

**PART 1728—ELECTRIC STANDARDS
AND SPECIFICATIONS FOR MA-
TERIALS AND CONSTRUCTION**

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

§ 1728.10 General purpose and scope.

(a) The requirements of this part are based on contractual provisions between RUS and the organizations which receive financial assistance from RUS.

(b) RUS will establish certain specifications and standards for materials, equipment, and construction units that will be acceptable for RUS financial assistance for the electric program. Materials and equipment purchased by the electric borrowers or accepted as contractor-furnished material must conform to RUS standards and specifications where they have been established and, if included in RUS Bulletin 43-5, "List of Materials Acceptable for Use on Systems of RUS Electrification Borrowers" (List of Materials), must be selected from that list or must have received technical acceptance from RUS. RUS, through its Technical Standards Committees, will evaluate certain materials, equipment and construction units, and will determine acceptance.

[50 FR 47710, Nov. 20, 1985. Redesignated at 55 FR 39395, Sept. 27, 1990]

§ 1728.20 Establishment of standards and specifications.

(a) *National and other standards.* RUS will utilize standards of national standardizing groups, such as the American National Standards Institute (ANSI), American Wood Preservers' Association (AWPA), the various national engineering societies and the National Electrical Safety Code (NESC), to the greatest extent practical. When there are no national standards or when RUS determines that the existing national standards are not adequate for rural electric systems, RUS will prepare standards for material and equipment to be used on systems of electric borrowers. RUS standards and specifications will be codified or listed in §1728.97, Incorporation by Reference of Electric Standards and Specifications. RUS will also prepare specifications for materials and equipment when it determines that such specifications will result in reduced costs, improved materials and equipment, or in the more effective use of engineering services.

(b) *Deviations from Standards.* No member of the RUS staff will be permitted to authorize deviations from the standard specifications, or to establish or change the technical standards, or to authorize the use of items that have not received acceptance by the Technical Standards Committees, except as provided for under §1728.70, or by authorization and/or delegation of authority by the Administrator of RUS.

(c) *Category of Items.* Items appearing in the List of Materials are listed by categories of generic items which are used in RUS construction standards incorporated by reference in §1728.97. RUS will establish and define these categories and will establish all criteria for acceptability within these categories.

[50 FR 47710, Nov. 20, 1985. Redesignated at 55 FR 39395, Sept. 27, 1990, as amended at 55 FR 53487, Dec. 31, 1990]

§ 1728.30 Inclusion of an item for listing or technical acceptance.

(a) *Scope.* RUS, through its Technical Standards Committees "A" and "B" will determine the acceptability of certain standards, standard specifications,

standard drawings, and items of materials and equipment to be used in transmission, distribution and general plant (excluding office equipment, tools, and work equipment, and consumer-owned electric wiring facilities).

(b) *Addresses of Committees.* The address of Technical Standards Committee “A” is: Chairman, Technical Standards Committee “A” (Electric), Rural Utilities Service, U.S. Department of Agriculture, Washington, DC 20250–1500. The address of Technical Standards Committee “B” is: Chairman, Technical Standards Committee “B” (Electric), Rural Utilities Service, U.S. Department of Agriculture, Washington, DC 20250–1500.

(c) *Review by Technical Standards Committee “A”.* All proposals for listing a product in the List of Materials must be addressed to Technical Standards Committee “A.” This committee will consider all proposals made by sponsors of specifications, drawings, materials, or equipment in categories for which RUS has established criteria for acceptability. A sponsor may be a manufacturer, supplier, contractor or any other person or organization which has made an application for listing or has requested an action by the committee. Committee “A” will consider all relevant information presented in determining whether an item should be accepted by Technical Standards Committee “A.” Formal rules of evidence and procedure shall not apply to proceedings before this committee.

(d) *Action by Technical Standards Committee “A”.* (1) Committee “A” may take one of the following actions:

- (i) Accept an item for listing without conditions (domestic items only),
- (ii) Reject an item (domestic or non-domestic),¹
- (iii) Accept an item for listing with conditions (domestic items only),
- (iv) Table an item for a time period sufficient to allow the sponsor to be notified and furnish additional information (domestic or non-domestic),
- (v) Grant technical acceptance with or without conditions for a period of

one year from the date of notification by RUS (nondomestic items only).

(2) All committee decisions regarding the actions listed above must be unanimous. If the vote is not unanimous, the item shall be referred to Technical Standards Committee “B.” Written notice of Technical Standards Committee “A’s” decision, stating the basis for the decision, will be provided to the sponsor.

(3) Items accepted without conditions by the Technical Standards Committees will be considered to be accepted on a general basis. No restrictions as to quantity or application will be placed on items which have received general acceptance. Items accepted subject to certain conditions, such as limited use to gain service experience, or limited use appropriate to certain areas and conditions, will be considered to be accepted on a conditional basis. The conditions will be cited as a part of the listing provided for in §1728.60, or as part of the technical acceptance for nondomestic items.

(e) *Appeal to Technical Standards Committee “B”.* A sponsor may request a review of an adverse decision by Technical Standards Committee “A” within ten (10) days of notification of such decision by submitting a letter requesting such review to Technical Standards Committee “B” (Electric).

(f) *Action by Technical Standards Committee “B”.* Committee “B” may take any of the actions listed for Committee “A” in §1728.30(d). However, for a Committee “B” action to be effective it must be by majority vote. Failure to obtain a majority on one of the proposed actions shall mean that the product will not be listed or accepted. Committee “B’s” determination shall be based on the record developed before Committee “A” and such additional information as Committee “B” may request. Formal rules of procedure and evidence shall not apply to proceedings before Committee “B.” Written notice of Committee “B’s” decision, stating the basis of the decision, will be provided to the sponsor.

(g) *Appeal to the Administrator.* In the event of an adverse decision by Committee “B,” the sponsor may, within ten (10) days of notification of such decision, request a review of this decision

¹Nondomestic items are items which do not qualify as domestic products pursuant to RUS “Buy American” requirement.

by submitting a letter to the Administrator requesting such a review.

(h) *Change in Design.* RUS acceptance of an item will be conditioned on the understanding that no design changes (material or dimensions) affecting the quality, strength, or electrical characteristics of the item shall be made without prior concurrence of Technical Standards Committee "A."

[50 FR 47711, Nov. 20, 1985. Redesignated at 55 FR 39395, Sept. 27, 1990]

§ 1728.40 Procedure for submission of a proposal.

(a) *Written Request.* Consideration of an item of material or equipment will be obtained by the sponsor through the submission of a written request in an original and five copies addressed to the Chairman, Technical Standards Committee "A" (Electric). The letter must include the catalog number or other identifying number or code as well as a description of the item. In the event that an item being submitted is also intended for consideration by Technical Standards Committee "A" (Telephone), a separate request must be made to the telephone committee. (See part 1755 of this chapter).

(b) *Technical and Performance Data.* Six copies of the specification of manufacture, drawings and test data must be submitted to the committee. Six copies of the performance history shall also be submitted unless RUS determines that such performance history is not reasonably available.

(c) *Sample.* One sample of the item must be submitted to the Chairman, Technical Standards Committee "A," unless RUS waives the requirements of the sample. In case of large, bulky or extremely heavy samples, the sponsor should contact the Chairman, Technical Standards Committee "A" (Electric), at the above address, before any sample is shipped.

(d) *Action on Proposal.* RUS will inform a sponsor of the action taken on the sponsor's proposal.

[50 FR 47711, Nov. 20, 1985. Redesignated at 55 FR 39395, Sept. 27, 1990]

§ 1728.50 Removal of an item from listing or technical acceptance.

(a) *Removal Actions.* An item of material or equipment may be removed

from the listing or technical acceptance in accordance with the following procedures upon determination that the item is unsatisfactory or has been misrepresented to the owner or RUS.

(b) *Notification by the Committee.* The sponsor of an item of material or equipment will be notified in writing of a proposal to remove such item from the listing or technical acceptance.

(c) *Supplemental Information.* Within ten (10) days of receipt of such notification, the sponsor may submit to Committee "A" a letter expressing the sponsor's intent to submit written supplemental technical information relevant to Committee "A's" determination. The sponsor must submit such information within twenty (20) days from the submission of its letter to Committee "A." Committee "A" will have the discretion of making a decision following the expiration of the time periods provided in this paragraph.

(d) *Review by the Technical Standards Committee "A".* Committee "A" will consider all relevant information presented in determining whether an item should be removed from the listing or technical acceptance. Formal rules of evidence and procedure shall not apply to proceedings before Technical Standards Committee "A."

(e) *Action by the Technical Standards Committee "A".* Committee "A" may take one of the following actions:

(1) Order the immediate removal of the item from the listing, or technical acceptance,

(2) Condition the item's continued listing, or technical acceptance,

(3) Recommend a basis of settlement which will adequately protect the interest of the Government, or

(4) Delay the effectiveness of its decision for a time period sufficient to allow the sponsor to appeal to Technical Standards Committee "B."

All committee "A" decisions regarding the actions listed above must be by unanimous vote. If the vote is not unanimous, the item will be referred to Technical Standards Committee "B."

Written notice of Technical Standards Committee "A's" decision, stating the basis for the decision, will be provided to the sponsor.

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(f) *Additional Opportunity to Present Information.* At the request of the sponsor, RUS may afford additional opportunity for consideration of relevant information. Such additional opportunity may include, without limitation, a meeting between RUS and the sponsor in such a forum that RUS may determine. In making this decision, RUS will consider, among other things, the best interests of RUS, its borrowers, and the sponsor, and the best manner to develop sufficient information relating to the proposed action.

(g) *Appeal to the Technical Standards Committee "B".* Within ten (10) days of notification of Committee "A's" decision, a sponsor may appeal in writing to Technical Standards Committee "B" to review Committee "A's" decision, specifying the reasons for such a request. Committee "B's" determination, in response to such request, shall be based on the record developed before Committee "A" and such additional information as Committee "B" may request. Formal rules of procedure and evidence shall not apply to proceedings before Committee "B."

(h) *Action by Technical Standards Committee "B".* Committee "B," by majority vote, may take one of the following actions:

- (1) Order the immediate removal of the item from listing, or technical acceptance,
- (2) Condition the item's continued listing, or technical acceptance,
- (3) Recommend a basis of settlement which adequately protects the interests of the Government, or
- (4) Delay the effectiveness of its decision for a time period sufficient to allow the sponsor to appeal to the Administrator of RUS.

Failure to obtain a majority vote on any of the above actions shall mean that the product will continue to be listed or accepted.

Written notice of Committee "B's" decision stating the basis of the decision will be provided to the sponsor.

(i) *Appeal to the Administrator.* Within ten (10) days of the receipt of Committee "B's" decision, a sponsor may appeal to the Administrator to review Committee "B's" decision. If an appeal is made, the sponsor shall submit a written request to the Administrator,

Rural Utilities Service, Room 4053, South Building, U.S. Department of Agriculture, Washington, DC 20250-1500 specifying the reasons to request reconsideration. The Administrator will have the option to decline the request, in which case the decision of Committee "B" shall stand. If a review is granted, the determination by the Administrator or the Administrator's designee shall be based on the record developed before Committee "A" and Committee "B" and such additional information as the Administrator may request. Formal rules of procedure and evidence shall not apply to the actions of the Administrator.

(j) *Action by the Administrator.* The Administrator may take one of the following actions:

- (1) Order the immediate removal of the item from the listing, or technical acceptance,
- (2) Condition its continued listing, or technical acceptance, or
- (3) Recommend a basis of settlement which adequately protects the interests of the Government.

Written notice of the Administrator's determination, stating the basis for the decision, will be provided to the sponsor.

The Administrator's actions are final.

[50 FR 47711, Nov. 20, 1985. Redesignated at 55 FR 39395, Sept. 27, 1990]

§ 1728.60 List of materials and equipment.

(a) *General.* Those items of material or equipment accepted by Technical Standards Committee "A" or "B," with the exception of technically accepted nondomestic items, will be listed in the List of Materials. Items which do not qualify as domestic products may be accepted on a technical basis only (technical acceptance) for a period of one year as provided in § 1728.30(c)(1) and will not be included in the List of Materials.

(b) *Publishing and Revisions.* RUS will reissue the List of Materials every year, dated July, and issue supplements, if needed, dated October, January, and April of every year. An RUS office copy, which is the official current copy, of the List of Materials, will be updated every time changes are

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made by the Technical Standards Committees.

(c) *Dual Listings.* RUS, through its Technical Standards Committees, will accept for listing only one item of a particular type of material or equipment for each manufacturer. If a manufacturer submits an item to perform the identical function of a listed item, RUS, through its Technical Standards Committees, may accept that item and remove the one previously listed. RUS will list only new items of material and equipment in the List of Materials. Used items will not be considered for listing.

[50 FR 47712, Nov. 20, 1985. Redesignated at 55 FR 39395, Sept. 27, 1990]

§ 1728.70 Procurement of materials.

(a) *By Owner.* When purchasing the type of materials included in the List of Materials, RUS borrowers shall purchase only materials listed in the List of Materials, or materials which have a current technical acceptance by RUS and meet the "Buy American" requirement.

(b) *By Contractor.* When performing work for an RUS borrower, contractors shall supply only items from the general acceptance pages of the List of Materials, or obtain the borrower's concurrence prior to purchase and use of a technically nondomestic item or any item listed on a conditional basis.

(c) *Procurement of Unlisted Items.* (1) The borrower shall request prior approval from RUS for use of an item that does not fall in categories established by RUS in the List of Materials for which acceptability has been established by the Technical Standards Committees.

(2) RUS will also determine, on a case-by-case basis, whether to allow use of an unlisted item in emergency situations and for experimental use or to meet a specific need. For purposes of this part 1728, an emergency shall mean a situation wherein the supply of listed material and equipment from the industry is not readily available, or the standard designs are not applicable to the borrower's specific problem under consideration.

(3) RUS will make arrangements for test or experimental use of newly developed items requiring limited trial

use. RUS, working with the borrower and the manufacturer, will establish test locations for the items to facilitate installation and observation.

[50 FR 47712, Nov. 20, 1985. Redesignated at 55 FR 39395, Sept. 27, 1990]

§ 1728.97 Incorporation by reference of electric standards and specifications.

The materials listed below are incorporated by reference in the corresponding sections noted. The Director of the Federal Register approves the incorporations by reference in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. A notice of any change in these materials will be published in the FEDERAL REGISTER. Standards and specifications materials are available for purchase at the addresses in the corresponding sections noted below. The materials incorporated by reference may also be inspected at the Rural Utilities Service's Program Development and Regulatory Analysis, Stop 1520, Room 5820-S, Washington, DC 20250-1522, call (202) 720-8674. Bulletins are also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of these materials at NARA, call (202) 741-6030, or go to: <http://www.archives.gov> or at the Office of the Federal Register, 800 North Capitol Street, NW., suite 700, Washington, DC, or go to: http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.

(a) The following RUS bulletins are available from the Rural Utilities Service, Room 1246-S, U.S. Department of Agriculture, Washington, DC 20250. For information on the availability of this material, call (202) 720-1900. The bulletins containing construction standards (50-4 and 1728F-803 to 1728F-811) may be obtained from the Superintendent of Documents, U.S. Government Printing Office (GPO) for Washington, DC 20402, Phone: 1-866-512-1800 (toll-free) 202-512-1800 (DC Area) or go to the GPO Web site at: <http://www.gpoaccess.gov/about/index.html>.

(1) Bulletin 50-4 (D-801), Specification and Drawings for 34.5/19.9 kV Distribution Line Construction (11-86), incorporation approved for § 1728.98.

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(2) Bulletin 50-15 (DT-3), RUS Specifications for Pole Top Pins with 1 $\frac{3}{8}$ " Diameter Lead Thread (1-51), incorporation approved for §1728.98.

(3) Bulletin 50-16 (DT-4), RUS Specifications for Angle Suspension Brackets (3-52), incorporation approved for §1728.98.

(4) Bulletin 50-19 (DT-7), RUS Specifications for Clevis Bolts (8-53), incorporation approved for §1728.98.

(5) Bulletin 50-23 (DT-18), RUS Specifications for 60" Wood Crossarm Braces (2-71), incorporation approved for §1728.98.

(6) Bulletin 50-31 (D-3), RUS Specifications for Pole Top Pins with 1" Diameter Lead Threads (2-79), incorporation approved for §1728.98.

(7) Bulletin 50-32 (D-4), RUS Specifications for Steel Crossarm Mounted Pins with 1" Diameter Lead Threads (10-50), incorporation approved for §1728.98.

(8) Bulletin 50-33 (D-5), RUS Specifications for Single and Double Upset Spool Bolts (2-51), incorporation approved for §1728.98.

(9) Bulletin 50-34 (D-6), RUS Specifications for Secondary Swinging Clevises (12-70), incorporation approved for §1728.98.

(10) Bulletin 50-35 (D-7), RUS Specifications for Service Swinging Clevises (9-52), incorporation approved for §1728.98.

(11) Bulletin 50-36 (D-8), RUS Specifications for Service Deadend Clevises (9-52), incorporation approved for §1728.98.

(12) Bulletin 50-40 (D-14), RUS Specifications for Pole Top Brackets for Channel Type Pins (9-51), incorporation approved for §1728.98.

(13) Bulletin 50-41 (D-15), RUS Specifications for Service Wireholders (11-51), incorporation approved for §1728.98.

(14) Bulletin 50-55 (T-2), RUS Specifications for Overhead Ground Wire Support Brackets (5-53), incorporation approved for §1728.98.

(15) Bulletin 50-56 (T-3), RUS Specifications for Steel Plate Anchors for Transmission Lines (12-53), incorporation approved for §1728.98.

(16) Bulletin 50-60 (T-9), RUS Specification—Single Pole Steel Structures, Complete with Arms (12-71), incorporation approved for §1728.98.

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(17) Bulletin 50-72 (U-4), RUS Specification for Electrical Equipment Enclosures (5-35 kV) (10-79), incorporation approved for §1728.98.

(18) Bulletin 50-73 (U-5), RUS Specifications for Pad-Mounted Transformers (Single and Three-Phase) (1-77), incorporation approved for §1728.98.

(19) Bulletin 50-74 (U-6), RUS Specification for Secondary Pedestals (600 Volts and Below) (10-79), incorporation approved for §1728.98.

(20) Bulletin 50-91 (S-3), RUS Specifications for Step-Down Distribution Substation Transformers (34.4-138 kV) (1-78), incorporation approved for §1728.98.

(21) Bulletin 1728F-700, RUS Specification for Wood Poles, Stubs and Anchor Logs (3-2011), incorporation approved for §§1728.98, 1728.202.

(22) Bulletin 1728F-803, Specifications and Drawings for 24.9/14.4 kV Line Construction (10-98), incorporation approved for §1728.98.

(23) Bulletin 1728F-804 (D-804), Specification and Drawings for 12.47/7.2 kV Line Construction, October 2005, incorporation approved for §1728.98.

(24) Bulletin 1728F-806 (D-806), Specifications and Drawings for Underground Electric Distribution, June 2000, incorporation approved for §1728.98.

(25) Bulletin 1728F-810, Electric Transmission Specifications and Drawings, 34.5 kV to 69 kV (3-98), incorporation approved for §§1728.98 and 1728.201.

(26) Bulletin 1728F-811, Electric Transmission Specifications and Drawings, 115 kV to 230 kV (3-98), incorporation approved for §§1728.98 and 1728.201.

(b) The following material is available for purchase from American Institute of Timber Construction (AITC), 7012 S. Revere Park Way, Englewood, Colorado 80112, telephone (303) 792-9559, web address: <https://www.aitc-glulam.org/index.asp>.

(1) AITC 200-2004, Manufacturing Quality Control Systems Manual For Structural Glued Laminated Timber, copyright 2004, (incorporation by reference approved for §§1728.201 and 1728.202.

(2) [Reserved]

(c) The following standards are available for purchase from the American National Standards Institute (ANSI),

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25 West 43rd Street, New York, New York 10036, telephone (212) 642-4900, Web address: <http://www.ansi.org/>.

(1) ANSI O5.2-2006, American National Standard for Wood Products, Structural Glued Laminated Timber for Utility Structures, approved December 5, 2006, incorporation by reference approved for §§. 1728.201, 1728.202.

(2) ANSI O5.3.2008, American National Standard for Wood Poles and Wood Products, Solid Sawn-Wood Crossarms & Braces—Specifications & Dimensions, approved July 15, 2008, incorporation by reference approved for §1728.201.

(d) The American National Standards Institute/Insulated Cable Engineers Association, Inc. (ANSI/ICEA) makes the following material available for purchase from Global Engineering Documents for a fee at the following address: IHS Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112, Phone: (303) 397-7956; (800)-854-7179, Fax: (303) 397-2740, email: global@ihs.com, Web site: <http://global.ihs.com>.

(1) ANSI/ICEA S-94-649-2004—Standard for Concentric Neutral Cables Rated 5 Through 46 KV (ANSI/ICEA S-94-649-2004), approved September 20, 2005, incorporation by reference approved for §1728.204.

(2) ANSI/ICEA T-31-610-2007—Test Method for Conducting Longitudinal Water Penetration Resistance Tests on Blocked Conductors (ANSI/ICEA T-31-610-2007), approved October 31, 2007, incorporated by reference approved for §1728.204.

(e) Copies of American Society for Testing and Materials (ASTM) publications referenced in this specification can be obtained from ASTM for a fee at the following address: ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, Telephone: (610) 832-9585, Web site: <http://astm.org>.

(1) ASTM B 3-01 (Reapproved 2007)—Standard Specification for Soft or Annealed Copper Wire, (ASTM B 3-01) approved March 15, 2007, incorporated by reference approved for §1728.204.

(2) ASTM B 8-04—Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft (ASTM B 8-04), approved April 1,

2004, incorporated by reference approved for §1728.204.

(3) ASTM B 230/B 230M-07—Standard Specification for Aluminum 1350-H19 Wire for Electrical Purposes (ASTM B 230/B 230M-07), approved March 15, 2007, incorporated by reference approved for §1728.204.

(4) ASTM B 231/B 231M-04—Standard Specification for Concentric-Lay-Stranded Aluminum 1350 Conductors (ASTM B 231/B 231M-04), approved April 1, 2004, incorporated by reference approved for §1728.204.

(5) ASTM B 400-08—Standard Specification for Compact Round Concentric-Lay-Stranded Aluminum 1350 Conductors (ASTM B 400-08), approved September 1, 2008, incorporated by reference approved for §1728.204.

(6) ASTM B 496-04—Standard Specification for Compact Round Concentric-Lay-Stranded Copper Conductors (ASTM B 496-04), approved April 1, 2004, incorporated by reference approved for §1728.204.

(7) ASTM B 609/B 609M-99—Standard Specification for Aluminum 1350 Round Wire, Annealed and Intermediate Tempers, for Electrical Purposes (ASTM B 609/B 609M-99), approved April 1, 2004, incorporated by reference approved for §1728.204.

(8) ASTM B 786-08—Standard Specification for 19 Wire Combination Unilay-Stranded Aluminum 1350 Conductors for Subsequent Insulation (ASTM B 786-08), approved September 1, 2008, incorporated by reference approved for §1728.204.

(9) ASTM B 787/B 787M-04—Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation (ASTM B 787/B 787M-04), approved September 1, 2004, incorporated by reference approved for §1728.204.

(10) ASTM B 835-04—Standard Specification for Compact Round Stranded Copper Conductors Using Single Input Wire Construction (ASTM B 835-04), approved September 1, 2004, incorporated by reference approved for §1728.204.

(11) ASTM B902-04a—Standard Specification for Compressed Round Stranded Copper Conductors, Hard, Medium-Hard, or Soft Using Single Input Wire

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Construction (ASTM B902–04a), approved September 1, 2004, incorporated by reference approved for §1728.204.

(12) ASTM D 1248–05—Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable (ASTM D 1248–05), approved March 1, 2005, incorporated by reference approved for §1728.204.

(13) ASTM D 2275–01 (Reapproved 2008)—Standard Test Method for Voltage Endurance of Solid Electrical Insulating Materials Subjected to Partial Discharges (Corona) on the Surface (ASTM D 2275–01), approved May 1, 2008, incorporated by reference approved for §1728.204.

(14) ASTM E 96/E 96M–05—Standard Test Methods for Water Vapor Transmission of Materials (ASTM E 96/E 96M–05), approved May 1, 2005, incorporated by reference approved for §1728.204.

(f) The following standards from the American Wood Protection Association (AWPA), Book of Standards, 2008 edition, are available for purchase from AWPA, P.O. Box 361784, Birmingham, AL 35236–1784, telephone 205–733–4077, <http://www.awpa.com/>.

(1) AWPA A1–06, *Standard Methods for Analysis of Creosote and Oil-Type Preservatives*, amended in 2006, incorporation by reference approved for §§1728.201 and 1728.202.

(2) AWPA A2–08, *Standard Methods for Analysis of Waterborne Preservatives and Fire-Retardant Formulations*, 2008, incorporation by reference approved for §§1728.201 and 1728.202.

(3) AWPA A3–08, *Standard Methods for Determining Penetration of Preservatives and Fire Retardants*, revised in 2008, incorporation by reference approved for §§1728.201 and 1728.202.

(4) AWPA A5–05, *Standard Methods for Analysis of Oil-Borne Preservatives*, 2008, incorporation by reference approved for §§1728.201 and 1728.202.

(5) AWPA A6–01, *Method for the Determination of Oil-Type Preservatives and Water in Wood*, amended in 2001, incorporation by reference approved for §1728.202.

(6) AWPA A7–04, *Standard for Wet Ashing Procedures for Preparing Wood for Chemical Analysis*, amended in 2004, incorporation by reference approved for §1728.202.

(7) AWPA A9–01, *Standard Method for Analysis of Treated Wood and Treating Solutions By X-Ray Spectroscopy*, amended in 2001, incorporation by reference approved for §§1728.201 and 1728.202.

(8) AWPA M2–07, *Standard for Inspection of Wood Products Treated with Preservatives*, reaffirmed in 2007, incorporation by reference approved for §1728.202.

(9) AWPA M3–05, *Standard Quality Control Procedures for Wood Preserving Plants*, amended in 2005, incorporation by reference approved for §1728.202.

(10) AWPA P1/P13–06, *Standard for Creosote Preservative*, reaffirmed in 2006, incorporation by reference approved for §§1728.201 and 1728.202.

(11) AWPA P5–08, *Standard for Waterborne Preservatives*, revised in 2008, incorporation by reference approved for §§1728.201 and 1728.202.

(12) AWPA P8–08, *Standard for Oil-Borne Preservatives*, revised in 2008, incorporation by reference approved for §§1728.201 and 1728.202.

(13) AWPA P9–06, *Standards for Solvents and Formulations for Organic Preservative Systems*, copyright 2008, incorporation by reference approved for §§1728.201 and 1728.202.

(g) The following material is available from the Insulated Cable Engineers Association (ICEA) and may be purchased from Global Engineering Documents for a fee at the following address: IHS Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112, Phone: (303) 397–7956; (800)–854–7179, Fax: (303) 397–2740, email: global@ihs.com, Web site: <http://global.ihs.com>.

(1) ICEA T–32–645–93—Guide for Establishing Compatibility of Sealed Conductor Filler Compounds with Conducting Stress Control Materials (ICEA T–32–645–93), approved February 1993, incorporated by reference approved for §1728.204.

(2) [Reserved]

(h) The following material is available from Southern Pine Inspection Bureau Standards, 4709 Scenic Highway, Pensacola, Florida 32504–9094, telephone (850) 434–2611. The web address for the Southern Pine Inspection Bureau is <http://www.spib.org/>.

(1) *Special Product Rules for Structural, Industrial, and Railroad-Freight Car Lumber*, effective October 15, 1991, incorporation by reference approved for § 1728.201.

(2) [Reserved]

(i) The following material is available for purchase from West Coast Lumber Inspection Bureau, P.O. Box 23145, Portland, Oregon 97281, telephone (503) 639-0651, fax (503) 684-8928. The web address for is <http://www.wclib.org/>.

(1) *Standard No. 17, Grading Rules for West Coast Lumber*, Revised January 1, 2004, incorporation by reference approved for § 1728.201.

(2) [Reserved]

[76 FR 36963, June 24, 2011, as amended at 77 FR 19528, Apr. 2, 2012]

§ 1728.98 Electric standards and specifications.

(a) To comply with this part, you must follow the requirements contained in the following REA/RUS bulletins. These bulletins are incorporated by reference in § 1728.97 of this part.

(1) Bulletin 50-4 (D-801), Specification and Drawings for 34.5/19.9 kV Distribution Line Construction (11-86).

(2) Bulletin 50-15 (DT-3), RUS Specifications for Pole Top Pins with 1 $\frac{3}{8}$ " Diameter Lead Thread (1-51).

(3) Bulletin 50-16 (DT-4), RUS Specifications for Angle Suspension Brackets (3-52).

(4) Bulletin 50-19 (DT-7), RUS Specifications for Clevis Bolts (8-53).

(5) Bulletin 50-23 (DT-18), RUS Specifications for 60" Wood Crossarm Braces (2-71).

(6) Bulletin 50-31 (D-3), RUS Specifications for Pole Top Pins with 1" Diameter Lead Threads (2-79).

(7) Bulletin 50-32 (D-4), RUS Specifications for Steel Crossarm Mounted Pins with 1" Diameter Lead Threads (10-50).

(8) Bulletin 50-33 (D-5), RUS Specifications for Single and Double Upset Spool Bolts (2-51).

(9) Bulletin 50-34 (D-6), RUS Specifications for Secondary Swinging Clevises (12-70).

(10) Bulletin 50-35 (D-7), RUS Specifications for Service Swinging Clevises (9-52).

(11) Bulletin 50-36 (D-8), RUS Specifications for Service Deadend Clevises (9-52).

(12) Bulletin 50-40 (D-14), RUS Specifications for Pole Top Brackets for Channel Type Pins (9-51).

(13) Bulletin 50-41 (D-15), RUS Specifications for Service Wireholders (11-51).

(14) Bulletin 50-55 (T-2), RUS Specifications for Overhead Ground Wire Support Brackets (5-53).

(15) Bulletin 50-56 (T-3), RUS Specifications for Steel Plate Anchors for Transmission Lines (12-53).

(16) Bulletin 50-60 (T-9), RUS Specification—Single Pole Steel Structures, Complete with Arms (12-71).

(17) Bulletin 50-72 (U-4), RUS Specification for Electrical Equipment Enclosures (5-35 kV) (10-79).

(18) Bulletin 50-73 (U-5), RUS Specifications for Pad-Mounted Transformers (Single and Three-Phase) (1-77).

(19) Bulletin 50-74 (U-6), RUS Specification for Secondary Pedestals (600 Volts and Below) (10-79).

(20) Bulletin 50-91 (S-3), RUS Specifications for Step-Down Distribution Substation Transformers (34.4-138 kV) (1-78).

(21) Bulletin 1728F-700, RUS Specification for Wood Poles, Stubs and Anchor Logs (3-2011).

(22) Bulletin 1728F-803, Specifications and Drawings for 24.9/14.4 kV Line Construction (10-98).

(23) Bulletin 1728F-804 (D-804), Specification and Drawings for 12.47/7.2 kV Line Construction, October 2005.

(24) Bulletin 1728F-806 (D-806), Specifications and Drawings for Underground Electric Distribution, June 2000.

(25) Bulletin 1728F-810, Electric Transmission Specifications and Drawings, 34.5 kV to 69 kV (3-98).

(26) Bulletin 1728F-811, Electric Transmission Specifications and Drawings, 115 kV to 230 kV (3-98).

(b) The terms "RUS form", "RUS standard form", "RUS specification", and "RUS bulletin" have the same meanings as the terms "REA form", "REA standard form", "REA specification", and "REA bulletin", respectively unless otherwise indicated.

[76 FR 36964, June 24, 2011]

§ 1728.201 Bulletin 1728H-701, Specification for Wood Crossarms (Solid and Laminated), Transmission Timbers and Pole Keys.

(a) *General Provisions.* (1) This section implements contractual provisions between Rural Utilities Service (RUS) and borrowers receiving financial assistance. The contractual agreement between RUS and its borrowers requires the borrower's system to be constructed in accordance with agency accepted plans and specifications. Each electric borrower must purchase only wood crossarms produced in accordance with the specification in this section.

(2) Each electric borrower shall require each contractor to agree in writing to furnish only materials produced in accordance with the specifications in this section.

(3) This specification describes the minimum acceptable quality of wood distribution crossarms and transmission crossarms (hereinafter called crossarms) that are purchased by or for borrowers. Where there is conflict between this specification and any other specification referred to in this section, this specification shall govern.

(4) Various requirements relating to quality control and inspection are contained in §1728.202 of this part, Specification for Quality Control and Inspection of Timber Products. Section 1728.201 of this part, ANSI O5.2, (incorporated by reference in §1728.97), and ANSI O5.3, (incorporated by reference in §1728.97) shall be followed exactly and shall not be interpreted or subjected to judgment by the quality control person or an independent inspector.

(5) The purchaser shall purchase from producers only material that meets the requirements of this specification. Each purchaser shall use a written purchase order to purchase material for use in financed systems in order to ensure compliance with the standards and specifications of this part. The written purchase order shall contain a provision that specifically requires the producer to comply with the provisions of this part. The purchase order shall contain a provision that specifically requires the producer to make the treating plant and storage areas available, during normal business hours, in

order for representatives of either the purchaser or this agency to inspect such to determine compliance with the standards and specifications of this part.

(6) The producer shall provide the inspectors with full information (drawings, etc.) relating to the requirements contained in the purchase order which is supplementary to this specification.

(7) The producer shall maintain, or have access to, adequate laboratory facilities at or very near the treating plant, and all chemical tests, assays or analyses associated with the treatment shall be independently performed in this laboratory by both the quality control designee and the borrower's inspector. The producer may use a central laboratory as accepted on a case-by-case basis.

(8) Inspection and treatment of all timber products produced under this specification shall be performed after receipt of the order from the purchaser, except as provided for reserve treated stock.

(9) The testing and inspection of the lamination process shall be in accordance with AITC 200 (incorporated by reference in §1728.97).

(10) With the exception of reserve treated stock, if requested by the borrower invoices for treated timber products shall be accompanied, in duplicate, by a copy of the producer's Certificate of Compliance and a copy of either the Independent Inspection Report or a Quality Assurance Plan Certificate. For reserve treated stock, inspection reports shall be available from the inspection agency. When shipped from reserve stock, the invoice shall bear an endorsement and a further certification by the producer that the material meets the requirements of this specification and any supplementary requirements cited in the purchase order under which it is purchased.

(11) Crossarms shall be warranted to conform to this specification. If any crossarm is determined to be defective or does not conform to this specification within 1 year after delivery to the borrower, it shall be replaced as promptly as possible by the producer. In the event of failure to do so, the purchaser may make such replacement

and the cost of the crossarm, at destination, shall be recoverable from the producer.

(12) Crossarm producers shall take out and maintain liability insurance for not less than \$1 million. Upon request, evidence of compliance shall be provided. The evidence shall be in the form of a certificate of insurance signed by a representative of the insurance company and include a provision that no changes in, or cancellation of, will be made without the prior written notice to the Director, Electric Staff Division, Rural Utilities Service.

(b) *Definitions.*

Agency refers to Rural Utilities Service (RUS), United States Department of Agriculture.

Arm refers to structural wood member used to support electrical conductors and equipment. Arm is used interchangeably with crossarm.

Certificate of compliance is a written certification by an authorized employee of the producer that the material shipped meets the requirements of this specification and any supplementary requirements specified in a purchase order from a borrower or the borrower's contractor.

Crossarm refers to a structural wood member used to support electrical conductors and equipment and is a term used interchangeably with arm.

Independent inspection relates to examination of material by an independent inspector employed by a commercial inspection agency.

Inspection means an examination of material in sufficient detail to ensure conformity to all phases of the specification under which it was purchased.

Lot is a quantity of crossarms of like size, conditioning, and fabrication, usually making up one treating charge.

Producer is used to describe the party who manufactures and/or treats crossarms.

Purchaser refers to either the borrower or contractors acting as the borrower's agent, except where a part of the specification specifically refers to only the borrower or the contractor.

Quality control designee refers to an individual designated by the producer to oversee proper operation of the manufacturer's internal quality control system.

Reserve treated stock consists of timber products treated in accordance with this specification, prior to and in anticipation of the receipt of specific orders, and held in storage ready for immediate shipment.

Supplier is a term used interchangeably with producer, or in some cases, may be the distributor selling crossarms to the borrower.

Treating plant is the organization that applies the preservative treatment to the crossarms.

(c) *Independent Inspection Plan.* This plan or a Quality Assurance Plan, as described in paragraph (e) of this section, is acceptable for supplying crossarms. All crossarms purchased under the Independent Inspection Plan, for use on an agency financed system shall be inspected by a qualified independent inspector in accordance with §1728.202 of this part.

(1) The borrower has the prerogative to contract directly with the inspection agency for service. The borrower should, where practical, select the inspection agency so that continual employment is dependent only on performance acceptable to the borrower and in accordance with this specification. The selected inspection agency shall not be allowed to subcontract the service to any other inspection agency.

(2) The producer shall not be permitted to be a party to the selection of the inspection agency by the borrower and shall not interfere with the work of the inspector, except to provide notification of the readiness of material for inspection. To obtain inspection services for reserve stock, the producer may deal directly with the inspection agency. The producer shall not be permitted to treat material before it has been properly inspected and hammered with the appropriate inspection/quality assurance mark.

(3) The methods of inspection described in this section and in §1728.202 of this part shall be used no matter which plan crossarms are produced under, i.e., Independent Inspection Plan, or Quality Assurance Plans, as described in this section

(d) *Quality Assurance Plans.* The producer shall furnish crossarms conforming to this specification as monitored by an acceptable Quality Assurance Plan. Borrower groups or agents for borrower groups endeavoring to operate Quality Assurance Plans shall submit their plan for assuring quality control to the Chairman, Technical Standards Committee "A", Electric Staff Division, Rural Utilities Service, Stop 1569, Washington, DC 20250-1569.

(e) *Material Requirements.* (1) *Material and Grade.* All crossarms furnished under this specification shall be free of brashy wood, decay, and insect holes larger than 3/32 of an inch and shall meet additional requirements as shown on specific drawings. Crossarms shall be made of one of the following:

(i) Douglas-fir which conforms to the applicable crossarm provisions of paragraphs 170 and 170a, or the applicable transmission arm provisions of paragraphs 169 and 169a of the Standard No. 17 Grading Rules for West Coast Lumber (incorporated by reference in §1728.97). Only coastal origin Douglas-fir shall be used for Douglas-fir crossarms manufactured under this specification;

(ii) Southern Yellow Pine which conforms to the provisions of Dense Industrial Crossarm 65, as described in paragraph 31.2 in the 2001 Southern Pine Inspection Bureau's Special Product Rules for Structural, Industrial, and Railroad-Freight Car Lumber, (incorporated by reference at §1728.97); or

(iii) Laminated wood crossarms shall conform to ANSI O5.2 (incorporated by reference at §1728.97) and have at least the same load carrying capacity as the solid sawn arm it replaces. The load carrying capacity of the laminated arms shall be determined by one of the procedures outlined in ANSI O5.2.

(2) Borrowers may use alternative crossarms that are listed in Informational Publication 202-1, List of Materials Acceptable for Use on Systems of USDA Rural Utilities Service Borrowers. For information on the availability of this material, call RUS at (202) 720-1900, or go to: http://www.rurdev.usda.gov/UEP_Engineering_LOM.html.

(3) *Knots.* Sound, firm, and tight knots, if well spaced, are allowed.

(i) Slightly decayed knots are permitted, except on the top face, provided the decay extends no more than 3/4 of an inch into the knot and provided the cavities will drain water when the arm is installed. For knots to be considered well spaced, the sum of the sizes of all knots in any 6 inches of length of a piece shall not exceed twice the size of the largest knot permitted. More than one knot of maximum permissible size shall not be in the same 6 inches of length. Slightly decayed, firm, or sound "pin knots" (3/8 of an inch or less) are not considered in size, spacing, or zone considerations.

(ii) Knots are subject to limits on size and location as detailed in Tables I and II.

TABLE I—KNOT LIMITS FOR DISTRIBUTION ARMS (SEE FIGURE 1, APPENDIX A)
[All dimensions in inches]

Class of knot and location	Maximum	Knot	Diameter
	Close grain		Dense grain
Round Knots			
Single Knot: Maximum Diameter Center Section*			
Upper Half	3/4	.....	1
Lower Half	1	.....	1 1/4
Elsewhere	1 1/4	.....	1 1/2
Sum of Diameters in a 6-Inch Length: Maximum:			
Center Section			
Upper Half	1 1/2	.....	2
Lower Half	2	.....	2 1/2
Elsewhere	2 1/2	.....	3

*No knot shall be closer than its diameter to the pole mounting hole.

TABLE II—KNOT LIMITS FOR TRANSMISSION ARMS (SEE FIGURE 2, APPENDIX A)
[All dimensions in inches]

Pole mounting hole zone *		Maximum diameter for Single Knot	
UPPER HALF (inner zone)		3/4.	
UPPER HALF (outer zone)		1 for close grain. 1 1/4 dense grain.	
Other locations transmission arm size **	Narrow face	Wide face (two sides)	
		Edge	Along centerline
4 5/8 × 5 5/8 or less	1	1 1/4	1 1/4
5 5/8 × 7 5/8	1 1/4	1 3/8	1 7/8
3 3/8 × 9 3/8	3/4	1 3/4	2 1/4

* No knot shall be closer than its diameter to the pole mounting hole.
** For cross sections not shown, refer to grading rules.

(iii) Knot clusters shall be prohibited unless the entire cluster, measured on the worst face, is equal to or less than the round knot allowed at the specific location.

(iv) Spike knots shall be prohibited in deadend arms. Any spike knot across the top face shall be limited to the equivalent displacement of a knot 3/8 of an inch deep on one face and the maximum round knot for its particular location on the worst face, with a maximum width of 1 inch measured at the midpoint of the spiked section. Elsewhere across the bottom or side faces, spike knots shall not exceed 1/2 the equivalent displacement of a round knot permitted at that location, provided that the depth of the knot on the worst face shall not exceed the maximum round knot allowed at that location.

(v) Loose knots and knot holes shall be such that they can drain water when the arm is installed in its normal position. In the center section, upper half, loose knots shall not be greater than 1/2 the dimensions of round knots. Elsewhere, loose knots shall not be greater than the round knot dimension. Loose knots shall be prohibited in deadend arms.

(vi) All knots except those “spike” knots intersecting a corner shall be measured on the least diameter of the knot.

(vii) A knot shall be considered to occupy a specific zone or section if the center of the knot (i.e., pith of knot) is within the zone or on the zone’s boundary.

(viii) If a round or oval knot appears on two faces and is in two zones, each face shall be judged independently. When this does not occur, average the least dimension showing on both faces. Knots which occur on only one face of a free of heart center (FOHC) arm shall be permitted to be 25 percent larger than the stated size.

(ix) Two or more knots opposite each other on any face shall be limited by a sum not to exceed the size of a maximum single knot permitted for the location. On all four faces, all knots shall be well spaced.

(x) Knots which have a maximum of 5/8 inch diameter may intersect pin holes in the center section. One inch diameter knots may intersect insulator pin holes elsewhere.

(4) *Miscellaneous characteristics, features, and requirements.* (i) The top face of distribution crossarms shall not have more than four medium pitch and bark pockets in 8-foot arms, and not more than five pitch and bark pockets in 10-foot arms. Elsewhere a maximum of six medium pockets in 8-foot arms and eight in 10-foot arms shall be permitted. Equivalent smaller pockets shall be permissible. An occasional large pocket is permissible.

(ii) Shakes shall be prohibited.

(iii) Prior to treatment on properly seasoned arms, single face checks shall not exceed an average penetration of 1/4 the depth from any face and shall be limited to 10 inches long on the top face, and 1/3 the arm length on the

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other faces. Checks shall not be repeated in the same line of grain in adjacent pin holes. The sum of the average depths of checks occurring in the same plane on opposite faces shall be limited to $\frac{1}{4}$ the face depth.

(iv) Compression wood shall be prohibited on any face. Compression wood is permitted if wholly enclosed in the arm, more than six annual rings from the surface, and not over $\frac{3}{8}$ of an inch in width.

(v) Insect holes $\frac{3}{32}$ of an inch and larger shall be prohibited. Insect pin holes (i.e. holes not over $\frac{1}{16}$ of an inch diameter) shall be allowed if scattered and not exceeding 10 percent of the arm girth.

(vi) Wane shall be allowed on one edge, limited to approximately 1 inch measured across the corner. Outside of the top center section, an aggregate length not to exceed 2 feet may have wane up to $1\frac{1}{2}$ inches on an occasional piece on one or both edges. Bark shall be removed.

(vii) Prior to and after preservative treatment, crook, bow, or twist shall not exceed $\frac{1}{2}$ of an inch in 8 foot arms and $\frac{3}{8}$ of an inch in 10 foot arms.

(f) *Manufacturing.* (1) All dimensions and tolerances shall conform to those shown on the drawings in this section or drawings supplied with the purchase order. Drawings supplied shall meet or exceed minimum dimensions and tolerances shown on the drawings in this section. Cross-sectional dimensions shall be measured and judged at about $\frac{1}{4}$ the arm length, except when the defects of "skip dressing" or "machine bite or offset" are involved.

(2) Lamination techniques shall comply with ANSI O5.2 (incorporated by reference at §1728.97).

(3) Pin and bolt holes shall be smoothly bored without undue splintering where drill bits break through the surface. The center of any hole shall be within $\frac{1}{8}$ of an inch of the center-line locations on the face in which it appears. Holes shall be perpendicular to the starting and finishing faces.

(4) *Shape.* The shape of the arms at any cross section, except for permissible wane, shall be as shown on the respective drawings in this section or supplied with the order. The two top edges may be either chamfered or

rounded $\frac{3}{8}$ of an inch radius. The two bottom edges shall be slightly eased $\frac{1}{8}$ of an inch radius for the entire length.

(5) *Incising.* The lengthwise surfaces of Douglas-fir crossarms shall be incised approximately $\frac{1}{4}$ of an inch deep. The incision shall be reasonably clean cut with a spacing pattern that ensures uniform penetration of preservative.

(6) *Quality of work.* All crossarms shall be of the highest quality production. Crossarms shall be dressed on four sides, although "hit and miss skips" may occur on two adjacent faces on occasional pieces.

(g) *Conditioning prior to treatment.* (1) All solid sawn crossarms shall be made of lumber which has been kiln-dried. Douglas-fir arms shall have an average moisture content of 19 percent or less, with a maximum not to exceed 22 percent in a single arm. Southern Yellow Pine arms shall have an average moisture content of 22 percent or less, with a maximum not to exceed 30 percent in a single arm.

(2) Moisture content levels shall be measured at about $\frac{1}{4}$ the length and at a depth of about $\frac{1}{5}$ the crossarm's thickness. Additionally, the moisture content gradient between the shell (i.e. $\frac{1}{4}$ of an inch deep) and the core (i.e. about 1 inch deep) shall not exceed 5 percentage points.

(3) A minimum of at least 20 solid sawn crossarms per treating charge shall be measured to verify moisture content and shall be duly recorded by the quality control designee.

(4) The moisture content of lumber used in laminating shall, at the time of gluing, be within the range of 8 to 12 percent, inclusive.

(h) *Preservatives.* (1) The preservatives shall be:

(i) Creosote which conforms to the requirements of AWPA P1-13-06 (incorporated by reference at §1728.97), when analyzed in accordance with the methods in AWPA A1-06 (incorporated by reference at §1728.97), sections 2, 3, 4, either 5 or 9, and 6;

(ii) Pentachlorophenol which contains not less than 95 percent chlorinated phenols and conforms to AWPA P8-08 (incorporated by reference at §1728.97) when analyzed in accordance with AWPA A5-05 (incorporated by reference at §1728.97) or AWPA A9-01

(incorporated by reference at §1728.97). The hydrocarbon solvents for introducing the preservative into the wood shall meet the requirements of AWWA P9-06 (incorporated by reference at §1728.97) Type A;

(2) Waterborne Preservatives shall be any of the following:

(i) Ammoniacal Copper Arsenates (ACA) and Ammoniacal Copper Zinc Arsenate (ACZA) which shall meet the requirements of AWWA P5-08 (incorporated by reference at §1728.97), when analyzed in accordance with methods in AWWA A2-08 (incorporated by reference at §1728.97) or AWWA A9-01 (incorporated by reference at §1728.97); and

(ii) Chromated Copper Arsenates (CCA) which shall meet the requirements of one of the formulations given in AWWA P5-08 (incorporated by reference at §1728.97) sections 4, 5 or 6, and 10. Tests to establish conformity shall be made in accordance with AWWA A2-08 (incorporated by reference at §1728.97) or A9-01 (incorporated by reference at §1728.97).

(A) The pH of treating solutions of the waterborne preservatives shown in AWWA P5-08 (incorporated by reference at §1728.97) section 10, shall be determined in accordance with AWWA A2-08, (incorporated by reference at §1728.97) section 8.

(B) The oxide formulations of waterborne preservatives shall be supplied.

(C) Douglas-fir crossarms shall not be treated with CCA preservatives.

(D) Materials treated with waterborne preservatives shall be free of visible surface deposits.

(iii) Copper Naphthenate (CuN) concentrate used to prepare wood preserving solutions shall contain not less than 6 percent nor more than 8 percent copper in the form of CuN and shall conform to AWWA P8-08 (incorporated by reference at §1728.97) when analyzed in accordance with AWWA A5-05 (incorporated by reference at §1728.97). The hydrocarbon solvents for introducing the preservative into the wood shall meet the requirements of AWWA P9-06 (incorporated by reference at §1728.97) Type A.

(i) *Preservative treatment.* (1) All timber products treated under this specification shall be treated by either a pressure or a thermal (non-pressure) process.

(2) These materials may be further conditioned by steaming, or by heating in hot oil (Douglas-fir), within the following limits:

	Time hours (max.)	Temperature
Steam	3	220 °F
Heating in Preservation	3	210 °F

(3) A final steam or hot oil bath may be used only to meet cleanliness requirements of paragraph (k) of this section. Total duration of the final steam bath shall not exceed 2 hours and the temperature shall not exceed 240 degrees Fahrenheit.

(j) *Results of treatments.* (1) The quality control designee shall test or supervise the testing of each treated charge for penetration and retention.

(2) *Method of sampling.* When testing penetration and retention, a borer core shall be taken from not less than 20 crossarms in each treating charge. The borings shall be taken from any face except the top face at a point as close to the end as possible, being at least 3 inches from the end of the arm and no closer than 3 inches from the edge of the holes. The bored holes shall be plugged with preservative-treated plugs driven into the arm. Borings from laminated arms shall not be taken from the same laminate unless there is an end joint separation.

(3) As determined in accordance with AWWA A3-08 (incorporated by reference at §1728.97) all sapwood present in Douglas-fir or Southern Yellow Pine crossarms shall be completely penetrated with preservative. In the heartwood of Douglas-fir crossarms, the penetration shall be not less than 3 inches longitudinally from the edge of holes and ends, and at least 3/16 inch from the surface of any face.

(4) Retention of preservative in the outer 1/10 of an inch for Douglas-fir and one inch for Southern Yellow Pine assay zones at the treating plant shall be not less than:

Preservation	Retention (pcf)	AWPA analysis method**
Creosote	8	A6.
Pentachlorophenol	* 0.4	A5.
ACA, ACZA, or CCA	0.4	A2, A7, or A9.
Copper Naphthenate	0.04	A5, or A9.

*The pentachlorophenol retention is for the lime ignition method. The copper pyridine method, retention 0.36 pcf is required when timbers may have been in contact with salt water, and for all species native to the Pacific coast region. It is not required when it specifically states on the rough sawn material invoice that this material has not been in contact with salt water or is shown by analysis to have no additional chlorides present in the wood before treating.

** All the AWPA Analysis Methods are incorporated by reference at § 1728.97.

(5) Cleanliness of lengthwise surfaces of all crossarms shall be free from tarry, greasy, or sticky material, and from oil exudation and pentachlorophenol crystallization (blooming).

(6) Re-treatment of materials which do not meet the penetration and retention requirements of this specification may be done only twice. Initial treatment steaming time plus re-treatment steaming time, combined, shall not exceed time allowed in paragraph (i) of this section.

(k) *Marks and brands.* (1) All crossarms shall be legibly branded (hot brand) or die-stamped and to a depth of approximately 1/16 of an inch before treatment.

(2) The letters and figures shall be not less than 1/2 of an inch in height. The top of the brand shall be oriented to the top of the arm.

(3) The brand or die-stamp shall include:

- (i) The manufacturer's identification symbol;
- (ii) Month and year of manufacture;
- (iii) Species of timber such as DF for Douglas-fir and SP for Southern Yellow Pine; and
- (iv) The preservative notated with a C for creosote, P for penta, S for waterbornes, or N for Copper Naphthenate.

(4) An example is:
M-6-06 Manufacturer—Month—Year
DF-P Douglas-fir—penta treated

(5) The brand or stamp shall be placed on either of the wide surfaces of the arms, oriented with letters right side up towards the top of the arm and preferably about 1 foot from the mid-point of the arm.

(6) Each producer should mark each type of arm in approximately the same location on the arm.

(7) Brands, inspection marks, or quality assurance marks shall be removed from arms that do not meet these specifications.

(1) *Storage.* (1) Producers may treat crossarms for reserve stock under any of the agency approved plans.

(2) Crossarms treated with oil-borne preservatives which have been held in storage for more than 1 year before shipment to the borrower, shall be re-assayed before shipment and shall be re-treated if found nonconforming for retention on orders placed in accordance with this section.

(3) Crossarms shall meet the assay after re-treatment in accordance with paragraph (k) of this section.

(4) Crossarms which are held in storage after final acceptance shall be stacked in piles or on skids in such a manner as to assure good ventilation. The stacks shall be covered or stored indoors for protection from the sun and weather to reduce checking, bending, and loss of preservative.

(m) *Drawings.* (1) The drawings of Appendix B of this section, Crossarm Drilling Guide, have a type number and show in detail the hole size, shape, and pattern desired for crossarms ordered under this specification.

(2) Purchase orders shall indicate the type crossarm required.

(3) Crossarms shall be furnished in accordance with the details of these drawings or in accordance with drawings attached to the purchase order.

(4) Appropriate drawings for transmission arms are to be specified and included with purchase orders. Technical drawings for transmission crossarms are published in Bulletin 1728F-811, "Electric Transmission Specifications and Drawings, 115kV through 230kV" (incorporated by reference at § 1728.97), and Bulletin 1728F-810, "Electric

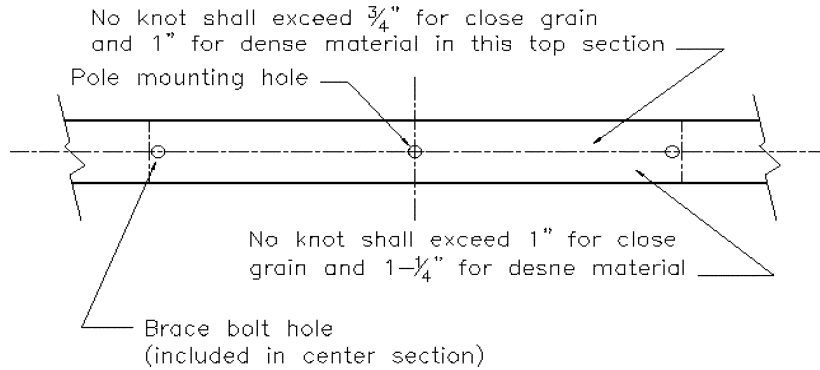
Transmission Specification and Drawings, 34.5kV through 69kV" (incorporated by reference at §1728.97).

(n) *Destination inspection.* All cross-arms shall meet or exceed their minimum dimensions for at least 1 year after date of delivery to the borrower.

APPENDIX A to §1728.201 – DISTRIBUTION AND TRANSMISSION ARMS

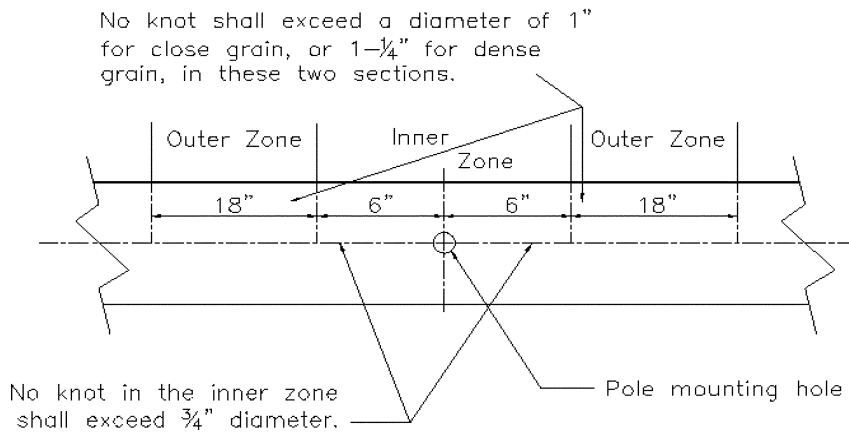
DISTRIBUTION ARMS

Figure 1



TRANSMISSION ARMS
POLE MOUNTING HOLE ZONE

Figure 2



APPENDIX B to §1728.201 – CROSSARM DRILLING GUIDE

TOLERANCES AND SIZES OF HOLES			
	NOMINAL	GO	NO GO
(A)	11/16"	5/8"	3/4"
(B)	7/16"	3/8"	1/2"
(C)	9/16"	1/2"	5/8"

TYPE 04

TYPE 05M

TYPICAL END SECTION

NOTES:

- Holes are to be located within $\pm 1/8"$
- Length of the crossarm is to be within $\pm 1/4"$
- The tolerance of any cross section is $+1/8"$ and $-0"$ at time of manufacture.
- All holes are to be drilled on centerlines of crossarm faces.

DISTRIBUTION CROSSARM DRILLING GUIDE

JUNE 2009		W2.1G
RUS		(Old M-19)

APPENDIX C TO § 1728.201—METRIC CONVERSION FACTORS

To convert from	To	Multiply by
Foot (ft)	Meter (m)	0.3048
Inch (in)	Centimeter	2.54

APPENDIX C TO § 1728.201—METRIC CONVERSION FACTORS—Continued

To convert from	To	Multiply by
Pound per cubic foot (pcf) (lb/ft ³)	Kilogram per cubic meter (kg/m ³) ...	16.01846
Pound per square inch (psi) (lb/in ²)	Kilogram per square meter (kg/m ²)	703.0696
Degrees Fahrenheit (°F)	Degrees Celsius (°C)	5/9(F° - 32)

§ 1728.202 Bulletin 1728H-702, Specification for Quality Control and Inspection of Timber Products.

(a) *Scope.* This specification describes in more detail the responsibilities and procedures pertaining to quality control for crossarms, as specified in §1728.201 of this part, and poles, covered in Bulletin 1728F-700, “Specification for Wood Poles, Stubs and Anchor Logs,” incorporated by reference in §1728.97 of this part and in §1755.97 of 7 CFR part 1755.

(b) *General stipulations.* (1) Conformance of poles and crossarms to agency specifications for the most part is the responsibility of the producer’s management.

A member of the producer’s staff shall be designated quality control designee and charged with the responsibility for the exercise of proper quality control procedures.

(2) The requirements of AWWA M3-05 (incorporated by reference at §1728.97), covering records, adequate laboratory, plant gauges, and other plant facilities including proper storage, shall be followed.

(3) The methods of inspection described in this section shall be used no matter which plan timber products are purchased under, i.e., Insured Warranty Plan, Independent Inspection Plan, or Quality Assurance Plans, as described in §1728.201 of this part or Bulletin 1728F-700 (incorporated by reference at §1728.97). The number of poles and crossarms actually inspected by monitors for quality control under a Quality Assurance Plan or the Insured Warranty Plan may vary from the number of poles and crossarms inspected under the Independent Inspection Plan. Under the Independent Inspection Plan, each pole and a sample number of crossarms shall be inspected.

(4) Under the Independent Inspection Plan, the borrower should designate in the purchase order which inspection agency it has selected. Unless the bor-

rower contracts for inspection as a separate transaction, the treating company shall obtain the services of the borrower’s designated inspection agency. For reserve treated stock for purchase under the Independent Inspection Plan, the treating company shall obtain the services of an inspection agency.

(5) Individual inspectors in the employ of Independent Inspection Agencies shall be experienced and competent. The inspector shall perform all phases of the inspection personally and in the proper sequence. The primary responsibility of the inspector is to determine, for the borrower, by careful inspection and verification, that the timber products, preservative, and treatment meet the requirements of Bulletins 1728F-700 (incorporated by reference at §1728.97) and §1728.201 of this part (Bulletin 1728H-701) and that the methods, storage facilities, and production equipment conform to applicable specifications. For details of the inspector’s qualifications see Appendix A of this section.

(6) Independent inspection agencies and inspectors shall maintain their impartiality. To do so, inspection agencies, inspectors, producers and brokers must maintain the greatest degree of separation and eliminate even the appearance of a conflict of interest. Inspection agencies shall not receive gratuities from or enter into financial agreements, other than for inspection services, with suppliers for which they perform inspection. Inspection agencies shall not provide gratuities or free services to suppliers. Inspection agencies shall not offer product warranties on inspected material.

(7) Failure of an individual inspector to follow proper procedures or failure of an inspection agency to properly train and supervise inspectors or follow the appropriate RUS specifications

constitutes grounds for RUS debarment of said company from future inspection of RUS financed material

(8) Inspection agencies shall have and maintain liability insurance in the amount of \$500,000 and a surety bond or miscellaneous errors and omission insurance for consequential damages for not less than \$250,000. Upon request, evidence of compliance to this requirement shall be forwarded to the agency. The evidence shall be in the form of a certificate of insurance or a Bond signed by a representative of the insurance or Surety Bonding company and include a provision that no change in, or cancellation of, will be made without the prior written notice to Chairman, Technical Standards Committee “A” (Electric).

(9) Inspection agencies shall maintain their own laboratory that is properly equipped, and capable of completely analyzing the respective preservatives and retentions, and at a minimum able to run referee methods. This laboratory shall be independent from any treating plant laboratory. Independent Inspection Agencies may use one central laboratory.

(10) Laminated materials manufactured for use on borrower systems shall comply with manufacturing and quality control requirements specified in ANSI O5.2 (incorporated by reference in §1728.97). The product shall be marked and certified.

(i) Laminated material shall be inspected in accordance with ANSI O5.2, (incorporated by reference in §1728.97).

(ii) Quality control of material shall be performed to determine conformance with §1728.201 of this part and AITC 200, (incorporated by reference in §1728.97).

(c) *Quality control and inspection procedures for product acceptance.* It is the responsibility of the plant quality control designee to perform the following procedures to ensure that a particular lot of material conforms to the requirements of the applicable Agency specification prior to treatment. After the plant quality control designee has performed these procedures, a particular lot of material shall be released to the inspector for verification of conformance.

(1) Poles can be purchased under any of the three purchase plans. These plans are Insured Warranty Plan, Independent Inspection Plan, or a Quality Assurance Plan. Under all of these plans, all poles in a lot shall be inspected by the plant quality control designee.

Under the Insured Warranty Plan and a Quality Assurance Plan, the number of poles inspected by a third party inspector may be less than every pole, depending on the terms of the plans.

(i) Ample space and assistance shall be provided by the treating plant for handling and turning to ensure that the surfaces of all items can be adequately inspected.

(ii) Under the Independent Inspection Plan, all poles shall be inspected by the Independent Inspector for conformance to the requirements of Bulletin 1728F-700 (incorporated by reference at §1728.97). If a pole is rejected and the cause of rejection is corrected, the rejected pole may be offered again for inspection as new material.

(iii) Dimensions, length, and circumference shall be measured by a standard steel tape to determine that they are in agreement with the details for class and length in the brand and butt stamp. If it is obvious by visual comparison with a measured pole that the brand information is correct, individual poles need not be measured. Pole circumference dimensions made prior to treatment shall govern acceptance. Reduction in dimension due to treatment and shipping shall be not more than 2 percent below the minimum for the pole class.

(iv) If 5 percent of the poles in a lot offered for inspection are defective, the inspector shall terminate the inspection. Re-examination of an entire lot by plant quality control shall be required when the number of rejected poles equals or exceeds 5 percent of the lot inspected. All defective or nonconforming poles either shall be removed from the lot or have their brands marked out.

(v) Poles in a lot shall be inspected for decay and all poles shall be of the same seasoning condition. If the plant quality control designee suspects that decay is present, a slice from both ends shall be cut for closer examination. If 3

percent of the inspected poles in a lot show evidence of decay, the entire lot shall be unconditionally rejected without further sorting.

(vi) Moisture content, when limited by the purchaser, as stated on the purchaser's purchase order, shall be measured by calibrated electronic moisture meter. Calibration of the meter shall include not only the zero settings for the X and Y readings, but also two resistance standards for 12 and 22 percent moisture content.

(vii) Material failing to conform for moisture content may be retested upon request after a recalibration of the instrument. The results of the second test shall govern disposition of the lot.

(viii) Re-examination for any mechanical damage or deterioration and for original acceptance shall be conducted on timber products not treated within 10 days after original inspection.

(2) Crossarms can be purchased only under either of two purchase plans. These plans are the Independent Inspection Plan or Quality Assurance Plans. Under the Independent Inspection Plan, crossarms are to be inspected prior to manufacture, during manufacture, and after treatment. Under a Quality Assurance Plan, crossarms are inspected according to the terms of the quality assurance program acceptable to Rural Utilities Service.

(i) Inspection prior to treatment shall include:

(A) Surface inspection of all ends of all arms. This is usually done on the stacks of arms prior to manufacture. Particular attention shall be paid to defects commonly found in the ends, such as compression wood, red heart and other forms of decay, shakes, splits, through checks, scantiness, honeycomb, and low density, determined by rings per inch and percent of summerwood. All non-conforming arms shall be rejected. Whenever the number of nonconforming arms is found to exceed 0.5 percent of the lot or one arm, whichever is greater, the entire lot shall be rejected for excess number of defective ends. After the producer has removed or marked out the defective material, the arms may be resubmitted for inspection.

(B) Surface inspection of the lengthwise sides performed on a random representative sample. The sample size shall equal 20 percent of a lot size or 200 arms, whichever is smaller. The inspector shall examine side surfaces as they are slowly rotated. When necessary, the rotation may be stopped for closer inspection. All non-conforming arms shall be rejected. Whenever the number of nonconforming arms is found to exceed 2 percent of the sample size, the entire lot shall be rejected. After the producer has removed or marked out the defective material, the arms may be resubmitted for inspection.

(C) Check of moisture content of the random sample by a calibrated moisture meter.

(D) Check of crossarm dimensions of the random sample measured after surfacing.

(ii) Inspection during manufacture shall consist of:

(A) Checking bolt and insulator pin holes for squareness and excessive splintering;

(B) Checking brands for completeness, location, and legibility; and

(C) Checking arms for conformance.

(iii) Under the Independent Inspection Plan, there shall be a final inspection after treatment for preservative retention and penetration and for damage.

(3) Structural glued laminated timber shall be tested and inspected in accordance with AITC 200 (incorporated by reference in §1728.97). Grade of lumber shall be inspected by a qualified grader for specified quality, so marked. Adhesives used for all structural arms shall meet requirements of ANSI O5.2 (incorporated by reference at §1728.97) paragraph 5.2. Melamine urea adhesives shall not be used. End joint spacing and limitations shall be in accordance with ANSI O5.2.

(d) *Preservatives.* (1) Creosote shall conform to the requirements of AWWA P1/P13-06 (incorporated by reference in §1728.97) when analyzed by AWWA A-06, (incorporated by reference in §1728.97) sections 2, 3, 4, either 5 or 9, and 6, as follows:

(i) Each occasional charge; and

(ii) The first charge and one of every five charges randomly selected in consecutive charges shall be analyzed.

(2) Solutions of waterborne preservatives shall be analyzed for components in accordance with AWPA A2-08 (incorporated by reference in §1728.97) or AWPA A9-01 (incorporated by reference in §1728.97) and shall meet the requirements of AWPA P5-08 (incorporated by reference in §1728.97) for composition. AWPA A2-08 shall be used as a referee method.

(3) Pentachlorophenol shall contain not less than 95 percent chlorinated phenols and should conform to AWPA P8-08 (incorporated by reference in §1728.297), in hydrocarbon solvent AWPA P9-06, Type A (incorporated by reference in §1728.97).

(4) Copper Naphthenate in hydrocarbon solvent AWPA P9-06 Type A (incorporated by reference in §1728.97), shall contain not less than 6 percent nor more than 8 percent copper in the form of Copper Naphthenate and shall conform to AWPA P8-08 (incorporated by reference in §1728.97), when analyzed in accordance with AWPA A5-05 (incorporated by reference in §1728.97).

(e) *Plant facilities and inspection during treatment.* (1) Manufacturing and treating plant facilities shall conform to paragraph 3, AWPA M3-05 (incorporated by reference in §1728.97). Pressure plants shall be equipped with recording instruments to register time, pressure, temperature and vacuum during each cycle of treatment. Pressure plants shall also be equipped with indicating thermometers and pressure and vacuum gauges to check the accuracy of the recorders. Work tanks shall be equipped with a thermometer. Thermal treating vats shall be equipped with a time and temperature recorder and with an indicating thermometer. Temperature recording devices are not mandatory for plants treating exclusively with waterborne preservatives.

(2) Temperature and humidity readings throughout the kiln shall be recorded on a recording chart and verified by observation of direct reading equipment. Gauges and recording equipment shall be calibrated annually.

(3) Recording instruments shall be checked with calibrated indicating

gauges and thermometers, per AWPA M3-05 (incorporated by reference in §1728.97). Inaccuracies shall be referred to the treating plant for prompt correction. If an inaccuracy which indicates error resulting in non-compliance with this specification indicating possible damage to the material, the inspector shall reject the charge.

(f) *Results of treatment.* (1) Poles shall be tested for retention and penetration by means of a calibrated increment borer 0.2 inches \pm 0.02 inches in diameter in accordance with procedures in AWPA M2-07 (incorporated by reference in §1728.97). Under the Independent Inspection Plan, all treating charges shall be tested for retention and penetration. Plant quality control and independent inspection shall do their analyses separately. Under the Insured Warranty Plan and Quality Assurance Plans, the frequency of testing retention and penetration may vary according to the agency approved plan.

(i) Unless otherwise specified, borings shall be taken approximately 1 foot above the face brand to 1 foot below the face brand. For pressure treated Western Red Cedar and all butt treated poles, borings shall be taken approximately 1 foot below groundline.

(ii) Penetration compliance shall be determined in accordance with AWPA A3-08 (incorporated by reference in §1728.97). Chrome Azurol S and Penta-Check shall be used to determine penetration of copper containing preservatives and penta, respectively.

(2) Retention sampling shall be when there are 20 or more poles in the treating charge, the retention sample for creosote shall consist of 20 assay zones from southern pine and Douglas-fir poles. All poles in charges with fewer than 20 poles shall be bored once. Charges with less than 15 poles shall be bored once and bored again on a random basis to obtain a minimum of 15 assay zones.

(i) Retention samples shall be taken from 20 poles in charges of 20 or more poles.

(ii) Retention samples for Alaska yellow, western red, and northern white cedars shall consist of a minimum of 30 assay zones for creosote and waterborne preservatives. For penta charges of fewer than 30 poles, the sample shall

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contain the assay zone from each pole in the lot.

(iii) Retention samples shall consist of borings, representative of pole volumes for each class and length in the

charge. Further selection and marking of poles of mixed seasoning, volume, and location on the tram shall be made as illustrated in the following table:

Number of poles	Class/length	Vol. in cu. ft.	% of total volume	Number of borings
27	7/30	232	15	3
26	4/35	447	29	6
11	5/35	163	10	2
55*	6/35	704	46	9
Total		1,526	.....

* If a portion of these poles were green and some partially seasoned, then the number of borings should reflect the approximate percentage of each.

(iv) When material in a lot consists of fewer pieces than the designated minimum number of samples for assay, additional borings shall be taken so as to make up at least the minimum sample, and in such manner that the sample is representative of the lot of material with respect to any variations in size, seasoning condition, or other features that might affect the results of treatment.

(v) Analyses for preservative retention shall be performed as follows:

(A) Creosote retention shall be analyzed by AWP A6-01 (incorporated by reference in §1728.97);

(B) Penta retention shall be analyzed by AWP A5-05 (incorporated by reference in §1728.97) or AWP A9-01 (incorporated by reference at §1728.97). Copper pyridine method is required when timber may have been in contact with salt water and for all species native to the Pacific coast region, unless the raw material invoice specifically states that the material either has not been in contact with salt water or has been shown by analysis to have contained no additional chlorides before treating;

(C) Copper Naphthenate retention shall be analyzed by tests in accordance with AWP A5-05 (incorporated by reference in §1728.97) or AWP A9-01 (incorporated by reference in §1728.97);

(D) Waterborne preservatives retention shall be analyzed by tests in accordance with AWP A2-08 (incorporated by reference in §1728.97), AWP A7-04 (incorporated by reference in §1728.97); or AWP A9-01 (incorporated by reference in §1728.97); and,

(E) Prior to unloading a tram, the inspectors may take their own samples and analyze them concurrently with the quality control designee, but each shall work independently, and quality control data shall be presented before acceptance of the charge.

(3) The penetration sampling of poles shall conform as follows:

(i) Group A poles consist of poles with a circumference of 37.5 inches or less at 6 feet from butt.

(A) Bore 20 Group A poles or 20 percent of the poles, whichever is greater. Accept if 100 percent of the sample conform; otherwise, bore all poles.

(B) Re-treat the charge if more than 15 percent of the borings are found to be nonconforming.

(C) Re-treat all nonconforming poles if 15 percent or fewer fail the requirement.

(ii) Group B poles consist of poles with circumference greater than 37.5 inches at 6 feet from the butt.

(A) For Group B poles 45 feet and shorter, bore each pole and re-treat only those found to be nonconforming, unless more than 15 percent fail; in that case, re-treat the entire lot.

(B) For Group B 50 feet and longer, bore each pole twice at 90 degrees apart around the pole and accept only those poles conforming to the penetration requirement in both borings. All nonconforming poles may be re-treated only twice.

(iii) All bored holes (nominal 0.2 of an inch diam. bit) shall be promptly filled with treated, tight-fitting wood plugs.

(4) Under the Independent Inspection Plan, all treated charges of crossarms

shall be tested for retention and penetration. Plant quality control inspectors and independent inspectors shall do their analyses independently. Under the Quality Assurance Plans, the frequency of testing retention and penetration may vary according to the plan.

(i) The penetration and retention sample shall consist of 20 (48 for creosote) outer $\frac{1}{16}$ of an inch for Douglas-fir and 1 inch for Southern Yellow Pine zones from borings taken from any face except the top face at a location as close to the end as possible being at least 3 inches from the end of the arm and no closer than 3 inches from the edge of any holes. For laminated material, borings shall be taken from laminates on a random basis.

(ii) Preservative penetration shall be tested by taking not less than 20 borings from 20 crossarms in each charge, determined in accordance with AWPA A3-08 (incorporated by reference in §1728.97). Chrome Azurol S and Penta-Check shall be used to determine penetration of copper containing preservatives and penta, respectively.

(5) Laminated material shall be checked for any evidence of delamination due to treatment and for the identifying quality stamp of AITC or American Plywood Association (APA).

(6) If used for analysis, x-ray fluorescence instruments (XRF) shall be accurate and reliable, and they shall generate reproducible results. Instruments shall have thorough instructions which should include recommendations on drying techniques, equipment, and density calculations. These drying recommendations shall be followed when using XRF instruments.

(7) To check the precision and accuracy of the in-plant x-ray fluorescence units (XRF) being used by producers, at least once monthly the independent inspector shall take a retention sample previously analyzed in the producer's laboratory and rerun it in the inspection agency's own laboratory. This sample shall be run utilizing either the XRF or recognized referee method for the given preservative. If the analytical results are within $\pm 5\%$ of retention value that was previously obtained on the sample using the plant's XRF unit,

the plant instrument needs no further calibration. All XRF units maintained by independent agencies as part of their required laboratories shall be calibrated at least quarterly either by the referee method for each preservative treatment being analyzed by said agency or by comparison with a set of graduated treated wood standards.

(8) Each independent inspector and plant quality control personnel that use XRF instruments, shall be properly trained in the analysis of treated wood and preservatives under the supervision of a competent instructor. Proof of training shall be kept on file.

(g) *Product acceptance.* Under the Independent Inspection Plan, the inspector shall signify acceptance by marking each piece of accepted material with a clear, legible hammer stamp in one end prior to treatment and in the other end after treatment. The inspector shall personally mark each piece, and shall not delegate this responsibility to another person.

(1) Charge Inspection Reports.

(2) Inspection Reports shall include the following:

(i) Total pieces offered by the producer, number of pieces rejected and cause of rejection;

(ii) Conditioning details of the material prior to treatment;

(iii) Copy of preservative analysis by preservative supplier;

(iv) The details of treatment; and

(v) The results of treatment. Results shall include the following:

(A) The depth of penetration for each sample and a summary of all poles rejected for insufficient penetration;

(B) Separate worksheets for retention analyses, prepared by quality control designee and independent inspector.

(3) On each inspection report the independent inspector and the plant quality control designee shall certify, in writing, that the material listed on the report has been inspected before and after treatment, and that the preservative used was analyzed in accordance with the requirements of this section.

(4) Each inspector or inspection agency shall permanently retain for a period of 1 year a copy or transcript of each report of inspection, together

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:

ABLE RATED VOLTAGE

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.

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

(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).

(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).

(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).

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

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

(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.

(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

(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: