

Specification 5100-102e
January 2007
Superseding
Specification 5100-102d
October 1998

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
SPECIFICATION FOR
COUPLINGS, FIRE AND SUCTION HOSE

1. SCOPE.

1.1 Scope. The couplings described in this specification are for use on USDA Forest Service fire hose and suction hose. Coupling thread series designations are 1 inch 11-1/2 NPSH, 1-1/2 inches 9 NH and 2-1/2 inches 7-1/2 NH.

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 Specifications

5100-184 - Suction Hose

5100-185 - Hose, Rubber, High Pressure, 3/4-inch Waterway

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

5100-187 - Fire Hose, Lightweight Synthetic, Lined, Woven Jacket, 1 Inch and 1-1/2 Inch

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.

5100-102e

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

2.2. Nongovernment 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.

American Society For Quality (ASQ)

ANSI/ASQ Z 1.4 - Sampling Procedures and Tables for Inspection by Attributes.

Address requests for copies to the American Society for Quality, P.O. Box 3005, Milwaukee, WI 53201-3005

ASTM International

B 16 - Free-Cutting Brass Rod, Bar, and Shapes for Use in Screw Machines

B 124 - Copper and Copper-Alloy Forging Rod, Bar and Shapes

B 135 - Seamless Brass Tube

B 145 - Leaded Red Brass and Leaded Semi-red Brass Sand Castings

Address requests for copies to ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

Nongovernment 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, samples shall be subjected to first article inspection in accordance with 4.4.2. During the term of the contract the contractor shall be required to notify the contracting officer in writing when a component or the component supplier changes in any way, when a major manufacturing process changes in any way, or when a manufacturing location changes. The contracting officer may at any time require the contractor to submit a new first article sample when substantive changes occur during the term of the contract.

3.2. Construction. The hose coupling shall consist of the male and female sections, swivel, and swivel gasket. Hose coupling sizes are 1 inch 11-1/2 NPSH, 1-1/2 inches 9 NH, and 2-1/2 inches 7-1/2 NH. Components shall be as shown in figure 1. Figure 1 is provided for information only and is not intended to designate a particular design or manufacturer.

5100-102e

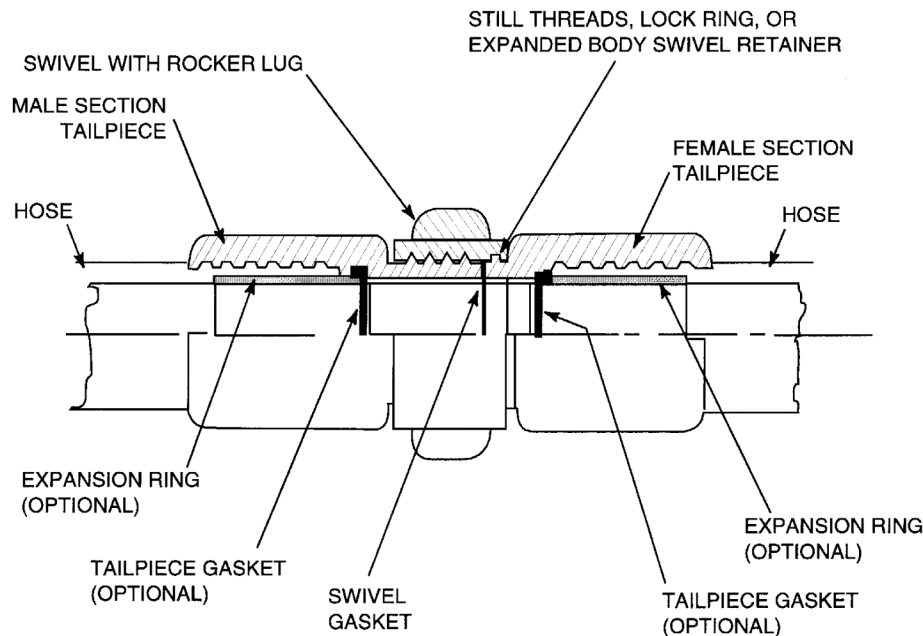


Figure 1. Coupling configuration.

3.2.1. Coupling Tailpiece Sections. The male and female tailpiece sections shall not have any ridges or grooves running across the serration of the inside walls. The rim of the tailpieces shall be smooth and well rounded without any sharp edges.

3.2.2. Coupling Swivel. A swivel shall be installed on the female tailpiece. The swivel shall be designed with a tolerance to permit free turning by a light twisting action before and after the tension tests of 4.6.1. The 2-1/2 inch 7-1/2 NH coupling shall have three rocker lugs.

3.2.3. Optional Coupling Expansion Ring and Tailpiece Gasket. The use of expansion rings and associated tailpiece gaskets are optional.

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. Coupling Tailpiece and Swivel Section Material. Tailpiece and swivel section material shall conform to the following:

- a. Copper alloy, 377, in accordance with ASTM B 124 or
- b. Copper alloy, 360 or 365, in accordance with ASTM B 16 or
- c. Copper alloy, 836, 838, 844, or 848, in accordance with ASTM B 145.

3.3.2. Expansion Ring Material. If expansion rings are used, they shall be made of a noncorrosive material, suitable for a water environment.

5100-102e

3.3.3. Tailpiece Gasket Material. If expansion rings with associated tailpiece gaskets are used, tailpiece gasket material physical properties shall meet the requirements of USDA Forest Service Standard 5100-190.

3.3.4. Swivel Gasket Material. Gasket material physical properties shall meet the requirements of USDA Forest Service Standard 5100-190.

3.3.5. Recoverable 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, provided all performance requirements of this specification are met.

3.4. Dimensions and Weights. Coupling dimensions shall be in accordance with USDA Forest Service Standard 5100-190. The maximum weight for a complete set of male and female hose couplings without hose are as follows: 17 ounces for the 1 inch 11-1/2 NPSH coupling set, 28 ounces for the 1-1/2 inch 9 NH coupling set, and 112 ounces for the 2-1/2 inch 7-1/2 NH coupling set.

3.4.1. Dimensional Tolerance. Unless otherwise noted, the following tolerances apply: one place (x.x) +/- 0.1 inch; two places (x.xx) +/- 0.03 inch and three places (x.xxx) +/- 0.010 inch.

3.4.2. Expansion Ring and Tailpiece Gasket. If an expansion ring and tailpiece gasket are used, the expansion ring shall be sized to fit within the inside diameter of hose and coupling tailpiece and the diameter shall not be less than the waterway specified in USDA Forest Service Standard 5100-190 after expansion. The tailpiece gasket shall conform to the minimum inner diameter for gaskets specified in USDA Forest Service Standard 5100-190 and the tailpiece gasket outer diameter shall accurately fit the recess provided and shall have a minimum thickness of 0.188 inch.

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 nonconformance which may impair serviceability or detract from the product's appearance.

3.5.1. Symmetry. All metal part sections shall be symmetrical and concentric to 0.030 inch.

3.5.2. Extruded Components. Extruded sections shall be free from laps, sharp die marks, cracks, or other nonconformities.

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

3.6. Threads, Waterways, Gaskets, Gasket Recesses, and Rocker Lugs. All threads, waterways, gaskets, gasket recesses, and rocker lugs shall be in accordance with USDA Forest Service Standard 5100-190.

3.7. Marking. Markings shall be in accordance with USDA Forest Service Standard 5100-190.

3.8. Surface Treatment. All finished surfaces of alloys, except casting alloys, shall be hardened to not less than 45 and not more than 70 on the Rockwell B scale.

3.9. Surface Finish. The finish for all surfaces, to include threaded surfaces, shall be in accordance with USDA Forest Service Standard 5100-190.

5100-102e

3.10. Performance.

3.10.1. Coupling Set Tensile Strength. When tested in accordance with 4.6.1, coupling sets with and without hose shall be tested for tensile strength. The requirement in 3.10.1.1 does not apply to couplings submitted as part of a first article submission for 5100-184 suction hose.

3.10.1.1. Coupling Set With Hose, Tensile Strength. When tested in accordance with 4.6.1.1, there shall be no permanent deformation, mechanical damage, or structural failure of any component parts, under a tensile load of up to 2,000 pounds per 1.0 inch of hose diameter. In addition, the swivel section shall turn freely before and after tension strength testing.

3.10.1.2. Coupling Set Without Hose, Tensile Strength. When tested in accordance with 4.6.1.2, there shall be no permanent deformation, mechanical damage, or structural failure of any component parts, under a tensile load of up to 1,200 pounds per 1.0 inch of hose diameter. In addition, the swivel section shall turn freely before and after tension strength testing.

4. QUALITY ASSURANCE PROVISIONS.

4.1 Responsibility for Inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his/her own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections or tests set forth in this specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1. Testing With 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 unless otherwise excluded, amended, modified, or qualified in this specification or applicable purchase document.

4.2. Responsibility for Compliance. All items shall meet all requirements of sections 3 and 5. 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 nonconforming material, either indicated or actual, nor does it commit the Government to accept nonconforming material.

4.3 Classification of Inspection. The inspection requirements specified herein are classified as follows:

- a. First Article Inspection (paragraph 4.3.2).
- b. Lot Acceptance Inspection (paragraph 4.3.3).

4.3.1. Lot. All coupling sets of one type and size presented together in one delivery shall be considered a lot for the purpose of inspection. A sample unit shall be one coupling set.

5100-102e

4.3.2 Sampling for First Article Inspection. The contractor shall make available to the Government items from which first articles may be selected. The first article shall consist of three coupling sets.

4.3.2.1 First Article Samples for 5100-185, 5100-186, or 5100-187 Fire Hose. If coupling sets are submitted as part of a first article submission for 5100-185, 5100-186, or 5100-187 fire hose, one of the coupling sets shall be installed on fire hose 18.0 inches +/- 0.5 inch long, and the other two coupling sets shall not be installed on fire hose.

4.3.2.2 First Article Samples for 5100-184 Suction Hose. If coupling sets are submitted as part of a first article submission for 5100-184 suction hose, the coupling sets shall not be installed on suction hose.

4.3.3 Sampling for Lot Acceptance Inspections and Tests. When inspection and testing is performed, sampling shall be in accordance with ANSI/ASQ Z 1.4. Sampling for inspection shall be performed on coupling sets ready for delivery. The sample size shall be in accordance with special inspection level S-3.

4.4. Inspection and Tests.

4.4.1. Lot Inspection. When selected in accordance with paragraph 4.3.3, each sample item shall be inspected in accordance with table 1 to determine conformance with this specification. If the sample is found to have any major nonconformities, as identified in table 1, the lot shall not be accepted. Additionally, if the number of minor nonconformities (table 1) in the sample exceeds an AQL of 2.5 percent nonconforming, the lot shall not be accepted.

Table 1. Lot Acceptance Inspection and Testing.

| Nonconformance | Paragraph | Classification | |
|--|-----------|----------------|-------|
| | | Major | Minor |
| 1. Hose coupling set not complete. | 3.2 | X | |
| 2. Tailpiece sections have ridges or grooves across inside wall serrations, or tailpiece rims not smooth and well rounded, or rims have sharp edges. | 3.2.1 | X | |
| 3. Swivel too loose or too tight. | 3.2.2 | X | |
| 4. Visible indication of material incompatibility or corrosion. | 3.3 | X | |
| 5. Materials not as specified. | 3.3.1 | X | |
| 6. Weight not as specified. | 3.4 | | X |
| 7. Workmanship not as specified (includes 3.5.1, 3.5.2, 3.5.3). | 3.5 | X | |
| 8. Threads, waterways, gaskets, gasket recesses, and rocker lugs not as specified in 5100-190. | 3.6 | X | |
| 9. Marking not as specified. | 3.7 | | X |
| 10. Surface finish not as specified. | 3.9 | X | |

4.4.2. First Article Inspection. Unless otherwise specified in paragraph 6.3, the first articles submitted in accordance with paragraph 3.1 shall be inspected as specified in paragraph 4.4.1 (table 1) and in accordance with table 2. The presence of any nonconformity or failure to pass any test shall be cause for rejection of the first article submission.

5100-102e

4.4.2.1 First Article Inspection Package. The contractor shall submit to the Government along with the selected first articles, copies of:

- a. All certificates of conformance, paragraph 4.5.
- b. Company inspection records, paragraph 4.1.
- c. All test results for the first article samples, paragraph 4.7.
- d. All other information necessary to perform the inspections identified in tables 1 and 2.

Table 2 – First Article Inspection.

| Nonconformance | Paragraph | Classification | |
|---|-----------|----------------|-------|
| | | Major | Minor |
| 1. Certificates of conformance missing or incomplete. | 4.5 | X | |
| 2. Coupling set tensile strength less than required. | 3.10.1 | X | |

4.5. Certificate of Conformance. A Certificate of Conformance (COC) shall meet the requirements of USDA Forest Service Standard 5100-190. Where COCs are required, the Government reserves the right to determine the validity of certification. These COCs shall be based on the testing of component materials and may be performed by the component material supplier. The date on the COCs for all textile, natural rubber and synthetic compounds shall not exceed 2 years prior to the current date. The contractor shall provide certificates of conformance for 3.3.1, 3.3.3, 3.3.4, and 3.8.

4.6. Performance Testing. Samples shall be subjected to the following tests to determine if the samples meet the requirements of this specification. A new sample shall be used for each separate test.

4.6.1. Coupling Set Tensile Strength Tests. As required by 3.10.1, the coupling sets with and without hose shall be tested for tensile strength.

4.6.1.1. Coupling Set With Hose, Tensile Strength Test. As required by 3.10.1.1, the sample hose with male and female coupling sections shall be connected together (male to female and with the swivel gasket in place) and installed on a tension-testing machine. A tensile load shall be applied up to 2,000 pounds per 1.0 inch of nominal hose diameter. The rate for applying the tensile load shall not exceed 2.0 inches per minute. There shall be no permanent deformation, mechanical damage, or structural failure. In addition, the swivel section shall turn freely before and after tension strength testing.

4.6.1.2. Coupling Set Without Hose, Tensile Strength Test. As required by 3.10.1.2, the coupling sections without hose will be connected together (male to female and with the swivel gasket in place). Mandrels shall be installed on each end of the couplings. The couplings and mandrels shall be installed on a tension-testing machine. A tensile load shall be applied up to 1,200 pounds per 1.0 inch of nominal hose diameter. The rate for applying the tensile load shall not exceed 0.25 inch per minute. There shall be no permanent deformation, mechanical damage, or structural failure. In addition, the swivel section shall turn freely before and after tension strength testing.

5100-102e

4.7. Test Results. The contractor shall have available copies of all test results performed to assure the quality or acceptability of the product submitted for acceptance. The test results shall also show the product's acceptable range or expected test result and the item's test value. All test equipment, which shall be used as media of inspection, shall be calibrated and current at the time of testing. Calibration shall be to a recognized State or Federal standard.

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 couplings described in this specification are for use on USDA Forest Service fire hose and USDA Forest Service suction hose.

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

- a. Title, number, and date of this specification.
- b. Type and size of fire hose required.
- c. When first article samples are not required (see 3.1, 4.4.2 and 6.3).
- d. If certificates of conformance are acceptable in lieu of lot by lot testing.
- e. Packaging, packing, and marking (see 5.1).

6.3 First Article. When first article samples are required, they shall be inspected and approved under the appropriate provisions of Federal Acquisition Regulation 52.209. The contracting officer should include specific instructions regarding arrangements for selection, inspection, and approval of the first article.

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.

5100-102e

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

Instructions: This form is provided to solicit beneficial comments that 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 that 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 5100-102e, Couplings, Fire and Suction Hose**

Name of Organization and Address:

____ Vendor ____ User ____ Manufacturer

1. ____ Has any part of this document created problems or required interpretation in procurement use?
 ____ Is any part of this document too rigid, restrictive, loose, or ambiguous?
 Please explain below.

Give paragraph number and wording:

Recommended change (s):

Reason for recommended change (s):

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5100-102e

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