SAE International

SURFACE VEHICLE STANDARD

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Superseding J1200 MAY1998

Blind Rivets - Break Mandrel Type

RATIONALE

J1200 has been reaffirmed to comply with the SAE five-year review policy.

Foreword—This Document has not changed other than to put it into the new SAE Technical Standards Board Format. According to this format, Scope is Section 1, References is Section 2, and Definitions is Section 3. Metric is now the primary unit followed by English units in parentheses.

1. Scope—This SAE Standard establishes the dimensional, mechanical, and performance requirements of inch and metric break mandrel blind rivets suitable for use in joining the component parts of an assembly.

2. References—There are no referenced publications specified herein.

3. Definitions

3.1 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.

3.2 Break Mandrel Blind Rivet—Break mandrel blind rivets are pull mandrel-type blind rivets, where during the setting operation the mandrel is pulled into or against the rivet body and breaks at or near the junction of the mandrel shank and its upset end.

4. General Specifications

4.1 Designations—These rivets are designated by styles and grades as described below in addition to size, length, and finish.

4.1.1 RIVET STYLES—The two basic styles of break mandrel blind rivets are designated as protruding head and flush head. Protruding head rivets are available in two styles designated as regular head and large head. Flush head rivets are available in the 120 degrees countersunk head.

4.1.2 RIVET GRADES—The material combination of break mandrel 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 1.

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TABLE 1—GRADES OF BREAK MANDREL BLIND RIVETS

Grade Designation	Rivet Body Material	Mandrel Material
10	Aluminum Alloy 5050	Aluminum Alloy 7178 or 2024
11	Aluminum Alloy 5052	Aluminum Alloy 7178 or 2024
16	Aluminum Alloy 5154	Carbon Steel
18	Aluminum Alloy 5052	Carbon Steel
19	Aluminum Alloy 5056	Carbon Steel
20	Copper alloy No. 110	Carbon Steel
30	Low Carbon Steel	Carbon Steel
40	Nickel-Copper Alloy (Monel)	Carbon Steel
50	Stainless Steel (300 Series)	Carbon Steel
51	Stainless Steel (300 Series)	Stainless Steel (300 Series)

4.2 Dimensions and Tolerances—The design of break mandrel type blind rivets shall be in accordance with the practice of the manufacturer providing the dimensions shown in Section 7 are maintained and rivets meet the mechanical and performance requirements of this standard. Tolerance on dimensions in tables, not designated otherwise, shall be 0.25 mm (±0.010 in).

4.3 Materials—Rivet bodies and mandrels shall be made of the material specified for the grade in Table 1. 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 under Section 5.

4.4 Finishes—Grade 30 rivet bodies are either zinc or cadmium plated with a minimum plating thickness of 0.004 mm (0.00015 in). Rivet bodies of all other grades are furnished plain (bare metal), unless otherwise specified. Because mandrels are discarded following rivet setting, mandrels of all materials may be furnished plain or with a protective coating at the option of the manufacturer, unless otherwise specified.

5. Mechanical and Performance Requirements

5.1 Shear Strength—Rivets, except those described in 5.2.1, shall have ultimate shear loads not less than the minimum ultimate shear loads specified for the applicable size and grade given in Tables 2A and 2B, when tested in accordance with 6.1.

5.2 Tensile Strength—Rivets, except those described in 5.2.1, shall have ultimate tensile loads not less than the minimum ultimate tensile loads specified for the applicable size and grade given in Tables 3A and 3B when tested in accordance with 6.2.

5.2.1 Grade 20 rivet is not subject to either shear or tensile testing. For all other grades, 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.

5.3 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 Tables 4A and 4B when tested in accordance with 6.3.

5.4 Mandrel Retention—The mandrel shall be retained within the rivet body such that a force in excess of 8.9 N (2 lb) is required to reduce the mandrel protrusion to its specified minimum.

TABLE 2A—ULTIMATE SHEAR LOADS OF BREAK MANDREL BLIND RIVETS

Nominal Rivet Size mm	Ultimate Shear Load[1] (Force) Min/N Grades 10, 11, & 18	Ultimate Shear Load[1] (Force) Min/N Grades 16 & 19	Ultimate Shear Load[1] (Force) Min/N Grade 30	Ultimate Shear Load[1] (Force) Min/N Grade 40	Ultimate Shear Load[1] (Force) Min/N Grades 50 & 51
2.4	310	400	580	890	1020
3.2	530	760	1160	1560	1870
4.0	850	1160	1650	2450	2890
4.8	1160	1690	2400	3560	4230
6.3	2050	3110	4450	6230	7560

1. Grade 20 rivet is not subject to shear testing.

TABLE 2B—ULTIMATE SHEAR LOADS OF BREAK MANDREL BLIND RIVETS

Nominal Rivet Size or Basic Shank Dia	Ultimate Shear Load[1] (Force) Min, lb Grades 10, 11, & 18	Ultimate Shear Load[1] (Force) Min, lb Grades 16 & 19	Ultimate Shear Load[1] (Force) Min, lb Grade 30	Ultimate Shear Load[1] (Force) Min, lb Grade 40	Ultimate Shear Load[1] (Force) Min, lb Grades 50 & 51
3/32 0.0938	70	90	130	200	230
1/8 0.1250	120	170	260	350	420
5/32 0.1562	190	260	370	550	650
3/16 0.1875	260	380	540	800	950
1/4 0.2500	460	700	1000	1400	1700

1. Grade 20 rivet is not subject to shear testing.

TABLE 3A—ULTIMATE TENSILE LOADS OF BREAK MANDREL BLIND RIVETS

Nominal Rivet Size mm	Ultimate Tensile Load[1] (Force) Min/N Grades 10, 11, & 18	Ultimate Tensile Load[1] (Force) Min/N Grades 16 & 19	Ultimate Tensile Load[1] (Force) Min/N Grade 30	Ultimate Tensile Load[1] (Force) Min/N Grade 40	Ultimate Tensile Load[1] (Force) Min/N Grades 50 & 51
2.4	360	530	760	1110	1250
3.2	670	980	1380	2000	2360
4.0	1020	1560	2090	3110	3650
4.8	1420	2220	3020	4450	5340
6.3	2490	4090	5520	8230	9340

1. Grade 20 rivet is not subject to tensile testing.

TABLE 3B—ULTIMATE TENSILE LOADS OF BREAK MANDREL BLIND RIVETS

Nominal Rivet Size or Basic Shank Dia	Ultimate Tensile Load[1] (Force) Min, lb Grades 10, 11, & 18	Ultimate Tensile Load[1] (Force) Min, lb Grades 16 & 19	Ultimate Tensile Load[1] (Force) Min, lb Grade 30	Ultimate Tensile Load[1] (Force) Min, lb Grade 40	Ultimate Tensile Load[1] (Force) Min, lb Grades 50 & 51
3/32 0.0938	80	120	170	250	280
1/8 0.1250	150	220	310	450	530
5/32 0.1562	230	350	470	700	820
3/16 0.1875	320	500	680	1000	1200
1/4 0.2500	560	920	1240	1850	2100

1. Grade 20 rivet is not subject to tensile testing.

TABLE 4A—MANDREL BREAK LOADS OF BREAK MANDREL BLIND RIVETS

Nominal Rivet Size or Basic Shank Dia mm	Mandrel Break Load[1] N Limit	Mandrel Break Load[1] N Grades 10 & 11	Mandrel Break Load[1] N Grades 16, 18, & 19	Mandrel Break Load[1] N Grade 20	Mandrel Break Load[1] N Grade 30	Mandrel Break Load[1] N Grade 40	Mandrel Break Load[1] N Grade 50	Mandrel Break Load[1] N Grade 51
2.4	Min	620	780	780	1160	1330	1330	1330
2.4	Max	1070	1220	1220	1600	2000	2220	2220
3.2	Min	1110	1780	1780	2670	2890	2890	2890
3.2	Max	1780	2670	2670	3560	3780	4230	4230
4.0	Min	1890	2670	2670	3340	4230	5120	5120
4.0	Max	2670	3780	3780	4450	5340	6450	6450
4.8	Min	2780	3340	3340	5120	6450	6230	6230
4.8	Max	3670	4670	4670	6450	7780	8450	8450
6.3	Min	4890	6450	6450	8670	11 100	13 300	13 300
6.3	Max	6230	8230	8230	10 500	12 900	16 000	16 000

1. Mandrel break load is defined as the load in Newtons necessary to break the mandrel when setting break mandrel types of pull mandrel blind rivets.

TABLE 4B—MANDREL BREAK LOADS OF BREAK MANDREL BLIND RIVETS

Nominal Rivet Size or Basic Shank Dia	Mandrel Break Load[1] lb Limit	Mandrel Break Load[1] lb Grades 10 & 11	Mandrel Break Load[1] lb Grades 16, 18, & 19	Mandrel Break Load[1] lb Grade 20	Mandrel Break Load[1] lb Grade 30	Mandrel Break Load[1] lb Grade 40	Mandrel Break Load[1] lb Grade 50	Mandrel Break Load[1] lb Grade 51
3/32 0.0938	Min	140	175	175	260	300	300	300
3/32 0.0938	Max	240	275	275	360	450	500	500
1/8 0.1250	Min	250	400	400	600	650	650	650
1/8 0.1250	Max	400	600	600	800	850	950	950
5/32 0.1562	Min	425	600	600	750	950	1150	1150
5/32 0.1562	Max	600	850	850	1000	1200	1450	1450
3/16 0.1875	Min	625	750	750	1150	1450	1400	1400
3/16 0.1875	Max	825	1050	1050	1450	1750	1900	1900
1/4 0.2500	Min	1100	1450	1450	1950	2500	3000	3000
1/4 0.2500	Max	1400	1850	1850	2350	2900	3600	3600

1. Mandrel break load is defined as the load in pounds necessary to break the mandrel when setting break mandrel types of pull mandrel blind rivets.

5.5 Blind Head Formation—The axially applied load necessary to upset the end of the rivet body, that is, form the blind side head, shall not exceed 80% of the actual mandrel break load, when tested in accordance with 6.3.

6. Test Methods

6.1 Shear Test—The test shall be comprised of loading a single lap joint assembled with one rivet so that the direction of applied load induces transverse shear against the rivet body. The test specimen shall be mounted in a tensile testing machine capable of applying load at a controllable rate. The grips shall be self-aligning and care shall be taken when mounting the specimen to assure that the load will be transmitted in a straight line through the test rivet.

The specimen shall be loaded at a speed of testing as determined with a free running cross head not less than 7.6 mm (0.3 in) nor greater than 13.0 mm (0.5 in)/min. Loading shall be continued until failure of the rivet occurs.

The maximum load in pounds or Newtons applied to the specimen coincident with or prior to rivet failure shall be recorded as the ultimate shear strength of the rivet.

The test specimen shall be comprised of two plates, of equal nominal thickness, axially aligned and assembled into a single lap joint with the test rivet, as shown in Figure 1 and Tables 5A and 5B. The design of test plates may be modified to include holes for shear testing two or more rivets using the same plates. Such holes shall be located on the longitudinal centerline of the plate, and center distances between adjacent holes shall be at least 4 times the diameter of the larger test hole. Ends of plates may be drilled for pin-type mounting in testing machine. Plates shall be alloy steel, quenched and tempered to a hardness of Rockwell C46-50.

The test rivet shall be set with a setting tool standard for that type of rivet and in accordance with the setting procedures recommended by the rivet manufacturer.

TABLE 5A—DIMENSIONS OF TEST PLATES, mm (FIGURES 1, 2, AND 3)

Nominal Rivet Size or Basic Shank Dia	G Shear and Tensile Test Plate Hole Dia Max	G Shear and Tensile Test Plate Hole Dia Min	G_1 Break Mandrel Test Restraining Plate Hole Dia Basic(1)	S End to Center Length Min(2)	T Shear and Tensile Test Plate Thickness Protruding Head Styles Min(3)	T_2 Shear and Tensile Test Plate Thickness Flush Head Styles Min(4)
2.4	2.54	2.49	1.70	9.6	1.2	1.8
3.2	3.35	3.30	2.18	12.8	1.6	2.4
4.0	4.16	4.11	2.66	16.0	2.0	3.0
4.8	4.98	4.93	3.15	19.2	2.4	3.6
6.3	6.60	6.55	4.09	25.2	3.2	4.7

1. Values shown are equal to nominal mandrel diameter plus 0.25 mm.
2. Values shown are equal to 4 times basic shank diameter of rivet.
3. Minimum values shown are equal to 0.50 times basic shank diameter of rivet. Maximum thickness shall not exceed 0.50 times maximum grip length specified for applicable rivet in Table 8A.
4. Minimum values shown are equal to 0.75 times basic shank diameter of rivet. Maximum thickness shall not exceed 0.50 times maximum grip length specified for applicable rivet in Table 8A.
5. The protusion diameter of the mandrel (W diameter), including the point burr, shall be less than basic G_1 plate hole diam eter.

TABLE 5B—DIMENSIONS OF TEST PLATES, in (SEE FIGURES 1, 2, AND 3)

Nominal Rivet Size or Basic Shank Dia	G Shear and Tensile Test Plate Hole Dia Max	G Shear and Tensile Test Plate Hole Dia Min	G_1 Break Mandrel Test Restraining Plate Hole Dia Basic[1]	S End to Center Length Min[2]	T Shear and Tensile Test Plate Thickness Protruding Head Styles Min[3]	T_1 Shear and Tensile Test Plate Thickness Flush Head Styles Min[4]
3/32 0.0938	0.100	0.098	0.067	0.375	0.047	0.056
1/8 0.1250	0.132	0.130	0.086	0.500	0.062	0.093
5/32 0.1562	0.164	0.162	0.105	0.625	0.078	0.117
3/16 0.1875	0.196	0.194	0.125	0.750	0.094	0.141
1/4 0.2500	0.260	0.258	0.161	1.000	0.125	0.188

1. Values shown are equal to nominal mandrel diameter plus 0.010 in.
2. Values shown are equal to 4 times basic shank diameter of rivet.
3. Minimum values shown are equal to 0.50 times basic shank diameter of rivet. Maximum thickness shall not exceed 0.50 times maximum grip length specified for applicable rivet in Table 8B.
4. Minimum values shown are equal to 0.75 basic shank diameter of rivet. Maximum thickness shall not exceed 0.50 times maximum grip length specified for applicable rivet in Table 8B.
5. The protusion diameter of the mandrel (W diameter), including the point burr, shall be less than basic G_1 plate hole diameter.

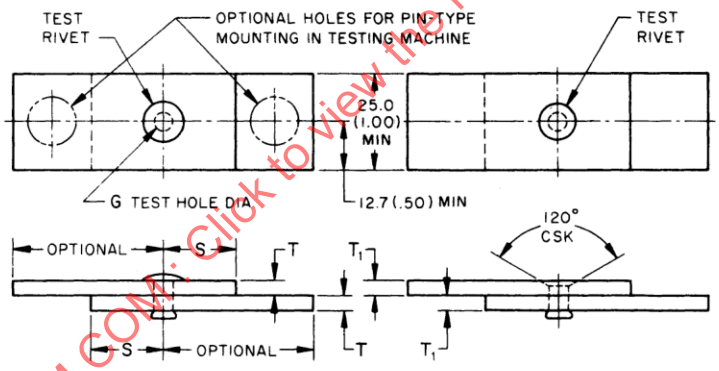

FIGURE 1—TEST SPECIMENS FOR SHEAR TESTING BREAK MANDREL BLIND RIVETS

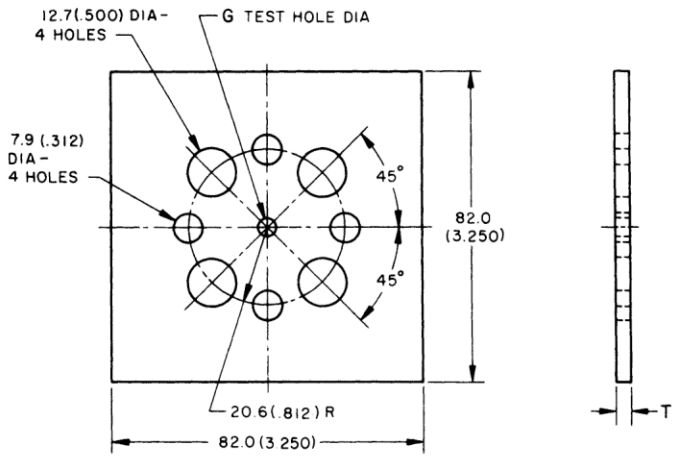

FIGURE 2A—DETAIL OF PLATE USED FOR TENSION TESTS

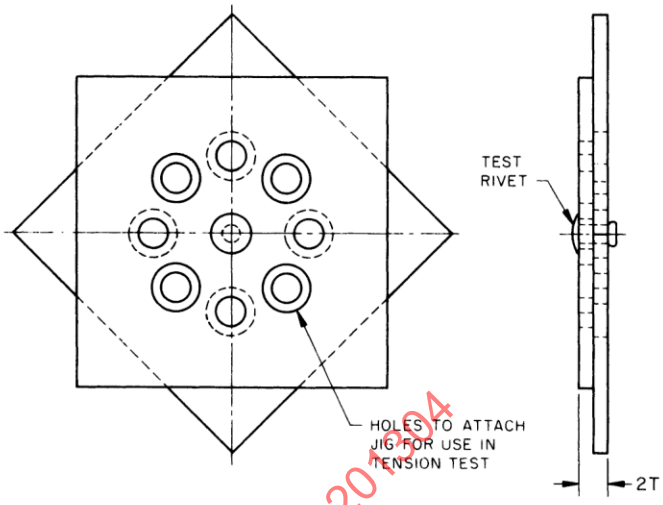

FIGURE 2B—ASSEMBLY OF TENSION TEST PLATES BEFORE ATTACHING TO JIG

FIGURE 2—TEST FIXTURES FOR TENSILE TESTING BREAK MANDREL BLIND RIVETS

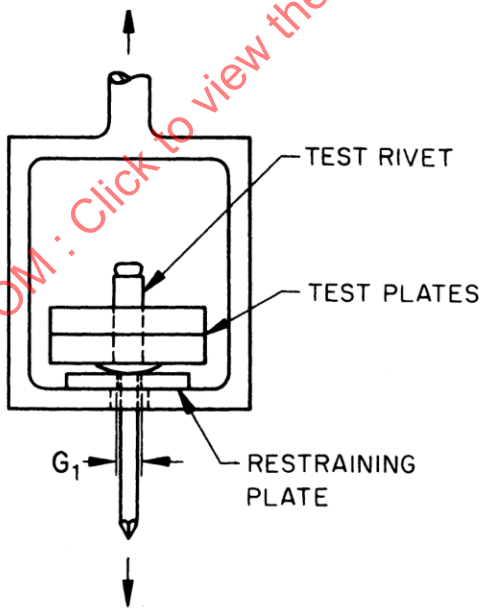

FIGURE 3—TEST FIXTURE FOR TESTING MANDREL BREAK LOADS AND BLIND HEAD FORMATION

6.2 Tensile Test—The test shall be comprised of separating two plates of a joint assembled with one blind rivet. the test rivet shall be installed in a test fixture, as depicted in Figure 2 and Tables 5A and 5B, or another comparable arrangement if an alternate test fixture is used, and the fixture placed between the compression heads of a testing machine. For referee purposes the test fixture shown in Figure 2 shall be used. Care shall be exercised to locate the fixture at the center of the piston when hydraulic testing machines are used. Load shall be applied to the joint at a speed of testing, as determined with a free running cross head, not less than 7.6 mm (0.3 in) nor greater than 13.0 mm (0.5 in)/min. Loading shall be continued to failure with failure occurring when the rivet body fractures or is pulled through one of the plates. The maximum load in pounds (Newtons) applied to the joint coincident with or prior to rivet failure shall be recorded as the ultimate strength of the rivet.

The test specimen shall be comprised of two plates of equal nominal thickness, aligned and assembled into a joint with the test rivet. The plates shall be of alloy steel, quenched, and tempered to a hardness of Rockwell C46-50.

The test rivet shall be set with a setting tool which is standard for that type of rivet and in accordance with the setting procedures recommended by the rivet manufacturer.

6.3 Mandrel Break Load and Blind Head Formation Test—The test rivet shall be installed in a test plate(s), and the assembly mounted in the fixture of a tensile testing machine. A suggested test fixture is illustrated in Figure 3. Load shall be applied axially to the mandrel. The load at which it is visually observed that the rivet body end is upset or otherwise deformed to form a head on the blind side, shall be recorded as the blind head formation load. (Note: The blind head formation load is a load applied to the mandrel sufficient to pull the mandrel head into the rivet body and initiate an expansion of the length of rivet body projecting beyond the blind side surface of the joined parts. When the formation of the blind side upset occurs there will normally be a period of tensile machine cross head travel with little or no increase in applied load.) Loading shall be continued until the mandrel breaks, and the maximum load occurring coincident with or prior to failure shall be recorded as the mandrel break load.

The test plate(s) may be of any material capable of supporting the test load without permanent deformation. Thickness of test plate(s) shall be as close as practical to the maximum of the grip range of the test rivet as specified in Tables 8A and 8B. The hole in the test plate(s) shall conform to the recommended hole size given for the rivet size in Tables 8A and 8B.

The restraining plate shall be alloy steel, quenched, and tempered to a hardness of Rockwell C42-46. The hole in the plate shall conform to G diameter as specified in Tables 5A and 5B.

***7. Inspection*—**Break mandrel blind rivets shall be inspected to determine conformance with dimensional, mechanical, and performance requirements. Inspection procedures shall be as specified by the purchaser on the purchase order or engineering drawings.

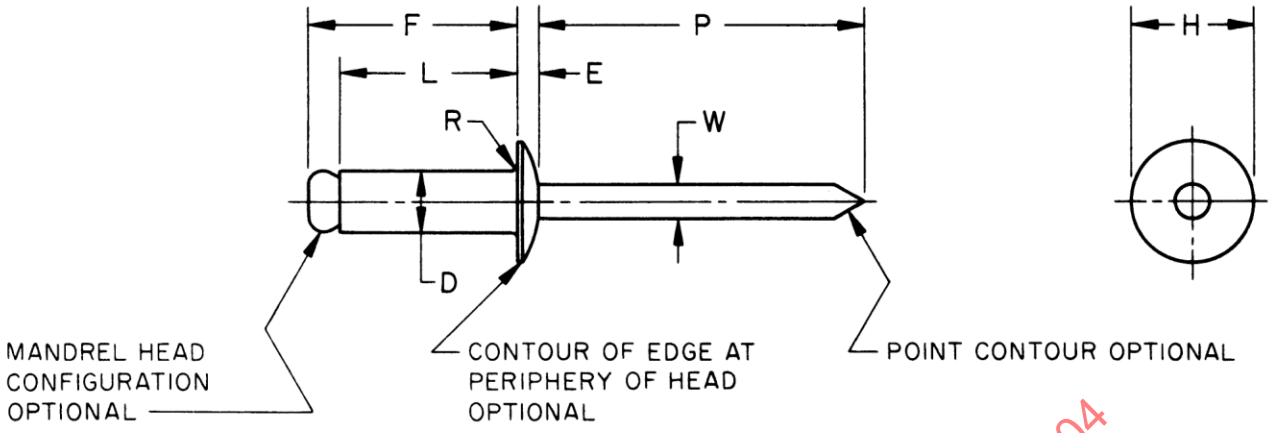

FIGURE 4—REGULAR AND LARGE PROTRUDING HEAD STYLE MANDREL BLIND RIVET DETAIL (SEE Tables 6A AND 6B)

TABLE 6A—DIMENSIONS OF REGULAR AND LARGE PROTRUDING HEAD STYLE BREAK MANDREL BLIND RIVETS, mm (SEE FIGURE 4)

Nominal Rivet Size or Basic Shank Dia	D Rivet Shank Dia Max	D Rivet Shank Dia Min	H Style 1–Regular Head Head Dia Max	H Style 1–Regular Head Head Dia Min	E Style 1–Regular Head Head Height Max	H Style 2–Large Head Head Dia Max	H Style 2–Large Head Head Dia Min	E Style 2–Large Head Head Height Max	R Fillet Radius[1] Max	W Mandrel Dia Nom	P Mandrel Protrusion Min	F Blind Side Protrusion[2] Max
2.4	2.44	2.29	5.03	4.52	0.81	7.44	6.83	1.02	0.4	1.45	25.0	L + 2.5
3.2	3.25	3.10	6.65	6.05	1.02	9.91	9.14	1.65	0.5	1.93	25.0	L + 3.0
4.0	4.04	3.89	8.33	7.52	1.27	12.40	11.38	1.90	0.5	2.41	27.0	L + 3.5
4.8	4.85	4.65	10.01	9.04	1.52	16.51	15.24	2.34	0.7	2.90	27.0	L + 4.0
6.3	6.48	6.25	13.33	12.07	2.03	19.81	18.29	2.72	0.8	3.84	31.0	L + 4.5

1. The junction of head and shank shall have a fillet with a max radius as shown. For Grade 40, 50, and 51 rivets, the max fillet radius for 4.8 mm rivets shall be 0.9 mm and for 6.3 mm rivets shall be 1.5 mm.
2. When computing the blind side protrusion (F), the max length of rivet (L) as given in Table 8A for the applicable grip shall be used. Minimum blind side clearance may be calculated by subtracting the actual grip (G), (that is, 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 4.0 mm rivet, a 10.8 mm length rivet would be used. Minimum blind side clearance necessary to permit proper rivet setting would be L + 3.5 mm - G, which is 10.8 mm + 3.5 mm – 5.0 mm, and equals 9.3 mm).

For application data see Table 8A.
Additional requirements given in General Specifications shall apply.

TABLE 6B—DIMENSIONS OF REGULAR AND LARGE PROTRUDING HEAD STYLE BREAK MANDREL BLIND RIVETS, in (SEE TABLE 4)

Nominal Rivet Size[1] or Basic Shank Dia		D Rivet Shank Dia Max	D Rivet Shank Dia Min	H Style 1–Regular Head Head Dia Max	H Style 1–Regular Head Head Dia Min	E Style 1–Regular Head Head Height Max	H Style 2–Large Head Head Dia Max	H Style 2–Large Head Head Dia Min	E Style 2–Large Head Head Height Max	R Fillet Radius[2] Max	W Mandrel Dia Nom	P Mandrel Protrusion Min	F Blind Side Protrusion[3] Max
3/32	0.0938	0.096	0.090	0.198	0.178	0.032	0.293	0.269	0.040	0.015	0.057	1.00	L + 0.100
1/8	0.1250	0.128	0.122	0.262	0.238	0.040	0.390	0.360	0.065	0.020	0.076	1.00	L + 0.120
5/32	0.1562	0.159	0.153	0.328	0.296	0.050	0.488	0.448	0.075	0.020	0.095	1.06	L + 0.140
3/16	0.1875	0.191	0.183	0.394	0.356	0.060	0.650	0.600	0.092	0.025	0.114	1.06	L + 0.160
1/4	0.2500	0.255	0.246	0.525	0.475	0.080	0.780	0.720	0.107	0.030	0.151	1.25	L + 0.180

1. Where specifying nominal size in decimals, zeros preceding decimal and in fourth decimal place shall be omitted.
2. The junction of head and shank shall have a fillet with a max radius as shown. For Grade 40, 50, and 51 rivets, the max fillet radius for 3/16 in rivets shall be 0.035 in and for 1/4 in rivets shall be 0.060 in.
3. When computing the blind side protrusion (F), the max length of rivet (L), as given in Table 8B for the applicable grip shall be used. Minimum blind side clearance may be calculated by subtracting the actual grip (G), (that is, total thickness of the material to be joined), from the specified blind side protrusion (F). (Example: To join two plates, each 0.100 in thick, with a 5/32 in rivet, a 0.425 length rivet would be used. Minimum blind side clearance necessary to permit proper rivet setting would be L + 0.140 in - G, which is 0.425 in + 0.140 in – 0.200 in, and equals 0.365 in).

For application data see Table 8B.
Additional requirements given in General Specifications shall apply.

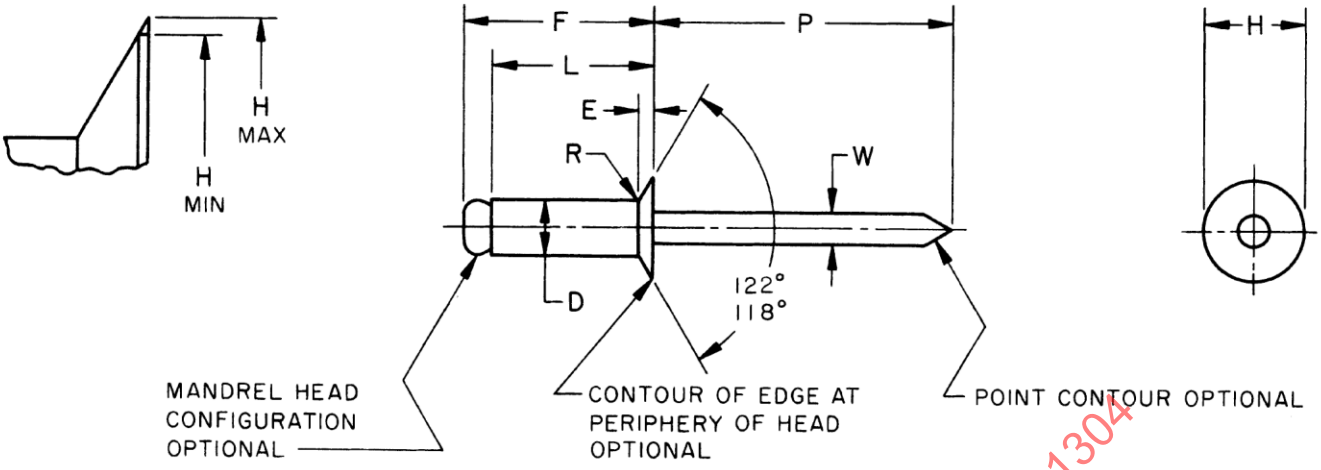

FIGURE 5—120 DEGREE COUNTERSUNK FLUSH HEAD STYLE BREAK MANDREL BLIND RIVET DETAIL (SEE Tables 7A AND 7B)

TABLE 7A—DIMENSIONS OF 120 DEG COUNTERSUNK FLUSH HEAD STYLE BREAK MANDREL BLIND RIVETS, mm (SEE FIGURE 5)

Nominal Rivet Size or Basic Shank Dia	D Rivet Shank Dia Max	D Rivet Shank Dia Min	H Head Dia[1] Max	H Head Dia[1] Min	E Head Height[2] Ref	R Fillet Radius Max	W Mandrel Dia Nom	P Mandrel Protrusion Min	F Blind Side Protrusion[3] Max
2.4	2.44	2.29	4.75	4.09	0.69	0.5	1.45	25.0	L + 2.5
3.2	3.25	3.10	5.92	5.26	0.79	0.7	1.93	25.0	L + 3.0
4.0	4.04	3.89	7.47	6.81	1.02	0.8	2.41	27.0	L + 3.5
4.8	4.85	4.65	9.17	8.51	1.27	0.9	2.90	27.0	L + 4.0

1. Max head diameter is calculated on nominal rivet diameter and nominal head angle extended to sharp corner. Min head diameter is absolute.
2. 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.
3. When computing the blind side protrusion (F), the max length of rivet (L), as given in Table 8A for the applicable grip shall be used. Minimum blind side clearance may be calculated by subtracting the actual grip (G), (that is, total thickness of the material to be joined), from the specified blind side protrusion (F). (Example: To join two plates, each 4.7 mm thick, with a 4.8 mm rivet, a 14.6 mm length rivet would be used. Minimum blind side clearance necessary to permit proper rivet setting would be L + 4.0 mm – G, which is 14.6 mm + 4.0 mm – 9.4 mm which equals 9.2 mm).

For application data see Table 8A.
Additional requirements given in General Specifications shall apply.