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MILITARY SPECIFICATION

CABLE, TELEPHONE (W-50-A)

This specification has been approved by the Department of Defense and is mandatory for use by the Departments of the Army, the Navy, and the Air Force.

1. SCOPE

1.1 This specification covers one type of twisted pair cable designated as Wire W-50-A, consisting of two hard drawn 4107 circular mil (No. 14 AWG) coated copper wires separately insulated with a styrene butadiene rubber (SBR) insulating compound followed by a chloroprene rubber (CR) jacketing compound and twisted together to form a finished cable.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on date of invitation for bids form a part of this specification to the extent specified herein:

SPECIFICATIONS

FEDERAL

J-C-98 — Cable and Wire, Insulated; Methods of Sampling and Testing.

MILITARY

MIL-C-12000 — Cable, Cord, and Wire, Electric, Packaging and Packing of.

STANDARDS

FEDERAL

Standard No. 601 — Rubber: Sampling and Testing.

MILITARY

MIL-STD-105 — Sampling Procedures and Tables for Inspection by Attributes.

MIL-STD-129 — Marking for Shipment and Storage.

(Copies of specifications and standards required by contractors in connection with specific procurement functions should be obtained from the procuring activity 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 shall apply.

AMERICAN SOCIETY FOR TESTING MATERIALS

B189 — Lead-Coated and Lead-Alloy-Coated Soft Copper Wire for Electrical Purposes.

D518 — Resistance to Light Checking and Cracking of Rubber Compounds.

D1149 — Accelerated Ozone Cracking of Vulcanized Rubber.

(Application for copies should be addressed to the American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pa.)

FSC 6145

3. REQUIREMENTS

3.1 Materials. The materials used for Wire W-50-A shall be as specified herein.

3.2 Conductors. Each conductor of Wire W-50-A shall be coated hard drawn copper wire, as follows:

3.2.1 *Size.* The conductors shall be not less than 0.063 inch nor more than 0.067 inch in diameter (No. 14 AWG).

3.2.2 *Finish.* The conductor shall be free from kinks, scales, irregularities, splints, or other flaws.

3.2.3 *Lead or lead alloy coating.* The copper conductors shall be continuously coated with a lead or lead alloy coating in accordance with ASTM B189.

3.2.4 *Brass coating or adhesive.* The lead or lead alloy coated conductors shall be coated with an electro-plated flash coating of brass of sufficient weight to impart a characteristic brass color to the conductors. The plating technique shall be that calculated to yield a coating of brass containing 75 to 80 percent of copper. An adhesive may be used in lieu of brass coating for bonding of insulation to the conductor (see 6.6).

3.2.5 *Joints.* The conductors shall be free from joints made during the process of drawing or in the finished conductors.

3.2.6 *Breaking strength and elongation.* The breaking strength of the conductors shall be not less than 200 pounds. The elongation of the coated or uncoated copper wire in a 60 inch length shall be not less than 0.90 percent.

3.3 Sunproofing wax. Styrene butadiene rubber (SBR), and chloroprene rubber (CR) compounds shall incorporate an acceptable sunproofing wax to protect the insulation and jacket against cracking due to exposure (see 6.5).

3.3.1 *Insulating compound.* Styrene butadiene rubber (SBR) insulating compound shall contain not less than 2.5 parts by weight of sunproofing wax per 100 parts by weight of base rubber polymer.

3.3.2 *Jacketing compound.* Chloroprene rubber (CR) jacketing compound shall contain not less than 3 parts by weight of sunproofing wax per 100 parts by weight of base rubber polymer.

3.4 Insulation. Each conductor of the cable shall be covered with a styrene butadiene rubber (SBR) insulating compound so compounded and vulcanized as to meet the requirements of this specification. The SBR insulating compound used shall be virgin material. The SBR insulating compound shall be compounded with such fillers, antioxidants and organic accelerators as are necessary to provide a compound having long life in service and in storage. The compound used for conductor insulation shall contain not more than 0.5 percent of free sulfur.

3.4.1 *Insulation repairs.* Faults in the insulations developed during processing or testing may be repaired, but all lengths of cable containing such repairs shall be capable of meeting the requirements of this specification. In making such repairs in the insulation, the insulation shall be removed by tapering cuts on each side of the defect. The cuts shall not nick the conductor. The bared conductor shall be wrapped with a high grade SBR or rubber insulating tape in thin layers until the diameter of the taped section is equal to the original insulation diameter, and then vulcanized. The patch shall be fully bonded to the original insulation. If desired, the insulation and jacket patches may be vulcanized at the same time.

3.5 Jacket. The insulated conductors shall be individually jacketed with a smooth continuous tight fitting adherent sheath of black vulcanized chloroprene rubber (CR) compound to form a completed cable capable of

withstanding the tests hereinafter specified. All chloroprene rubber compound used shall be virgin material.

3.5.1 *Jacket repairs.* Faults in the jacket developed during processing or testing may be repaired, but all lengths of cable containing such repairs shall be capable of meeting the requirements of this specification, unless otherwise specified herein. In making such repairs in the jacket, the jacket shall be removed by tapering cuts on each side of the defect. The cuts shall not nick the insulation. The insulation shall be wrapped with a chloroprene rubber jacketing tape until the taped section is approximately equal to the completed conductors diameter and then vulcanized. The patched section shall not exceed 3½ inches in length and 0.220 inch in diameter and shall be not less than the diameter of the adjacent jacket. Edges of the patch shall be well rounded and the ends tapered down and fully bonded to the original jacket.

3.6 Dimensions of insulation and jacket. The diameter of the insulated conductor shall be not less than 0.120 inch. The thickness of the jacket shall be not less than 0.025 inch. The total thickness of insulation and jacket shall be not less than 0.050 inch. The diameter of the insulated and jacketed conductor shall be not less than 0.175 inch and not more than 0.200 inch. Tracer ridges shall not be included in the above measurements.

3.7 Distinguishing marks. In order that the two jacketed conductors may be readily distinguished from each other, the jacket of one conductor of the twisted pair shall bear identification marks consisting of two longitudinal ridges. The ridges shall be adjacent or radially spaced from each other approximately forty-five°. The ridges shall be continuous throughout the length of the cable. The ridges constituting the tracer shall be approximately 0.040 of an inch in width at the junction of the ridge and the round portion of the jacket. The height shall be not less than 0.015 of an inch.

3.8 Twisting. Two completed single conductors, one unmarked and the other marked with longitudinal ridges shall be twisted together with a right hand lay to form the finished cable. The length of lay shall not exceed 4 inches.

3.9 Insulation adhesion. The adhesion of the insulation to the conductor in any length of the completed insulation and jacketed conductor shall be such that a force of not less than 12 pounds applied parallel to the axis of the conductor will be required to strip a three-eighths inch length of insulation from the conductor, when tested as specified in 4.9. The adhesion of insulation after aging specified in 4.10 shall average not less than 90 percent of the unaged values of these specimens.

3.10 Insulation and jacket adhesion. The adhesion of the sheath to the insulation and the insulation to the conductor shall be such as to withstand a load equal to the breaking load of the single conductor applied parallel to the axis of the conductor without buckling of the insulation or sheath or slippage of the conductor, when tested as specified in 4.11.

3.11 Compression characteristics. Each of the completed single insulated and jacketed conductors shall be capable of satisfying the following compression requirements, when tested as specified in 4.12, 4.12.1, and 4.12.2.

3.11.1 *Compression before aging.* For any length of unaged completed insulated and jacketed single conductor, the load required to produce crushing shall be not less than 1,000 pounds.

3.11.2 *Compression after 48-hour aging.* For any length of completed insulated and jacketed single conductor which has been subjected for 48 hours to the accelerated aging specified in 4.12.2, the load required to produce crushing shall be not less than 750 pounds, provided that in no case shall this crushing load be less than 0.7 of the crushing value obtained on the length of same specimen prior to accelerated aging.

3.11.3 *Compression after 10 days aging.* Any length of completed insulated and jacketed single conductor which has been subjected for 10 days to accelerated aging, specified in 4.12.2, shall be capable of withstanding, without crushing, a load of not less than one-half of the crushing load obtained on the same specimen prior to accelerated aging.

3.12 Low temperature characteristics. Specimens of the completed insulated jacketed conductors shall be capable of being wound around a mandrel of one-fourth inch at — 40° ± 2° F. without cracking the conductor insulation or jacket, when tested as specified in 4.13.

3.13 High voltage spark. All of the completed cable shall be capable of withstanding without dielectric failure, a spark test potential of not less than 8,000 volts r.m.s, ac applied for a period of not less than 0.4 of a second, when tested as specified in 4.14.

3.14 Electrical characteristics during water immersion. Any length of completed cable shall be capable of conforming to the following voltage, insulation resistance, and mutual capacitance requirements while immersed in tap water under conditions to insure complete wetting of the surface of the cable. The period of immersion shall be not less than 12 hours.

3.14.1 Voltage. A potential of 2,000 volts r.m.s., ac shall be maintained between each conductor and the surrounding water for a period of 1 minute, without showing any evidence that rupture of the insulation has occurred, when tested as specified in 4.15. Following the application of the voltage test, the cable shall satisfy the insulation resistance requirements specified in 3.14.2.

3.14.2 *Insulation resistance.* The insulation resistance of each conductor to the water shall be not less than 1,000 megohms-thousand feet at, or corrected to + 60° F., when tested as specified in 4.16. The test for insulation resistance shall be made using a galvanometer with a potential of not less than 100 volts dc.

3.14.3 *Mutual capacitance.* The mutual capacitance of the cable shall be not more than 0.045 microfarad per 1,000 feet when measured at a frequency of approximately 900 or 1,000 cycles per second, when tested as specified in 4.17.

3.15 Jacket longitudinal resistance. In any length of the completed single conductor, the longitudinal resistance of the coverings shall be not less than 500 megohms per foot of conductor, when tested as specified in 4.18 The resistance shall be measured between two electrodes each consisting of a single circumferential loop of approximately No. 22 AWG, soft copper wire so placed around the jacket as to make intimate contact with the jacket surface.

3.16 D. c. resistance. The dc resistance of each conductor of the cable shall be not more than 2.9 ohms per thousand feet at, or corrected to +68° F., when tested as specified in 4.19.

3.17 Continuity. All of the completed cable shall have electrically continuous conductors when tested as specified in 4.20.

3.18 Ozone resistance. After testing in accordance with 4.21 , the jacket of Wire W–50–A shall exhibit no visible cracks, when viewed under a seven power optical magnifier (see 6.7).

3.19 Coils. The cable shall be in coils of one continuous length. Both ends of the cable in each coil shall be readily accessible.

3.19.1 The length desired for each coil is 750 feet. A minimum length of 735 feet and maximum length of 765 feet shall be permitted.

3.19.2 The coils of cable, as formed, shall have an eye capable of receiving a mandrel 14½ inches in diameter. The traverse in coiling shall be not greater than 4¼ inches.

3.20 Workmanship. Wire W–50–A shall be manufactured and finished in a thoroughly workmanlike manner in accordance with all applicable requirements of this specification.

4. QUALITY ASSURANCE PROVISIONS

4.1 Supplier's responsibility. The supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own or any other inspection facilities and services acceptable to the Government. Inspection records of the examinations 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 assure supplies and services conform to prescribed requirements.

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

4.3 Verification of material. For all finished cable submitted to the Government for acceptance, the contractor shall furnish a certificate of compliance for the compound used in the composition of the insulation and jacket which shall indicate conformance with the requirements of 3.3, 3.4, and 3.5 as follows:

4.3.1 *Sunproofing wax.* The contractor shall specify the amount of sunproofing wax used in the insulating and jacketing compound per 100 parts by weight of base rubber polymer and shall identify the acceptable sunproofing wax used, by manufacturer's name and trademark or number (see 6.5).

4.3.2 *Virgin material* Virgin material shall be defined as 100 percent new material which has been through processes essential to its manufacture one time only. Any material which has previously been processed in any other manner or which has additives processed in any other manner is considered nonvirgin material. This shall apply to the manufacture of all ingredients and components used. The contractor shall certify that the materials used meet the above conditions.

4.3.3 *Free elemental sulfur content.* The free elemental sulfur content of the insulation compound shall be determined in accordance with Method 16211 of Federal Standard No. 601 except that where greater sensitivity is required, a 0.01 iodine solution shall be used and the blue end point shall last 3 to 4 seconds.

4.4 Classification of inspection. Inspection shall be classified as follows:

(1) Acceptance inspection of equipment before preparation for delivery (see 4.5).

(2) Acceptance inspection of preparation for delivery (see 4.6).

4.5 Acceptance inspection of equipment before preparation for delivery. The contractor, to demonstrate compliance with specified requirements, shall perform the inspection specified in 4.5.1 through 4.5.4. This does not relieve the contractor of his responsibility for performing any additional inspection which is necessary to control the quality of the product and to assure compliance with all specification requirements. The Government will review and evaluate the contractor's inspection procedures and examine the contractor's inspection records. In addition the Government — at its discretion — may perform all or any part of the specified inspection, to verify the contractor's compliance with specified requirements (see 6.3).

4.5.1 *Group A inspection.* This inspection (including sampling) shall conform to table I and the ordinary inspection procedures of Standard MIL–STD–105.

TABLE I. *Group A inspection*

Inspection	Requirement paragraph	Inspection paragraph	A Q L	
			Major	Minor
Visual and mechanical				
Conductors	3.2	4.7	1.0 per cent for the group	4.0 per cent for the group
Conductor size	3.2.1	4.7		
Conductor finish	3.2.2	4.7		
Joints	3.2.5	4.7		
Insulation	3.4	4.8		
Jacket	3.5	4.8		
Dimensions of insulation and jacket	3.6	4.8		
Distinguishing marks	3.7	4.8		
Coils	3.19	4.22		
Electrical				
Voltage	3.14.1	4.15	1.0 per cent for the group	(*)
Insulation resistance	3.14.2	4.16		
Mutual capacitance	3.14.3	4.17		
D.c. resistance	3.16	4.19		
Continuity	3.17	4.20		
Jacket longitudinal resistance	3.15	4.18		

* All electrical defects are considered major.

4.5.2 *Group B inspection.* This inspection (including sampling) shall conform to table II and to the special procedures for small-sample inspection of Standard MIL–STD–105. The reduced inspection procedure shall be R–1. Group B inspection shall normally be performed on inspection lots that have passed group A inspection and on samples selected from units that have been subjected to and met the group A inspection. The AQL's shall be as shown in table II.

TABLE II. *Group B inspection*

Inspection	Requirement paragraph	Inspection paragraph	Sampling plan
Lead or lead alloy coating	3.2.3	4.7	6.5% for the group combined. — L–7 (normal and tightened) and L–5 (reduced).
Brass coating or adhesive	3.2.4	4.7	
Breaking strength and elongation	3.2.6	4.7	6.5% — L–7 (normal and tightened) and L–5 (reduced).
Twisting	3.8	4.8	6.5% — L–7 (normal and tightened) and L–5 (reduced).
Insulation adhesion	3.9	4.9	6.5% — L–7 (normal and tightened) and L–5 (reduced).
Insulation and jacket adhesion	3.10	4.11	6.5% — L–7 (normal and tightened) and L–5 (reduced).
Compression	3.11	4.12	6.5% for the group combined. — L–7 (normal and tightened) and L–5 (reduced).
Compression before aging	3.11.1	4.12	
Compression after 48 hours aging	3.11.2	4.12.1	
Compression after 10 days aging	3.11.3	4.12.2	
Low temperature characteristics	3.12	4.13	6.5% — L–7 (normal and tightened) and L–5 (reduced).

4.5.3 *Group C inspection.* This inspection shall be as listed in table III and shall normally be performed on sample units that have been subjected to and met group A and group B inspection.

TABLE III. *Group C inspection*

Inspection	Requirement paragraph	Inspection paragraph
Air oven aging of insulation	3.9	4.10
Ozone resistance	3.18	4.21

4.5.3.1 *Sampling for inspection.* Six specimens for each group C inspection shall be selected per 500,000 feet or fraction thereof of finished cable on order, without regard to their quality, except that the units inspected at the start of the contract shall be selected from the first units produced.

4.5.3.2 *Noncompliance.* If a sample unit fails group C inspection, the contractor shall immediately investigate the cause of failure and shall report to the Government inspector the results thereof and details of the corrective action taken on the process and all units of product which were manufactured with the same conditions, materials, processes, etc. If the Government inspector does not consider the corrective action will enable the product to meet specified requirements, or if the contractor cannot determine the cause of failure, the matter shall be referred to the contracting officer (see 6.8).

4.5.4 *Disposition of nonconforming product.* Disposition of nonconforming product shall conform to Standard MIL–STD–105. Such product shall be suitably tagged or identified to indicate the cause of failure and means employed to correct the fault. The required information shall be presented to the Government when the product is submitted.

4.6 Acceptance inspection of preparation for delivery. The contractor, to demonstrate compliance with specified requirements, shall perform inspection in accordance with the applicable provisions of Specification MIL–C–12000. This does not relieve the contractor of his responsibility for performing any additional inspection which is necessary to control the quality of the product and to assure compliance with all specification requirements. The Government will review and evaluate the contractor's inspection procedures, and examine the contractor's inspection record. In addition the Government — at its discretion — may perform all or any part of the specified inspection, to verify the contractor's compliance with specified requirements (see 6.3).

4.7 Conductors. Specimens of the conductors taken from each sample unit shall be inspected for compliance with 3.2 to 3.2.6 inclusive.

4.8 Insulation and jacketing. Specimens of insulated and jacketed conductor taken from each sample unit shall be inspected for compliance with 3.4 to 3.8, inclusive.

4.9 Insulation adhesion. Specimens of the completed cable taken from each sample unit shall be inspected for compliance with 3.9. The specimens used in making this test shall have had the insulation and jacket removed from the conductor for several inches of its length and the three-eighths inch test length of insulation to be tested shall be at one end of the specimen. The stripped conductor shall be passed through a die having an aperture of not less than 0.074 nor more than 0.079 inch in diameter. The tension shall be applied to the conductor and the die. The tensile force shall be applied through a spring having a contrast of approximately 6 pounds per inch, moving away from the fixed end of the sample at a speed of approximately 6 inches per minute, or through an equivalent mechanical arrangement yielding an approximately equal testing machine speed.

4.10 Air oven aging of insulation. Specimens of the single insulated conductor from which the jacket has been removed without injury to the insulation, shall be subjected to the air oven aging specified in method

4031 of Specification J–C–98 at a temperature of 212° F. for a period of 166 + 1 hour. The adhesion of insulation after aging shall conform to 3.9.

4.11 Insulation and jacket adhesion. Specimens of the single insulated and jacketed conductors taken from each sample unit shall be tested for compliance with 3.10. The testing machine shall be equipped with parallel plate toggle type jaws with effective corrugated faces two and one-half inches in length and at least one-half inch in width. The rate of separation of the jaws shall be approximately four inches per minute. The jaws shall be set from nine to twelve inches apart prior to test. One end of a sample of finished single conductor shall be knotted and placed in one jaw. The second jaw shall be tightly clamped upon the sample in such a manner that the force will be applied directly in line with the conductor. The distance from the second jaw to the free end of the sample shall be six inches. Buckling of the jacket between the second jaw and the free end during test, or slippage of the sheath or insulation from the conductor at the free end under load of less than the breaking load of the conductor shall constitute a failure. Slippage of the jaws over the sheath shall not constitute failure, but shall call for a retest.

4.12 Compression. Specimens of the completed insulated and jacketed single conductors taken from each sample unit shall be tested for compliance with 3.11, as follows:

4.12.1 *Compression.* A length of completed single conductor shall be placed longitudinally between the parallel faces of two steel plates, the face of each plate being 2 inches in length. A load resulting from decreasing the separation of the steel plates at an approximately uniform rate shall be applied to the sample held between the plates until the insulation crushes. The speed of the compression testing machine shall be such that, when no sample is between the steel plates, the rate of approach of the plates will be approximately 1½ inches per minute. The crushing load shall be taken as that load which produces the initial abrupt reduction in the separation of the steel plates without a proportionate increase in the load. The reduction in thickness of the insulting compound at the crushing load shall be sufficiently abrupt to indicate definitely the failure. The crushing load shall be determined at + 75° F. or, alternatively, at a temperature between 50° — 100° F. and corrected to a temperature of + 75° F. The temperature coefficient employed in correcting observed values to the reference temperature shall be approved for the specific compounds employed.

4.12.2 *Accelerated aging.* Specimens of completed single conductor shall be subjected to an atmosphere of oxygen at a pressure of not less than 290 pounds per square inch and not more than 310 pounds per square inch and a temperature not less than + 156° F. and not more than + 160° F. The accelerated aging shall be continuous for the periods specified in 3.11.2 and 3.11.3.

4.13 Low temperature. Specimens of the completed insulated and jacketed conductors taken from each sample unit shall be wrapped around their respective test mandrels for at least five turns at a rate of approximately one turn per second. Both the test mandrels and the specimens shall be maintained at — 40° + 2° F. for at least 20 hours prior to and during this test. At the conclusion of the bending operation, there shall be no evidence of cracking of the insulation or jacket when the specimen is examined through a lens having a magnification of three diameters.

4.14 High voltage spark. The completed cable shall be sparked tested in accordance with method 6211 of Specification J–C–98 for compliance with 3.13. A certification to the effect that a high voltage spark test was performed shall accompany the completed cable which is submitted for acceptance by the Government inspector.

4.15 Voltage. The completed cable taken from each sample unit shall be tested in accordance with method 6111 of Specification J–C–98 under the conditions specified in 3.14, for compliance with 3.14.1. The source of potential shall be a generator or transformer capable of delivering at least 5 k.v.a. at normal load. The frequency of the alternating voltage shall be not less than 25 cycles per second.

4.16 Insulation resistance. The completed cable shall be tested in accordance with method 6031 of Specification J–C–98 under the conditions specified in 3.14 for compliance with 3.14.2. The insulation resistance shall be computed from the galvanometer deflection obtained after an electrification of 1 minute with the negative pole of the source of potential connected to the conductor. The insulation resistance may be measured prior to 1 minute if the galvanometer ceases fluctuating and reading indicates that a steady or increasing resistance value has been obtained.

4.17 Mutual capacitance. The mutual capacitance of the completed cable shall be measured, using a capacitance bridge, under the conditions specified in 3.14, for compliance with 3.14.3.

4.18 Jacket longitudinal resistance. The jacket longitudinal resistance of the completed cable shall be measured with a megger, megohm bridge or galvanometer, using a potential of not less than 100 volts dc, for compliance with 3.15.

4.19 D.c. resistance. The dc resistance of the completed cable shall be measured in accordance with method 6021 of Specification J–C–98 for compliance with 3.16.

4.20 Continuity. A continuity test shall be conducted on the completed cable for compliance with 3.17. In making the continuity test, a potential of not more than 10 volts dc shall be used. An indicator such as a flashlight bulb shall be placed in series with the conductor and potential source to indicate continuity of the conductor.

4.21 Ozone resistance test.

4.21.1 *General procedure.* The test for ozone resistance shall be performed in accordance with the procedures prescribed in ASTM D1149 with the following exceptions. This test shall be carried out using a suitable chamber in which the ozone concentration can be controlled to within ± 3 parts of ozone per hundred million parts of air and in which the temperature can be controlled to within $\pm 2°$ F.

4.21.2 The ozone concentration used in this test shall be 50 ± 3 parts of ozone per 100,000,000 parts of air.

4.21.3 The temperature of the chamber shall be $100 \pm 2°$ F.

4.21.4 Test specimens.

4.21.4.1 *Preparation.* Test specimens shall be prepared by one of the following methods. Not less than three specimens from the jacket shall be tested.

(a) The specimens shall be formed by slitting the jacket lengthwise and after removal from the cable, the specimens shall be mounted in accordance with the requirements of ASTM D518, Method B except that the length of the clamping strips shall be such as to facilitate placement within the test chamber and elongated to give an elongation of 20 percent for exposure in the chamber.

(b) A length of the completed cable shall be wrapped around a mandrel four times the diameter of the cable and exposed thus in the chamber.

4.21.4.2 *Conditioning of specimens.* The specimens shall be aged at room temperature

in a closed cabinet for 24 hours before exposure in the testing chamber.

4.21.4.3 *Exposure.* The specimens shall be exposed for 7 days to the ozone concentration and the temperature specified in 4.21.2 and 4.21.3, respectively.

4.21.5 *Results.* At the end of the exposure time and while still elongated, the jacket shall be examined for compliance with 3.18.

4.22 Coils. Cable, telephone (W–50–A) furnished on coils shall be inspected for compliance with 3.19, 3.19.1, and 3.19.2.

5. PREPARATION FOR DELIVERY

5.1 Preservation and packaging.

5.1.1 *Level A.* Cable, telephone (W–50–A) shall be preserved and packaged with the applicable provisions of Specification MIL–C–12000, except that Air Force shipments shall be in accordance with 5.1.1.1 only.

5.1.1.1 Cable, telephone (W–50–A) shall be in continuous lengths of 750 feet on nonreturnable wood or metal spools or reels. Minimum acceptable lengths shall be 735 feet and maximum length shall be 765 feet.

5.1.2 *Level C.* Cable, telephone (W–50–A) shall be preserved and packaged in accordance with the applicable provisions of Specification MIL–C–12000, except that the requirements for Air Force shipments shall be identical to 5.1.1.1 only.

5.2 Packing.

5.2.1 *Level A.* Cable, telephone (W–50–A) shall be packed for shipment as specified in Specification MIL–C–12000, except that Air Force shipments shall be in accordance with 5.2.1.1 only.

5.2.1.1 Cable, telephone (W–50–A) shall be packed for shipment on nonreturnable wood or metal spools or reels in accordance with standard commercial practice for export type shipment.

5.2.2 *Level B.* Cable, telephone (W–50–A) shall be packed for shipment as specified in Specification MIL–C–12000 (not applicable to Air Force shipments).

5.2.3 *Level C.* Cable, telephone (W–50–A) shall be packed for shipment as specified in Specification MIL–C–12000, except that Air Force shipments shall be in accordance with 5.2.3.1 only.

5.2.3.1 Cable, telephone (W–50–A) shall be packed for shipment in accordance with standard commercial practice, to permit acceptance by carrier for transportation at the lowest applicable rate, and to afford maximum protection from normal hazards of transportation.

5.3 Marking. Interior packages and exterior shipping containers shall be marked in accordance with the applicable provisions of Standard MIL–STD–129.

6. NOTES

6.1 Intended use. Cable, telephone (W–50–A) is intended for use where an insulated wire is needed in a section of an open wire telephone line, for terminating open wire lines, as an emergency restoration wire for open lines, and as a drop wire.

6.2 Ordering data. Procurement documents should specify the following:

(a) Title, number, and date of this specification and any amendment thereto.

(b) Level of packaging and level of packing required for shipment (level A, level B, or level C).

(c) The specific paragraphs of section 5 which are applicable to the particular procurement.

(d) Place of final inspection.

6.3 Verification inspection. Verification by the Government will be limited to the amount deemed necessary to determine compliance with the contract and will be limited in severity to the definitive quality assurance provisions established in this specification and the contract. The amount of verification inspection by the Government will be adjusted to make maximum utilization of the contractor's quality control system and the quality history of the product, and will normally be identified by the categories listed below:

(a) Type A — The total of that inspection set forth in the Quality Assurance Provisions of this specification or the contract. Included in this category is that amount of inspection referred to as normal and tightened inspection by Military Standard MIL–STD–105.

(b) Type B — That inspection set forth in the Quality Assurance Provisions of this specification or the contract reduced in amount under the reduced inspection provisions of Military Standard MIL–STD–105.

(c) Type C — A reduced inspection procedure resulting in a material reduction in the amount of inspection set forth in the Quality Assurance Provisions of this specification. The amount of inspection is less than that provided for in type B and is based upon a consistently acceptable product resulting from a planned quality control system voluntarily employed by the contractor in the production of the product.

6.4 Definitions. The inspection terms used herein conform to Standard MIL–STD–109, and are as follows:

6.4.1 *Unit of product.* A unit of product is defined as a continuous length of bare conductor or a coil of finished cable.

6.4.2 *Specimen.* A specimen is an individual piece of finished cable or any part removed from the finished cable such as conductors, insulation, insulated conductors, and jacket, which is taken from a sample unit and subjected to inspection.

6.4.3 *Finished cable.* Finished cable is cable on which all manufacturing operations have been completed and which is ready to be submitted for inspection.

6.5 Acceptable sunproofing waxes. Acceptable sunproofing waxes are "Heliozone" as made by the E. I. Dupont de Nemours and Co., Inc., Wilmington, Del. "Sunproof, Improved Sunproof, Sunproof No. 713 and No. 718" as made by the Naugatuck Chemical Division of the U.S. Rubber Co., Naugatuck, Conn., "Sunolite" as made by the Witco Chemical Co., 295 Madison Ave., New York 17, N. Y., "Antisun Wax and Antisun XX Wax" as made by the Cary Chemicals Co., Inc., New Brunswick, N. J., "Sunoco Anti-Check" as made by the Sun Oil Co., 1606 Walnut Street, Philadelphia 3, Pa., "Sunproofing Wax Type AA–1177" as made by the Allied Asphalt and Mineral Corp., 217 Broadway, New York 17, N.Y., "Sunproofing Wax #1343 and #1344" as made by Frank B. Ross Co., Inc., 6–10 Ash Street, Jersey City, N. J.; and "Microflake Wax" as made by the Genseke Brothers, West 48th Place and Whipple Street, Chicago, Ill.; or equal. Information pertaining to approval of additional sources for sunproofing waxes and any changes or deletions in the above sources should be obtained from the U. S. Army Signal Material Support Agency, Fort Monmouth, N. J.

6.6 Information on adhesives. An adhesive such as "Typly", as made by the Marbon Chemical Division of the Borg Warner Corporation, Gary, Ind., or equal may be used for bonding of insulations to the conductor (see 3.2.4).

6.7 Information on antiozonants. Experience has shown that jacket compounds containing 3 parts of an acceptable anti-

ozonant such as (N'N' Di–3) (5-methyl keptyl) p-phenylene diamine and proper quantities of wax on 100 parts of the rubber have passed this test satisfactorily. This information is not a requirement of this specification.

6.8 Group C inspection. Approval to ship may be withheld, at the discretion of the Government, pending the decision from the contracting officer on the adequacy of corrective action (see 4.5.3.2).

Notice. When Government drawings, specifications or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

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