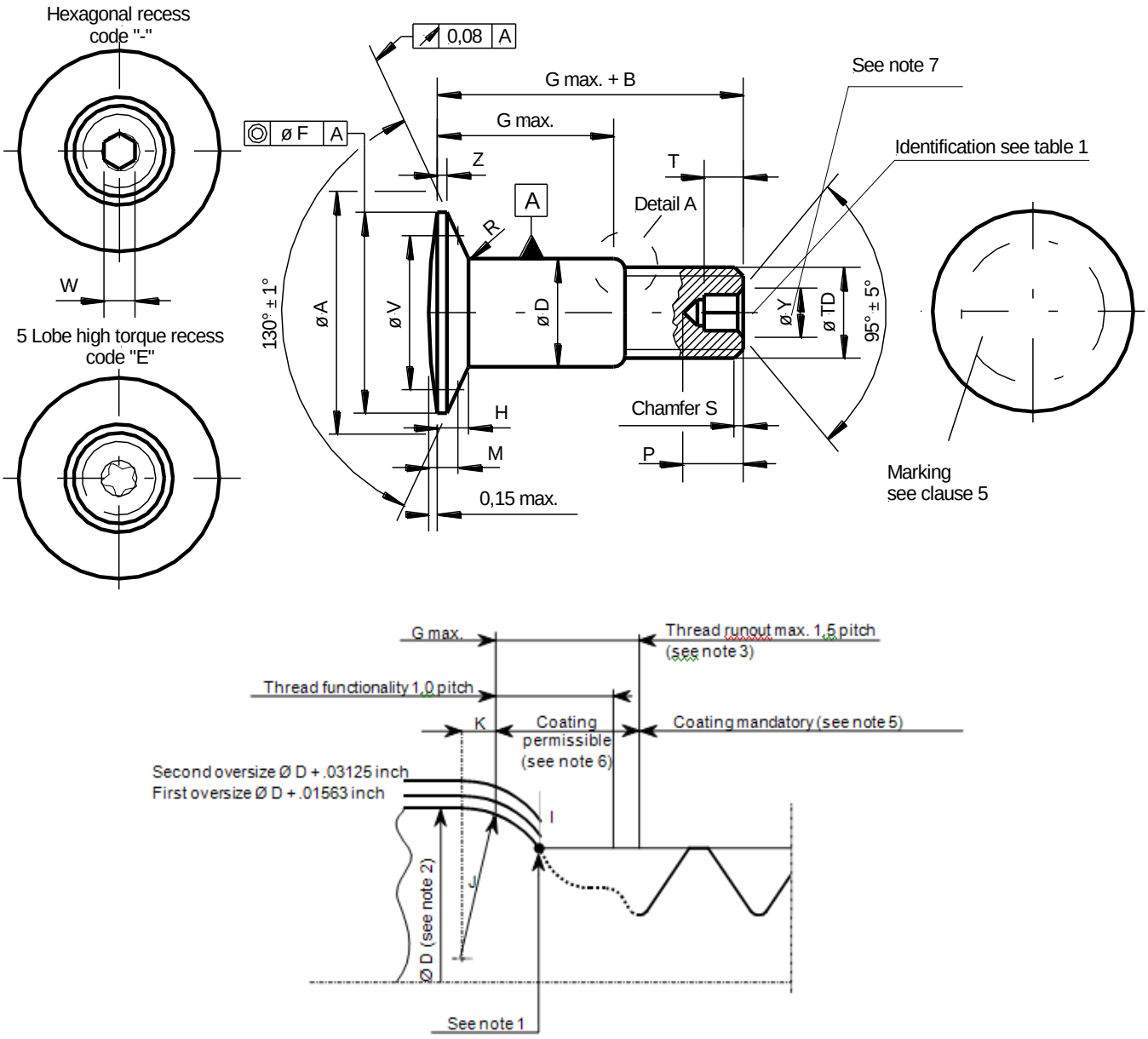


Figure 1: Configuration, dimensions and tolerances

Note 1: For nominal diameter: The diameter measured at point I shall be less than or equal to the maximum diameter TD.

For oversize diameters: Maximum diameter at point I shall be incremented by .01563 and .03125 inch for first and second oversize respectively. The TD diameter stays the same as for nominal diameter.

Note 2: Check concentricity of diameters D (shank) and TD (thread) to avoid interference between the bolt thread and hole when using tight interference fits.

Note 3: The maximum thread run-out and functionality for first and second oversize is incremented by 0,25 mm.

Note 4: Requirement for shank straightness: Maximum deviation of 0,004 mm / mm of pin length.

Note 5: Only for B coded fasteners, threads shall be coated with aluminium coating as per EN4473.

Note 6: Only for B coded fasteners, overspray of aluminium coating as per EN4473 is permissible in this area.

Note 7: Valid for hexagonal recess.

Table 3: Dimensions and tolerances (continued)

Dimensions in millimeters

Dia-meter code	Nominal shank diameter (inch)	Thread modified [1] (inch)	Ø A (theo.)		B	Ø D Code K		Ø D Code T, B		F	H (theo.)	
			min.	max.	Ref.	min.	max.	min.	max.	max.	min.	max.
2	5/32	.1640-32 UNJC-3A	8,40	8,61	7,11	4,127	4,153	4,140	4,153	0,102	0,99	1,04
3	3/16	.1900-32 UNJF-3A	9,71	9,93	7,37	4,788	4,813	4,800	4,813	0,127	1,14	1,19
3A	7/32	.2160-28 UNJF-3A	11,13	11,35	7,75	5,517	5,542	5,530	5,542		1,31	1,36
4	1/4	.2500-28 UNJF-3A	12,77	12,98	8,13	6,312	6,337	6,324	6,337	0,152	1,49	1,55

Table3: Dimensions and tolerances (continued)

Dimensions in millimeters

Dia-meter code	K	J		M		Ø V		Ø TD		R	
	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
2	0,33	1,65	2,16	0,597	0,668	6,497	6,502	3,988	4,051	0,38	0,63
3	0,41	1,78	2,67	0,572	0,653	7,569	7,574	4,597	4,673	0,50	0,76
3A	0,48	2,41	2,92	0,732	0,820	8,415	8,420	5,258	5,334		
4	0,53	3,18	3,68	0,668	0,765	10,282	10,287	6,121	6,197		

Table 3: Dimensions and tolerances (concluded)

Dimensions in millimeters

Dia-meter code	S	Z	Hexagonal recess							5 Lobe high torque recess	
			T		P	W		Ø Y		T	P
	Ref.	max.	min.	max.	max.	min.	max.	min.	max.	min.	max.
2	0,79 x 37°	0,304	2,04	2,54	3,43	2,01	2,03	2,39	2,64	1,73	3,03
3		0,381					2,05	2,64	3,02	1,77	3,10
3A										1,80	3,30
4			2,29	2,79	3,78	2,41	2,46	3,10	3,61	1,97	3,50

[1] Thread as per AS8879 except diameter TD.

Table 4: Grip length and mass

Dimensions in millimeters

Length code [1)]	G_{max} ± 0,254	Diameter code 2		Diameter code 3		Diameter code 3A		Diameter code 4	
		Length (G_{max}+B) ± 0,254	Mass (Ref.) (kg/1000pcs)	Length (G_{max}+B) ± 0,254	Mass (Ref.) (kg/1000pcs)	Length (G_{max}+B) ± 0,254	Mass (Ref.) (kg/1000pcs)	Length (G_{max}+B) ± 0,254	Mass (Ref.) (kg/1000pcs)
2	3,18	10,29	0,576	10,54	0,808	10,93	1,181	11,31	1,593
3	4,76	11,87	0,672	12,12	0,935	12,51	1,355	12,89	1,814
4	6,35	13,46	0,767	13,71	1,062	14,10	1,529	14,48	2,034
5	7,94	15,05	0,863	15,30	1,189	15,69	1,703	16,07	2,255
6	9,52	16,63	0,959	16,88	1,316	17,27	1,877	17,65	2,475
7	11,11	18,22	1,055	18,47	1,443	18,86	2,051	19,24	2,696
8	12,70	19,81	1,150	20,06	1,570	20,45	2,225	20,83	2,916
9	14,29	21,40	1,246	21,65	1,697	22,04	2,399	22,42	3,137
10	15,88	22,99	1,342	23,24	1,824	23,63	2,573	24,01	3,357
11	17,47	24,58	1,437	24,83	1,951	25,22	2,747	25,60	3,577
12	19,06	26,17	1,533	26,42	2,078	26,81	2,921	27,19	3,798
13	20,64	27,75	1,629	28,00	2,205	28,39	3,095	28,77	4,018
14	22,23	29,34	1,725	29,59	2,332	29,98	3,269	30,36	4,239

[1)] Longer grip lengths may be purchased in 1,5875 mm (1/16 inch) increments if required.

Table 5: First oversize .015625 inch shank (0,396mm)

Dimensions in millimeters

Diameter code	Nominal shank diameter (inch)	Thread modified [1] (inch)	B	Ø D Code K		Ø D Code T, B		H (theo.)	
			Ref.	min.	max.	min.	max.	min.	max.
2X	Use diameter code 3								
3X	13/64	.1900-32 UNJF-3A	7,62	5,121	5,146	5,133	5,146	1,06	1,11
3AX	15/64	.2160-28 UNJF-3A	8,00	5,914	5,939	5,927	5,939	1,23	1,28
4X	17/64	.2500-28 UNJF-3A	8,38	6,708	6,733	6,721	6,733	1,42	1,47

[1] Thread as per AS8879 except diameter TD.

Table 6: Grip length and mass for first oversize .015625 inch shank

Dimensions in millimeters

Length code [1]	Diameter code 3X Mass (Ref.) (kg/1000pcs)	Diameter code 3AX Mass (Ref.) (kg/1000pcs)	Diameter code 4X Mass (Ref.) (kg/1000pcs)
2	0,808	1,194	1,684
3	0,935	1,389	1,935
4	1,062	1,584	2,185
5	1,189	1,779	2,435
6	1,316	1,974	2,686
7	1,443	2,169	2,936
8	1,570	2,365	3,186
9	1,697	2,560	3,437
10	1,824	2,755	3,687
11	1,951	2,950	3,938
12	2,078	3,145	4,188
13	2,205	3,340	4,438
14	2,332	3,535	4,689

[1] Longer grip lengths may be purchased in 1,5875 mm (1/16 inch) increments if required.

Table 7: Second oversize .03125 inch shank (0,792mm) (continued)

Dimensions in millimeters

Diameter code	Nominal shank diameter (inch)	Thread modified [1] (inch)	Ø A (theo.)		B	Ø D Code K		Ø D Code T, B		H (theo.)	
			min.	max.	Ref.	min.	max.	min.	max.	min.	max.
2Y	Use diameter code 3X										
3Y [2]	7/32	.1900-32 UNJF-3A	10,44	10,66	7,62	5,517	5,542	5,530	5,542	1,14	1,19
4Y	9/32	.2500-28 UNJF-3A	13,55	13,77	8,38	7,104	7,130	7,117	7,130	1,49	1,55

[1] Thread as per AS8879 except diameter TD.
[2] Not for new design, use diameter code 3A.

Table 7: Second oversize .03125 inch shank (0,792mm) (continued)

Dimensions in millimeters

Diameter code	Nominal shank diameter (inch)	M		Ø V	
		min.	max.	min.	max.
2Y	Use diameter code 3X				
3Y [2]	7/32	0,759	0,837	7,569	7,574
4Y	9/32	0,851	0,927	10,282	10,287

[1] Thread as per AS8879 except diameter TD.
[2] Not for new design, use diameter code 3A.

Table 8: Grip length and mass for second oversize .03125 inch shank

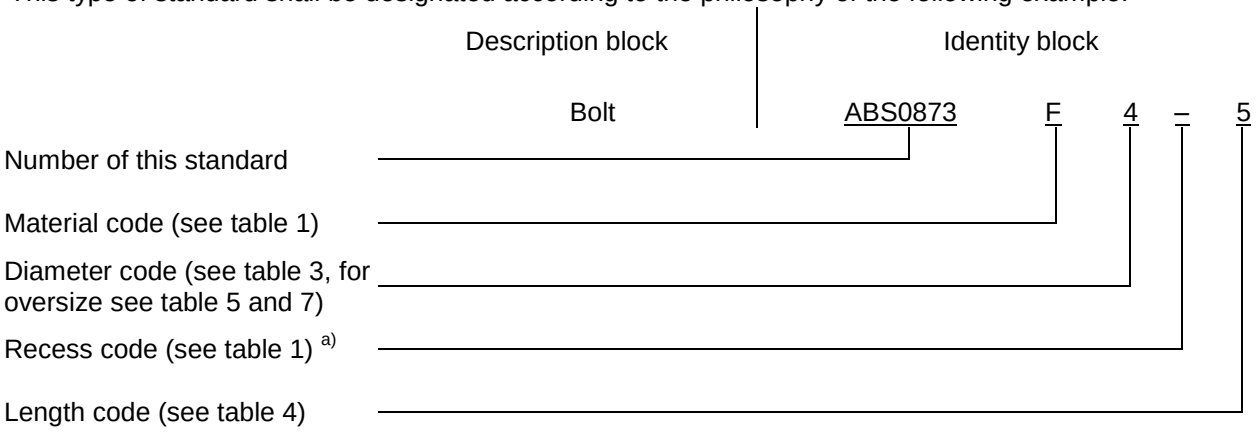
Dimensions in millimeters

Length code [1]	Diameter code 3Y	Diameter code 4Y
	Mass (Ref.) (kg/1000pcs)	Mass (Ref.) (kg/1000pcs)
2	0,951	1,814
3	1,121	2,095
4	1,290	2,375
5	1,460	2,656
6	1,630	2,937
7	1,799	3,218
8	1,969	3,499
9	2,139	3,779
10	2,308	4,060
11	2,478	4,341
12	2,648	4,622
13	2,817	4,902
14	2,987	5,183

[1] Longer grip lengths may be purchased in 1,5875 mm (1/16 inch) increments if required.

4 Designation

This type of standard shall be designated according to the philosophy of the following example:



a) If the diameter code ends with an letter (e.g. 3A, 3X, 3AX, 4X or 4Y) don't use the "-" (e.g. ABS0873K3A5, ABS0873B4E5, ABS0873B3AXE5)

5 Marking

EN2424, style B

– Manufacturer's part number
– Manufacturer's trademark
– Diameter code

Marking shall be recessed with a maximum depth of 0,25 mm.

6 Technical specification

EN6116

RECORD OF REVISIONS

Issue	Clause modified	Description of modification
1 11/06		New standard
2 10/07	Table 1 Table 2 Figure 1 Table 3 Table 4 Table 5 Table 6	Bolt identification added, type classification of EN4473 finish removed. Mechanical Characteristics for diameter code 3A corrected: Min. tensile strength was: 8890N / is: 11600N Max. Fatigue load was: 3550N / is: 4060N Dimensions for oversize diameters corrected. Dimensions for diameter code 3A corrected. ”Theoretical” added to Ø A and dimension H. Dimensions J, K, M, Ø V and R added. Dimensions W, T and Ø Y rounded to two digits. Dimensions and mass for diameter code 3A corrected. Diameter code 2X added. Diameter code 2Y and note 2 added.
3 10/10	Figure 1 Table 1 Table 2 Table 3	Note 7 added Updated and “see note 3” added Note 6 amended Material code B with new 5 Lobe high torque recess code E added. Recess code and footnote 2) updated P min changed to P max
	Table 5 Table 6 Table 7	New first oversize with diameter code 3 AX added. Column “Ø A”, “M” and “Ø V” added. Mass for first oversize added. Second oversize with diameter code 3Y crossed out and the head dimensions A, M and V added. Code 3Y and footnote 2) updated
	Table 8	Mass for second oversize added. The recess code in designation. Dimension P for hexagonal recess added. Values in column “Diameter code 4 Y Length …” corrected
	Designation	Footnote a) added
	Page 5 Page 6 & 8	Header updated (Code T or code B) In table header code P deleted
	Table 5 and 7 Table 6 and 8	For dimension H (theo) added. G max and Length deleted and values for mass modified.
4 07/14	Table 1	Added material code “F” Added EN4473 Type II. Added material code “C”
5 01/15	Table 1	Removed “Type I” from K code Finish.

RECORD OF REVISIONS

Issue	Clause modified	Description of modification
6 03/15	Table 1	Removed “Type I” from B code Finish.