

with laboratory worksheets covering retention by assay and preservative analyses for the purchaser, and on request shall furnish a copy or transcript of any of these reports to the Chairman, Technical Standards Committee "A", Electric Staff Division, Rural Utilities Service, Washington, DC 20250-1569.

(h) *Charge numbers on re-treat poles.*

(1) The letter "R" shall be added to the original charge number in the butts of all poles that are re-treated for insufficient penetration or retention of preservative.

(2) All poles that fail to meet treatment requirements after two re-treatments shall be permanently rejected.

(i) *Safety provisions.* Poles intended for agency borrowers shall not be inspected when, in the opinion of the inspector, unsafe conditions are present.

APPENDIX A TO §1728.202—INSPECTOR'S QUALIFICATIONS

Inspection agencies should see that inspectors assigned to the inspection of timber products and treatment for borrowers are competent and experienced. In general, any of the following examples are considered as minimum qualifying experience before a new inspector may be permitted to inspect timber products for borrowers:

(a) Three years' experience as an inspector of timber and the preservative treatment of timber; or

(b) Three years' experience in timber treating plant quality control work; or

(c) Under the direct, on site, supervision of an experience, well-qualified inspector, the prospective inspector shall have performed the following:

(1) Inspected at least 10,000 poles and/or crossarms "in the white."

(2) Checked preservative penetration results on at least 10,000 poles and crossarms;

(3) Made at least 100 wood assays for preservative retention;

(4) Made at least 25 analyses of each type preservative used on material the person is assigned to inspect; and

(d) In both (a) and (b) of this Appendix A, the experience should be not less than that required in (c).

(e) Inspectors experienced in the inspections of one product, such as poles, should not be qualified to inspect another product, such as crossarms, until the above experience is gained for each respective product.

(f) The inspector should be especially well informed in wood preservation and the operation of a timber treating plant, and be competent in preservative analysis and other laboratory work.

(g) In all cases, an inspector should be thoroughly instructed in the application of the specifications and the standards pertaining thereto before being permitted to independently inspect timber products and the treatments applied to them. Knowledge of these specifications and standards, as well as the inspector's proficiency, may be checked routinely by members of the agency staff.

[76 FR 36965, June 24, 2011, as amended at 77 FR 29537, May 18, 2012]

§ 1728.203 [Reserved]

§ 1728.204 Electric standards and specifications for materials and construction.

(a) *General specifications.* This section details requirements for 15 and 25 kV single phase, V-phase, and three-phase power cables for use on 12.5/7.2 kV (15 kV rated) and 24.9/14.4 kV (25 kV rated) underground distribution systems with solidly multi-grounded neutral. Cable complying with this specification shall consist of solid or strand-filled conductors which are insulated with tree-retardant cross-linked polyethylene (TR-XLPE) or ethylene propylene rubber (EPR), with concentrically wound copper neutral conductors covered by a nonconducting or semiconducting jacket. 35 kV rated cables may be used in 24.9/14.4 kV application where additional insulation is desired.

(1) The cable may be used in single-phase, two (V)-phase, or three-phase circuits.

(2) Acceptable conductor sizes are: No. 2 AWG (33.6 mm²) through 1000 kcmil (507 mm²) for 15 kV cable, No. 1 AWG (42.4 mm²) through 1000 kcmil (507 mm²) for 25 kV, and 1/0 (53.5 mm²) through 1000 kcmil (507 mm²) for 35 kV cable.

(3) Except where provisions therein conflict with the requirements of this specification, the cable shall meet all applicable provisions of ANSI/ICEA S-94-649-2004 (incorporated by reference in §1728.97). Where provisions of the ANSI/ICEA specification conflict with this section, §1728.204 shall apply.

(b) *Definitions.* As used in this section:

Agency refers to the Rural Utilities Service (RUS), an agency of the United States Department of Agriculture's

(USDA), hereinafter referred to as the Agency.

EPR Insulating Compound is a mixture of ethylene propylene base resin and selected ingredients.

TR-XLPE Insulating Compound is a tree retardant crosslinked polyethylene (TR-XLPE) insulation compound containing an additive, a polymer modification filler, which helps to retard the growth of electrical trees in the compound.

(c) *Phase conductors.* (1) Central phase conductors shall be copper or aluminum as specified by the borrower within the limit of §1728.204(a)(2).

(2) Central copper phase conductors shall be annealed copper in accordance with ASTM B 3-01 (incorporated by reference in §1728.97). Concentric-lay-stranded phase conductors shall conform to ASTM B 8-04 (incorporated by reference in §1728.97) for Class B stranding. Compact round concentric-lay-stranded phase conductors shall conform to ASTM B 496-04 (incorporated by reference in §1728.97). Combination unilay stranded phase conductors shall conform to ASTM B 787/B 787M-04 (incorporated by reference in §1728.97). Compact round atranded copper conductors using single input wire construction shall conform to ASTM B835-04 (incorporated by reference in §1728.97). Compressed round stranded copper conductors, hard, medium-hard, or soft using single input wire construction shall conform to ASTM B902-04a (incorporated by reference in §1728.97). If not specified, stranded phase conductors shall be Class B stranded.

(3) Central aluminum phase conductors shall be one of the following:

(i) Solid: Aluminum 1350 H12 or H22, H14 or H24, H16 or H26, in accordance with ASTM B 609/B 609M-99 (incorporated by reference in §1728.97).

(ii) Stranded: Aluminum 1350 H14 or H24, H142 or H242, H16, or H26, in accordance with ASTM B 609/B 609M-99 (incorporated by reference in §1728.97) or Aluminum 1350-H19 in accordance with ASTM B 230/B 230M-07 (incorporated by reference in §1728.97). Concentric-lay-stranded (includes compacted and compressed) phase conductors shall conform to ASTM B 231/B 231M-04 (incorporated by reference in

§1728.97) for Class B stranding. Compact round concentric-lay-stranded phase conductors shall conform to ASTM B 400-08 (incorporated by reference in §1728.97). Combination unilay stranded aluminum phase conductors shall conform to ASTM B 786-08 (incorporated by reference in §1728.97). If not specified, stranded phase conductors shall be class B stranded.

(4) The interstices between the strands of stranded conductors shall be filled with a material designed to fill the interstices and to prevent the longitudinal migration of water that might enter the conductor. This material shall be compatible with the conductor and conductor shield materials. The surfaces of the strands that form the outer surface of the stranded conductor shall be free of the strand fill material. Compatibility of the strand fill material with the conductor shield shall be tested and shall be in compliance with ICEA T-32-645-93 (incorporated by reference in §1728.97). Water penetration shall be tested and shall be in compliance with ANSI/ICEA T-31-610-2007 (incorporated by reference in §1728.97).

(5) The center strand of stranded conductors shall be indented with the manufacturer's name and year of manufacture at regular intervals with no more than 12 inches (0.3 m) between repetitions.

(d) *Conductor shield (stress control layer).* A non-conducting (for discharge resistant EPR) or semi-conducting shield (stress control layer) meeting the applicable requirements of ANSI/ICEA S-94-649-2004 (incorporated by reference in §1728.97) shall be extruded around the central conductor. The minimum thickness at any point shall be in accordance with ANSI/ICEA S-94-649-2004. The void and protrusion limits on the conductor shield shall be in compliance with ANSI/ICEA S-94-649-2004. The shield shall have a nominal operating temperature equal to, or higher than, that of the insulation.

(e) *Insulation.* (1) The insulation shall conform to the requirements of ANSI/ICEA S-94-649-2004 (incorporated by reference in §1728.97) and may either be tree retardant cross-linked polyethylene (TR-XLPE) or ethylene propylene rubber (EPR), as specified by

the borrower. The void and protrusion limits on the insulation shall be in compliance with ANSI/ICEA S-94-649-2004.

(2) The thickness of insulation shall be as follows:

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Cable rated voltage	Nominal thickness	Minimum thickness	Maximum thickness
15 kV	220 mils (5.59 mm)	210 mils (5.33 mm)	250 mils (6.35 mm).
25 kV	260 mils (6.60 mm)	245 mils (6.22 mm)	290 mils (7.37 mm).
35 kV	345 mils (8.76 mm)	330 mils (8.38 mm)	375 mils (9.53 mm).

(f) *Insulation shield.* (1) A semi-conducting thermosetting polymeric layer meeting the requirements of ANSI/ICEA S-94-649-2004 (incorporated by reference in §1728.97) shall be extruded tightly over the insulation to serve as an electrostatic shield and protective covering. The shield compound shall be compatible with, but not necessarily the same material composition as, that of the insulation (e.g., cross-linked polyethylene shield may be used with EPR insulation). The void and protrusion limits on the semi-conducting shields shall be in compliance with the ANSI/ICEA S-94-649-2004.

(2) The thickness of the extruded insulation shield shall be in accordance with ANSI/ICEA S-94-649-2004 (incorporated by reference in §1728.97).

(3) The shield shall be applied such that all conducting material can be easily removed without the need for externally applied heat. Stripping tension values shall be 3 through 18 pounds (1.36 through 8.16 kg) for TR-XLPE and EPR discharge free cables. Discharge resistant cables shall have strip tension of 0 through 18 pounds (0 through 8.16 kg).

(4) The insulation shield shall meet all applicable tests of ANSI/ICEA S-94-649-2004 (incorporated by reference in §1728.97).

(g) *Concentric neutral conductor.* (1) Concentric neutral conductor shall consist of annealed round, uncoated copper wires in accordance with ASTM B 3-01 (incorporated by reference in §1728.97) and shall be spirally wound over the shielding with uniform and equal spacing between wires. The concentric neutral wires shall remain in continuous intimate contact with the extruded insulation shield. Full neutral is required for single phase and 1/3 neutral for three phase applications unless

otherwise specified. The minimum wire size for the concentric neutral is 16 AWG (1.32 mm²).

(2) When a strap neutral is specified by the borrower, the neutral shall consist of uncoated copper straps applied concentrically over the insulation shield with uniform and equal spacing between straps and shall remain in intimate contact with the underlying extruded insulation shield. The straps shall not have sharp edges. The thickness of the flat straps shall be not less than 20 mils (0.5 mm).

(h) *Overall outer jacket.* (1) An electrically nonconducting (insulating) or semi-conducting outer jacket shall be applied directly over the concentric neutral conductors.

(2) The jacket material shall fill the interstice area between conductors, leaving no voids. The jacket shall be free stripping. The jacket shall have three red stripes longitudinally extruded into the jacket surface 120° apart.

(3) Nonconducting jackets shall consist of low density, linear low density, medium density, or high density HMW black polyethylene (LDPE, LLDPE, MDPE, HDPE) compound meeting the requirements of ANSI/ICEA S-94-649-2004 (incorporated by reference in §1728.97) and ASTM D 1248-05 (incorporated by reference in §1728.97) for Type I, Class C, Category 4 or 5, Grade J3 before application to the cable. Polyvinyl chloride (PVC) and chlorinated polyethylene (CPE) jackets are not acceptable.

(4) Semi-conducting jackets shall have a maximum radial resistivity of 100 ohm-meter and a maximum moisture vapor transmission rate of 1.5 g/m²/24 hours at 38 °C (100 °F) and 90 percent relative humidity in accordance

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with ASTM E 96/E96M-05 (incorporated by reference in §1728.97).

(5) The minimum thickness of the jacket over metallic neutral wires or straps shall comply with the thickness specified in ANSI/ICEA S-94-649-2004 (incorporated by reference in §1728.97).

(i) *Tests.* (1) As part of a request for Agency consideration for acceptance and listing, the manufacturer shall submit certified test data results to the Agency that detail full compliance with ANSI/ICEA S-94-649-2004 (incorporated by reference in §1728.97) for each cable design.

(i) Test results shall confirm compliance with each of the material tests, production sampling tests, tests on completed cable, and qualification tests included in ANSI/ICEA S-94-649-2004 (incorporated by reference in §1728.97).

(ii) The testing procedure and frequency of each test shall be in accordance with ANSI/ICEA S-94-649-2004 (incorporated by reference in §1728.97).

(iii) Certified test data results shall be submitted to the Agency for any test, which is designated by ANSI/ICEA S-94-649-2004 (incorporated by reference in §1728.97) as being “for Engineering Information Only,” or any similar designation.

(2) *Partial discharge tests.* Manufacturers shall demonstrate that their cable is not adversely affected by excessive partial discharge. This demonstration shall be made by completing the procedures described in paragraphs (1)(2)(i) and (1)(2)(ii) of this section.

(i) Each shipping length of completed cable shall be tested and have certified test data results available indicating compliance with the partial discharge test requirements in ANSI/ICEA S-94-649-2004 (incorporated by reference in §1728.97).

(ii) Manufacturers shall test production samples and have available certified test data results indicating compliance with ASTM D 2275-01 (incorporated by reference in §1728.97) for discharge resistance as specified in the ANSI/ICEA S-94-649-2004 (incorporated by reference in §1728.97). Samples of insulated cable shall be prepared by either removing the overlying extruded insulation shield material, or using insulated cable before the extruded insu-

lation shield material is applied. The sample shall be mounted as described in ASTM D 2275-01 and shall be subjected to a voltage stress of 250 volts per mil of nominal insulation thickness. The sample shall support this voltage stress, and not show evidence of degradation on the surface of the insulation for a minimum of 100 hours. The test shall be performed at least once on each 50,000 feet (15,240 m) of cable produced, or major fractions thereof, or at least once per insulation extruder run.

(3) *Jacket tests.* Tests described in paragraph (1)(3)(i) of this section shall be performed on cable jackets from the same production sample as in paragraphs (1)(2)(i) and (1)(2)(ii) of this section.

(i) A Spark Test shall be performed on nonconducting jacketed cable in accordance with ANSI/ICEA S-94-649-2004 (incorporated by reference in §1728.97) on 100 percent of the completed cable prior to its being wound on shipping reels. The test voltage shall be 4.5 kV AC for cable diameters <1.5 inches and 7.0 kV for cable diameters >1.5 inches, and shall be applied between an electrode at the outer surface of the nonconducting (insulating) jacket and the concentric neutral for not less than 0.15 second.

(ii) [Reserved]

(4) Frequency of sample tests shall be in accordance with ANSI/ICEA S-94-649-2004 (incorporated by reference in §1728.97).

(5) If requested by the borrower, a certified copy of the results of all tests performed in accordance with this section shall be furnished by the manufacturer on all orders.

(j) *Miscellaneous.* (1) All cable provided under this specification shall have suitable markings on the outer surface of the jacket at sequential intervals not exceeding 2 feet (0.61 m). The label shall indicate the name of the manufacturer, conductor size, type and thickness of insulation, center conductor material, voltage rating, year of manufacture, and jacket type. There shall be no more than 6 inches (0.15 m) of unmarked spacing between texts label sequence. The jacket shall be marked with the symbol required by Rule 350G of the National Electrical

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Safety Code and the borrower shall specify any markings required by local safety codes. This is in addition to extruded red stripes required in this section.

(2) Watertight seals shall be applied to all cable ends to prevent the entrance of moisture during transit or storage. Each end of the cable shall be firmly and properly secured to the reel.

(3) Cable shall be placed on shipping reels suitable for protecting it from damage during shipment and handling. Reels shall be covered with a suitable covering to help provide physical protection to the cable.

(4) A durable label shall be securely attached to each reel of cable. The label shall indicate the purchaser's name and address, purchase order number, cable description, reel number, feet of cable on the reel, tare and gross weight of the reel, and beginning and ending sequential footage numbers.

[77 FR 19529, Apr. 2, 2012]

PART 1730—ELECTRIC SYSTEM OPERATIONS AND MAINTENANCE

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AUTHORITY: 7 U.S.C. 901 *et seq.*, 1921 *et seq.*, 6941 *et seq.*

SOURCE: 63 FR 3450, Jan. 23, 1998, unless otherwise noted.

Subpart A—General

§ 1730.1 Introduction.

(a) This part contains the policies and procedures of the Rural Utilities Service (RUS) related to electric borrowers' operation and maintenance practices and RUS' review and evaluation of such practices.

(b) The policies and procedures included in this part apply to all electric borrowers (both distribution borrowers and power supply borrowers) and are intended to clarify and implement certain provisions of the security instrument and loan contract between RUS and electric borrowers regarding operations and maintenance. This part is not intended to waive or supersede any provisions of the security instrument and loan contract between RUS and electric borrowers.

(c) The Administrator may waive, for good cause, on a case by case basis, certain requirements and procedures of this part.

§ 1730.2 RUS policy.

It is RUS policy to require that all property of a borrower be operated and maintained properly in accordance with the requirements of each borrower's loan documents. It is also RUS policy to provide financial assistance only to borrowers whose operations and maintenance practices and records are satisfactory or to those who are taking corrective actions expected to make their operations and maintenance practices and records satisfactory to RUS.

§ 1730.3 RUS addresses.

(a) Persons wishing to obtain forms referred to in this part should contact: