



Designation: E784 – 89 (Reapproved 2022)

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

This standard is issued under the fixed designation E784; 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.

1.3 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*²

- A48/A48M Specification for Gray Iron Castings
 - A276 Specification for Stainless Steel Bars and Shapes
 - B30 Specification for Copper Alloys in Ingot and Other Remelt Forms
 - B85 Specification for Aluminum-Alloy Die Castings
 - B86 Specification for Zinc and Zinc-Aluminum (ZA) Alloy Foundry and Die Castings
 - B139/B139M Specification for Phosphor Bronze Rod, Bar, and Shapes
 - B247 Specification for Aluminum and Aluminum-Alloy Die Forgings, Hand Forgings, and Rolled Ring Forgings
- 2.2 *Federal Specifications:*³
- 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

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

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from Naval Publications and Forms Center, 5801 Tabor Ave., Philadelphia, PA 19120.

PPP-B-676 Boxes, Setup

PPP-F-320 Fiberboard, Corrugated and Solid, Sheet Stock (Container Grade) and Cut Shapes

2.3 *Federal Standard:*³

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

2.4 *Military Specifications:*³

MIL-P-116 Methods of Preservation-Packaging

MIL-STD-1188 Commercial Packaging of Supplies and Equipment

2.5 *Military Standard:*³

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 (3¾ 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.



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	...	...	<i>B</i>	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. 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 B85. Zinc-base alloy shall conform to AG 40A of Specification B86. Cast iron shall conform to Specification A48/A48M, 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 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 B247. Copper alloy fittings shall conform to composition to Specification B30.

4.3 *Springs*—Component springs of clamps shall be phosphor bronze or corrosion-resistant steel. Phosphor bronze shall conform to Composition C51000 of Specification B139/B139M. Corrosion-resistant steel shall conform to Class 202 or 302 of Specification A276.

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 Federal Services, Unified National Coarse Thread Series.⁴

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 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 two V-grooved areas at right angles to each other. Class 2 clamp holders shall consist of two 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 two 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

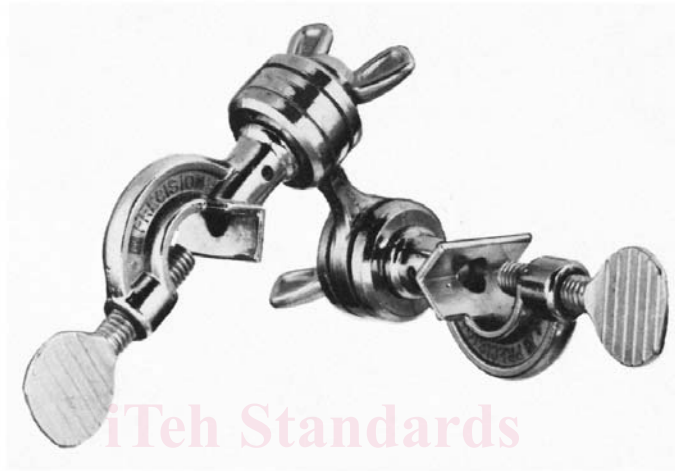
⁴ NIST Handbook 100, National Bureau of Standards, is available from the National Technical Information Service, Port Royal Road, Springfield, VA 21161.



Class 1



Class 2



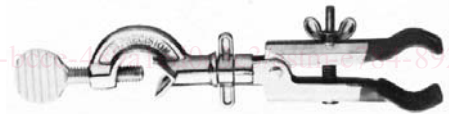
Class 3

iTeh Standards
(<https://standards.itih.ai>)
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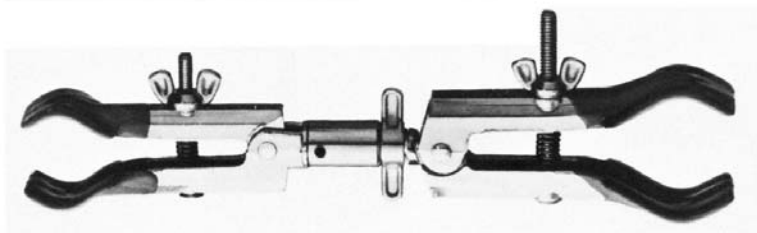
FIG. 1 Type I—Clamp Holders



Class 1



Class 2



Class 3

FIG. 2 Type II—Two-Pronged Clamps

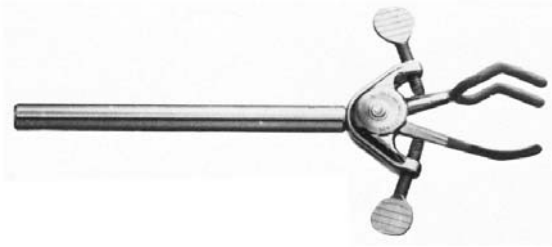
rods. All clamp holders shall be capable of attachment to rods up to 17 mm ($1\frac{1}{16}$ in.) in diameter by passing the clamp holder over the ends of the rods.

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 clamps shall be of two-piece construction capable of being extended approximately 25 mm (1 in.). The clamp section shall



Class 1



Class 2

FIG. 3 Type III—Extension Clamps

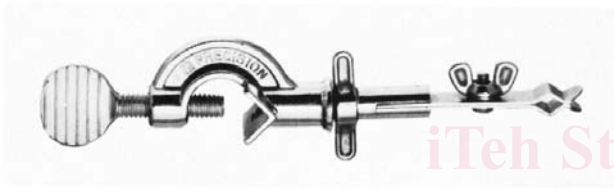


FIG. 4 Type IV—Thermometer Clamp

clamp shall have a two-pronged jaw and a one-pronged jaw, each independently adjusted by means of a separate thumb-screw. The one-pronged jaw shall be so located that it is equidistant from both prongs of the two-pronged jaw. Class 3 extension clamp shall be three-pronged (of similar construction to Class 2) or four-pronged (two two-pronged jaws, one jaw being smaller than the other so that the smaller jaw passes between the prongs of the larger jaw) fitted to the extension arms by means of a thread swivel and wingnut for positioning the clamp at any angle.

5.3.4 *Type IV*—Thermometer clamps shall consist of a V-grooved holder and a spring clip having a wingnut for tightening the thermometer in the clip. The holder and clip shall be connected by means of a threaded shaft capable of being extended approximately 25 mm (1 in.), adjustable through 350°, and position-fixed by means of a locknut on the extension shaft.

5.3.5 *Type V*—Clamps, double buret holder shall be constructed of a one-piece H-frame with the vertical arms curved outward. The ends of each arm shall have a suitable curved finger at right angles to the frame. Two spring-actuated gripping arms, each with a suitable curved finger at right angle to the arm, shall be attached to each side of H-frame and aligned with the curved frame arms to form double clamps for supporting two burets ranging in diameter from 5 to 20 mm. Burets shall be firmly gripped at two points by the clamps thus formed without sideslipping or obscuring any of the buret graduations. Insertion, adjustment, and removal of burets shall be accomplished by applying pressure on the spring-actuated arms; each side of the buret holder will operate separately. The buret holder shall be fitted with a setscrew, centrally located, for fastening the holder to the support rod.

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

6. Workmanship

6.1 All clamp and clamp holders shall be free of imperfections that affect their serviceability. All parts shall be constructed of suitable gauge material to prevent deformation when used extensively in the laboratory. Edges and corners shall be free of burrs and fins.

7. Keywords

7.1 clamps; holders; laboratory; utility