

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
SPECIFICATION
CLAMP, SHUTOFF, FIRE HOSE

1. SCOPE.

1.1. Scope. The shutoff clamp described in this specification is used to temporarily shutoff the flow of water through 1 inch 11-1/2 NPSH and 1-1/2 inch 9 NH cotton synthetic fire hose. The clamp is a hand tool that applies the principles of mechanical advantage effectively, allowing one person to shut off hose under a water pressure of up to 300 psig (2068 kPag).

2. APPLICABLE DOCUMENTS.

2.1. Government Documents. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those in effect on the date of the invitation for bids or request for proposals (see 6.2).

USDA Forest Service Standard

5100-190 - Threads, Gaskets, Rocker Lugs, Connections and Fittings, Fire Hose

USDA Forest Service Specification

5100-186 - Fire Hose, Cotton-Synthetic, Lined, Woven Jacket, 1 inch and 1-1/2 inch

Copies of Forest Service Specifications and Standards are available from the USDA Forest Service San Dimas Technology and Development Center, 444 East Bonita Avenue, San Dimas, CA 91773-3198.

2.2. Non-Government Publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those in effect on the date of the invitation for bids or request for proposals.

Beneficial comments, recommendations, additions, deletions and any pertinent data that may be used in improving this document should be addressed to: USDA Forest Service, San Dimas Technology and Development Center, 444 East Bonita Avenue, San Dimas, CA 91773-3198 by using the Specification Comment Sheet at the end of this document or by letter.

American National Standards Institute (ANSI)/American Society for Quality Control (ASQC)

Z 1.4 - Sampling Procedures and Tables for Inspection by Attributes

Address requests for copies to the American National Standards Institute Inc., 11 West 42nd Street, New York, NY 10036.

American Society for Testing and Materials (ASTM)

- A 313 - Specification for Chromium-Nickel Stainless and Heat-Resisting Steel Spring Wire
- B 26 - Aluminum-Alloy Sand Castings
- B 62 - Specification for Composition Bronze or Ounce Metal Castings
- D 624 - Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer
- D 635 - Test Method for Rate of Burning and/or Extent and Time of Burning of Self Supporting Plastics in a Horizontal Position
- D 638 - Test Method for Tensile Properties of Plastics
- D 785 - Test Method for Rockwell Hardness of Plastics and Electrical Insulating Materials
- E 380 - Practice for Use of the International System of Units

Address requests for copies to American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

Non-Government standards and other publications normally are available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.

2.3. Order of Precedence. In the event of conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS.

3.1. First Article. Unless otherwise specified, first article inspection shall be performed on a product sample(s) in accordance with 4.4.3.

3.2. Construction. The hose clamp shall be a hand operated tool with no other mechanical or energy source needed for operation.

3.2.1. Clamp Components. The hose clamp shall consist of a lever arm, two-piece jaws, overcenter drawing loop and lock ring (see Figure 1). One quick movement shall be used to open or close the clamp. An overcenter pivot point shall automatically lock the clamp in the closed position. A lock ring shall be used to positively hold the locked position. Figure 1 is provided for information only and is not intended to designate a particular design or manufacturer.

3.2.2. Optional Jaw Insert. Optional jaw insert(s) or jaw(s) lining may be included, in order to prevent hose damage and slippage.

3.2.3. Optional Other Attachments. Other optional attachments may be designed into the clamp, such as a spanner wrench or bent lever arm, providing it does not interfere with the basic application to shutoff water in fire hose.

3.3. Materials. Where more than one type of material is used in various components, there shall be no incompatibility between materials which may cause corrosion.

3.3.1. Lever Arm Material. The lever arm material shall be cast aluminum alloy, 356-T6, in accordance with ASTM B 26.

3.3.2. Two Piece Jaw Material. The two piece jaw material shall be cast aluminum alloy, 356-T6, in accordance with ASTM B 26.

3.3.3. Optional Jaw Insert Material. The optional jaw insert or lining material shall be natural or synthetic rubber, or plastic. The jaw insert or lining material shall meet the minimum physical property requirements indicated in Table 1, when tested in accordance with 4.5.3.

Table 1. Jaw Insert Material Physical Properties

Physical Properties	Values
Tensile strength	2000 psi (13.78 MPa)
Elongation	300%
Hardness (Shore Type A)	70 $\pm$ 5 durometer
Tear strength	400 lb/in (7150 kg/m)
Burning rate	None

3.3.4. Overcenter Drawing Loop Material. The overcenter drawing loop material shall be brass, in accordance with ASTM B 62.

3.3.5. Pivot Pin Material. The pivot pin material shall be type 302 stainless steel, in accordance with ASTM A 313.

3.3.6. Lock Ring Material. The lock ring material shall be type 302 stainless steel, in accordance with ASTM A 313.

3.3.7. Recovered Materials. The contractor is encouraged to use recovered materials to the maximum extent practicable, in accordance with paragraph 23.403 of the Federal Acquisition Regulation (FAR), provided all performance requirements of this specification are met.

3.4. **Dimensions and Weight.** The overall dimensions shall be as indicated in Figure 1. The length of the clamp shall not exceed 12 inches (304.8 mm). The height of the clamp shall not exceed 4 inches (101.6 mm). The maximum width of the overcenter drawing loop shall be 1.5 inches (38.1 mm); the pivot pin maximum width shall be 0.82 inch (20.8 mm); and the maximum width of the lever arm and jaws shall be 0.5 inch (12.7 mm). The maximum width shall be measured when the clamp is in the retracted or closed position. The lock ring shall be 0.125 inch (3.175 mm) in

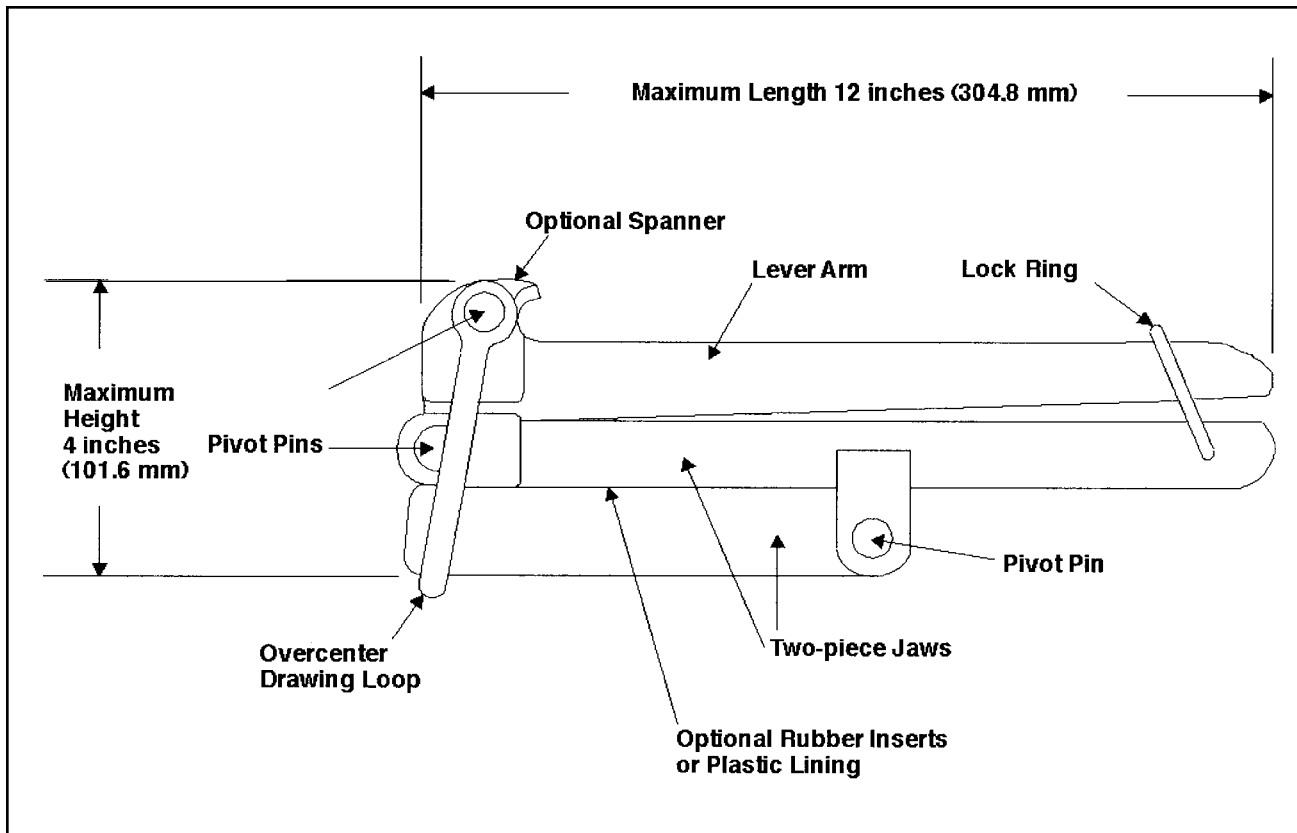


Figure 1. Hose clamp configuration.

diameter. The weight of the clamp shall not exceed 27 ounces (766 g).

3.4.1. **Dimensional Tolerance.** Unless otherwise noted, the following tolerances apply: one place (x.x) ± 0.1 inch (2.5 mm); two places (x.xx) ± 0.01 inch (0.25 mm) and three places (x.xxx) ± 0.010 inch (0.254 mm).

3.5. **Workmanship.** Workmanship shall be equal to the best commercial practices consistent with the highest engineering standards in the industry and shall be free from any defect which may impair serviceability or detract from the product's appearance.

3.5.1. **Symmetry.** All metal part sections shall be symmetrical.

3.5.2. **Forged or Extruded Components.** Forged and extruded sections shall be free from laps, sharp die marks, cracks or other defects.

3.5.3. **Cast Components.** Cast parts shall be fine-grained, free from blowholes, pinholes, pits, porosity, hard spots, shrinkage, cracks or other defects.

3.5.4. Plastic or Rubber Components. All plastic or rubber parts shall be fully and completely formed from the mold. There shall be no blisters, pinholes, pits, sink marks, crazing, wrinkles, voids, foreign material or cracks in plastic material, or other defects.

3.6. Markings. The clamp shall be permanently and legibly marked, on the outside surface, with the letters "FSS", "300 psi max", the manufacturer's name or trademark and the year of manufacture. All letters and numerals shall be at least 0.38 inch (9.7 mm) high. The method of marking shall not damage the clamp.

3.7. Surface Finish. The finish for all surfaces shall be in accordance with USDA Forest Service Standard 5100-190.

3.8. Performance.

3.8.1. Clamping Effect and Strength. When tested in accordance with 4.6.2, the clamp shall be capable of shutting off water at 300 psig (2068 kPag) pressure with no permanent deformation, mechanical damage, structural failure or leakage greater than one drop per second. The clamp shall not slip from the original locked position and shall not damage the hose. One person shall be capable of operating the clamp manually.

3.8.2. Impact Resistance. When tested in accordance with 4.6.3, there shall be no damage or separation of parts.

3.9. Metric Products. Metric dimensions are provided for information only, inch-pound units shall be the required units of measure for this specification. Products manufactured to metric dimensions will be considered on an equal basis with those manufactured using inch/pound units, provided they fall within the tolerances specified using conversion tables contained in the latest revision of ASTM E 380, and all other requirements of this specification are met.

4. SAMPLING, INSPECTION AND TEST PROCEDURES.

4.1. General Inspections and Tests. Unless otherwise specified in the contract or purchase order, the contractor is responsible for performance of all inspection requirements prior to submission for Government acceptance inspection and tests. The contractor may utilize their own facilities or any commercial laboratory acceptable to the Government. Inspection records of the examination and tests shall be kept complete and available to the Government.

4.1.1. Inspection and Test Site. The Government shall conduct lot acceptance inspection and tests to determine compliance with the specification. If lot acceptance and tests are conducted at locations other than the manufacturing facilities, the contracting officer will specify location and arrangements. In the case of on-site inspections at the contractor's facility, the contractor shall furnish the inspector all reasonable facilities for their work. During any inspection, the inspector may take from the lot one or more samples and submit them to an independent test laboratory approved by the Government or to a Government test facility for inspection and tests.

4.1.2. Testing by Referenced Documents. The contractor is responsible for insuring that components and materials used were manufactured, examined and tested in accordance with referenced specifications and standards. The Government reserves the right to perform any of the inspections or tests set forth in this section where such action is deemed necessary to assure

supplies and services conform to prescribed requirements.

4.2. Responsibility for Compliance. All items shall meet all requirements of sections 3 and 4. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in this specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.3. Sampling for Inspection. When inspection is performed, sampling shall be in accordance with ANSI/ASQC Z 1.4.

4.3.1. Lot. All fire hose shutoff clamps presented together in one delivery shall be considered a lot for the purpose of inspection. A sample unit shall be one fire hose shutoff clamp.

4.3.2. Sampling for Visual and Dimensional Examination. Sampling for visual and dimensional examination shall be S-3, with an Acceptable Quality Level (AQL) of 2.5 percent defective.

4.3.3. Sampling for Lot Acceptance Tests. Sampling for lot acceptance testing shall be S-3 with an AQL of 2.5 percent defective.

4.4. Inspection and Tests.

4.4.1. Visual and Dimensional Examination. When selected in accordance with 4.3.2, each sample shutoff clamp shall be visually and dimensionally examined to determine conformance with this specification. Visual or dimensional defects shall be classified as major or minor. A defect not listed in Table 2 shall be classified as a minor defect. If the number of defects in any sample exceeds the indicated AQL, the lot shall be rejected.

Table 2. Major and Minor Defects

Defect	Classification	
	Major	Minor
1. Clamp not complete.	X	
2. Construction not as required.	X	
3. Dimensions and weight not as required.	X	
4. Material not as required.	X	
5. Workmanship and finish not as required.	X	
6. Illegible or improper marking.		X

4.4.2. Lot Acceptance Tests. Each of the samples selected in accordance with 4.3.3 shall be tested in accordance with 4.6 to determine conformance with the requirements of this specification.

4.4.3. First Article Inspection. Unless otherwise specified (see 6.2), the first article sample(s) indicated in 3.1, shall be inspected as specified in 4.4.1 and 4.6. All inspection and testing of the first article sample(s) shall stop upon a single failure and the sample(s) rejected. The contractor will be informed as to the nature of the failure, but the Government shall not be obligated to continue testing a defective item, once it is known to be defective or when it is considered in the best interest of the Government.

4.4.4. Quality Conformance Inspection. Unless otherwise specified, sampling for inspection shall be performed in accordance with ANSI/ASQC Z 1.4. The inspection level and AQL shall be as specified in 4.3.3.

4.5. Certificate of Conformance. A Certificate of Conformance shall meet the requirements of USDA Forest Service Standard 5100-190. Where certificates of conformance are required, the Government reserves the right to verify test any such items to determine the validity of certification. These certificates shall be based on the testing of component materials and may be performed by the component material supplier. The contractor shall provide certificates of conformance for all materials used in 3.3.1, 3.3.2, 3.3.3, 3.3.4, 3.3.5 and 3.3.6 (see 4.5.2, 4.5.3, 4.5.4, 4.5.5, 4.5.6 and 4.5.7).

4.5.1. Certificates of Conformance in Lieu of Testing. Unless otherwise specified, certificates of conformance may be acceptable in lieu of testing of end items.

4.5.2. Lever Arm Material. As required by 3.3.1, the lever arm material shall meet the indicated material physical property requirement listed, when tested according to the defined test method.

4.5.3. Two Piece Jaw Material. As required by 3.3.2, the two piece jaw material shall meet the indicated material physical property requirement listed, when tested according to the defined test method.

4.5.4. Jaw Insert Material. As required by 3.3.3, if an optional jaw insert or lining material is used, it shall be natural or synthetic rubber, or plastic and shall be tested for physical properties in accordance to the ASTM Test Methods indicated in Table 3.

Table 3. Jaw Insert Physical Properties Test Methods

Physical Property	ASTM Test Method
Tensile strength	D638
Elongation	D638
Hardness (Shore Type A)	D785
Tear strength	D624
Burning rate	D635

4.5.5. Overcenter Drawing Loop Material. As required by 3.3.4, the overcenter drawing loop material shall meet the indicated material physical property requirement listed.

4.5.6. Pivot Pin Material. As required by 3.3.5, the pivot pin material shall meet the indicated material physical property requirement listed.

4.5.7. Lock Ring Material. As required by 3.3.6, the lock ring material shall meet the indicated material physical property requirement listed.

4.6. Performance Testing. Samples shall be subjected to the following tests to determine if the samples meet the requirements of this specification.

4.6.1 Fluid Medium. All testing requiring the use of a fluid medium shall be performed using municipally supplied potable water. This shall include, but is not limited to, clamping effect and strength testing and pressure testing. If the contractor does not have access to a municipal water supply, the testing shall be performed using any clear fresh water normally available for firefighting. First article testing conducted by the Government will be conducted using municipally supplied potable water.

4.6.2. Clamping Effectiveness and Strength Test. As required by 3.8.1, the clamp shall be tested for clamping effectiveness and strength. The rate for applying hydrostatic pressure shall not be less than 300 psig (2068 kPag) per minute and not more than 600 psig (4137 kPag) per minute, i.e. at a uniform rate over a 30 to 60 second time interval.

4.6.2.1. Test Preparation. A 100 foot (30.5 m) length of 1 inch 11-1/2 NPSH and 1-1/2 inch 9 NH cotton-synthetic fire hose qualified under USDA Forest Service Specification 5100-186 shall be used for this test. Connect the 1 inch 11-1/2 NPSH hose to a water pressure source. Connect a shutoff ball valve with a lever handle, to the male end of the fire hose. Charge the line to eliminate all of the air in the hose. Shutoff the ball valve. Position the ball valve supported by the handle, on the test floor. A hydrostatic pressure of 300 psig (2068 kPag) shall be applied and held.

4.6.2.2. Clamping Effectiveness and Strength Test Method. Position the clamp directly over the hose and at least 3 feet from the end coupling. Open the shutoff valve. Close the clamp to shut off the water. Position the ball valve, supported by the handle, on the test floor. The discharge end of the hose shall be observed to ensure that there is no leakage greater than one drop per second, as measured for a full minute. In addition, observe the clamp position for any slippage from the original locked position, along the length of the hose. Remove the clamp. Inspect the clamp and hose for any damage. Repeat the test 10 times on different segments of the hose. Repeat 4.6.2.1 and 4.6.2.2 with the 1-1/2 inch 9 NH cotton-synthetic fire hose.

4.6.3. Impact Resistance Test. As required by 3.8.2, the clamp shall be tested for impact resistance. The clamp shall be dropped in a free fall from a height of 8.0 foot (2.44 m) to a flat concrete surface. The clamp shall be dropped three consecutive times from three different positions to impact at three different points on the clamp. The clamp shall be examined after the third drop for damage or separation of parts.

5. PACKAGING, PACKING AND MARKING.

5.1. Packaging, Packing and Marking. The packaging, packing and marking shall be as specified in the contract or order.

6. NOTES.

6.1. Intended Use. The shutoff clamp described in this specification is used to temporarily shutoff the flow of water through USDA Forest Service cotton synthetic fire hose in wildland firefighting activities.

6.2. Acquisition Requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. If a first article sampling and inspection is not required (see 3.1, 4.4.3, and 6.3).
- c. If certificates of conformance are acceptable in lieu of lot by lot testing (see 4.4.2 and 4.5).
- d. Packaging, packing and marking (see 5.1).

6.3. First Article. When a first article sample(s) is required, it shall be inspected and approved in accordance with the First Article clauses set forth in the solicitation. Specific instructions shall be included regarding arrangements for selection, inspection and approval of the first article sample(s).

6.4. Notice. When Government drawings, specifications, or other data are used for any purpose other than in connection with a related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever.

6.5. Preparing Activity. USDA-Forest Service, San Dimas Technology and Development Center, 444 East Bonita Avenue, San Dimas, CA 91773-3198.

United States Department of Agriculture, Forest Service
Standardization Document Improvement Proposal

Instructions: This form is provided to solicit beneficial comments which may improve this document and enhance its use. Contractors, government activities, manufacturers, vendors, or other prospective users of this document are invited to submit comments to the USDA Forest Service, San Dimas Technology and Development Center, 444 East Bonita Avenue, San Dimas, California 91773-3198. Attach any pertinent data which may be of use in improving this document. If there is additional documentation, attach it to the form and place both in an envelope addressed to the preparing activity. A response will be provided when a name and address are included.

Note: This form shall not be used to submit request for waivers, deviation, or for clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

Standard Number and Title: **Specification 5100-245c, Clamp, Shutoff, Fire Hose**

Name of Organization and Address:

_____ Vendor _____ User _____ Manufacturer

1. _____ Has any part of this document created problems or required interpretation in procurement use?
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USDA Forest Service
San Dimas Technology & Development Center
Attn: Water Handling Project Leader
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