

MILITARY SPECIFICATION

CABLE, RADIO FREQUENCY RG-373/U

1. SCOPE

1.1 This specification covers the design and construction of a high strength, single-conductor buoyant cable.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on the date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

SPECIFICATIONS

FEDERAL

L-P-390 - Plastic Molding Material, Polyethylene, Low and Medium Density  
QQ-W-343 - Wire, Electrical (Uninsulated)

MILITARY

MIL-C-17 - Cables, Radio Frequency; Coaxial, Dual Coaxial, Twin Conductor,  
and Twin Lead  
MIL-C-12000 - Cable, Cord and Wire, Electric-Packaging of  
MIL-I-45208 - Inspection System Requirements

(Copies of specifications, standards, drawings, and publications required by contractors in connection with specific functions should be obtained from the procuring agency or as directed by the contracting officer.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

USN UNDERWATER SOUND LABORATORY (USNUSL)

USNUSL Test Gland Assembly Unit Number 00158  
USNUSL Technical Memorandum Number 220-74-62

(Application for copies should be addressed to the US Navy Underwater Sound Laboratory, New London, Connecticut 06320.)

3. REQUIREMENTS

3.1 First article sample. Prior to beginning production, a sample shall be tested as specified in 4.3 (see 6.3).

3.2 Mechanical characteristics.

3.2.1 Specific gravity. The cable shall have the lowest possible overall specific gravity consistent with the requirements specified herein.

3.2.1.1 The specific gravity shall not exceed 0.85 when measured under a hydrostatic pressure of 600 pounds per square inch gage (psig) and at room temperature in fresh water. The measurement shall be made after a continuous immersion time of two hours at 600 psig. The cable sample shall not be removed from the pressure tank nor the pressure reduced until after the measurement is completed. An approved test method is contained in USL Technical Memorandum No. 220-74-62.

3.2.1.2 The specific gravity, at atmospheric pressure, in fresh water shall be not less than 0.70.

3.2.2 Cold bend. The cable shall be subjected to and satisfactorily pass the cold bend requirements of MIL-C-17.

3.2.3 Crack resistance. The cable shall be resistant to stress cracking when tested as specified in 4.5.6

### 3.3 Construction.

3.3.1 Center conductor. The center conductor of the cable shall be a single strand of No. 16 AWG, Type S drawn and fully annealed copper wire in accordance with QQ-W-343 and of continuous length (with no joint or splice).

3.3.2 Solid core dielectric. The solid core dielectric shall consist of Type II, Class L, Grade 7A polyethylene as specified in L-P-390 having an outside diameter of  $0.180 \pm .004$  inch. The surface of the dielectric shall be smooth so that an O-ring of  $0.070 \pm .003$  inch cross section and  $.145 \pm .005$  inch I.D. (AN6227-2) will seal on the dielectric without any leakage at any pressure from 0 to 600 psig.

3.3.3 Strength members. The strength members shall consist of at least seventeen strands of .038 inch diameter fiberglass as Owens-Corning Fiberglass Co.'s ECG 75-5/3 Latex 2.0 "S" coated or equivalent, laid on the solid core with a minimum left lay of 20 inches.

3.3.4 Jacket. The jacket shall consist of two layers of black foamed polyethylene securely bonded together. The extreme diameter of the cable shall be  $.650 \pm .025$  inch. The surface of the jacket shall be smooth so that an O-ring of 0.360 inch cross section and .620 I.D. (Federal Stock #H-5330-064-6585) will seal anywhere along the entire length of the cable with zero leakage at any pressure from 0 to 600 psig when applied for 2 hours. The surface of the jacket shall be of uniform hardness and free of major imperfections such as blow holes, cuts, valleys, and bruises and abrupt changes of diameter with the tolerance range. Abrupt changes are defined as variations in diameter greater than .005 inch per inch of length.

3.3.4.1 Jacket bonding. The cable shall satisfactorily meet the bonding test of 4.5.7.

### 3.4 Strength.

3.4.1 Breaking strength. The cable shall have a minimum breaking strength of 2000 pounds.

3.4.2 Between center conductor and solid core dielectric. The shear strength between the center conductor and the solid core dielectric shall be a minimum of 20 pounds per linear foot of cable.

3.4.3 Between strength members and jacket. The shear strength between the strength members and the jacket shall be a minimum of 100 pounds per linear foot of cable. The shear strength between each layer of jacket shall be 100 pounds per linear foot.

3.5 Length. Unless otherwise specified in the contract or order, the cable shall be provided in not less than 2000 foot nor more than 2100 foot continuous lengths (with no joints or splices).

### 3.6 Identification.

3.6.1 Manufacturer's identification. Manufacturer's identification shall consist of coloring the solid dielectric core in accordance with a manufacturer's identification color to be assigned by the Laboratory. Coloring of the core shall not affect the characteristics of the cable.

#### 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier 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 assure supplies and services conform to prescribed requirements.

4.1.1 Quality control system. The supplier shall provide and maintain a quality control system in accordance with MIL-I-45208.

4.2 Classification of inspections. The inspection requirements specified herein are classified as follows:

- (a) First article inspection (see 4.3)
- (b) Quality conformance inspection (see 4.4)

4.3 First article inspection. Unless otherwise specified (see 6.1), a 300-foot sample of cable constructed in accordance with this specification shall be required for first article inspection.

4.3.1 First article test report. Unless otherwise specified, a report of the tests conducted shall be forwarded to USNUSL, New London, Connecticut 06320 with a 100-foot length taken from the 300 foot sample. The manufacturer shall not initiate production prior to receipt of approval of this report except at his own risk.

#### 4.4 Quality conformance inspection.

4.4.1 Sampling. A sample of cable shall be selected from each reel for the examination and tests of 4.4.2, 4.5.4. Samples of sufficient length shall be selected from every 40,000 feet of cable for the tests of 4.5.2, 4.5.3, 4.5.5 and 4.5.6.

4.4.2 Visual and dimensional examination. The samples selected in accordance with 4.3.1 shall be examined to verify that the design, construction, physical dimensions, and workmanship are in accordance with this specification.

4.4.2.1 Each reel of cable shall be supplied with diameter recordings specified in 4.4.1.

#### 4.5 Test procedures.

4.5.1 Dimensions and out-of-round. The overall diameter of the outer jacket shall be measured. The cable making equipment shall be fitted with electronic or mechanical measuring device(s) to produce graphic records of the cable produced. Two recordings shall be made as nearly simultaneously as possible of each diameter, 90 degrees apart, and at a point in manufacturing where further dimensional changes such as cooling, tension, and so forth will not occur. The recordings shall be permanent and reproducible by a common commercial process. The recording accuracy shall be no less than 5 percent of the tolerance being measured, and any portion of the recording of the O.D. shall be identifiable to within  $\pm 2$  feet of the cable being measured and not less than 1/20 of an inch of paper per each 1 foot of cable being monitored. Each recording shall be identified with the reel of cable being monitored. The beginning of the cable length and end of the cable run shall be indicated on the recordings.

4.5.1.1 Calibration. The zero position on the graph and an indication of which side of zero is over and which side is under the nominal cable diameters shall be required, and an indication of specific values in thousandths of an inch shall be made on the recording with regard to the dielectric and outer jacket outside diameters.

4.5.2 Breaking strength. The breaking strength of the cable shall be determined by means of a power-driven tensile machine. The rate of travel of the power actuated grip shall be adjusted to move at a rate of  $12 \pm 2$  feet per minute. Distance between grips shall be five (5) feet prior to the application of the load. A reduction of the jacket diameter to .580 inch shall be considered a failure.

4.5.3 Shear strength. A suitable device such as a Kellems grip shall be used to facilitate measurement of the shear strength between strength members and jacket.

4.5.4 Specific gravity. The specific gravity shall be measured under a hydrostatic pressure of 600 pounds per square inch gage (psig) at room temperature in fresh water. The measurement shall be made after a continuous immersion of two hours. The cable sample shall not be removed from the pressure tank nor the pressure reduced until after the measurement is completed.

4.5.5 Cold bend. The cable shall be subjected to the cold bend test specified in MIL-C-17.

4.5.6 Crack resistance. The cable shall be tightly wrapped around a mandrel 3 inches in diameter continuously for 24 hours to determine conformance with 3.2.3.

4.5.7 Jacket bonding. A knife cut 1/16 of an inch deep shall be made across one side of the cable. The cable shall be bent back on itself with the cut on the outside of the bend. There shall be no indication of separation of the inner and outer jacket.

4.6 Inspection conditions. Unless otherwise specified herein, all inspections shall be made at room ambient temperature, pressure and humidity.

4.7 Inspection of preparation for delivery. Inspection shall be conducted to insure conformance with the requirements of Section 5 of this specification.

## 5. PREPARATION FOR DELIVERY

(The preparation for delivery requirements specified herein apply only for direct Government procurements. Preparation for delivery requirements of referenced documents listed in Section 2 do not apply unless specifically stated in the contract or order. Preparation for delivery requirements for products procured by contractors shall be specified in the individual order.)

5.1 Preservation and packaging, packing, and marking. Preservation and packaging, packing and marking shall be in accordance with MIL-C-12000 as specified in the contract or orders (see 6.1).

## 6. NOTES

6.1 Ordering data. Procurement documents should specify the following:

- (a) Title, number, and date of this specification.
- (b) Length if other than specified in 3.5.
- (c) Levels of preservation, packaging and packing and marking (see 5.1).

6.2 First article. Invitations for bids should provide that the Government reserves the right to waive the requirement for first article samples as to those bidders offering a product which has been previously procured 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 procurement.

Preparing activity:  
Navy - EC  
(Project 6145-N152)