INCH-POUND

MIL-F-52553B(ME)
8 April 1992
SUPERSEDING
MIL-F-52553A(ME)
17 June 1976

MILITARY SPECIFICATION

FITTINGS, WIRE ROPE

This specification is approved for use within the USA Belvoir Research, Development, and Engineering Center, Department of the Army, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers swaging-type sleeves and ferrules and a ferrule connector. The sleeves and ferrules are for wire rope conforming to RR-W-410, type I, class 2, 6 x 19, or type I, class 3, 6 x 37 improved plow steel, wire strand, or independent wire rope core.

1.2 Classification. The fittings shall be of the following types and sizes, as specified (see 6.2):

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: USA Belvoir Research, Development, and Engineering Center, ATTN: STRBE-TSE, Fort Belvoir, VA 22060-5606 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A FSC 4030

Type I - Sleeve.

Sizes .250-inch
.313-inch
.375-inch
.500-inch
.625-inch
.750-inch
.875-inch
1-inch
1.125-inch
1.250-inch
1.375-inch
1.500-inch

Type II - Ferrules.

Sizes 1.00-inch
1.125-inch
1.250-inch
1.375-inch
1.500-inch

Type III - Ferrule connector.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATIONS

FEDERAL

RR-W-410 - Wire Rope and Strand.
PPP-B-601 - Boxes, Wood, Cleated-Plywood.

MILITARY

MIL-P-116 - Preservation, Methods of.
MIL-P-52554 - Press, Hydraulic, Portable, with Dies for Swaging, 500-Ton, Gasoline-Engine-Driven.

STANDARDS

MILITARY

MIL-STD-105	- Sampling Procedures and Tables for Inspection by Attributes.
MIL-STD-129	- Marking for Shipment and Storage.
MIL-STD-889	- Dissimilar Metals.
MIL-STD-1190	- Minimum Guidelines for Level C Preservation, Packing and Marking.

(Unless otherwise indicated, copies of federal and military specifications and standards are available from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2 Non-Government publications. The following document(s) form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation (see 6.2).

AMERICAN IRON AND STEEL INSTITUTE (AISI)

Steel Products Manual.

(Application for copies should be addressed to the American Iron and Steel Institute, 1000 16th Street NW, Washington, DC 20036.)

AMERICAN SOCIETY FOR TESTING AND MATERIAL (ASTM)

D 3953	- Strapping, Flat Steel and Seals.
D 4675	- Selection and Use of Flat Strapping Materials.

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103-1187.)

(Non-Government standards and other publications are normally 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 a 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 Description. The fittings shall be in accordance with applicable figures and as specified herein.

3.2 First article. Unless otherwise specified (see 6.2) a sample shall be subjected to first article inspection (see 6.3) in accordance with 4.3.

3.3 Materials. Unless otherwise specified (see 6.2), the fittings shall be carbon steel conforming to AISI steel products manual designations 1010 through 1020. Materials not specified shall be selected by the contractor and shall be subject to all provisions of this specification.

3.3.1 Material deterioration prevention and control. The fittings shall be fabricated from compatible materials, inherently corrosion resistant or treated to provide protection against the various forms of corrosion and deterioration that may be encountered in any of the applicable operating and storage environments to which the fittings may be exposed.

3.3.1.1 Dissimilar metals. Dissimilar metals shall not be used in intimate contact with each other unless protected against galvanic corrosion. Dissimilar metals and methods of protection are defined and detailed in MIL-STD-889.

3.3.1.2 Identification of materials and finishes. The contractor shall identify the specific material, material finish or treatment for use with component and subcomponent, and shall make information available upon request to the contracting officer or designated representative.

3.3.2 Recovered materials. For the purpose of this requirement, recovered materials are those materials which have been collected from solid waste and reprocessed to become a source of raw materials, as distinguished from virgin raw materials. The components, pieces and parts incorporated in the fittings may be newly fabricated from recovered materials to the maximum extent practicable, provided the fittings produced meets all other requirements of this specification. Used, rebuilt or remanufactured components, pieces and parts shall not be incorporated in the fittings.

3.4 Sleeves and ferrules. The sleeves and ferrules shall be designed to be swaged to the applicable size wire rope when using a swaging machine conforming to MIL-P-52554 and using dies that are compatible with both the machine and fittings. After swaging with a force of not more than 500 tons, the sleeves and ferrules shall withstand the pulls specified in table I without separation, slipping, cracking, or other failure when tested as specified in 4.5.2.

TABLE I. Strength of sleeves, ferrules, and ferrule connectors.

Wire rope size diameter (inches)	Minimum breaking strength of test item (pounds)
.250	5880
.313	9160
.375	13,120
.500	23,000
.625	35,800
.750	51,200
.875	69,200
1.000	89,800
1.125	113,000
1.250	138,800
1.375	167,000
1.500	197,800

3.5 Type I - sleeves. The sleeves shall be as shown on figure 1 and as specified herei .

3.6 Type II - ferrules. The ferrules shall be as shown on figure 2 and as specified herein. The bore shall be smooth or have spiral flukes or grooves to fill the space between the wire rope strands before swaging. The ferrules, before swaging, shall provide a close fit with the wire rope but shall not require more than light blows with a hammer to drive them onto the end of the wire rope.

3.7 Type III - ferrule connectors. The ferrule connectors shall be for 1.375- and 1.500-inch wire rope sizes and shall be as shown on figure 3 and as specified herein. The connector shall accept the wire rope ferrules in 1.375- and 1.500-inch sizes. The connector shall not require the use of bolts, pins, or similar devices for attaching the connector to the wire rope ferrules and shall not require more than 15 seconds for installation or removal of the connector when sufficient slack is provided in the wire rope. When connected to the wire rope ferrules, the connector shall withstand the pulls specified in table I without separation, cracking, or permanent deformation.

3.8 Workmanship. All sleeves, ferrules, and ferrule connectors shall be finished free of harmful extraneous materials such as sand, dirt, and scale. All surfaces shall be free of burrs, sharp edges, cracks, dents, and other irregularities which would impair the safe use or function of the item.

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 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 set forth in the specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items must meet all requirements of section 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 the 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 acceptance of defective material.

4.1.2 Material inspection. The contractor is responsible for ensuring that components and materials used are manufactured, examined, and tested in accordance with referenced specifications and standards, as applicable.

4.2 Classification of inspection. The inspection shall be classified as follows:

a. First article inspection (see 4.3).
b. Quality conformance inspection (see 4.4).
c. Inspection of packaging (see 4.6).

4.3 First article inspection.

4.3.1 Examination. The first article fittings shall be examined as specified in 4.5.1. Presence of one or more defects shall be cause for rejection.

4.3.2 Tests. The first article fittings shall be tested as specified in 4.5.2. Failure of any test shall be cause for rejection.

4.4 Quality conformance inspection.

4.4.1 Sampling. Sampling for examination shall be in accordance with MIL-STD-105. Sample size shall be determined by using MIL-STD-105, table I and IIa. A lot shall be accepted when 0 defects are found and rejected when 1 or more defects are found.

4.4.2 Examination.

4.4.2.1 Samples. Samples selected in accordance with 4.4.1 shall be examined for the defects specified in 4.5.1. Presence of one or more defects shall be cause for rejection.

4.4.3 Tests.

4.4.3.1 Samples. Samples selected in accordance with 4.4.1 shall be tested as specified in 4.5.2. Presence of one or more defects shall be cause for rejection.

4.5 Inspection procedures.

4.5.1 Examination. The fittings shall be examined as specified herein, for the following major defects:

101. Dimensions not as specified.
102. Material not as specified (see 3.3).
103. Materials are not resistant to corrosion or deterioration or treated to be made resistant to corrosion or deterioration for the applicable storage and operating environment as specified (see 3.3.1).
104. Dissimilar metals as specified in MIL-STD-889 are not effectively insulated from each other as specified (see 3.3.1.1).
105. Contractor does not have documentation available for identification of material, material finishes, or treatments (see 3.3.1.2).
106. Marking missing, incomplete, or not legible.
107. Workmanship not as specified (see 3.8).

4.5.2 Tests.

4.5.2.1 Test methods. Pull test shall be made with a tension testing machine, using pull test samples made up in accordance with the appropriate sketches shown on figure 4. Failure of a sleeve, ferrule, or ferrule connector, when all three items are being tested at the same time, does not constitute failure of the other items of the test assembly. However, any item which does not fail in a composite test in which a failure of another item has occurred shall pass a separate test before acceptance.

4.5.2.2 Strength. Each test sample of a sleeve, ferrule, or ferrule connector shall be tested at the pull forces indicated in table I. The contractor shall use extra-improved plow steel wire rope conforming to RR-W-410, table XI, to ensure against wire rope failure. Nonconformance to 3.4 or 3.7, as applicable, shall constitute failure of this test.

4.6 Inspection of packaging.

4.6.1 Quality conformance inspection of pack.

4.6.1.1 Unit of product. For the purpose of inspection, a completed pack prepared for shipment shall be considered a unit of product.

4.6.1.2 Sampling. Sampling for examination shall be in accordance with MIL-STD-105, by using Tables I and IIa. A lot shall be accepted when 0 defects are found and rejected when 1 or more defects are found.

4.6.1.3 Examination. Samples selected in accordance with 4.6.1.2 shall be examined for the following defects. Presence of one or more defects shall be cause for rejection.

108.	Preservation not as specified (see 5.1).
109.	Strapping not as specified for level A (see 5.2.1).
110.	Container not as specified (see 5.2.1 or 5.2.2).
111.	Identification marking missing, incomplete, or not legible (see 5.3).

5. PACKAGING

5.1 Preservation (see 6.7). The fittings shall be coated with type P-1 preservative. The preservative shall conform to the applicable specification listed in and shall be applied in accordance with the requirements of MIL-P-116.

5.2 Packing. Packing shall be level A or C, as specified (see 6.2).

5.2.1 Level A. The fittings, coated with preservative as specified in 5.1, shall be packed in close-fitting boxes conforming to PPP-B-601, overseas type, grade B, style optional. Strapping shall be in accordance with ASTM D 3953, type 1 or 2, zinc-coated, size as applicable and ASTM D 4675.

5.2.2 Level C. The fittings as specified in 5.1 shall be packed in accordance with MIL-STD-1190.

5.3 Marking. In addition to any special marking specified in the contract or purchase order (see 6.2), marking shall be in accordance with MIL-STD-129.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The fittings are intended for use in rigging of wire rope for the installation of the submarine pipelines and tanker mooring systems and for other applications where eyes or ferrules are required on the

ends of wire rope. The sleeves and ferrules are intended to be cold-swaged onto wire rope with a swaging machine of 500-ton force and equipped with the proper dies.

6.2 Ordering data. Acquisition documents should specify the following:

a. Title, number, and date of this specification.
b. Type and size of fittings required (see 1.2).
c. Issue of DODISS to be cited in the solicitation and, if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).
d. Time frame required for submission of first article fittings and number of each type and size required (see 3.2).
e. When material shall be other than as specified (see 3.3).
f. Level of packing required (see 5.2).
g. Any special marking required (see 5.3).

6.3 First article. When a first article inspection is required, the item(s) should be a production model. The first article should consist of one or more units. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examinations, approval of the first article test results and disposition of the first articles. Invitation for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection to those bidders offering a product which has been previously acquired or tested by the Government, and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending contract. Bidders should not submit alternate bids unless specifically requested to do so in the solicitation.

6.4 Fitting compatibility. The sleeves and ferrules furnished by the contractor may not be compatible with the existing dies furnished with the hydraulic press conforming to MIL-P-52554. Consequently, new dies may be required to properly swage these new fittings.

6.5 Classification changes. Classification changes of fittings between this revision and the previous edition are as follows:

Type I - Sleeve. Add Sizes .250-inch, .313-inch, and 1.125 inch.

Type II - Ferrules. Add sizes 1.125-inch.

Type III - Ferrule Connector. Delete Sizes 1.125-inch and 1.500-inch.

6.6 Information figures. Figures 1, 2, and 3 show types of fittings which have been found acceptable; however, the figures are included for illustration only and are not intended to preclude the furnishing of other fittings which conform to this specification.

6.7 Level of preservation. For the purpose of marking, the level of preservation specified in 5.1 shall be designated as level A.

6.8 Subject term (keyword) listing.

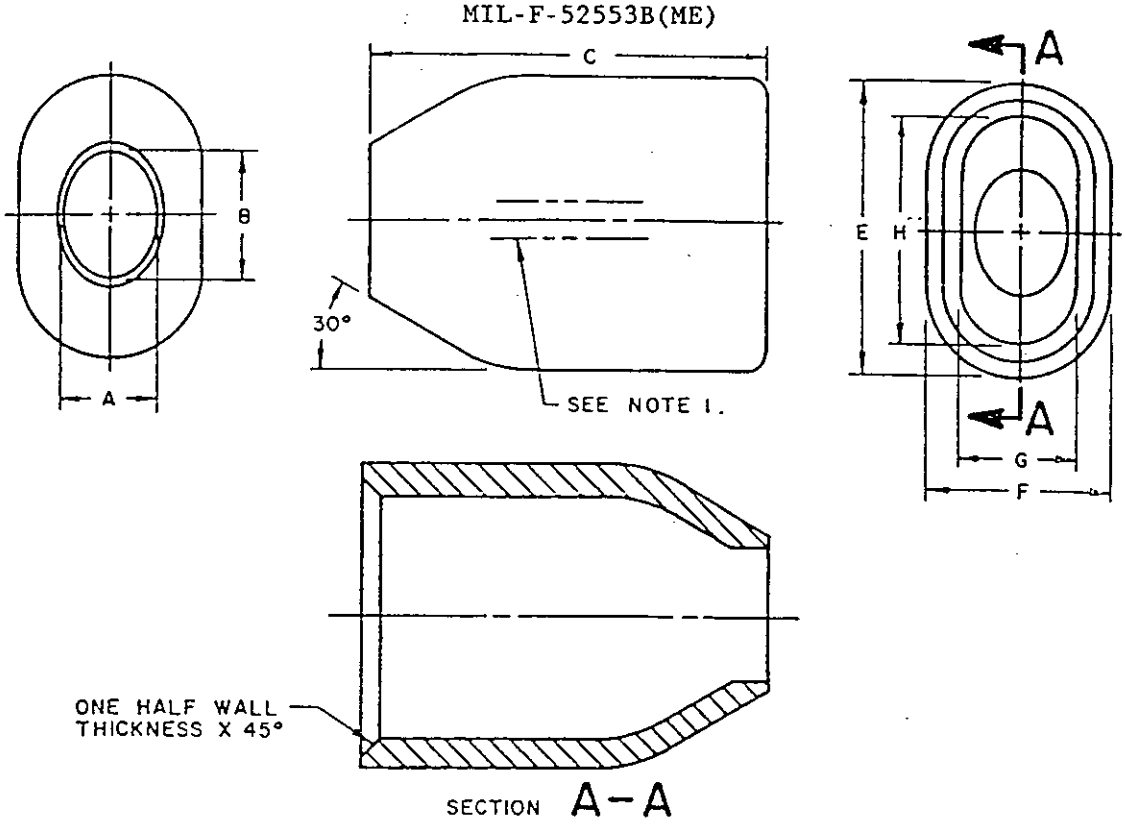
Connector, ferrule
Ferrule connector
Ferrule, swage type
Ferrule, wire rope
Sleeve, swage type
Wire rope ferrule
Wire rope sleeve

6.9 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodian:
Army - ME

Preparing activity:
Army - ME

Project 4030-A028

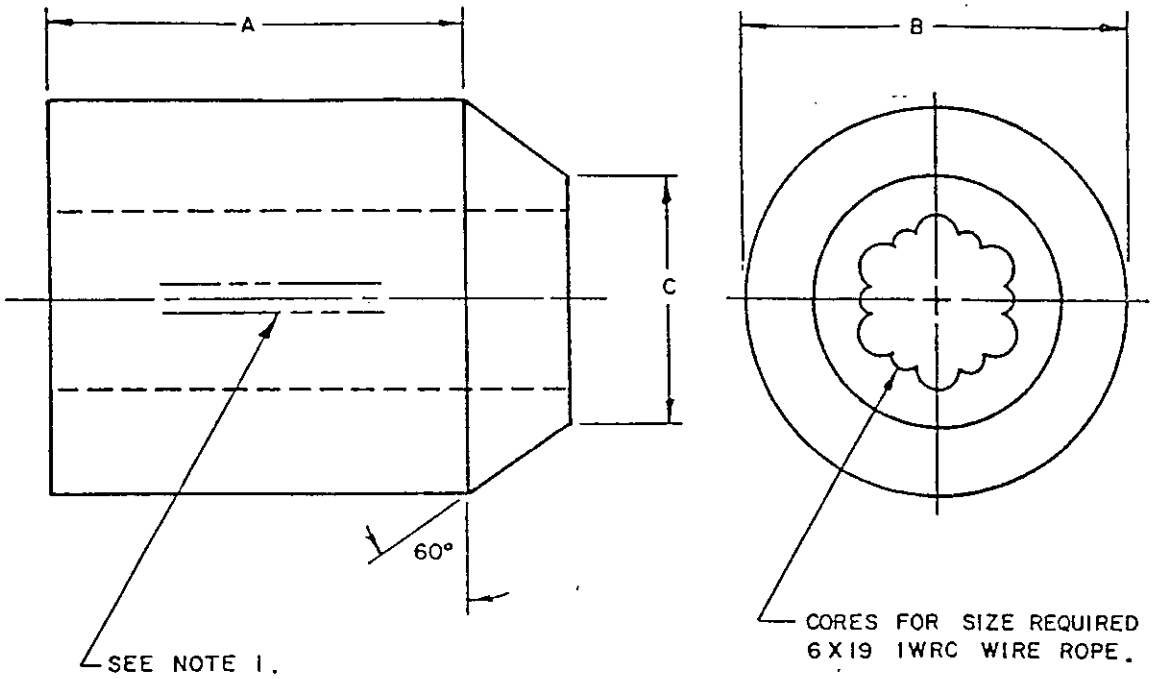


WIRE ROPE SIZE	A ±.03	B ±.03	C ±.06	E ±.03	F ±.03	G ±.03	H ±.03
.250	.31	.44	1.03	.78	.53	.34	.59
.312	.38	.50	1.28	.91	.59	.41	.72
.375	.44	.56	1.56	1.12	.69	.50	.88
.500	.59	.75	2.03	1.56	.97	.66	1.25
.625	.72	.88	2.53	1.81	1.19	.75	1.38
.750	.88	1.03	3.06	2.25	1.44	.88	1.69
.875	1.00	1.17	3.59	2.58	1.62	1.03	1.98
1.000	1.12	1.30	4.09	2.91	1.84	1.19	2.28
1.125	1.25	1.50	4.59	3.34	2.06	1.31	2.59
1.250	1.38	1.62	5.09	3.69	2.28	1.44	2.94
1.375	1.53	1.75	5.62	4.00	2.53	1.62	3.12
1.500	1.69	1.88	6.12	4.53	2.81	1.72	3.44

NOTES:

1. WIRE ROPE SIZE SHALL BE METAL STAMPED IN .25 HIGH CHARACTERS ON SURFACE INDICATED, LOCATION OPTIONAL.
2. BREAK SHARP EDGES .02 TO .06 RADIUS.
3. ALL DIMENSIONS ARE IN INCHES.
4. UNSPECIFIED TOLERANCE : ANGLES ± 5°.

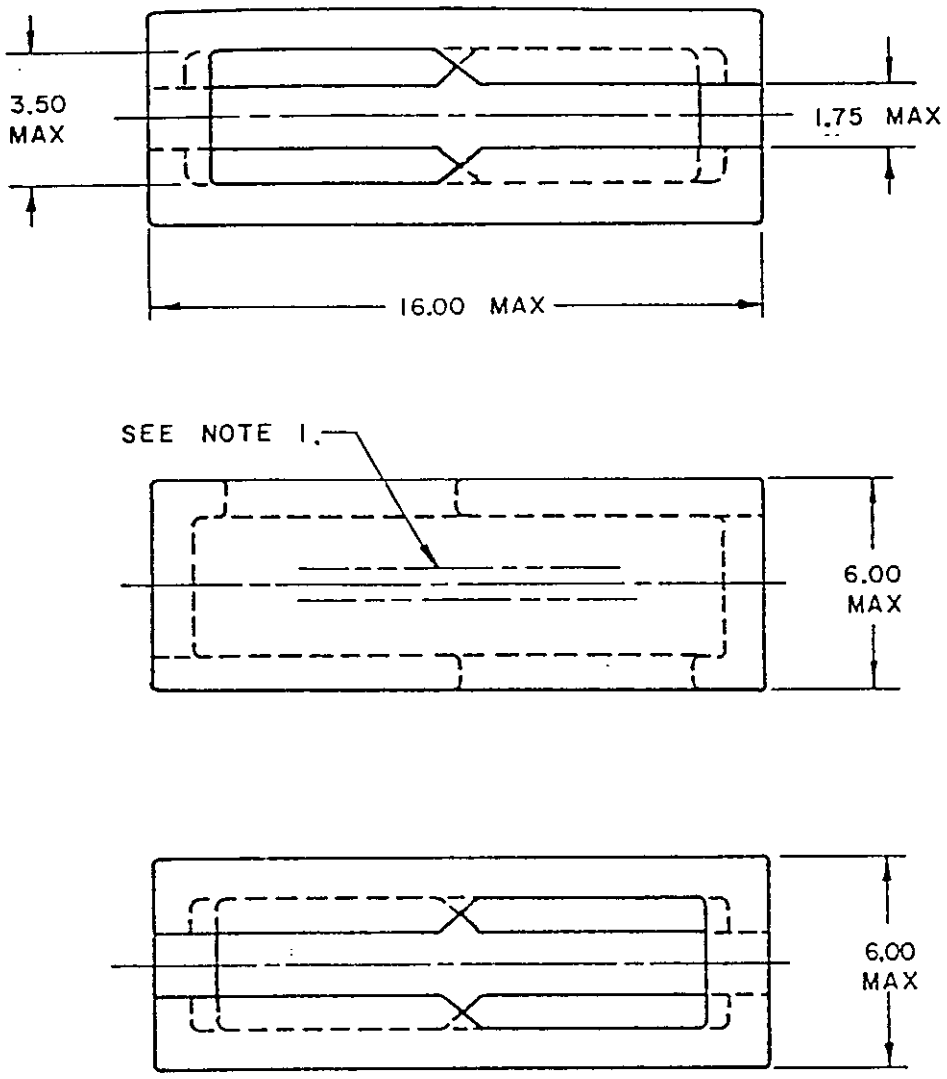
FIGURE 1. Sleeve, wire rope.



WIRE ROPE DIA	A ±.06	B ±.06	C ±.06
1.000	3.75	2.75	1.75
1.125			
1.250			
1.375	4.62	3.19	2.12
1.500			

NOTES:
1. WIRE ROPE SIZE SHALL BE METAL STAMPED IN .25 HIGH CHARACTERS ON SURFACE INDICATED, LOCATION OPTIONAL.
2. BREAK SHARP EDGES .02 TO .06 RADIUS.
3. ALL DIMENSIONS ARE IN INCHES.
4. UNSPECIFIED TOLERANCE: ANGLES ± 5°.

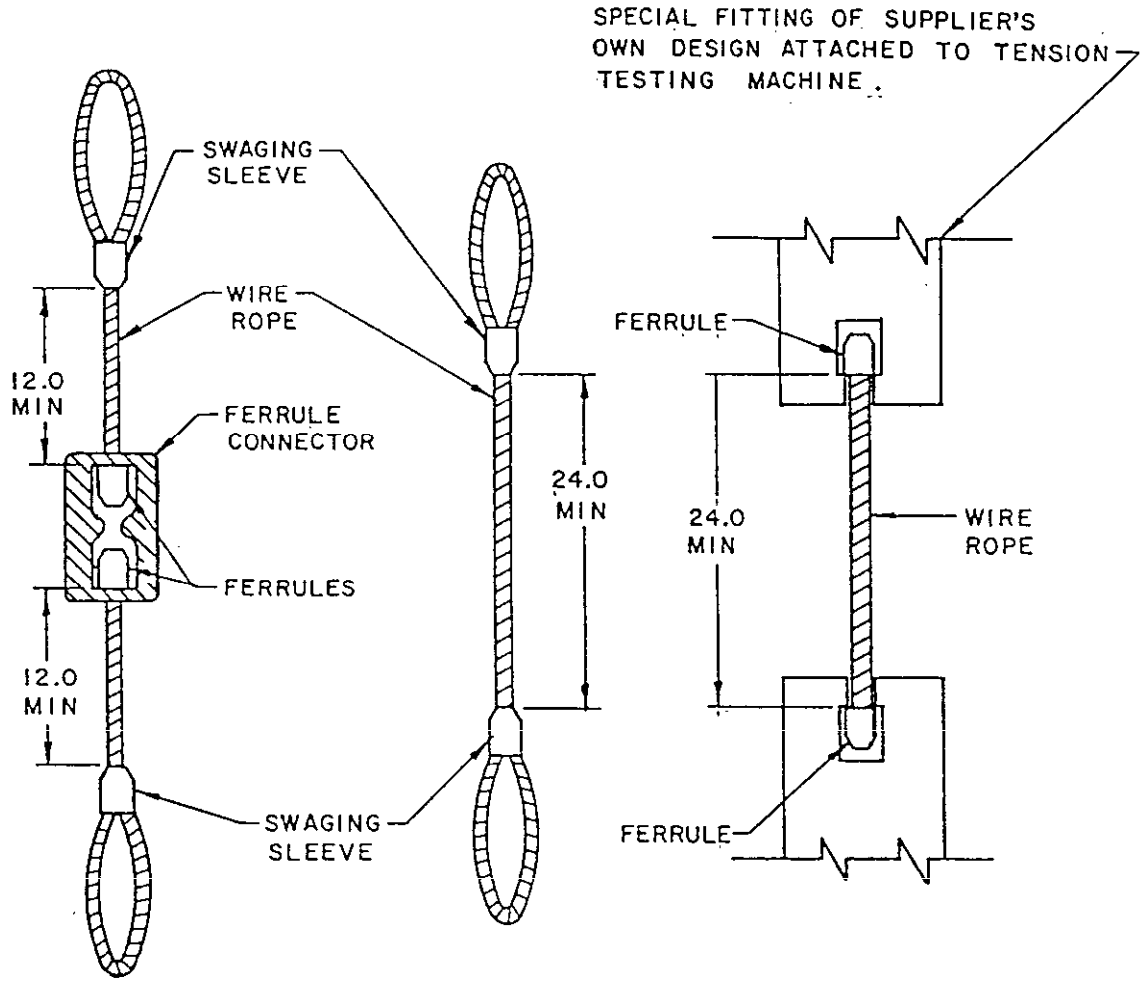
FIGURE 2. Ferrule, wire rope.



NOTES:

1. WIRE ROPE SIZE SHALL BE METAL STAMPED IN .25 HIGH CHARACTERS ON SURFACE INDICATED, LOCATION OPTIONAL.
2. BREAK SHARP EDGES .02 TO .06 RADIUS.
3. ALL DIMENSIONS ARE IN INCHES.

FIGURE 3. Connector, ferrule, wire rope.



TEST SETUP "A" TEST SETUP "B" TEST SETUP "C"

NOTES:

1. TEST SETUP "A" FOR SIMULTANEOUS TESTING OF SWAGING SLEEVE, FERRULES, FERRULE CONNECTORS, OR FOR THE SEPARATE TESTING OF ANY OF THE COMPONETS.
2. TEST SETUP "B" FOR THE TESTING OF SWAGING SLEEVE ONLY.
3. TEST SETUP "C" FOR THE TESTING OF FERRULES ONLY.
4. ALL DIMENSIONS ARE IN INCHES.

FIGURE 4. Fabrication of test samples.

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or 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.

RECOMMEND A CHANGE:	1. DOCUMENT NUMBER MIL-F-525538(ME)	2. DOCUMENT DATE (YYMMDD) 920408

3. DOCUMENT TITLE
Fittings, Wire Rope

4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME (Last, First, Middle Initial)	b. ORGANIZATION	
c. ADDRESS (Include Zip Code)	d. TELEPHONE (Include Area Code) (1) Commercial (if applicable) (2) AUTOVON	7. DATE SUBMITTED

8. PREPARING ACTIVITY

a. NAME Carolyn B. Johnson	b. TELEPHONE (Include Area Code) (1) Commercial (703) 704-3468 (2) AUTOVON 654-3468
c. ADDRESS (Include Zip Code US Army Belvoir RDE Center ATTN: STRBE-TSE Fort Belvoir, VA 22060-5606	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340