BLIND RIVETS

METRIC STRUCTURAL SPLITTING SELF PLUGGING PULL MANDREL BLIND RIVETS

IFI 530 1982

1. Scope.

1.1 Scope. This standard establishes the dimensional, mechanical, and performance requirements for metric structural splitting self plugging pull mandrel blind rivets suitable for use in engineering assemblies where load transmitting capability by the rivet is a design requirement.

1.2 Definitions.

1.2.1 Blind Rivet. A blind rivet is a blind fastener which has a self-contained mechanical, chemical or other feature which permits the formation of an upset on the blind end of the rivet and expansion of the rivet shank during rivet setting to join the component parts of an assembly.

1.2.2 A structural splitting self plugging pull mandrel blind rivet (hereinafter called rivet) is a two piece assembly consisting of a rivet body and a mandrel. During the setting operation, the mandrel is pulled against and into the rivet body causing the rivet blind end to split axially into three or more segments. The mandrel breaks at a point within or above the rivet head with the entrapped length of the mandrel being retained in the rivet body.

1.2.3 Definitions of other terms used in this standard are given in IFI-110, "Glossary of Terms Relating to Blind Rivets," page H—1.

2. Designations.

2.1 Styles. The two basic styles of rivets are designated as protruding head and flush head. Protruding head rivets are available in two styles designated as regular head and

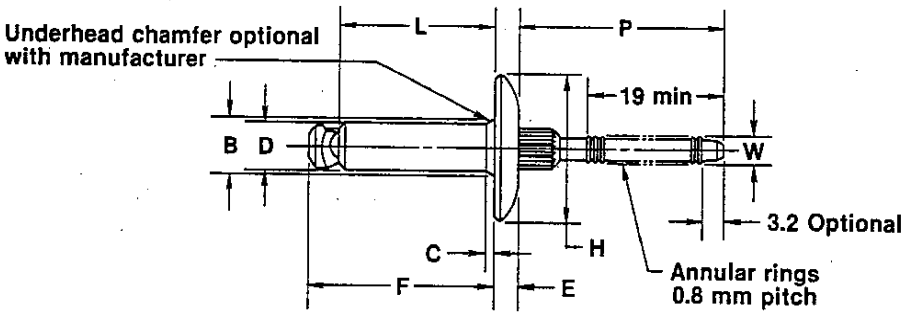

Table 1 Dimensions of Regular and Large Head Structural Splitting Self Plugging Pull Mandrel Blind Rivets

Rivet Series No.	Nom Rivet Size	D		H		E		H		E		B	C	W	P	F
		Body Dia		Style 1 — Regular Head				Style 2 — Large Head				Hole Filling Chamfer	Chamfer Length	Mandrel Dia	Mandrel Protrusion	Blind Side Protrusion
				Head Dia		Head Height		Head Dia		Head Height						
		Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Max	Nom	Min	Max
6	4.8	4.85	4.70	10.29	9.53	2.62	2.11	14.91	13.64	2.62	2.11	5.11	0.89	2.95	25	L + 3.2
8	6.3	6.48	6.30	13.59	12.32	3.20	2.69	19.69	18.42	3.20	2.69	6.83	1.14	3.84	25	L + 4.2

NOTES:

1. All dimensions are in millimeters.
2. For application data see Table 2.
3. Maximum body diameter may be increased by 0.03 mm within 2.5 mm of underside of head.
6. When computing the blind side protrusion (F), the maximum length of rivet (L) as given in Table 2 for the applicable grip shall be used. Minimum blind side clearance may be calculated by subtracting the actual grip (G), (i.e., total thickness of the material to be joined), from the specified blind side protrusion (F). (Example: To join two plates, each 2.5 mm thick, with a No. 6 rivet, a No. 64 rivet would be used. Minimum blind side clearance necessary to permit proper rivet setting would be L + 3.2 — G, which is 15.3 + 3.2 — 5.0, and equals 13.5 mm).

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Table 2 Application Data for Protruding Head Style Structural Splitting Self Plugging Pull Mandrel Blind Rivets

Rivet Series No.	Nom Rivet Size	Recommended Metric Drill Size	Recommended Hole Size		Rivet No.	Grip Range	Rivet Length L
			Max	Min			Max
6	4.2	4.9	4.98	4.88	61	0.8 to 1.6	10.6
					62	1.7 to 3.2	12.2
					63	3.3 to 4.8	13.8
					64	4.9 to 6.4	15.3
					65	6.5 to 7.9	16.9
					66	8.0 to 9.5	18.5
					67	9.6 to 11.1	20.1
					68	11.2 to 12.7	21.7
					69	12.8 to 14.3	23.3
					610	14.4 to 15.9	24.9
					611	16.0 to 17.5	26.5
					612	17.6 to 19.1	28.0
8	6.3	6.5	6.63	6.53	82	1.7 to 3.2	13.2
					83	3.3 to 4.8	14.8
					84	4.9 to 6.4	16.4
					85	6.5 to 7.9	18.0
					86	8.0 to 9.5	19.6
					87	9.6 to 11.1	21.2
					88	11.2 to 12.7	22.8
					89	12.8 to 14.3	24.3
					810	14.4 to 15.9	25.9
					811	16.0 to 17.5	27.5
					812	17.6 to 19.1	29.1
					813	19.2 to 20.6	30.7
					814	20.7 to 22.2	32.3
					815	22.3 to 23.8	33.9
					816	23.9 to 25.4	35.5

NOTES:
1. All dimensions are in millimeters.
2. Recommended drill sizes are those which normally produce holes within the specified hole size limits.

large head. Flush head rivets are available in one style designated as 100 degree countersunk head.

2.2 Grades. The material combinations of rivets are designated as grades with each grade representing a different combination of rivet body material and mandrel materials as given in Table 5.

2.3 Design. The design of rivets shall be in accordance with the practice of the manufacturer.

3. Requirements.

3.1 Materials and Processes.

3.1.1 Materials. Rivet bodies and mandrels shall be made of the material specified for the grade in Table 5.

3.1.2 Heat Treatment. Rivet components shall be heat treated as necessary to meet the mechanical and performance requirements specified for the grade. Heat treatment shall be in accordance with good commercial practice.

3.1.3 Finish. Unless otherwise specified, rivets may be coated at the option of the manufacturer.

3.2 Dimensional Requirements.

3.2.1 Rivet Dimensions. Protruding and 100 deg flush head rivets shall conform to the dimensions given in Tables 1 and 3, respectively.

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3.2.2 Application Data. Recommendations on the selection and application of protruding and 100 deg flush head rivets are given in Tables 2 and 4, respectively.

3.3 Mechanical and Performance Requirements.

3.3.1 Shear Strength. Rivets, except those described in 3.3.3, shall have ultimate shear strengths not less than the minimum specified for the applicable size and grade given in Table 6 when tested in accordance with 2.1 of IFI-522, page H—29.

3.3.2 Tensile Strength. Rivets, except those described in 3.3.3, shall have ultimate tensile strengths not less than the minimum specified for the applicable size and grade given in Table 6 when tested in accordance with 2.2 of IFI-522.

3.3.3 Protruding head rivets with specified maximum grip lengths shorter than 1.0 times the nominal rivet diameter, and flush head rivets with specified maximum grip lengths shorter than 1.5 times the nominal rivet diameter shall not be subject to either shear or tensile testing.

3.3.4 Mandrel Break Load. While the rivet is being set, the axially applied load necessary to break the mandrel shall be within the limits specified for the applicable rivet size and grade in Table 7 when tested in accordance with 2.3 of IFI-522.

3.3.5 Mandrel Retention. Mandrels of properly set rivets shall withstand, without apparent

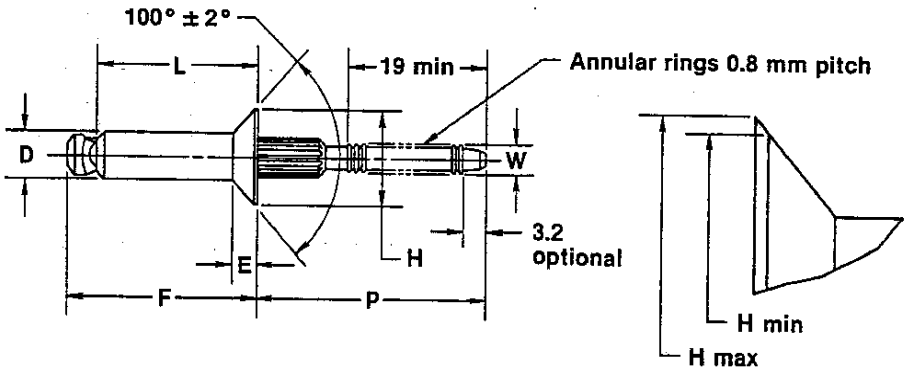

Table 3 Dimensions of 100 Deg Flush Head Structural Splitting Self Plugging Pull Mandrel Blind Rivets

Rivet Series No.	Nom Rivet Size	D		H		E	W	P	F
		Body Dia		Head Dia		Head Height	Mandrel Dia	Mandrel Protrusion	Blind Side Protrusion
		Max	Min	Max	Min	Ref	Nom	Min	Max
6	4.8	4.85	4.70	9.93	9.17	2.06	2.95	25	L + 3.2
8	6.3	6.48	6.30	13.00	12.24	2.64	3.84	25	L + 4.2

NOTES:

1. All dimensions are in millimeters.
2. For application data see Table 4.
3. Maximum body diameter may be increased by 0.03 mm within 2.5 mm of underside of head.
4. When computing the blind side protrusion (F), the maximum length of rivet (L) as given in Table 4 for the applicable grip shall be used. Minimum blind side clearance may be calculated by subtracting the actual grip (G) (i.e., total thickness of the material to be joined), from the specified blind side protrusion (F). (Example: To join two plates, each 4.5 mm thick, with a No. 6 rivet, a No. 66 rivet would be used. Minimum blind side clearance necessary to permit proper rivet setting would be L + 3.2 — G, which is 18.5 + 3.2 — 9.0 and equals 12.7 mm).

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Table 4 Application Data for 100 Deg Flush Head Style Structural Splitting Self Plugging Pull Mandrel Blind Rivets

Rivet Series No.	Nom Rivet Size	Recommended Metric Drill Size	Recommended Hole Size		Rivet No.	Grip Range	Rivet Length L
			Max	Min			Max
6	4.2	4.9	4.98	4.88	64	4.7 to 6.4	15.3
					65	6.5 to 7.9	16.9
					66	8.0 to 9.5	18.5
					67	9.6 to 11.1	20.1
					68	11.2 to 12.7	21.7
					69	12.8 to 14.3	23.3
					610	14.4 to 15.9	24.9
					611	16.0 to 17.5	26.5
8	6.3	6.5	6.63	6.53	84	4.7 to 6.4	16.4
					85	6.5 to 7.9	18.0
					86	8.0 to 9.5	19.6
					87	9.6 to 11.1	21.2
					88	11.2 to 12.7	22.8
					89	12.8 to 14.3	24.3
					810	14.4 to 15.9	25.9
					811	16.0 to 17.5	27.5
					812	17.6 to 19.1	29.1
					813	19.2 to 20.6	30.7
					814	20.7 to 22.2	32.3
					815	22.3 to 23.8	33.9
					816	23.9 to 25.4	35.5

NOTES:

1. All dimensions are in millimeters.
2. Recommended drill sizes are those which normally produce holes within the specified hole size limits.

Table 5 Grades of Structural Splitting Self Plugging Pull Mandrel Blind Rivets

Grade Designation	Rivet Body Material	Mandrel Material
12	Aluminum Alloy 5056	Aluminum Alloy
19	Aluminum Alloy 5056	Carbon Steel
30	Low Carbon Steel	Carbon Steel

movement of the mandrel in the rivet body, the axial push-out loads specified for the applicable size and grip length in Table 8 when tested in accordance with 2.5 of IFI-522.

4. Marking.

Rivets need not be marked to identify either grade or source of manufacture.

5. Inspection.

Rivets shall be inspected to determine conformance with dimensional, mechanical and performance requirements. Inspection should be performed in accordance with sampling plans given in MIL-STD-105. Alternate inspection procedures may be specified by the purchaser on the purchase order or engineering drawings.

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Table 6 Ultimate Shear & Tensile Strengths of Structural Splitting Self Plugging Pull Mandrel Blind Rivets

Nom Rivet Size mm	Rivet No.	Ultimate Shear Strength newtons, min			Ultimate Tensile Strength newtons, min		
		Grade 12	Grade 19	Grade 30	Grade 12	Grade 19	Grade 30
4.2	63	*	4000	*	*	2670	*
	64	*	4670	*	*	2670	*
	65	*	5000	*	*	2670	*
	66	*	5340	*	*	2670	*
	67	*	5670	*	*	2670	*
	68	*	6000	*	*	2670	*
	69	*	6000	*	*	2670	*
	610	*	6000	*	*	2670	*
	611	*	6000	*	*	2670	*
	612	*	6000	*	*	2670	*
6.3	84	*	6670	*	*	4890	*
	85	*	7120	*	*	4890	*
	86	*	7780	*	*	4890	*
	87	*	8450	*	*	4890	*
	88	*	8900	*	*	4890	*
	89	*	9340	*	*	4890	*
	810	*	9340	*	*	4890	*
	811	*	9340	*	*	4890	*
	812	*	9340	*	*	4890	*
	813	*	9340	*	*	4890	*
	814	*	9340	*	*	4890	*
	815	*	9340	*	*	4890	*
	816	*	9340	*	*	4890	*

*Values are under development.

Table 7 Mandrel Break Loads of Structural Splitting Self Plugging Pull Mandrel Blind Rivets

Nom Rivet Size mm	Grade	12	19	30
	Rivet Body Material	Aluminum	Aluminum	Steel
	Mandrel Material	Aluminum	Steel	Steel
4.2	Min	*	5340	*
	Max	*	7120	*
6.3	Min	*	8900	*
	Max	*	10700	*

*Values are under development.

NOTES: 1. All loads in newtons.

2. Mandrel break load is defined as the load in newtons necessary to break the mandrel when setting the rivet.

Table 8 Mandrel Retention Loads of Structural Splitting Self Plugging Pull Mandrel Blind Rivets

Nom Rivet Size mm	Mandrel Retention Load newtons, min
4.2	110
6.3	110