EADS NORMALISATION GENERALE	NORME D'ETUDES **RIVETS BLIND 100°COUTERSUNK HEAD**	**ASNA0077** Issue : **N** Date : **07.2012**

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1 FIELD OF APPLICATION

The purpose of this ASN is to define the main characters of blind rivets with 100° countersunk head which can be attached by a single action.

2 NORMATIVE REFERENCES

QQ-A-430	Aluminum alloy rod and wire, for rivets and cold heading.
QQ-N-281	Nickel-copper alloy bar, rod, plate, sheet, strip, wire, forgings, and structural.
QQ-P-35	Passivation treatments for corrosion - resistant steel.
QQ-P-416	Plating, cadmium (electrodeposited).
AMS 5657	Steel bars and forgings, corrosion and moderate heat resistant 15 Cr - 7,1 Ni - 2,5 Mo - 1,1 Al.
AMS 5737	Steel bars, wire, forging, and tubing, corrosion and heat resistant 15 Cr - 25,5 Ni - 1,2 Mo - 2,1 Ti-0,006 B - 0,30 V consumable electrode melted 1650°F (899°C) - Solution and precipitation heat treated.
AMS 6322	Steel bars, forgings, and rings 0,50 Cr - 0,55 Ni - 0,25 Mo (0,38 - 0,43 C) (SAE 8740).
MIL-C-5541	Chemical conversion coatings on aluminum and aluminum alloys.
MIL-DTL-83488	Coating, aluminum, high purity.
MIL-R-7885	Rivets, blind, structural, mechanically locked spindle and friction locked spindle, general specification for.
MIL-STD-1312-21	Fastener test methods method 21, shear joint fatigue.
NAS 1686	Rivet, blind, aluminum sleeve, mechanically locked spindle, bulbed.
NAS 1687	Rivet, blind, monel and inconel sleeve, mechanically locked spindle, bulbed.
IGC 04.81.104	Monograms of fastener manufacturers.

This document shall be consulted at the latest issue in effect.

Keywords: blind rivet (TC) – 100° countersunk head rivet – Rivet.

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3 REQUIRED CHARACTERISTICS

3.1 Configuration

These rivets are composed of 4 or 5 parts, depending on the manufacturer:

① A grooved end shank

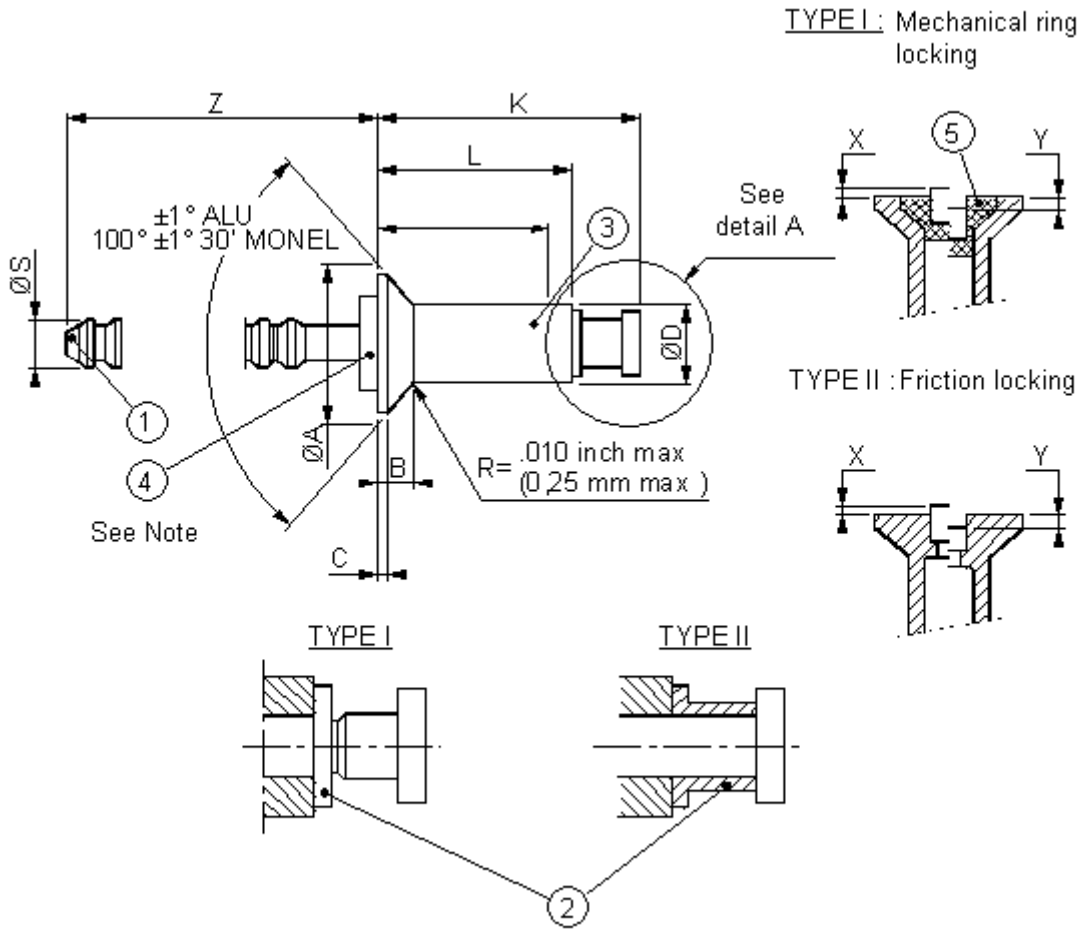
② Depending on the manufacturer

- Either an expansion washer
- Or an expansion ring

③ A socket

④ An abutment washer

⑤ A retaining ring (depending on the manufacturer)



NOTE – Coating of abutment washer:

- For rivets of standard diameter : GOLD colored
- For rivets of large diameter: SILVER colored.

FIGURE 1

3.2 Standard rivets: Dimensions – Length and grip length codes.

TABLE1 - Dimensions

Diameter code	Nominal diameter		D		A Theoretical		B Ref.		C							
			+ .003 – .001	+ 0,076 – 0,025	± .004	± 0,102			Aluminum				Monel			
									min.		max.		mii.		max.	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
4	1/8	3,2	.126	3,20	.225	5,715	.042	1,07	.002	0,05	.010	0,25	.005	0,12	.015	0,38
5	5/32	4,0	.157	3,99	.286	7,264	.055	1,40	.002	0,05	.012	0,30	.005	0,12	.015	0,38
6	3/16	4,8	.189	4,80	.353	8,966	.070	1,78	.002	0,05	.012	0,30	.005	0,12	.015	0,38
8	1/4	6,4	.253	6,43	.476	12,09	.096	2,44	.002	0,05	.016	0,41	.005	0,12	.015	0,38

Diameter code	S Ref.		Z		BK		X		Y	
			min.		min.		max.		Max.	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
4	.073	1,85	.87	22,10	.355	9,02	.010	0,25	.015	0,38
5	.091	2,31	.94	23,88	.370	9,40	.010	0,25	.020	0,51
6	.110	2,79	.94	23,88	.415	10,54	.010	0,25	.020	0,51
8	.146	3,71	.97	24,64	.485	12,32	.015	0,38	.025	0,63

Minimum dimensions for rivet attachment

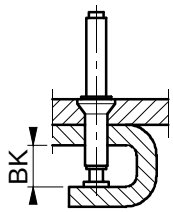


TABLE 2 – Length and grip length code

Grip length code	Grip length				DIAMETER CODE											
					4						5					
					L		K		MASS [1]		L		K		MASS [1]	
	min.		max.		.000 - .030	0 - 0,76	max.		Code		.000 - .030	0 - 0,76	max.		Code	
									A-B	C-D E-F					A-B	C-D E-F
	inch	mm	inch	mm	inch	mm	inch	mm	g	g	inch	mm	inch	mm	g	g
02	–		.125	3,18	.224	5,69	.45	11,43	0,26	0,52	.230	5,84	.47	11,94	0,46	0,83
03	.126	3,20	.187	4,75	.287	7,29	.51	12,95	0,32	0,61	.293	7,44	.53	13,46	0,55	0,97
04	.188	4,78	.250	6,35	.349	8,86	.57	14,48	0,39	0,71	.355	9,02	.59	14,99	0,65	1,13
05	.251	6,37	.312	7,92	.412	10,46	.63	16,00	0,45	0,82	.418	10,62	.65	16,51	0,75	1,30
06	.313	7,95	.375	9,52	.474	12,04	.70	17,78	0,51	0,91	.480	12,19	.72	18,29	0,86	1,46
07	.376	9,55	.437	11,10	.537	13,64	.76	19,30	0,58	1,01	.543	13,79	.77	19,56	0,96	1,62
08	.438	11,13	.500	12,70	.599	15,21	.82	20,83	0,64	1,12	.605	15,37	.84	21,34	1,06	1,79
09	.501	12,73	.562	14,27	.662	16,81	.88	22,35	0,71	1,24	.668	16,97	.90	22,86	1,16	1,95
10	.563	14,30	.625	15,88	–	–	–	–	–	–	.730	18,54	.96	24,38	1,26	2,10
11	.626	15,90	.687	17,45	–	–	–	–	–	–	.793	20,14	1.02	25,91	1,37	2,26
12	.688	17,48	.750	19,05	–	–	–	–	–	–	–	–	–	–	–	–
13	.751	19,07	.812	20,62	–	–	–	–	–	–	–	–	–	–	–	–
14	.813	20,65	.875	22,22	–	–	–	–	–	–	–	–	–	–	–	–

1) The masses are calculated: attached rivet – selected shank.

TABLE 2 (cont'd)

Grip length code	Grip length				DIAMETER CODE											
					6						8					
					L		K		MASS [1]		L		K		MASS [1]	
	min.		max.		.000 - .030	0 - 0,76	max.		Code		.000 - .030	0 - 0,76	max.		Code	
									A-B	C-D E-F					A-B	C-D E-F
	inch	mm	inch	mm	inch	mm	inch	mm	g	g	inch	mm	inch	mm	g	g
02	–		.125	3,18	.262	6,65	.51	12,95	0,79	1,57	–	–	–	–	–	–
03	.126	3,20	.187	4,75	.325	8,26	.57	14,48	0,90	1,80	.378	9,60	.65	16,5	1,85	3,16
04	.188	4,78	.250	6,35	.387	9,83	.64	16,26	1,05	2,03	.440	11,20	.72	18,3	2,09	3,46
05	.251	6,37	.312	7,92	.450	11,43	.70	17,78	1,20	2,26	.503	12,80	.78	19,8	2,33	4,07
06	.313	7,95	.375	9,52	.512	13,00	.76	19,30	1,35	2,49	.565	14,35	.84	21,3	2,57	4,55
07	.376	9,55	.437	11,10	.575	14,61	.82	20,83	1,49	2,71	.628	15,95	.90	22,9	2,81	5,01
08	.438	11,13	.500	12,70	.637	16,18	.88	22,36	1,63	2,94	.690	17,50	.97	24,6	3,05	5,61
09	.501	12,73	.562	14,27	.700	17,78	.95	24,13	1,79	3,17	.753	19,10	1.03	26,2	3,29	5,90
10	.563	14,30	.625	15,88	.762	19,35	1.01	25,65	1,93	3,40	.815	20,70	1.09	27,7	3,53	6,18
11	.626	15,90	.687	17,45	.825	20,96	1.07	27,18	2,08	3,63	.878	22,30	1.15	29,2	3,77	7,17
12	.688	17,48	.750	19,05	.887	22,53	1.13	28,70	2,22	3,85	.940	23,90	1.22	31,0	4,01	7,61
13	.751	19,07	.812	20,62	–	–	–	–	–	–	1.003	25,50	1.28	32,5	4,24	8,04
14	.813	20,65	.875	22,22	–	–	–	–	–	–	1.065	27,05	1.34	34,0	4,49	8,47

1) The masses are calculated; attached rivet – selected shank.

Diameter code	4		5		6	
	inch	mm	inch	mm	inch	mm
Min. grip length	.063	1,60	.065	1,65	.080	2,03

3.3 Rivets with large diameter: Dimensions – length and grip length codes.

TABLE 3 - Dimensions

Diameter code	Nominal diameter		D		A Theoretical		B Ref.		S Ref.		Z		BK	
			+ .003 – .001	+ 0,076 – 0,025	± .004	± 0,102					min.		min.	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
4	1/8	3,2	.140	3,55	.225	5,715	.035	0,89	.081	2,06	.87	22,10	.390	9,91
5	5/32	4,0	.173	4,39	.286	7,264	.047	1,19	.100	2,54	.94	23,88	.395	10,03
6	3/16	4,8	.201	5,10	.353	8,966	.063	1,60	.117	2,97	.94	23,88	.410	10,41
8	1/4	6,4	.267	6,78	.476	12,09	.086	2,18	.158	4,01	.96	24,38	.490	12,45

Diameter code	X		Y	
	max.		max.	
	inch	mm	inch	mm
4	.010	0,25	.015	0,38
5	.010	0,25	.020	0,51
6	.010	0,25	.020	0,51
8	.015	0,38	.025	0,63

Minimum dimensions for rivet attachment

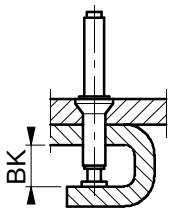


TABLE 4 – Grip length codes - Lengths

Grip length code	Grip length				DIAMETER CODE											
					4						5					
					L		K		MASS [1]		L		K		MASS [1]	
	min.		max.		.000 - .030	0 - 0,76	max.		Code A-B	Code C-D E-F	.000 - .030	0 - 0,76	max.		Code A-B	Code C-D E-F
	inch	mm	inch	mm	inch	mm	inch	mm	g	g	inch	mm	inch	mm	g	g
01	.045	1,14	.062	1,57	.200	5,06	.45	11,43	0,24	0,50	–	–	–	–	–	–
02	.063	1,60	.125	3,18	.238	6,04	.45	11,43	0,38	0,65	.266	6,76	.47	11,94	0,61	1,02
03	.126	3,20	.187	4,75	.301	7,64	.52	13,21	0,44	0,76	.309	7,85	.53	13,46	0,71	1,20
04	.188	4,78	.250	6,35	.363	9,22	.58	14,73	0,52	0,88	.371	9,42	.60	15,24	0,82	1,40
05	.251	6,37	.312	7,92	.426	10,82	.65	16,51	0,59	1,01	.434	11,02	.66	16,76	0,93	1,60
06	.313	7,95	.375	9,52	.488	12,39	.71	18,03	0,67	1,13	.496	12,60	.72	18,29	1,07	1,80
07	.376	9,55	.437	11,10	.551	13,99	.78	19,81	0,74	1,26	.559	14,20	.79	20,07	1,19	1,99
08	.438	11,13	.500	12,70	.613	15,57	.84	21,34	0,82	1,39	.621	15,77	.85	21,59	1,31	2,19
09	.501	12,73	.562	14,27	.676	17,17	.90	22,86	0,90	1,52	.684	17,37	.91	23,11	1,43	2,39
10	.563	14,30	.625	15,88	–	–	–	–	–	–	.746	18,95	.98	24,89	1,55	2,59
11	.626	15,90	.687	17,45	–	–	–	–	–	–	.809	20,55	1.04	26,42	1,67	2,80
12	.688	17,48	.750	19,05	–	–	–	–	–	–	–	–	–	–	–	–
13	.751	19,07	.812	20,62	–	–	–	–	–	–	–	–	–	–	–	–
14	.813	20,65	.875	22,22	–	–	–	–	–	–	–	–	–	–	–	–

1) The masses are calculated : attached rivet – selected shank

TABLE 4 (cont'd)

Grip length code	Grip length				DIAMETER CODE											
					6						8					
					L		K		MASS [1]		L		K		MASS [1]	
	min.		max.		.000 - .030	0 - 0,76	max.		Code		.000 - .030	0 - 0,76	max.		Code	
									A-B	C-D E-F					A-B	C-D E-F
	inch	mm	inch	mm	Inch	mm	inch	mm	g	g	inch	mm	inch	mm	g	g
02	–		.125	3,18	.265	6,73	.48	12,19	0,91	1,82	–	–	–	–	–	–
03	.126	3,20	.187	4,75	.328	8,33	.55	13,46	1,03	2,08	.375	9,50	.64	16,30	2,04	4,96
04	.188	4,78	.250	6,35	.390	9,91	.62	15,75	1,19	2,35	.437	11,10	.70	17,80	2,41	5,43
05	.251	6,37	.312	7,92	.453	11,51	.68	17,27	1,35	2,61	.500	12,70	.77	19,60	2,59	5,90
06	.313	7,95	.375	9,52	.515	13,08	.74	18,80	1,50	2,88	.562	14,30	.83	21,10	2,84	6,36
07	.376	9,55	.437	11,10	.578	14,68	.82	20,83	1,66	3,14	.625	15,90	.89	22,60	3,13	6,83
08	.438	11,13	.500	12,70	.640	16,27	.89	22,61	1,82	3,40	.687	17,45	.95	24,10	3,42	7,30
09	.501	12,73	.562	14,27	.703	17,86	.95	24,13	1,98	3,67	.750	19,05	1.02	25,90	3,70	7,77
10	.563	14,30	.625	15,88	.765	19,43	1.01	25,65	2,14	3,94	.812	20,60	1.08	27,40	3,99	8,23
11	.626	15,90	.687	17,45	.828	21,03	1.07	27,18	2,29	4,20	.875	22,20	1.14	29,00	4,27	8,70
12	.688	17,48	.750	19,05	.890	22,61	1.14	28,95	2,45	4,46	.937	23,80	1.20	30,50	4,56	9,17
13	.751	19,07	.812	20,62	–	–	–	–	–	–	1.000	25,40	1.27	32,25	4,84	9,63
14	.813	20,65	.875	22,22	–	–	–	–	–	–	1.062	27,00	1.60	40,65	5,13	10,10

1) The masses are calculated : attached rivet – selected shank.

Diameter code	4		5		6	
	inch	mm	inch	mm	inch	mm
Min. grip length	.063	1,60	.063	1,60	.073	1,85

3.4 Material – Surface treatment

TABLE5

CODE	MATERIAL				TRAITEMENT DE SURFACE				Maximum operating temperature	Identification color
	Socket	Shank	Retaining ring	Expansion ring	Socket	Shank	Retaining ring	Expansion ring		
A	Aluminum alloy 5056 QQ-A-430	Steel alloy 8740 AMS 6322	Stainless steel A286 AMS 5737	Steel alloy SAE 1038	MIL-C-5541 Light color	Cadmium plated QQ-P-416 Type II Cl. 2	None	Cadmium plated QQ-P-416 Type I Cl. 2	120°C	None
B	Aluminum alloy 5056 QQ-A-430	Stainless steel 15.7 PH AMS 5657 or Stainless steel A286 AMS 5737				Cadmium plated QQ-P-416 Type I Cl. 2 or passivation QQ-P-35			492°C	
C [1]	Monel QQ-N-281				None	None			400°C	Gold
D [1]	Monel QQ-N-281				I.V.D. [2] MIL-DTL-83488 Type II Cl. 3				400°C	Gold
E	Monel QQ-N-281				None				492°C	None
F	Monel QQ-N-281				I.V.D. [2] MIL-DTL-83488 Type II Cl. 3				400°C	Gold

1) Codes C and D shall not used for new design studies. Valid until stocks are exhausted.
2) I.V.D. (Ion Vapor Deposition : Protection by deposition of aluminum under vacuum.

3.5 Tensile and shear strength

TABLE 6

Material finish code	STANDARD RIVETS											
	Code Ø	4					5					
		02	03	04	05	06	02	03	04	05	06	07
A and B	Single shear strength min.(N)	1828	2362	2896	2954			3176	3834	4502	4582	
	Tensile strength (N)	1268					1979					
C and D	Single shear min.(N)	2157	2967	3247	3247			3821	4804	5044	5044	
	Tensile strength (N)	1779					2825					
E and F	Single shear strength min. (N)	2162	2936	3718	4425	4425		3839	4804	5782	6783	6872
	Tensile strength (N)	1779					2825					
RIVETS OF LARGE DIAMETER												
A and B	Single shear strength min. (N)	2135	2731	3296	3621			3625	4346	5057	5538	
	Tensile strength (N)	1535					2357					
C and D	Single shear strength min. (N)	2535	3492	3980	3980			4492	5649	6018	6018	
	Tensile strength (N)	2179					3291					
E and F	Single shear strength min. (N)	2553	3487	4421	5360	5426		4492	5649	6805	8006	8295
	Tensile strength (N)	2179					3291					

Notes :

1) The values indicated in the table above are only valid for assemblies using sheets of the given thickness. The values shall take into account the thickness of the sheet used.
2) For rivets with a grip length greater than indicated, take as the base the final value given in the table for the appropriate diameter.
3) Codes C and D shall not be used for new design studies. Valid until stocks are exhausted.

TABLEAU 6 (suite)

Material finish code	STANDARD RIVETS														
	Code Ø	6						8							
		03	04	05	06	07	08	03	04	05	06	07	08	09	10
A And B	Single shear strength min. (N)	4083	4870	5827	6463	6583			7210	8260	9341	10408	11632		
	Tensile strength (N)	2825						5004							
C and D	Single shear strength min. (N)	4577	5711	6174	7233	7233			8029	9253	11129	12674	12788		
	Tensile strength (N)	3959						6984							
E and F	Single shear strength min. (N)	4581	5738	6895	8095	9251	9852		8095	9630	11123	12766	13900	15857	17436
	Tensile strength (N)	3959						6984							
RIVETS OF LARGE DIAMETER															
A and B	Single shear strength min. (N)	4470	5338	6174	7023	7495			7895	8985	10097	11209	11898	13010	
	Tensile strength (N)	3158													
C and D	Single shear strength min. (N)	5382	6716	8108	8108										
	Tensile strength (N)	4448						7806							
E and F	Single shear strength min. (N)	5426	6761	8118	9496	10853	11231		9496	11253	13099	14856	16658	18415	19527
	Tensile strength (N)	4448						7806							

Notes :

1) The values indicated in the table above are only valid for assemblies using sheets of the given thickness. The values shall take into account the thickness of the sheet used.

2) For rivets with a grip length greater than those indicated, take at the base the final values given in the table for the appropriate diameter.

3) Codes C and D shall not be used for new design studies. Valid until stocks are exhausted.

4 DESIGNATION

Each blind rivet shall be designated as follows:

4.1 New designation

Description block[1]	Identifier block[2]
BLIND RIVET	**ASNA0077 A 4 03 X**

Number of the standard
Material code – Surface treatment (see § 4.4)
Diameter code (see § 4 .2 or 4.3, table 1)
Grip length code (see § 4.2 or 4.3, table 2)
Code for rivets of large diameter

NOTE – If necessary, the company code F5442[3] must be set between the description block and the identifier block.

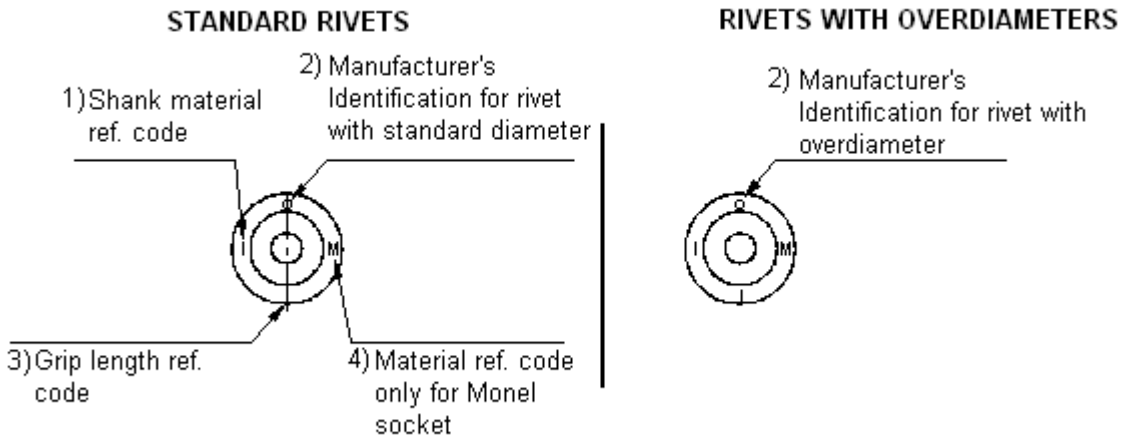
4.2 Old designation (not valid for new design studies)

Description block[1]	Identifier block[2]
BLIND RIVET	**ASNA-0077 A 4 03 X**

Number of the standard
Material code – Surface treatment (see § 4.4)
Diameter code (see § 4.2 or 4.3, table 1)
Grip length code (see § 4.2 or 4.3, table 2)
Code for rivets of large diameter

[1] Optional
[2] The identifier block shall not written without spaces. Those in the example are only intented to facilitate reading. .
[3] Company code assigned to EADS Corporate Standardization F5442 is the designer's code for the present standard.

5 MARKING



The marking on the rivet head includes the following:

1) - no code for steel shanks,
   - a + sign for rivets with stainless steel shanks and aluminum alloy sockets.
2) The manufacturer's monogram (see IGC 04.81.104).
3) The grip length code.
4) The socket material code (M) for Monel sockets only.

6 TECHNICAL SPECIFICATIONS

NAS 1686 or MIL-R-7885: for rivets of material code A and B, depending on the manufacturer.

MIL-R-7885: for rivets of code C and D, until stocks are exhausted.

NAS 1687: for rivets of material code E and F, except for the shear test MIL-STD-1312 test 21.

7 MANUFACTURERS

Refer to the list of qualified manufacturers and products.

RECORD OF REVISION

Issue	Paragraph modified	Description of modification	Reason
A (09.79)		New standard	
B (01.80)	2	Codified reference modified	
C (06.81)	4.5	Dimensions A and D modified in table 5	
D (10.81)		Related information 2 added Rivets of large diameter	
E (09.83)		Manufacturer's identification added for rivets of large diameter. Monel socket protection: cadmium plating replaced by I.V.D.: Protection for stainless steel shank with socket. Monel: Cadmium plating deleted.	Restricted circulation. Aircraft Division only.
F (12.83)		Manufacturer's identification added for rivets of large diameter. Monel socket protection: cadmium plating replaced by I.V.D. Protection for stainless steel shank with socket. Monel: cadmium plating deleted. Diameter 6,4 added.	
G (06.85)		Mention of articles protected by patent lax added. Making: - Manufacturer's initials added after IGC. Related information 1 and 2 - Manufacturer added as per PQ001.05 - Example of reference correspondence Aerospatiale and manufacturer deleted.	
H (01.90)	2 4.4 4.5 5	Standard revised References MIL-R-007885 specification changed for : Material codes A and B: NAS 1686 Material codes C and D: MIL-R-7885 Material codes E and F: NAS 1687 Material codes E and F added Codes C and D changed to: Not to be used for new design studies. Valid until stocks are exhausted. Table revised following change in specification Old designation replaced by new designation for new design studies	CN/DIR 1 AECMA rules applied Manufacturer's request following change in specification. Aircraft Division request

RECORD OF REVISION (cont'd)

Issue[1)]	Paragraph modified	Description of modification	Reason
J (03.93)	7	Technical specification : MIL-R-7885 revalidated for material codes A and B	Second procurement source added Aircraft Division request
K (09.95)	2 3.4 Figure 1	Standard references added Material A286 added alternately with stainless steel 15.7 PH for code B Detail added	Manufacturer's request
L (09.96)	2 3.4 Table 5	Reference QQ-A-35 added Surface treatment on shank – Code B Passivation as per QQ-P-35 added for stainless steel A286	DCR/N Initiative
M (09.97)	6	For rivets codes C and D: technical specification NAS 1687 replaced by MIL-R-7885.	Manufacturer's request.
N	Page 1 Table 1 Table 4 Tableau 1-3 Table 6	AEROSPATIALE becomes EADS. Dimension C added. Grip length code added. Min. length code changed. Code BK added Rivet single shear strength : – 8-06 A and B codes 9431 change to 9341 – 5-03 E and F codes 4839 change to 3839. Rivet of large diameter tensile strength : - 5 A and B codes 2537 change to 2357.	IW/OP/QS initiative. IDCR/DN/P Initiative Manufacturer request Manufacturer request Request of EUROCOPTER N°249 dated: 02/07/2012. Manufacturer request.

1) The issues I, O, X, Q and Z are not used..