



Standard Specification for Clamps, Utility, Laboratory, and Holders, Buret and Clamp¹

This standard is issued under the fixed designation E 784; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification covers clamps and clamp holders for use in securing laboratory apparatus to support stands.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

2. Referenced Documents

2.1 ASTM Standards:

- A 48 Specification for Gray Iron Castings²
- A 276 Specification for Stainless and Heat Resisting Steel Bars and Shapes³
- B 30 Specification for Copper-Base Alloys in Ingot Form⁴
- B 85 Specification for Aluminum-Alloy Die Castings⁵
- B 86 Specification for Zinc-Alloy Die Castings⁵
- B 139 Specification for Phosphor Bronze Rod, Bar, and Shapes⁴
- B 247 Specification for Aluminum and Aluminum-Alloy Die Forgings, Hand Forgings, and Rolled Ring Forgings⁵

2.2 Federal Specifications:⁶

- UU-P-553 Paper, Wrapping, Tissue
- PPP-B-566 Boxes, Folding, Paper
- PPP-B-601 Box, Wood, Cleated-Plywood
- PPP-B-621 Box, Wood, Nailed and Lock Corner
- PPP-B-636 Box, Shipping, Fiberboard
- PPP-B-676 Boxes, Setup
- PPP-F-320 Fiberboard, Corrugated and Solid, Sheet Stock (Container Grade) and Cut Shapes

2.3 Federal Standard:⁶

- Fed. Std. No. 123 Marking for Shipment (Civil Agencies)

2.4 Military Specifications:⁶

- MIL-P-116 Methods of Preservation-Packaging
- MIL-STD-1188 Commercial Packaging of Supplies and Equipment

2.5 Military Standard:⁶

- MIL-STD-105 Sampling Procedures and Tables for Inspection by Attributes

3. Classification

3.1 *Types, Sizes, and Classes*—The clamp and clamp holders covered by this specification shall be of the types, classes, and sizes as specified in 3.2-3.6 (see S3.1).

3.2 Type I—Clamp holders:

3.2.1 *Class 1*—Fixed jaw.

3.2.2 *Class 2*—Swivel jaw.

3.2.3 *Class 3*—All position jaw.

3.3 Type II—Two-pronged clamps:

3.3.1 *Class 1*—Fixed, with holder.

3.3.1.1 *Size 1*—Small clamp expands to 38 mm (1½ in.).

3.3.1.2 *Size 2*—Large clamp expands to 64 mm (2½ in.).

3.3.2 *Class 2*—Swivel with holder.

3.3.2.1 *Size 1*—Small clamp expands to 38 mm (1½ in.).

3.3.2.2 *Size 2*—Large clamp expands to 64 mm (2½ in.).

3.3.3 *Class 3*—Swivel, duplex.

3.4 Type III—Extension clamps:

3.4.1 *Class 1*—Two-pronged.

3.4.1.1 *Size 1*—Small clamp expands to 38 mm (1½ in.).

3.4.1.2 *Size 2*—Large clamp expands to 64 mm (2½ in.).

3.4.2 *Class 2*—Three-pronged.

3.4.2.1 *Size 1*—Small clamp expands to 25 mm (1 in.).

3.4.2.2 *Size 2*—Large clamp expands to 98 mm (3⅞ in.).

3.4.3 *Class 3*—Universal.

3.4.3.1 *Size 1*—Small clamp expands to 51 mm (2 in.).

3.4.3.2 *Size 2*—Large clamp expands to 76 mm (3 in.).

3.5 *Type IV*—Thermometer clamp, swivel with holder.

3.6 *Type V*—Clamp, double buret holder.

4. Materials

4.1 *Base Metal*—Clamps and clamp holders shall be manufactured from aluminum-base alloy, zinc-base alloy, or cast iron. Aluminum base alloy metal shall conform to alloy number A380 of Specification B 85. Zinc-base alloy shall conform to AG 40A of Specification B 86. Cast iron shall conform to Specification A 48, Class 20.

4.2 *Metal Fittings*—Fittings such as screws, nuts, and rivets for clamps and clamp holders shall be forged aluminum or chemical-resistant alloy for either aluminum-base alloy or

¹ This specification is under the jurisdiction of ASTM Committee E-41 on Laboratory Apparatus and is the direct responsibility of Subcommittee E41.01 on Apparatus.

Current edition approved Feb. 24, 1989. Published April 1989. Originally published as E 784 – 81. Last previous edition E 784 – 82.

² *Annual Book of ASTM Standards*, Vol 01.02.

³ *Annual Book of ASTM Standards*, Vol 01.05.

⁴ *Annual Book of ASTM Standards*, Vol 02.01.

⁵ *Annual Book of ASTM Standards*, Vol 02.02.

⁶ Available from Naval Publications and Forms Center, 5801 Tabor Ave., Philadelphia, Pa. 19120.

zinc-base alloy clamps and clamp holders. In addition zinc-base alloy clamps and clamp holders may have copper alloy fittings. Forged aluminum fittings shall conform in composition to 2014 of Specification B 247. Copper alloy fittings shall conform to composition to Specification B 30.

for Federal Services, Unified National Coarse Thread Series.⁷

5.1.1 Metric threads can be used if specified.

5.2 *Dimensions*—The dimensions and tolerances shall be as shown in Table 1.

5.3 *Construction*—The illustrations shown in Figs. 1-5 are

TABLE 1 Dimensions and Tolerances for Clamps and Clamp Holders

Type	Classification		Maximum diameter of opening, mm (in.)		Overall length, mm (in.)	Tolerance, ±mm (± in.)	Type of Jaw	
	Class	Size	Clamp	Holder			Clamp	Holder
I	1	...	...	1 ¹ / ₁₆ (17)	127 (5)	6 (1/4)	...	V
I	2	...	...	1 ¹ / ₁₆	152 (6)	6 (1/4)	...	V
I	3	...	...	1 ¹ / ₁₆	127 (5)	3 (1/8)	...	V
II	1	1	38.1 (1 ¹ / ₂)	1 ¹ / ₁₆	178 (7)	6 (1/4)	round	V
II	1	2	63.5 (2 ¹ / ₂)	1 ¹ / ₁₆	178 (7)	6 (1/4)	round	V
II	2	1	38.1 (1 ¹ / ₂)	1 ¹ / ₁₆	178 (7)	6 (1/4)	round	V
II	2	2	63.5 (2 ¹ / ₂)	1 ¹ / ₁₆	191 (7 ¹ / ₂)	6 (1/4)	round	V
II	3	...	38.1 and 63.5 (1 ¹ / ₂ and 2 ¹ / ₂) ^A	...	216 (8 ¹ / ₂)	6 (1/4)	round	...
III	1	1	38.1 (1 ¹ / ₂)	...	203 (8)	6 (1/4)	round	...
III	1	2	63.5 (2 ¹ / ₂)	...	228 (9)	6 (1/4)	round	...
III	2	1	25.4 (1)	...	152 (6)	6 (1/4)	prong	...
III	2	2	(3 ³ / ₈)	...	267 (10 ¹ / ₂)	13 (1/2)	prong	...
III	3	1	50.8 (2)	...	203 (8)	6 (1/4)	prong	...
III	3	2	76.2 (3)	...	242 (9 ¹ / ₂)	6 (1/4)	prong	...
IV	...	...	3 (1/8) to 13 (1/2)	1 ¹ / ₁₆	152 (6)	6 (1/4)	clip	V
V	...	...	^B	1 ¹ / ₁₆	254 (10)	6 (1/4)	finger	V

^A Clamp on each end, one small and one large sized.

^B Clamp shall be capable of holding micro to 100-mL size burets, 5 to 20 mm in diameter.

4.3 *Springs*—Component springs of clamps shall be phosphor bronze or corrosion-resistant steel. Phosphor bronze shall conform to Composition C51000 of Specification B 139. Corrosion-resistant steel shall conform to Class 202 or 302 of Specification A 276.

4.4 *Sleeves*—Component sleeves of clamps may be rubber, plastic, fiber glass, non-hazardous minerals, or replaceable plastic. Unless otherwise specified by the procuring agency, rubber sleeves shall be supplied with clamps (see S2.1).

4.4.1 *Rubber*—Rubber for sleeves shall conform to Type R, class optional of MIL-STD-147.

4.4.2 *Plastic*—When plastic sleeves are specified, they shall be bonded firmly to the clamp jaw. The plastic sleeve shall be formed by hot dipping the clamp jaw in a vinyl plastisol conforming to Type II of MIL-P-20689.

4.4.3 *Mineral*—When mineral sleeves are specified, they shall be nonraveling and woven from high-quality mineral yarn.

4.4.4 *Fiber Glass*—When fiber glass sleeves are specified, they shall be nonraveling and woven.

4.4.5 *Replaceable Plastic*—When replaceable plastic sleeves are specified, they shall be durable enough not to break down in sand blasting, shot blasting, painting or coating operations. Application should be quick and the resulting fit be snug and conforming.

5. Dimensions, Mass, and Permissible Variations

5.1 *Fitting Threads*—Thumbscrews, wingnuts, and holders shall be threaded in accordance with Screw Thread Standards

for the convenience of identification and shall not preclude clamps and clamp holders otherwise in accordance with this specification.

5.3.1 *Type I*—Class 1 clamp holders shall be of one-piece construction, consisting of 2 V-grooved areas at right angles to each other. Class 2 clamp holders shall consist of 2 separate V-grooved sections freely movable through an angle of 360° in parallel planes and position fixed by means of a set screw. Class 3 clamp holders shall consist of 2 V-grooved areas connected to each other by a double plate joint which keeps the V-grooved areas in planes permanently set at 90° to each other. The plate joints have friction disks which allow each V-grooved area full movement through an angle of 360° within each plane. The V-grooved areas of each class are fitted with thumbscrews for attachment to support rods or anchoring clamp shafts. All clamp holders shall be capable of direct attachment to rods up to 13 mm (1/2 in.) in diameter without the necessity of passing the clamp holders over the ends of the rods. All clamp holders shall be capable of attachment to rods up to 17 mm (1¹/₁₆ in.) in diameter by passing the clamp holder over the ends of the rods.

5.3.2 *Type II*—Class 1 and Class 2 two-pronged clamps shall consist of a V-grooved holder fitted with thumbscrews for attachment to support rods and a spring type clamp. The clamp shall have two jaws that spread under spring tension and shall be adjustable to the maximum opening shown in Table 1 by means of a single screw and wingnut. Class 1 two-pronged clamps shall be of one-piece construction. Class 2 two-pronged

⁷ NIST Handbook 100, National Bureau of Standards, is sold by the National Technical Information Service, Port Royal Road, Springfield, Va. 21161.



Class 1



Class 2



Class 3

FIG. 1 Type I—Clamp Holders



Class 1



Class 2



Class 3

FIG. 2 Type II—Two-Pronged Clamps

clamps shall be of two-piece construction capable of being extended approximately 25 mm (1 in.). The clamp section shall be adjustable through 360° and position-fixed by means of a thumbscrew or locknut on the extension shaft. Class 3 two-pronged clamps shall consist of 2 two-pronged clamps connected by means of a threaded shaft capable of being extended approximately 25 mm (1 in.), adjustable through 360°, and position-fixed by means of a locknut on the extension shaft.

5.3.3 *Type III*—Extension clamps shall consist of a spring-type clamp fixed to an extension arm for insertion and positioning in a Type I clamp holder. Class 1 extension clamp shall have a two-pronged jaw that spreads under spring tension and be adjustable to the maximum opening shown in Table 1 by means of a single screw and wingnut. Class 2 extension clamp shall have a two-pronged jaw and a one-pronged jaw,