

**Aerospace series****Bolt, Titanium Alloy,  
100° Countersunk Head**

**"When this standard is applied, a careful check must be made as to whether any protective rights exist. This standard issuer hereby disclaims any liability for infringement of patent or design rights resulting from the use of this standard"**

**Published and distributed by:  
AIRBUS S.A.S.  
ENGINEERING DIRECTORATE  
31707 BLAGNAC Cedex  
FRANCE**

## **Contents**

- 1 Scope
- 2 Normative references
- 3 Requirements
- 4 Designation
- 5 Marking
- 6 Technical specification

## 1 Scope

This standard specifies the dimensions tolerances and static values of 100° countersunk intermediate head point drive short thread titanium alloy bolts.

## 2 Normative references

This Airbus 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 Airbus Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

ISO2768-1	General tolerances
ISO8080	Anodic treatment of titanium and titanium alloys - Sulfuric acid process.
EN2000	Aerospace series – Quality assurance EN aerospace products – Approval of the quality system of manufacturers
EN6114	Aerospace series – Bolt countersunk head, short thread inch series <sup>1</sup>
EN2424	Aerospace series - Marking of aerospace products <sup>1</sup>
EN6117	Specification for lubrication of bolts with cetyl alcohol. <sup>1</sup>
EN6118	Aerospace series - Process specification – Aluminium base protection for fasteners. <sup>1</sup>
EN4473	Aerospace series - Aluminium pigmented coatings – Technical specification <sup>1</sup>
AS8879	Screw threads – UNJ profile, inch controlled radius root with increased minor diameter <sup>2</sup>
AMS4928	Titanium alloy bars, wire, forgings and rings <sup>2</sup>
AMS4967	Titanium alloy bars, wire, forgings and rings <sup>2</sup>
BS.TA28	Titanium alloy forging stock and wire
ANSI-B46.1	Surface Texture.
HS294	Product specification – Aluminium pigmented coating. (Manufacturers specification)
HS380	Product specification - Hi-lite fastening system. (Manufacturers specification)
HS380-1	Product specification - Hi-lite fastening system. Annealed (Manufacturers specification)

## 3 Requirements

### 3.1 Configuration, dimensions, tolerances and mass

- 3.1.1 The configuration, dimensions and tolerances shall conform to figure 1 and tables 2 & 3, . Tolerances not specified, shall be in accordance with ISO2768-m.
- 3.1.2 The bolts are produced by a Double Anneal Heat Treatment process.
- 3.1.3 Surface texture as per ANSI-B46.1

<sup>1</sup> In preparation at the date of publication of this standard

<sup>2</sup> Published by: Society of Automotive Engineers (SAE), 400 Commonwealth Drive, Warrendale, PA 15096-0001, USA

### 3.2 Mass

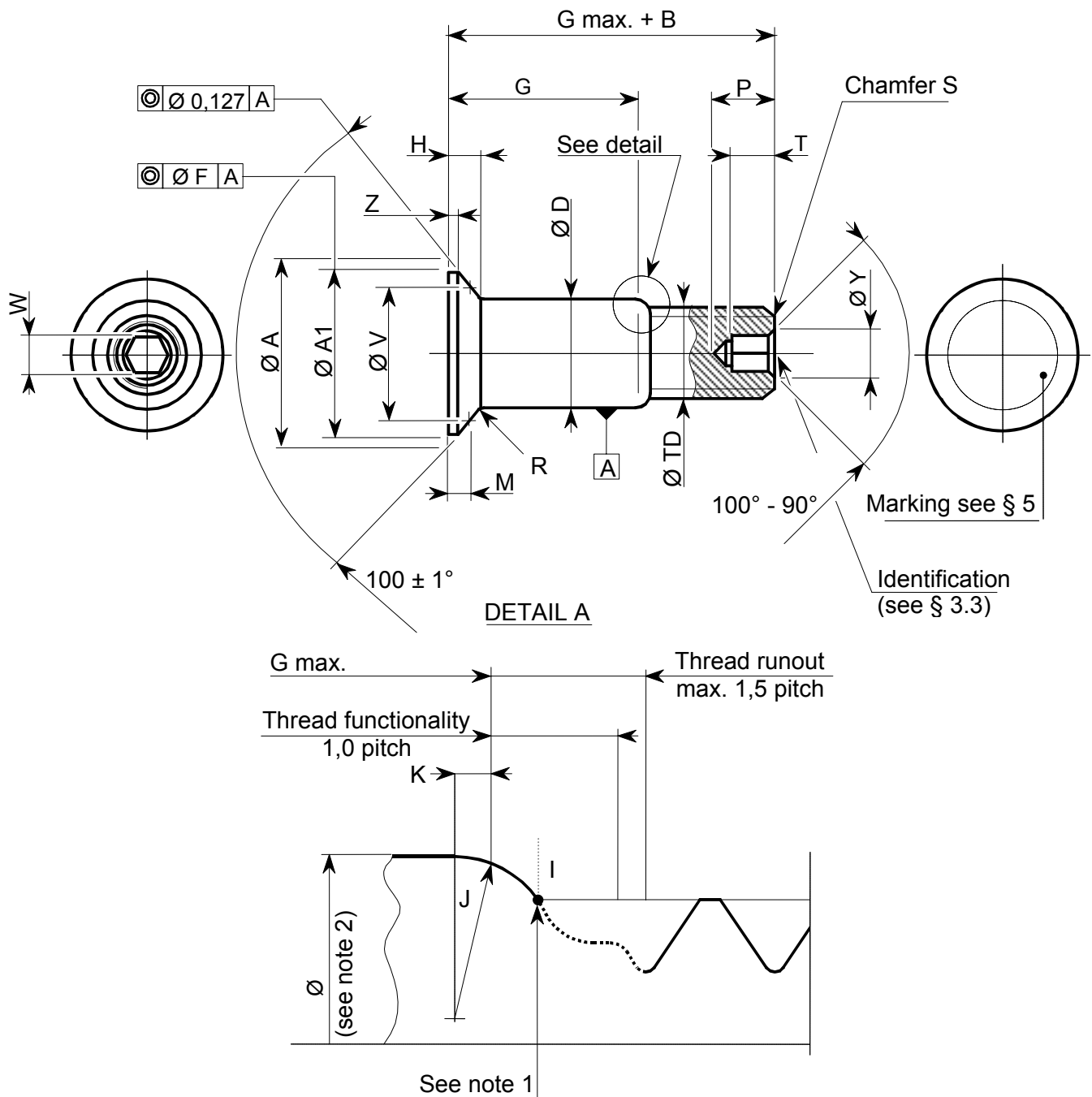
The calculation of the mass of a bolt shall be in accordance with EN6114

### 3.3 Material and surface treatment

**Table 1 : Material and surface treatment**

Material	Code	Finish	Lubrication	Bolt Identification	Code
Titanium alloy 6AL-4V as per AMS 4928 or AMS 4967 or BS TA28 Rc min. = 650 MPa	V	Sulfuric-acid anodizing as per ISO 8080	Cetyl alcohol as per EN 6117	None	T
		IVD as per EN 6118		A Black paint identification at thread end	BV
		Aluminium coating as per specification EN 4473		None	HK

3.3.1 Heat-treated to 85 ksi shear in accordance with Specifications HS380 and HS380-1



**Figure 1 : Configuration**

**Note 1:** The diameter measured at point I shall be less than or equal to the max. diameter TD 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:** When installation is at maximum interference and diameter 'TD' is at maximum diameter, 'TD' must not contact the hole during installation even with maximum eccentricity between diameter 'D' and diameter 'TD'.

**Table 2 : Dimensions and tolerances**

Dimensions in inch (mm)

Dia Dash No	Nominal Ø	Ø A1 Max	Ø A Max	B Ref	ØD ('T' Code)		ØD (Other Code)		F	H Ref	M	
					Max	Min	Max	Min			Max	Min
12	3/4	1.251 (31,78)	1.3000 (33,020)	0.896 (22,76)	0.7490 (19,025)	0.7485 (19,011)	0.7490 (19,025)	0.7480 (18,999)	0.012 (0,31)	0.229 (5,82)	0.0776 (1,971)	0.0716 (1,819)
14	7/8	1.461 (37,11)	1.5091 (38,331)	1.000 (25,40)	0.8740 (22,200)	0.8735 (22,187)	0.8740 (22,200)	0.8730 (22,174)	0.014 (0,36)	0.263 (6,68)	0.0694 (1,763)	0.0622 (1,580)
16	1	1.671 (42,44)	1.7201 (43,691)	1.160 (29,46)	0.9990 (25,375)	0.9985(2 5,362)	0.9990 (25,375)	0.9980 (25,349)		0.298 (7,57)	0.0617 (1,567)	0.0536 (13,614)

**Table 2 : Dimensions and tolerances**

Dimensions in inch (mm) continued

Dia Dash No	Nominal Ø	P Max	R		S Ref	T Min	Thread <sup>a)</sup>	ØTD	
			Max	Min				Max	Min
12	3/4	0.523 (13,28)	0.050 (1,27)	0.040 (1,02)	1/16in x 37°	0.300 (7,62)	0.7500-16 UNJF-3A Modified	0.7430 (18,872)	0.7370 (18,720)
14	7/8	0.608 (15,44)			5/64in x 37°	0.370 (9,40)	0.8750-14 UNJF-3A Modified	0.8680 (22,047)	0.8610 (21,869)
16	1	0.770 (19,56)				0.490 (12,45)	1.0000-12 UNJF-3A Modified	0.9930 (25,222)	0.9860 (25,044)

**Table 2 : Dimensions and tolerances**

Dimensions in inch (mm) concluded

Dia Dash No	Nominal Ø	J Min	K Max	ØV		W (Hex)		ØY		Z Max
				Max	Min	Max	Min	Max	Min	
12	3/4	0.375 (9,52)	0.044 (1,12)	1.1124 (28,255)	1.1122 (28,250)	0.3185 (8,090)	0.3150 (8,001)	0.398 (10,110)	0.378 (9,60)	0.022 (0,5580)
14	7/8	0.390 (9,91)	0.045 (1,14)	1.3440 (34,138)	1.3438 (34,133)	0.3820 (9,703)	0.3780 (9,601)	0.471 (11,96)	0.451 (11,40)	
16	1	0.410 (10,41)		1.5732 (39,959)	1.5730 (39,954)	0.5100 (12,954)	0.5040 (12,802)	0.618 (15,70)	0.598 (15,19)	

a) Rolled thread formed as per AS8879 except for ØTD

**Table 3 : Grip Lengths** Dimensions in inch (mm)

Length Code *	G Max $\pm 0.005$ ( $\pm 0,13$ )	Length G Max + B $\pm 0.010$ ( $\pm 0,25$ )		
		12	14	16
7	0.437 (11,11)	1.332 (33,84)	–	–
8	0.500 (12,70)	1.395 (35,43)	1.500 (38,10)	–
9	0.562 (14,29)	1.457 (37,02)	1.563 (39,69)	1.722 (43,75)
10	0.625 (15,88)	1.520 (38,61)	1.625 (41,28)	1.785 (45,34)
11	0.687 (17,46)	1.582 (40,19)	1.687 (42,86)	1.847 (46,92)
12	0.750 (19,05)	1.645 (41,78)	1.750 (44,45)	1.910 (48,51)
13	0.812 (20,64)	1.707 (43,37)	1.812 (46,04)	1.972 (50,10)
14	0.875 (22,22)	1.770 (44,95)	1.875 (47,62)	2.035 (51,68)
15	0.938 (23,810)	1.832 (46,54)	1.937 (49,21)	2.097 (53,27)
16	1.000 (25,40)	1.896 (48,13)	2.000 (50,80)	2.160 (54,86)
17	1.063 (27,00)	1.959 (49,72)	2.063 (52,39)	2.223 (56,45)
18	1.125 (28,58)	2.021 (51,31)	2.125 (53,98)	2.286 (58,04)
19	1.188 (30,17)	2.084 (52,89)	2.188 (55,56)	2.348 (59,62)
20	1.250 (31,75)	2.146 (54,48)	2.250 (57,15)	2.410 (61,21)
21	1.313 (33,35)	2.209 (56,07)	2.313 (58,74)	2.473 (62,80)
22	1.375 (34,93)	2.271 (57,65)	2.375 (60,32)	2.536 (64,38)
23	1.438 (36,53)	2.333 (59,24)	2.438 (61,91)	2.598 (65,97)
24	1.500 (38,10)	2.396 (60,83)	2.500 (63,50)	2.660 (67,56)
25	1.563 (39,69)	2.459 (62,42)	2.563 (65,09)	2.723 (69,15)
26	1.625 (41,28)	2.521 (64,01)	2.625 (66,68)	2.785 (70,74)
27	1.687 (42,86)	2.583 (65,59)	2.687 (68,26)	2.847 (72,32)
28	1.750 (44,45)	2.646 (67,18)	2.750 (69,85)	2.910 (73,91)
29	1.813 (46,04)	2.709 (68,77)	2.813 (71,44)	2.973 (75,50)
30	1.875 (47,62)	2.771 (70,35)	2.875 (73,02)	3.035 (77,08)
31	1.937 (49,21)	2.833 (71,94)	2.937 (74,61)	3.097 (78,66)

(continued)

**Table 3 (concluded)**

Dimensions in inch (mm) Continued				
Length Code *	G Max $\pm 0.005$ ( $\pm 0,13$ )	Length G Max + B $\pm 0.010$ ( $\pm 0,25$ )		
		12	14	16
32	2.000 (50,80)	2.896 (73,53)	3.000 (76,20)	3.160 (80,26)
34	2.125 (53,98)	3.021 (76,71)	3.125 (79,38)	3.285 (83,44)
36	2.250 (57,15)	3.146 (79,88)	3.250 (82,55)	3.410 (86,61)
38	2.375 (60,32)	3.271 (83,05)	3.375 (85,72)	3.535 (89,78)
40	2.500 (63,50)	3.396 (86,23)	3.500 (88,90)	3.660 (92,96)
42	2.625 (66,68)	3.521 (89,41)	3.625 (92,08)	3.785 (96,14)
44	2.750 (69,85)	3.646 (92,58)	3.750 (95,25)	3.910 (99,31)
46	2.875 (73,02)	3.771 (95,75)	3.875 (98,42)	4.035 (102,48)
48	3.000 (76,20)	3.896 (98,93)	4.000 (101,60)	4.160 (105,66)
50	3.125 (79,38)	4.021 (102,11)	4.125 (104,78)	4.285 (108,84)
52	3.250 (82,55)	4.146 (105,28)	4.250 (107,95)	4.410 (112,01)
54	3.375 (85,72)	4.271 (108,45)	4.375 (111,12)	4.535 (115,18)
56	3.500 (88,90)	4.396 (111,63)	4.500 (114,30)	4.660 (118,36)
58	3.625 (92,08)	4.521 (114,81)	4.625 (117,48)	4.785 (121,54)
60	3.750 (95,25)	4.646 (117,98)	4.750 (120,65)	4.910 (124,71)

**\*Note:** Intermediate grip lengths may be purchased in 1/16 inch (1.5875mm) increments if necessary.

**Table 4 : Mechanical Characteristics**

Values in lbf (N)

Dia Dash No	Double Shear Strength b)		Tensile Strength Min	Fatigue Load c) Max
	Min	Max		
12	75 000.00 (333 617,0)	82 200.00 (365 644,0)	41 000.00 (187 377,0)	14 300.00 (63 609,0)
14	101 900.00 (453 274,0)	111 900.00 (497 756,0)	52 000.00 (231 307,0)	18 200.00 (80 958,0)
16	133 200.00 (592 503,0)	146 100.00 (649 885,0)	67 000.00 (298 030,0)	20 100.00 (89 409,0)

b) Values apply without lubrication.

c) Minimum fatigue loads are equal to 10% of maximum fatigue loads.



## 4 Designation

EXAMPLE:

	Description block	Identity block
	Bolt Protruding	ABS0560 V HK 12 - 30
Number of this standard	_____	_____
Material code (see table 1)	_____	_____
Finish code (see table 1)	_____	_____
Dia dash number (see table 2)	_____	_____
Grip length number (see table 3)	_____	_____

## 5 Marking

Parts to this standard to be marked in accordance with EN2424 Style 'A', in addition the manufacturers part number may be added.

## 6 Technical specification

Product specification HS380 and HS380-1.

RECORD OF REVISIONS

Issue	Clause modified	Description of modification
3 08/06		Additional grip lengths added for the A380 project. Normative references updated to latest specifications. Addition of Anodising for the A400M project.