

ASME B18.7.1M-2007

[Revision of ANSI/ASME B18.7.1M-1984 (R2005)]

Metric General Purpose Semi-Tubular Rivets

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FOREWORD

ASME Standards Committee B18, Subcommittee 7, has met periodically since 1979 to arrive at a metric standard to serve as a companion to ANSI B18.7. This Standard covers only oval head semi-tubular rivets with straight holes. The Committee has declared its intent to expand the scope of the standard to include other head styles, tapered holes, full tubular rivets, and rivet caps as their use in metric dimensions become apparent. These other styles of rivets, although not included here, are available from manufacturers, and the dimensions in this Standard should be the basis for further development.

Because semi-tubular rivets are used in automatic assembly machines, the concentricity of the outside edge of the head to the rivet shank is an important functional attribute. On a low oval head rivet, the axis of the head is very difficult to find, and therefore the true head position method of measuring concentricity was not used in this Standard.

The previous edition was approved by the ballot of the B18 Main Committee on June 24, 1983. Following acceptance by ASME, this proposal was referred to the American National Standards Institute for designation as an American National Standard. This was granted on July 24, 1984 and last reaffirmed without change in 2005.

This edition was balloted and approved by the B18 Standards Committee and B18 Subcommittee 7 on December 28, 2006. The proposal was submitted to the American National Standards Institute (ANSI) and designated as an American National Standard on March 7, 2007.

ASME B18 COMMITTEE

Standardization of Bolts, Nuts, Rivets, Screws, Washers, and Similar Fasteners

(The following is the roster of the Committee at the time of approval of this Standard.)

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General. ASME Standards are developed and maintained with the intent to represent the consensus of concerned interests. As such, users of this Standard may interact with the Committee by requesting interpretations, proposing revisions, and attending Committee meetings. Correspondence should be addressed to:

Secretary, B18 Standards Committee
The American Society of Mechanical Engineers
Three Park Avenue
New York, NY 10016-5990

Proposing Revisions. Revisions are made periodically to the Standard to incorporate changes that appear necessary or desirable, as demonstrated by the experience gained from the application of the Standard. Approved revisions will be published periodically.

The Committee welcomes proposals for revisions to this Standard. Such proposals should be as specific as possible, citing the paragraph number(s), the proposed wording, and a detailed description of the reasons for the proposal, including any pertinent documentation.

Proposing a Case. Cases may be issued for the purpose of providing alternative rules when justified, to permit early implementation of an approved revision when the need is urgent, or to provide rules not covered by existing provisions. Cases are effective immediately upon ASME approval and shall be posted on the ASME Committee Web page.

Requests for Cases shall provide a Statement of Need and Background Information. The request should identify the standard, the paragraph, figure or table number(s), and be written as a Question and Reply in the same format as existing Cases. Requests for Cases should also indicate the applicable edition(s) of the standard to which the proposed Case applies.

Interpretations. Upon request, the B18 Standards Committee will render an interpretation of any requirement of the Standard. Interpretations can only be rendered in response to a written request sent to the Secretary of the B18 Standards Committee.

The request for an interpretation should be clear and unambiguous. It is further recommended that the inquirer submit his/her request in the following format:

Subject:	Cite the applicable paragraph number(s) and the topic of the inquiry.
Edition:	Cite the applicable edition of the Standard for which the interpretation is being requested.
Question:	Phrase the question as a request for an interpretation of a specific requirement suitable for general understanding and use, not as a request for an approval of a proprietary design or situation. The inquirer may also include any plans or drawings, which are necessary to explain the question; however, they should not contain proprietary names or information.

Requests that are not in this format may be rewritten in the appropriate format by the Committee prior to being answered, which may inadvertently change the intent of the original request.

ASME procedures provide for reconsideration of any interpretation when or if additional information that might affect an interpretation is available. Further, persons aggrieved by an interpretation may appeal to the cognizant ASME Committee or Subcommittee. ASME does not "approve," "certify," "rate," or "endorse" any item, construction, proprietary device, or activity.

Attending Committee Meetings. The B18 Standards Committee regularly holds meetings, which are open to the public. Persons wishing to attend any meeting should contact the Secretary of the B18 Standards Committee.

METRIC GENERAL PURPOSE SEMI-TUBULAR RIVETS

1 INTRODUCTORY NOTES

1.1 Scope

1.1.1 This Standard covers the general and dimensional data for oval head semi-tubular rivets for use in general purpose applications. The products described are suitable for joining metallic and nonmetallic materials or combinations thereof. Although these products are suitable for general purpose assembly, other special purpose types are available to satisfy particular requirements, and manufacturers should be consulted for special requirements.

1.1.2 The inclusion of dimensional data in this Standard is not intended to imply that all of the products described are stock production sizes. Consumers are requested to consult with suppliers concerning availability of products.

1.2 Types of Rivets

The rivets specified in this Standard include the following.

1.2.1 Semi-Tubular Rivets. Semi-tubular rivets are available in the head styles listed in section 2 and shall have straight holes normally produced by extruding or drilling.

1.2.2 (Reserved for other types.)

1.3 Comparison to ISO Standards

At this time, no ISO Standard for these tubular rivets exists. No work within ISO is expected for some time.

1.4 Options

Options, where specified, shall be at the discretion of the manufacturer unless otherwise agreed upon by the manufacturer and the purchaser.

1.5 Dimensions

(a) Unless otherwise stated, all dimensions in this Standard are in millimeters and apply before any coating. When plating or coating is specified, the finished product dimensions shall be as agreed upon by the supplier and purchaser.

(b) Symbols specifying geometric characteristics are in accordance with ASME Y14.5M.

1.6 Terminology

For definitions of terms relating to fasteners or component features thereof used in this Standard, refer to ASME B18.12.

1.7 Related Standards

Standards in this series for small solid rivets, large rivets, and other related products are published under separate cover.

1.8 References

The following is a list of publications referenced in this Standard. Unless otherwise specified, the referenced standard shall be the most recent issue at the time of order placement.

ASME B18.12, Glossary of Terms for Mechanical Fasteners

ASME B18.24, Part Identifying Number Code System Standard for B18 Fastener Products

ASME Y14.5M, Dimensioning and Tolerancing

Publisher: The American Society of Mechanical Engineers (ASME), Three Park Avenue, New York, NY 10016-5990; Order Department: 22 Law Drive, P.O. Box 2300, Fairfield, NJ 07007-2300

ASTM E 527, Standard Practice for Numbering Metals and Alloys (UNS)

Publisher: ASTM International (ASTM), 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA, 19428-2959

2 GENERAL DATA FOR SEMI-TUBULAR RIVETS

2.1 Heads

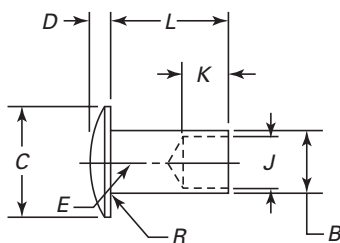
2.1.1 Because the heads of these rivets are not machined or trimmed, the circumference may be somewhat irregular and the edges may be rounded or flat.

2.1.2 The bearing surface of oval head rivets shall be perpendicular to the axis of the rivet shank within 2 deg.

2.1.3 The rivet head and the rivet shank shall be concentric within 11% of the nominal shank diameter on the basis of full indicator movement (FIM).

2.2 Underhead Fillets

Oval head rivets shall be furnished with a fillet of not less than 0.1 mm under the head; however, the radius of the fillet shall not exceed the values specified in Table 1.

Table 1 Dimensions of Oval Head Semi-Tubular Rivets**Type S**

Nominal Length	Body Size, B	Head Diameter, C	Head Thickness, D	Head Radius Reference, E	Maximum Underhead Radius, R	Hole Diameter, J	Hole Depth, K	Work Hole Diameter
1.6	1.56/1.64	2.75/3.01	0.43/0.53	3.09	0.15	1.15/1.25	1.20 ± 0.15	1.71
2.0	1.95/2.05	3.47/3.73	0.52/0.68	3.83	0.20	1.45/1.55	1.50 ± 0.15	2.14
2.5	2.45/2.55	4.37/4.63	0.67/0.83	4.84	0.25	1.83/1.93	1.88 ± 0.20	2.67
3.0	2.94/3.06	5.27/5.53	0.80/1.00	5.78	0.32	2.20/2.30	2.25 ± 0.20	3.21
3.5	3.44/3.56	6.17/6.43	0.92/1.18	6.80	0.38	2.58/2.68	2.63 ± 0.20	3.75
4.0	3.93/4.07	7.07/7.33	1.07/1.33	7.81	0.43	2.95/3.05	3.00 ± 0.20	4.28
5.0	4.92/5.08	8.85/9.15	1.37/1.63	9.74	0.53	3.70/3.80	3.75 ± 0.20	5.35
6.0	5.91/6.09	10.62/10.98	1.62/1.98	11.72	0.65	4.43/4.57	4.50 ± 0.20	6.42
7.0	6.90/7.10	12.42/12.78	1.92/2.28	13.68	0.76	5.18/5.32	5.25 ± 0.38	7.49
8.0	7.90/8.10	14.20/14.60	2.22/2.58	15.71	0.88	5.93/6.07	6.00 ± 0.38	8.56

GENERAL NOTE: The dimensions shown in the above illustration relate to the respective values shown in Tables 1 and 2.

2.3 Length

2.3.1 Measurement. The length of oval head rivets shall be measured parallel to the axis of rivet from the underside of the head to the extreme end of the rivet.

2.3.2 Length Increments. The minimum lengths and increments applicable to longer lengths shall be as specified in Table 2.

2.3.3 Tolerance on Length. The tolerance on length of rivets shall be as specified in Table 2.

2.4 Hole Depth

2.4.1 Hole depth shall be measured parallel to the axis of the rivet from the extreme end of the rivet to the intersection of the diameter of the hole with contour at bottom of hole. The hole depth to extreme point on bottom contour of hole shall not be greater than the actual shank length of the rivet.

2.4.2 The tolerance on hole depth shall be as specified in Table 1.

2.5 Material

Semi-tubular rivets are made from low carbon steel (0.1% carbon or less), commercial yellow brass, copper, aluminum, stainless steel, or other materials as agreed to by the manufacturer and the purchaser.

The following raw materials are in common use:

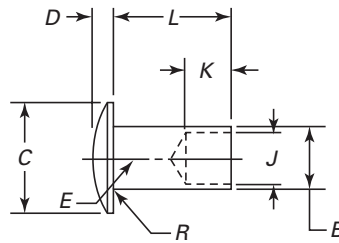
Material	Type
Aluminum (Aluminum Association)	5052-H32 (UNS A95052) 5056-H32 (UNS A95056) 1100-H14 (UNS A91100) 2117-H15 (UNS A92117) [Note (1)]
Brass	CDA260 (UNS C26000) CDA270 (UNS C27000)
Copper	CDA102 (UNS C10200) CDA110 (UNS C11000)
Nickel-copper	AMS 7233 (UNS N04400)
Stainless steel (AISI)	Type 430 (UNS 43020) Series 300 (302, 305) (UNS S30200, S30500)
Steel (AISI)	C1006 (UNS G10060) C1008 (UNS G10080)

NOTE:

(1) Rivets made from Type 2117 aluminum are heat treated and supplied in the T-4 condition.

2.6 Finish

Unless otherwise specified, rivets shall be supplied with a natural (as-processed) finish, unplated, or uncoated. Rivets may be furnished plain (bare metal) or with a protective coating (electrodeposited plating and/or chemical conversion coating) as specified by the user. All rivets shall be provided with a supplementary lubricant if necessary to meet the stated performance requirements without galling. The lubricant shall be

Table 2 Length Increments and Length Tolerances for Semi-Tubular Rivets**Type S**

Nominal Size	Length Increment	Minimum Nominal Rivet Length, L	Tolerance on Nominal Lengths		
			Up to and Including 4 Times Shank Diameter	Over 4 Times Shank Diameter and Up to and Including 8 Times Shank Diameter	Over 8 Times Shank Diameter
1.6	0.5	2.00	± 0.18	± 0.20	± 0.25
2.0	0.5	2.00	± 0.18	± 0.20	± 0.25
2.5	0.5	2.00	± 0.18	± 0.20	± 0.25
3.0	0.5	2.50	± 0.18	± 0.25	± 0.38
3.5	1.0	3.00	± 0.25	± 0.30	± 0.38
4.0	1.0	3.00	± 0.25	± 0.30	± 0.38
5.0	1.0	4.00	± 0.25	± 0.30	± 0.38
6.0	2.0	5.00	± 0.25	± 0.38	± 0.50
7.0	2.0	6.00	± 0.25	± 0.38	± 0.50
8.0	2.0	6.00	± 0.25	± 0.38	± 0.50

GENERAL NOTE: The dimensions shown in the above illustration relate to the respective values shown in Tables 1 and 2.

clean and dry to the touch, shall not be irritating to normal skin, nor emit an unpleasant odor during rivet assembly. The performance of rivets that are furnished with a protective coating shall not deteriorate when the rivets are stored indoors for a period of 6 months. In cases where rivets are given a protective coating or are cleaned following delivery to the purchaser, the rivet producer shall not be held responsible for failure of the rivet to meet dimensional, mechanical, or performance requirements traceable to plating, coating, or cleaning practice. Lubrication (e.g., waxing) may improve the setting of the rivet.

2.7 Workmanship

The rivets shall be free from all burrs, seams, or other imperfections that may impair their usability. Rivets are

not machined or trimmed, and unevenness of the tubular end shall not be such that the usability of the rivet shall be impaired, when clinched with properly alligned, appropriate setting tools.

NOTE: Nickel and chromium finishes are very hard and, therefore, will have a tendency to flake off the end of the rivet when it is set by the user.

2.8 Designation

2.8.1 Semi-tubular rivets shall be designated by the following data in the sequence shown: designation of standard; nominal size; length (in millimeters); product name; material; and protective finish, if required.

EXAMPLE: ASME B18.7.1M, 3 mm $\times$ 4 mm Semi-Tubular Rivet, Oval Head, Steel, Zinc Plated

2.8.2 For a recommended part identifying number (PIN) for rivets, see ASME B18.24.

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