RIVET – COUNTERSUNK, SHEAR, LOCKBOLT AND REPAIR SIZES R1 AND R2

Issue : **M**
Date : **May 07**
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SUMMARY

1 - SCOPE AND FIELD OF APPLICATION

This standard specifies the dimensions, tolerances, required characteristics and the masses of a countersunk rivet, shear, lockbolt and repair sizes R1 and R2.

2 - REFERENCES

ASNA2025	: Bush - Use with ASNA2043, ASNA2048, ASNA2391 and ASNA2392.
ANSI-B46-1	: Surface texture (surface roughness waviness and lay).
AMS4967	: Titanium alloy bars, wire forgings and rings 6.0Al-4.0V annealed heat treated.
C2010	: Procurement specification.
EN2424	: Aerospace series – Marking of aerospace products.
NAS4006	: Aluminium coating
EN6117	: Aerospace series - Specification for lubrication of pins with Cetyl Alcohol.
EN6118	: Aerospace series - Process specification - Aluminium base protection for fasteners.

ISO8080 : Aerospace - Anodic treatment of titanium and titanium alloys - Sulfuric acid process.

MIL-PRF-46010 : Lubricant, solid, film, heat cured, corrosion inhibiting.

3 - TERMINOLOGY

Not applicable.

4 - REQUIRED CHARACTERISTICS

4.1 - Configuration, dimensions, tolerances, mass

4.1.1 - Configuration shall be in accordance with the figure.

4.1.2 - Dimensions shall be in accordance with tables 1 and 4.

Definition of grip length code No. : divide grip length by 1,58.

4.1.3 - Dimensions of rivet repair sizes shall be in accordance with tables 2 and 3.

4.1.4 - Tolerances shall be in accordance with tables 1 and 4.

Concentricity of the tapered surface of the head with respect to Ø A : within the value of 0,127 mm (TIR).
Shank rectitude within the values of S (TIR per shank length of 25,4 mm).

4.1.5 - Mass shall be in accordance with table 5.

4.1.6 - Mass of rivet repair sizes shall be in accordance with table 5.

4.2 - Materials, finishes and lubrications shall be in accordance with table 6.

4.3 - Mechanical characteristics

4.3.1 - Mechanical characteristics shall be in accordance with table 7.

4.3.2 - Mechanical characteristics of rivet repair sizes shall be in accordance with table 8.

4.4 - General characteristics

Surface roughness as per ANSI-B46-1 : Ra 0,8 µm for bearing side, shank and coupling radius at both shank ends, Ra 3,2 µm for other surfaces.

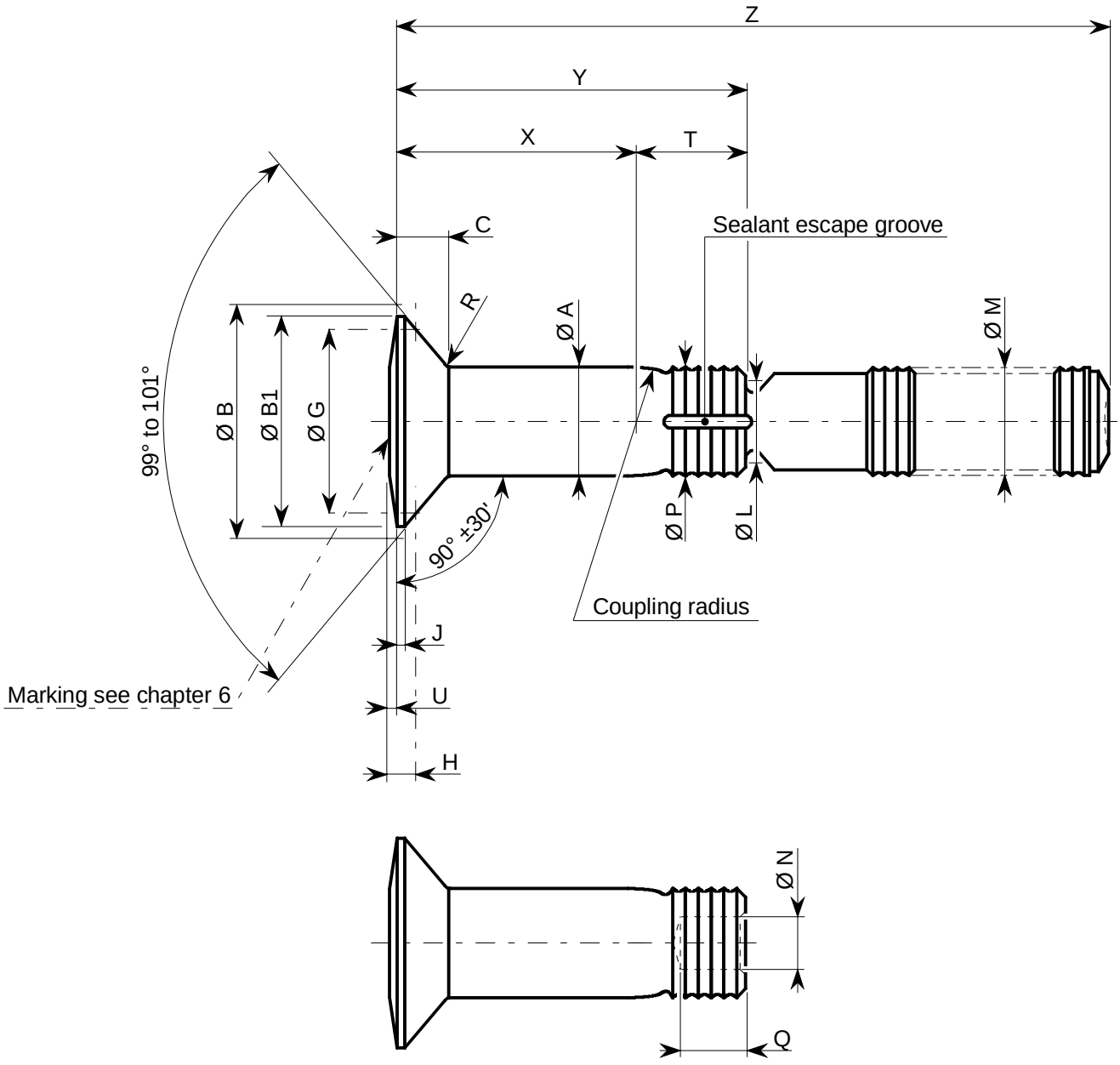


Figure - Configuration

Table 1 – Dimensions, tolerances

Ø CODE No.	NOM. Ø	Ø A	Ø B max.	Ø B1	C max.	Ø G	H	J max.	Ø L Ref.	Ø M max.	Ø N max.	Ø P max.	Q Depth max.	R	S (see § 4.1.4)	T Ref.	U Ref.
2	4,165	4,152 4,127	6,731	6,289 6,015	1,092	5,151 5,146	0,723 0,652	0,279	3,200	3,962	1,651	3,962	2,946	0,635 0,381	0,114	3,810	0,076
3	4,826	4,813 4,788	7,747	7,297 6,942	1,219	6,200 6,195	0,718 0,637	0,330	3,810	4,673	2,184	4,673	2,997	0,762 0,508	0,114	3,860	0,101
4	6,350	6,337 6,312	10,134	9,642 9,086	1,600	8,420 8,415	0,812 0,716	0,431	4,749	6,197	2,768	6,197	4,114	0,762 0,508	0,114	5,334	0,127

Dimensions in mm.

Table 2 – Dimensions of rivet 1st repair size

Ø CODE No.	Ø A	Ø B max.	C max.	Ø G	H	J max.	Ø L REF.	Ø M max.	Ø P max.	r	S (see § 4.1.4)	T REF.	U REF.
X2	4,813 4,788	7,747	1,219	6,200 6,195	0,718 0,637	0,330	3,810	4,673	4,673	0,762 0,508	0,114	3,861	0,101
X3	5,146 5,120	7,747	1,092	6,200 6,195	0,718 0,637	0,330	3,810	4,673	4,673	0,762 0,508	0,114	3,861	0,101
X4	6,733 6,708	10,134	1,422	8,420 8,145	0,812 0,716	0,431	4,749	6,197	6,197	0,762 0,508	0,114	5,334	0,127

Dimensions in mm.

Table 3 – Dimensions of rivet 2nd repair size

Ø CODE No.	Ø A	Ø B max.	C max.	Ø G	H	J max.	Ø L REF.	Ø M max.	Ø P max.	R	S (see § 4.1.4)	T REF.	U REF.
Y2	5,146 5,120	7,747	1,092	6,200 6,195	0,718 0,637	0,330	3,810	4,673	4,673	0,762 0,508	0,114	3,861	0,101

Dimensions in mm.

Table 4 – Dimensions, tolerances

GRIP LENGTH CODE No.	PERMISSIBLE GRIP OVERLAP		GRIP LENGTH		X *	DIAMETER CODE No.					
						2		3		4	
						Y	Z	Y	Z	Y	Z
	Min.	Max.	Min.	Max.		± 0,25	+ 5,08 0	± 0,25	+ 5,08 0	± 0,25	+ 5,08 0
02	1,19	3,58	1,60	3,18	3,18	6,98	20,32	7,03	22,09	-	-
03	2,76	5,15	3,20	4,78	4,78	8,58	21,84	8,63	23,62	10,10	26,67
04	4,36	6,75	4,80	6,35	6,35	10,16	23,62	10,21	25,40	11,68	28,19
05	5,94	8,33	6,38	7,93	7,93	11,73	25,14	11,78	26,92	13,25	29,71
06	7,54	9,93	7,95	9,53	9,53	13,33	26,67	13,38	28,44	14,85	31,49
07	9,11	11,50	9,55	11,13	11,13	14,93	28,19	14,98	29,97	16,45	33,02
08	10,71	13,10	11,15	12,70	12,70	16,51	29,97	16,56	31,75	18,03	34,54
09	12,29	14,68	12,73	14,28	14,28	18,08	31,49	18,13	33,27	19,60	36,06
10	13,89	16,28	14,30	15,88	15,88	19,68	33,02	19,73	34,79	21,20	37,84
11	15,46	17,85	15,90	17,48	17,48	21,28	34,54	21,33	36,32	22,80	39,37
12	17,06	19,45	17,50	19,05	19,05	22,86	36,32	22,91	38,10	24,38	40,89
13	18,64	21,03	19,08	20,63	20,63	24,43	37,84	24,48	39,62	25,95	42,41
14	20,24	22,63	20,65	22,23	22,23	26,03	39,37	26,08	41,14	27,55	44,19
15	21,81	24,20	22,25	23,83	23,83	27,63	40,89	27,68	42,67	29,15	45,72
16	23,41	25,80	23,85	25,40	25,40	29,21	42,67	29,26	44,45	30,73	47,24
17	24,99	27,38	25,43	26,98	26,98	30,78	44,19	30,83	45,97	32,30	48,76
18	26,59	28,98	27,00	28,58	28,58	32,38	45,72	32,43	47,49	33,90	50,54
19	28,16	30,55	28,60	30,18	30,18	33,98	47,24	34,03	49,02	35,50	52,07
20	29,76	32,15	30,20	31,75	31,75	35,56	49,02	35,61	50,80	37,08	53,59
21	31,34	33,73	31,78	33,33	33,33	37,13	50,54	37,18	52,32	38,65	55,11
22	32,94	35,33	33,35	34,93	34,93	38,73	52,07	38,78	53,84	40,25	56,89
23	34,51	36,90	34,95	36,53	36,53	40,33	53,59	40,38	55,37	41,85	58,42
24	36,11	38,50	36,55	38,10	38,10	41,91	55,37	41,96	57,15	43,43	59,94
25	37,69	40,08	38,13	39,68	39,68	43,48	56,89	43,53	58,67	45,00	61,46
26	39,29	41,68	39,70	41,28	41,28	45,08	58,42	45,13	60,19	46,60	63,24
27	40,86	43,25	41,30	42,88	42,88	46,68	59,94	46,73	61,72	48,20	64,77
28	42,46	44,85	42,90	44,45	44,45	48,26	61,72	48,31	63,50	49,78	66,29
29	44,04	46,43	44,48	46,03	46,03	49,83	63,24	49,89	65,02	51,35	67,81
30	45,64	48,03	46,05	47,63	47,63	51,43	64,77	51,48	66,54	52,95	69,59
31	47,21	49,60	47,65	49,23	49,23	53,03	66,29	53,08	68,07	54,55	71,12
32	48,81	51,20	49,25	50,80	50,80	54,61	68,07	54,66	69,85	56,13	72,64

***** Grip length is measured from the theoretical intersection of the crown radius and head angle to the end of the full cylindrical portion of the shank.

Dimensions in mm.

Table 5 – Mass

GRIP LENGTH CODE No.	MASS (g)						
	Ø CODE No.			Ø CODE No. FOR REPAIR SIZES			
	2	3	4	X2	X3	X4	Y2
02	0,43	0,69	1,48	0,48	0,72	1,52	0,51
03	0,52	0,81	1,67	0,60	0,86	1,74	0,65
04	0,62	0,92	1,86	0,73	0,98	1,96	0,80
05	0,71	1,03	2,05	0,85	1,11	2,17	0,94
06	0,81	1,14	2,24	0,98	1,24	2,39	1,09
07	0,90	1,26	2,43	1,11	1,37	2,61	[illegible]
08	1,00	1,37	2,62	1,24	1,50	2,83	[illegible]
09	1,09	1,48	2,81	1,36	1,63	[illegible]	1,52
10	1,18	1,60	3,00	1,48	1,7[illegible]	[illegible]	1,66
11	1,28	1,71	3,19	1,61	[illegible]90	3,48	1,81
12	1,37	1,82	3,38	[illegible]	2,02	3,70	1,95
13	1,47	1,94	3,57	[illegible]	2,16	3,92	2,10
14	1,56	2,05	[illegible]	1,99	2,29	4,13	2,24
15	1,66	[illegible]	[illegible]95	2,12	2,42	4,35	2,39
16	1,75	[illegible]	4,14	2,24	2,55	4,57	2,53
17	[illegible]	2,39	4,33	2,38	2,68	4,79	2,68
18	1,94	2,50	4,52	2,50	2,81	5,01	2,82
19	2,03	2,61	4,71	2,62	2,94	5,22	2,96
20	2,13	2,73	4,90	2,75	3,08	5,44	3,11
21	2,22	2,84	5,09	2,87	3,21	5,66	3,25
22	2,32	2,95	5,28	3,00	3,33	5,88	3,40
23	2,41	3,07	5,47	3,13	3,47	6,09	3,54
24	2,51	3,18	5,66	3,26	3,60	6,31	3,70
25	2,60	3,29	5,85	3,38	3,73	6,53	3,84
26	2,69	3,41	6,04	3,50	3,86	6,75	3,98
27	2,79	3,52	6,23	3,64	3,99	6,97	4,13
28	2,88	3,63	6,42	3,76	4,12	7,18	4,27
29	2,98	3,74	6,61	3,89	4,25	7,40	4,42
30	3,07	3,86	6,80	4,01	4,39	7,62	4,56
31	3,17	3,97	6,99	4,14	4,51	7,84	4,71
32	3,26	4,08	7,18	4,26	4,64	8,06	4,85

Table 6 – Materials, finishes, lubrications

MATERIAL	FINISH CODE	FINISH	LUBRICATION
Titanium alloy TA 6V as per AMS4967 Min. shear strength : 655 MPa	Without	I.V.D. as per EN6118	Dry film as per MIL-PRF-46010 + Cetyl alcohol as per EN6117
	HK	KALGARD 2245 or HI-KOTE 1 as per NAS4006	
	A	Anodizing as per ISO8080	

Table 7 – Mechanical characteristics

Ø CODE No.	NOMINAL Ø	Min. DOUBLE SHEAR STRENGTH (daN)	Min. TENSILE STRENGTH WITH BUSHING ASNA2025 (daN)
2	4,165	1 780	573
3	4,826	2 390	711
4	6,350	4 135	1 334

Dimensions in mm.

Table 8 – Mechanical characteristics of rivet repair sizes

Ø CODE No.	NOMINAL Ø	Min. DOUBLE SHEAR STRENGTH (daN)	Min. TENSILE STRENGTH WITH BUSHING ASNA2025 (daN)
X2	4,826	2 390	711
X3	5,156	2 735	711
	6,756	4 706	1 334

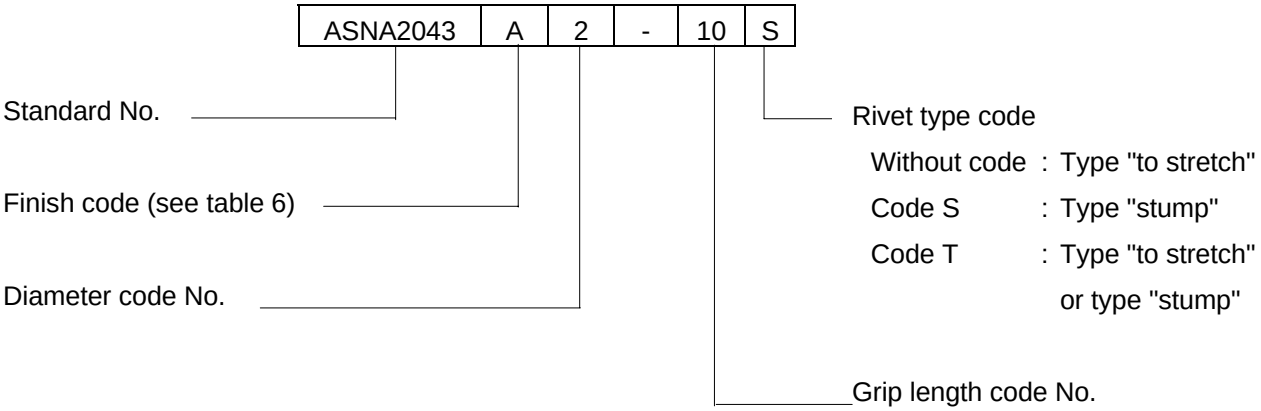
Dimensions in mm.

5 - DESIGNATION

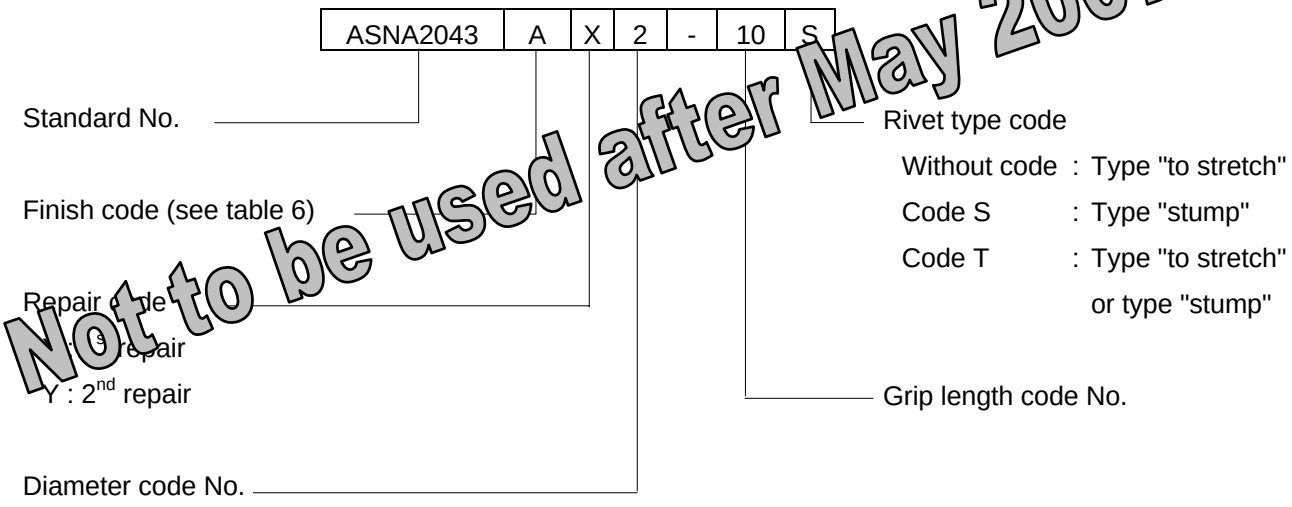
Example of part number identification to be used on drawing schedules :

ASNA2043A2-10S , Rivet

Example of part number construction :



Example of part number construction for rivet repair sizes:



6 - MARKING

Parts shall be marked as per EN2424, category G.
Manufacturer's reference marking on head (recessed of 0,254 mm max.)

7 - TECHNICAL SPECIFICATION

C2010.

8 - MANUFACTURERS

Refer to the list of qualified manufacturers and products.

AMENDMENT RECORD SHEET

Issue	Modified paragraph	Modification summary	Justification
A.06.84		New standard.	
B.			
C.			
D.			
E.01.86		Paragraph repair sizes added.	
F.11.87		Diameter code Nos 3 and 4 added.	CASA request
G.02.88		Rivet type "S" added. Dimensions N and Q added.	CASA request
H.08.89		Finish Kalgard 2245 or Hi-Kote 1 (finish code HK) added.	ATR
J.09.89		For diameter code No. 3, dimensions Y, grip length code No. 29 : 50,13 mm changed to 49,89 mm.	Modification in compliance with manufacturer's documentation
K.03.90		Type "S" added on drawing schedules. Code A added.	A 340 TF3 – WG1
L.08.91		Anodizing as per AMS2488 replaced by ISO8080.	Following manufacturer's documentation
M.05.07		Standard fully amended. “Grip length” is called “X”. Ø B1 added in figure and table 1. A/DET0012 and A/DET0013 changed to EN6117 and EN6118 in chapter 2 and table 6. Unit (µm) of roughness added in § 4.4. ”Admissible tightening torque” changed to “permissible grip overlap” in table 2. Dry film as per MIL-PRF-46010 added for lubrication in § 2 and table 6. ”Not to be used after May 2007” added for repair sizes.	

Note : Modification to the last standard issue are indicated by a vertical line in the margin.

AMENDMENT RECORD SHEET

Issue	Modified paragraph	Modification summary	Justification

Note : Modification to the last standard issue are indicated by a vertical line in the margin.