BLIND RIVETS

METRIC MULTI-GRIP FLUSH BREAK PULL MANDREL SELF-PLUGGING BLIND RIVETS

IFI-552
1999

IFI NOTES:

1. *This specification is under the jurisdiction of the IFI Standards and Technical Practices Committee and directly under the Technical Committee of IFI's Division I. This is the first metric edition of this standard.*
2. *There are no ISO standards for this product at this time.*

1. Scope

1.1 This standard establishes the dimensional, mechanical, and performance requirements of metric multi-grip flush break, positive lock pull mandrel self-plugging blind rivets suitable for use in joining the component parts of assemblies of varying grip range where structural integrity 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,

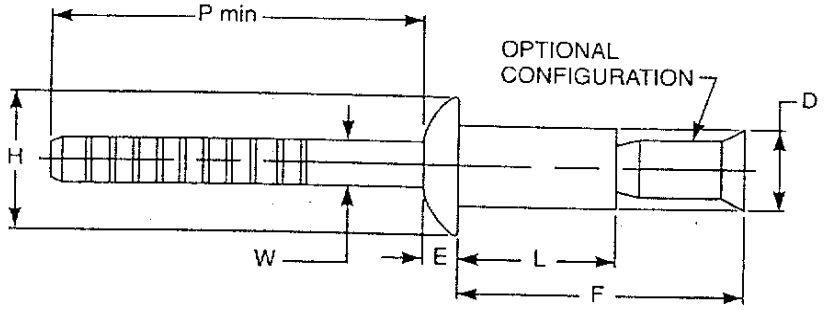


Table 1 Dimensions of Metric Regular and Large Multi-Grip Protruding Head Flush Break Pull Mandrel Self-Plugging Blind Rivets

Rivet Series No.	Nom Rivet Size	D		H		E	H		E	F	P	W		L
		Body Dia		Style 1 — Regular Head			Style 2 — Large Head			Blind Side Protrusion	Mandrel Protrusion	Mandrel Shank Dia		Rivet Body Length
				Head Dia		Head Height	Head Dia		Head Height					
		Max	Min	Max	Min	Max	Max	Min	Max	Max	Min	Max	Min	Max
6	4.8	4.90	4.67	10.15	9.01	2.28	13.45	12.69	2.66	L + 10.81	25.4	3.05	2.89	See Table 2
8	6.3	6.60	6.45	13.45	12.18	2.97	—	—	—	L + 15.86	25.4	4.11	3.88	
See Note										3				

NOTES:
1. All dimensions are in millimeters.
2. For application data see Table 2.
3. When computing the blind side protrusion (F), the max length of rivet body (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 being joined) from the specified blind side protrusion (F). F – G is the recommended minimum blind side clearance, however, because of its unique design, when setting this type of rivet, less blind side clearance may be possible in some applications. When less than the recommended minimum blind side clearance is a design requirement, it is suggested the rivet manufacturer be consulted.

Note: Special nosepiece may be required.

METRIC MULTI-GRIP FLUSH BREAK PULL MANDREL SELF-PLUGGING BLIND RIVETS

Table 2 Application Data for Metric Protruding Head Multi-Grip Flush Break Pull Mandrel Self-Plugging Blind Rivets

Rivet Series No.	Nominal Rivet Size	Recommended Drill Size	Recommended Hole Size		Rivet No.	Grip Range	Rivet. Body Length L
			Max	Min			Max
6	4.8	4.91	5.18	4.92	64 67	1.57-6.35 5.43-11.09	10.56 14.64
8	6.3	6.63	7.0	6.63	86 810	2.03-9.52 8.88-15.86	14.11 20.46
See Note		3			2		

NOTES:
1. All dimensions are in millimeters.
2. The first numeral in the rivet number designates the rivet series number, the last one or two numerals give the maximum grip in 1.57 mm which the rivet is capable of joining.
3. Recommended drill sizes are those which normally produce holes within the specified hole size limits.

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 Multi-grip flush break positive lock blind rivets are pull mandrel type blind rivets where during the setting operation the mandrel is pulled into the rivet body and breaks essentially flush with the top of the rivet head. Because the break plane of the mandrel occurs above the junction of the rivet shank and head, the shear plane(s) of the joint will occur through rivet shank and mandrel. Multi-grip means the rivet has the design capability to join component parts having a broad range of thicknesses. Positive lock means that during rivet setting an intentional deformation occurs in the rivet mandrel and/or body, which provides a mechanical resistance to mandrel removal from the rivet body.

1.2.3 Definitions of other terms used in this standard are given in IFI-110/550, "Glossary of Terms Relating to Blind Rivets," page I–3.

2. Designations

2.1 Styles. The two basic styles of multi-grip flush break pull mandrel self-plugging blind rivets are designated as protruding head and 100 deg flush head.

2.2 Grades. The material combinations of multi-grip flush break pull mandrel self-plugging blind rivets are designated as grades, with each material combination representing a different combination of rivet body material and mandrel material as given in Table 5.

2.3 Design. The design of multi-grip flush break pull mandrel self-plugging blind rivets shall be in accordance with the practice of the manufacturer.

3. Requirements

3.1 Materials and Processes

3.1.1 *Material.* Rivet bodies and mandrels shall be made of the material specified for the

METRIC MULTI-GRIP FLUSH BREAK PULL MANDREL SELF-PLUGGING BLIND RIVETS

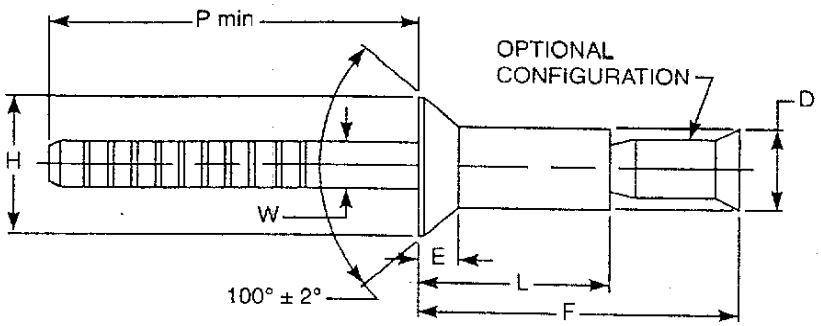


Table 3 Dimensions of Metric 100 Deg Flush Head Multi-Grip Flush Break Pull Mandrel Self-Plugging Blind Rivets

Rivet Series No.	Nom Rivet Size	D		H		E	F	P	W		L
		Body Dia		Head Dia		Head Height	Blind Side Protrusion	Mandrel Protrusion	Mandrel Shank Dia		Rivet Body Length
		Max	Min	Max	Min	Ref	Max	Min	Max	Min	Max
6	4.8	4.90	4.67	9.14	8.25	1.78	L + 10.81	25.4	3.05	2.89	See Table 4
8	6.3	6.60	6.45	11.37	10.03	2.00	L + 13.70	25.4	4.11	3.88	
See Note				3		4	5				

NOTES:
1. All dimensions are in millimeters.
2. For application data see Table 4.
3. Maximum head diameter is calculated on nominal rivet diameter and nominal head angle extended to sharp corner. Minimum head diameter is absolute.
4. Head height is given for reference purposes only. Variations in this dimension are controlled by the diameters (H) and (D) and the included angle of the head.
5. When computing the blind side protrusion (F), the max length of rivet body (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., the total thickness of the material being joined) from the specified blind side protrusion (F). F – G is the recommended minimum blind side clearance. However, because of its unique design, when setting this type of rivet, less blind side clearance may be possible in some applications. When less than the recommended minimum blind side clearance is a design requirement, it is suggested the rivet manufacturer be consulted.

grade in Table 5. When the specific material analysis is not given, the analysis shall be selected by the manufacturer and shall be such to assure that rivets meet the mechanical and performance requirements specified in 3.3.

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.* Bodies and mandrels of Grades 12 and 14 may be anodized or chemically surface treated. Grades 30 and 31 rivet bodies are either plain (bare metal) or zinc or cadmium plated with a minimum plating thickness of 0.0038 mm. Grade 51 rivet bodies are furnished

METRIC MULTI-GRIP FLUSH BREAK PULL MANDREL SELF-PLUGGING BLIND RIVETS

Table 4 Application Data for Metric 100 Deg Flush Head Multi-Grip Flush Break Pull Mandrel Self-Plugging Blind Rivets

Rivet Series No.	Nominal Rivet Size	Recommended Drill Size	Recommended Hole Size		Rivet No.	Grip Range	Rivet Body Length L
			Max	Min			Max
6	4.8	4.91	5.18	4.92	65 68	3.17-7.92 6.98-12.70	12.34 15.38
8	6.3	6.63	7.0	6.63	87	3.17-11.09	16.75
See Note		3			2		

NOTES:
1. All dimensions are in millimeters.
2. The first numeral in the rivet number designates the rivet series number, the last one or two numerals give the maximum grip in 1.57 mm, which the rivet is capable of joining.
3. Recommended drill sizes are those which normally produce holes within the specified hole size limits.

Table 5 Grades of Metric Multi-Grip Flush Break Pull Mandrel Self-Plugging Blind Rivets

Grade Designation	Rivet Body Material	Mandrel Material
30 31	Steel (1) Steel (1)	Carbon Steel Stainless Steel (300 Series)
12 14	Aluminum Alloy 5056 Aluminum Alloy 2117	Aluminum Alloy Aluminum Alloy
51	Stainless Steel (300 Series)	Stainless Steel (300 Series, A286 or equivalent)

NOTE:
1. Includes both carbon and alloy steel.

Table 6 Ultimate Shear and Tensile Strengths of Metric Multi-Grip Flush Break Pull Mandrel Self-Plugging Blind Rivets

Nominal Rivet Size mm	Ultimate Shear Strength Newtons, min			Ultimate Tensile Strength Newtons, min		
	Grades 30, 31	Grades 12, 14	Grade 51	Grades 30, 31	Grades 12, 14	Grade 51
4.8	578.0	2440	5780	4445	2000	4445
6.3	10.675	5645	10.675	8230	3690	8230

plain unless otherwise specified. Grade 30 mandrels may be either zinc or cadmium plated or may be furnished plain or with a protective coating at the option of the manufacturer.

3.2 Dimensional Requirements

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

Table 7 Mandrel Retention Loads of Metric Multi-Grip Flush Break Pull Mandrel Self-Plugging Blind Rivets

Nominal Rivet Size mm	Mandrel Retention Load Newtons, min		
	Grades 30, 31	Grades 12, 14	Grade 51
4.8	445	222	445
6.3	1110	445	1110

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

3.3 Mechanical and Performance Requirements

3.3.1 *Shear Strength.* Rivets shall have ultimate shear strengths not less than the minimum ultimate shear strengths specified for the applicable size and grade given in Table 6 when tested in accordance with 2.1 of IFI-522, "Mechanical Testing of Metric Blind Rivets", page I–27.

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

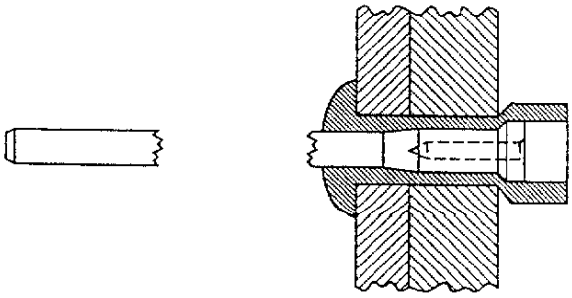
3.3.3 *Mandrel Retention.* Mandrels of properly set rivets shall withstand, without apparent movement of the mandrel in the rivet body, the axial push-out loads specified for the applicable size in Table 7 when tested in accordance with 2.5 of IFI-522, page I–31.

4. Test Methods

Tests shall be conducted in accordance with the test methods specified in IFI-522.

5. Inspection

Rivets shall be inspected to determine conformance with dimensional, mechanical, and performance requirements. Inspection shall be as agreed upon between manufacturer and purchaser.



Properly Set Rivet