Designation: E784 – 89 (Reapproved 2017)

Standard Specification for Clamps, Utility, Laboratory, and Holders, Buret and Clamp[1]

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.

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 Form
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
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 (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 B85. Zinc-base alloy shall conform to AG 40A of Specification B86. Cast iron shall conform to Specification A48/A48M, Class 20.

[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.

TABLE 1 Dimensions and Tolerances for Clamps and Clamp Holders

Classification			Maximum diameter of opening, mm (in.)		Overall length, mm (in.)	Tolerance, ±mm (± in.)	Type of Jaw	
Type	Class	Size	Clamp	Holder			Clamp	Holder
I	1	...	...	11⁄16 (17)	127 (5)	6 (¼)	...	V
I	2	...	...	11⁄16	152 (6)	6 (¼)	...	V
I	3	...	...	11⁄16	127 (5)	3 (⅛)	...	V
II	1	1	38.1 (1½)	11⁄16	178 (7)	6 (¼)	round	V
II	1	2	63.5 (2½)	11⁄16	178 (7)	6 (¼)	round	V
II	2	1	38.1 (1½)	11⁄16	178 (7)	6 (¼)	round	V
II	2	2	63.5 (2½)	11⁄16	191 (7½)	6 (¼)	round	V
II	3	...	38.1 and 63.5 (1½ and 2½)[A]	...	216 (8½)	6 (¼)	round	...
III	1	1	38.1 (1½)	...	203 (8)	6 (¼)	round	...
III	1	2	63.5 (2½)	...	228 (9)	6 (¼)	round	...
III	2	1	25.4 (1)	...	152 (6)	6 (¼)	prong	...
III	2	2	(3⅞)	...	267 (10½)	13 (½)	prong	...
III	3	1	50.8 (2)	...	203 (8)	6 (¼)	prong	...
III	3	2	76.2 (3)	...	242 (9½)	6 (¼)	prong	...
IV	...	...	3 (⅛) to 13 (½)	11⁄16	152 (6)	6 (¼)	clip	V
V	...	...	[B]	11⁄16	254 (10)	6 (¼)	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.

4.2 *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.

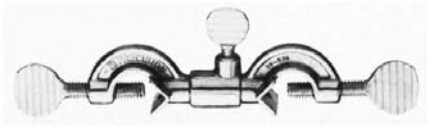
5.3 *Construction*—The illustrations shown in Figs. 1-5 are for the convenience of identification and shall not preclude clamps and clamp holders otherwise in accordance with this specification.

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 (½ 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

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

Class 1

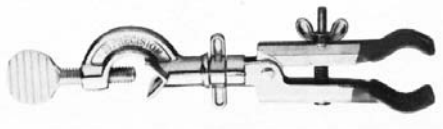


Class 2

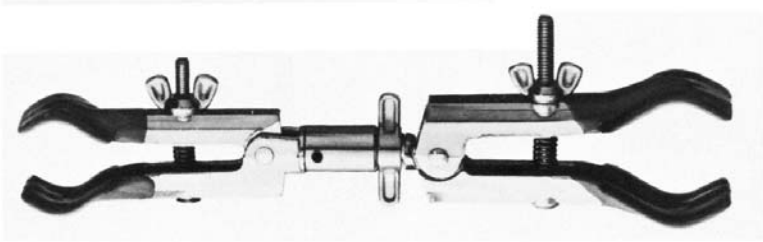
Class 3

FIG. 1 Type I—Clamp Holders

Class 1



Class 2

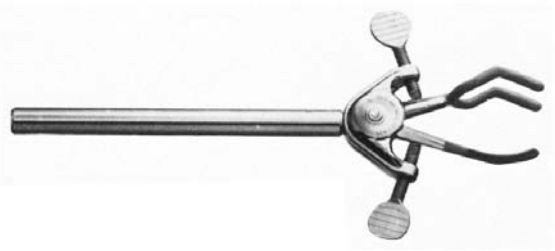


Class 3

FIG. 2 Type II—Two-Pronged Clamps

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 be adjustable through 360° and position-fixed by means of a

Class 1



Class 2

FIG. 3 Type III—Extension Clamps

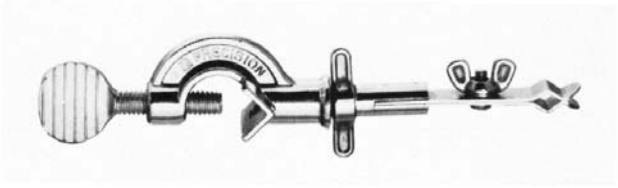


FIG. 4 Type IV—Thermometer Clamp

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, each independently adjusted by means of a separate thumbscrew. 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, adjust-ment, 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.

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

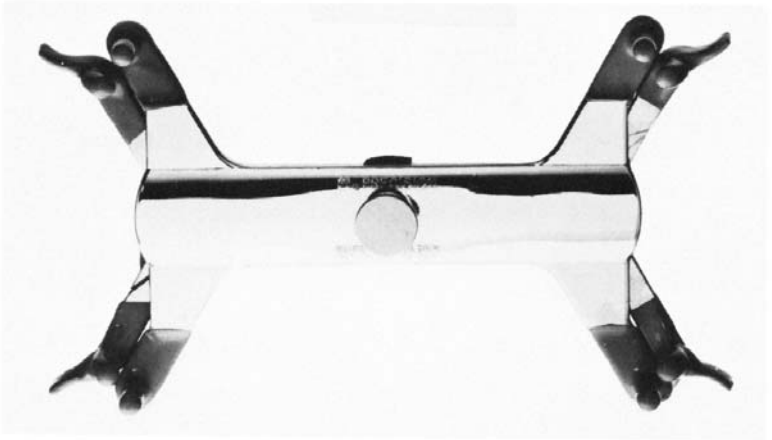


FIG. 5 Type V—Clamp, Double Buret Holder

SUPPLEMENTARY REQUIREMENTS

The following supplementary requirements are binding when this specification is used by the Department of Defense and the Federal Government for the procurement of clamps.

S1. Sampling

S1.1 Sampling shall be conducted in accordance with MIL-STD-105.

S2. Ordering Information

S2.1 *Procurement documents should specify the following*:

S2.1.1 Title, number, and date of this ASTM specification,

S2.1.2 Level of packaging and packing required,

S2.1.3 Type, class, and size required,

S2.1.4 If clamps desired with sleeves other than rubber, and

S2.1.5 Number of unit packages per intermediate package and number of clamps or clamp holders per pack required.

S2.2 *Supplier's Responsibility*—The supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may use his own or any other inspection facilities and services acceptable to the government. Inspection records of the examination and tests shall be kept complete and available to the government as specified in the contract or order. The government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to ensure that supplies and services conform to prescribed requirements.

S3. Lotting and Sampling

S3.1 A lot shall consist of those clamp and clamp holders of the same type, same class, and same size made by one manufacturer and submitted for delivery at one time.

S3.2 Sampling shall be conducted in accordance with S1.1.

S4. Inspection

S4.1 *Examination*—Samples of clamps or clamp holders and Level A and examination of packaging for delivery requirements shall be examined in accordance with the classification of defects and with MIL-STD-105.

S4.2 Classification of defects shall be in accordance with Table S4.1 and Table S4.2.

S5. Rejection Criteria

S5.1 The sample must pass all the physical and chemical requirements when tested as specified to be accepted. Any test failure will result in the rejection of the lot.

S6. Certification

S6.1 Compliance with all stipulations of this specification regarding fill, closure, marking, and other requirements not involving tests will be certified by the supplier.

TABLE S4.1 Classification of Defects of Clamps or Clamp Holders

Categories	Defects
Critical	none defined
Major	AQL 4.0 % defective
101	dimensions not as specified
102	fitting threads not as specified
103	design not as specified
104	defective (burrs, fins, or cracks)
105	marking incorrect, illegible, or incomplete

TABLE S4.2 Classification of Defects of Level A and Commercial Packaging

Categories	Defects
Critical	none defined
Major	AQL 2.5 % defective
101	unit, intermediate, or shipping container not as specified
102	number of clamps or holders per intermediate or shipping container not as specified or indicated
103	unlike clamps or holders packaged per intermediate or shipping container
104	closure of unit, intermediate, or shipping container not as specified
105	unit, intermediate, or shipping container damaged
106	cushioning material not as specified
107	marking of unit, intermediate, or shipping container illegible, incorrect, or incomplete

S7. Marking

S7.1 *Civil Agencies*—In addition to any special marking required by the contract or order, unit and intermediate packages and exterior shipping containers shall be marked in accordance with Fed. Std. No. 123.

S7.2 *Military Agencies*—In addition to any special marking required by the contract or order, unit and intermediate packages and exterior shipping containers shall be marked in accordance with MIL-STD-129. All containers shall bear the name of the item, national stock number, and quantity contained therein.

S7.3 *Commercial Marking*—In addition to any special marking required by the contract or order, unit and intermediate packages and exterior shipping containers shall be marked in accordance with MIL-STD-1188