

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

Bulletin 1728F-700, RUS Specification for Wood Poles, Stubs and Anchor Logs (8-93).

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

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

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

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

[48 FR 31853, July 12, 1983, as amended at 52 FR 22289, June 11, 1987; 52 FR 48799, Dec. 28, 1987; 53 FR 39229, Oct. 6, 1988; 53 FR 44176, Nov. 2, 1988; 55 FR 8909, Mar. 9, 1990. Redesignated at 55 FR 39395, Sept. 27, 1990, as amended at 56 FR 1563, Jan. 16, 1991; 58 FR 41398, Aug. 3, 1993; 59 FR 66440, Dec. 27, 1994; 63 FR 11591, Mar. 10, 1998; 63 FR 72104, Dec. 31, 1998; 65 FR 34047, May 26, 2000]

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

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

(2) Each RUS electric borrower shall require each contractor to agree in writing to furnish only materials produced in accordance with the specification 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 RUS 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, RUS Specification for Quality Control and Inspection of Timber Products. Section

1728.201 of this part and the American National Standards Institute (ANSI) 05.2, 1983, American National Standard for Wood Products—Structural Glued Laminated Timber for Utility Structures, shall be followed exactly and shall not be interpreted or subjected to judgment by the quality control person or an independent inspector.

(5) The borrower 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 RUS financed systems in order to insure 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 RUS to inspect such to determine compliance with the standards and specifications of this part.

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

(7) The borrower shall insure that the producer maintains, or has access to, adequate laboratory facilities at or very near the treating plant. 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. If acceptable to RUS on a case-by-case basis, the producer may use a central laboratory.

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

(9) The borrower shall insure that each inspection agency maintains its own central laboratory with qualified staff capable of completely analyzing

the preservative and treatments. If acceptable to RUS, this central laboratory may be used for the independent inspector's routine assays, with results made available the next working day.

(10) The testing and inspection of the lamination process shall be in accordance with American Institute of Timber Construction (AITC) 200-83, Inspection Manual.

(11) With the exception of reserve treated stock, all 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. The certificate shall be presented to the purchaser with the invoice. 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.

(12) 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 shipment 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, recoverable from the producer.

(b) *Definitions.*

Arm refers to structural wood member used to support electrical conductors.

Certificate of compliance is a 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 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 insure 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 treats crossarms.

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

Quality control designee refers to an individual designated by the producer to be responsible for quality control.

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) *Related specifications and standards incorporated by reference.* The following specifications and standards are incorporated by reference. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies of each reference are available for inspection during normal business hours at RUS, room 1250-S, U.S. Department of Agriculture, Washington, DC 20250 or at the Office of the Federal Register, 800 North Capitol Street, NW., suite 700, Washington, DC. Copies of these standards and specifications may be purchased from the addresses shown below.

(1) West Coast Lumber Inspection Bureau, Standard No. 17, Grading Rules for West Coast Lumber, September 1, 1991, available from West Coast Lumber Inspection Bureau, P.O. Box 23145, Portland, Oregon 97223, telephone (503) 639-0651, Fax (503) 684-8928.

(2) Southern Pine Inspection Bureau, Standard Grading Rules for Southern

Pine Lumber, October 15, 1991, available from Southern Pine Inspection Bureau, 4709 Scenic Highway, Pensacola, Florida 32504, telephone (904) 434-2611.

(i) Southern Pine Inspection Bureau, Special Product Rules for Structural, Industrial, and Railroad-Freight Car Lumber, October 15, 1991, available from Southern Pine Inspection Bureau, 4709 Scenic Highway, Pensacola, Florida 32504, telephone (904) 434-2611.

(ii) [Reserved]

(3) American Wood Preservers' Association (AWPA), Book of Standards, 1991 edition, available from AWPA, P.O. Box 286, Woodstock, Maryland 21163-0286.

(i) A1-91, Standard Methods for Analysis of Creosote and Oil-Type Preservatives.

(ii) A2-91, Standard Methods for Analysis of Waterborne Preservatives and Fire-Retardant Formulations.

(iii) A3-91, Standard Methods for Determining Penetration of Preservatives and Fire Retardants.

(iv) A5-91, Standard Methods for Analysis of Oil-Borne Preservatives.

(v) A6-89, Method for the Determination of Oil-Type Preservatives and Water in Wood.

(vi) A7-75, Standard Wet Ashing Procedure for Preparing Wood for Chemical Analysis.

(vii) A9-90, Standard Method for Analysis of Treated Wood and Treating Solutions by X-Ray Spectroscopy.

(viii) A11-83, Standard Method for Analysis of Treated Wood and Treating Solutions by Atomic Absorption Spectroscopy.

(ix) C1-91, All Timber Products—Preservative Treatment by Pressure Processes.

(x) C4-91, Poles—Preservative Treatment by Pressure Processes.

(xi) C8-91, Western Red Cedar and Alaska Yellow Cedar Poles—Preservative Treatment by the Full-Length Thermal Process.

(xii) C10-91, Lodgepole Pine Poles—Preservative Treatment by the Full-Length Thermal Process.

(xiii) C12-90, Western Larch Poles—Full-Length Preservative Treatment by Thermal Process.

(xiv) M1-90, Standard for the Purchase of Treated Wood Products.

(xv) M2-91, Standard for Inspection of Treated Timber Products.

(xvi) M3-81, Standard Quality Control Procedures for Wood Preserving Plants.

(xvii) M4-91, Standard for the Care of Preservative-Treated Wood Products.

(xviii) P1/P13-91, Standard for Coal Tar Creosote for Land and, Fresh Water and Marine (Coastal Water Use).

(xix) P5-91, Standards for Waterborne Preservatives.

(xx) P8-91, Standards for Oil-Borne Preservatives.

(xxi) P9-91, Standards for Solvents and Formulations for Organic Preservative Systems.

(4) American Institute of Timber Construction (AITC) 200-83, Inspection Manual, 1987 edition, available from AITC, 333 West Hampden Avenue, Englewood, Colorado 80110, telephone (303) 761-3212.

(5) American National Standards Institute (ANSI) 05.2-1983, American National Standard for Wood Products—Structural Glued Laminated Timber for Utility Structures, available from ANSI, 1430 Broadway, New York, New York 10018.

(6) American Society for Testing and Materials (ASTM) D9-87 (1992), Standard Terminology Relating to Wood, available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187, telephone number (215) 299-5585.

(d) *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 produced under the independent inspection plan for use on an RUS 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 subcontract the service to any other inspection agency without the prior written consent by the borrower.

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(2) The producer shall not 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 the inspection services for reserve stock, the producer may deal directly with the inspection agency. Under the Independent Inspection Plan, the producer shall not treat material before it has been properly inspected in the white, as evidenced by the inspector's hammer 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. The number of crossarms actually inspected by monitors of quality control under a Quality Assurance Plan may vary from the number of crossarms inspected under the Independent Inspection Plan.

(e) *Quality assurance plans.* The producer shall furnish crossarms conforming to this specification as monitored by a Quality Assurance Plan acceptable to RUS. RUS borrower groups or agents for borrower groups endeavoring to operate Quality Assurance Plans shall submit their plan for assuring quality control to the Director, Electric Staff Division, Rural Utilities Service, Washington, DC 20250-1500, for specific approval prior to contracting with RUS borrowers under such plans.

(f) *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 (0.24 cm), and shall meet additional requirements as shown on specific drawings. They 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 1991 Standard Grading Rules for West Coast Lumber No. 17. All references to Douglas-fir shall be of coastal origin;

(ii) Southern Yellow Pine which conforms to the provisions of Dense Industrial Crossarm 65, as described in paragraph 31.2 in Southern Pine Inspection

Bureau 1991 Special Product Rules for Southern Pine; or

(iii) Laminated wood crossarms shall conform to ANSI 05.2-1983, 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 05.2.

(2) Borrowers may use alternative wood crossarms that are listed in RUS Bulletin 1728C-100, List of Materials Acceptable for Use on Systems of RUS Electrification Borrowers.

(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 (1.91 cm) 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 (15.24 cm) 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 (15.24 cm) of length. Slightly decayed, firm, or sound "Pin knots" (3/8 of an inch (0.95 cm) or less) are not considered in size, spacing, or zone considerations.

(ii) Knots are subject to the following limits on size and location:

KNOT LIMITS FOR DISTRIBUTION ARMS
DRAWING M-19 (SEE FIGURE 1, EXHIBIT 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

Inch	Cm
3/4	1.91
1	2.54
1-1/4	3.18
1-3/8	3.49
1-1/2	3.81
1-3/4	4.45
1-7/8	4.76
2	5.08
2-1/4	5.72
2-1/2	6.35
3-1/4	8.26
3-1/2	8.89
3-5/8	9.21
4-5/8	11.75
5-5/8	14.29
7-3/8	18.73
9-3/8	23.81

KNOT LIMITS FOR TRANSMISSION ARMS
(SEE FIGURE 2, EXHIBIT 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
4-5/8x5-5/8 or less	1	1-1/4	1-1/4
5-5/8x7-3/8	1-1/4	1-3/8	1-7/8
3-5/8x9-3/8	3/4	1-3/4	2-1/4

*No knot will 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 (0.95 cm) deep on one face and the maximum round knot for its particular location on the worst face, with a maximum width of 1 inch (2.54 cm) 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 drain water when the arm is normally

installed. In the center section, upper half, they shall not be greater than 1/2 the dimensions of round knots. Elsewhere, they shall not be greater than the round knot dimension. They 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) *Knot spacing.* 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 (1.59 cm) diameter may intersect pin holes in the center section. One inch (2.54 cm) diameter knots may intersect 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 (2.4 m) arms, and not more than five pitch and bark pockets in 10 foot (3.0 m) arms. Elsewhere a maximum of six medium pockets in 8 foot (2.4 m) arms and eight in 10 foot (3.0 m) arms shall be permitted. Equivalent smaller pockets shall be permissible. An occasional large pocket is permissible.

(ii) Shakes shall be prohibited.

(iii) *Checks.* 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 (25.40 cm) long on the top face, and 1/3 the arm length on the other faces. Checks shall not be repeated in the same line of grain in adjacent pin holes. The sum of the average depths of

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checks occurring in the same plane on opposite faces shall be limited to 1/4 the face depth.

(iv) Compression wood shall be prohibited on any face. It is permitted if wholly enclosed in the arm, more than six annual rings from the surface, and not over 3/8 of an inch (0.95 cm) in width.

(v) Insect holes larger than 3/32 of an inch (0.24 cm) shall be prohibited. Pin holes (i.e. holes not over 1/16 of an inch (0.16 cm) 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 (2.54 cm), measured across the corner. Outside of the top center section, an aggregate length not to exceed 2 feet may have wane up to 1-1/2 inches (3.81 cm) on an occasional piece on one or both edges. Bark shall be removed.

(vii) Prior to preservative treatment, crook, bow, or twist shall not exceed 1/2 of an inch (1.27 cm) in 8 foot arms (2.4 m) and 5/8 of an inch (1.59 cm) in 10 foot (3.0 m) arms.

(g) *Manufacture.* (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 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 05.2-1983.

(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 1/8 of an inch (0.32 cm) of the center-line locations on the face in which it appears. The 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 3/8 of an inch (0.95 cm) radius. The two bottom edges may be slightly

eased 1/8 of an inch (0.32 cm) radius for the entire length.

(5) *Incising.* The lengthwise surfaces of Douglas-fir crossarms shall be incised approximately 1/4 of an inch (0.64 cm) deep. The incision shall be reasonably clean cut with a spacing pattern that insures uniform penetration of preservative.

(6) *Workmanship.* All crossarms shall be first quality workmanship. Crossarms shall be dressed on four sides, although "hit and miss skips" may occur on two adjacent faces on occasional pieces. Five (5) percent of a lot or shipment may be 1/8 of an inch (0.32 cm) scant in thickness or width at the ends for a length not exceeding 6 inches (15.24 cm), or may have 1/8 of an inch (0.32 cm) machine bite on offset.

(h) *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. Southern Yellow Pine arms shall have an average moisture content of 22 percent or less, with a maximum not to exceed 30 percent.

(2) Moisture content levels shall be measured at about 1/4 the length and at a depth of about 1/5 the crossarm's thickness. Additionally, the moisture content gradient between the shell (i.e. 1/4 of an inch (0.64 cm) deep) and the core (i.e. about 1 inch (2.54 cm) 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 or independent inspector.

(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.

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

(i) Creosote which conforms to the requirements of AWPA Standard P1 when analyzed in accordance with the methods in AWPA Standard A1, 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 Standard P8 when analyzed in

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accordance with AWPA Standard A5 or A9. The hydrocarbon solvents for introducing the preservative into the wood shall meet the requirements of AWPA Standard P9 Type A; or

(iii) Waterborne preservatives, which may only be one of the following:

(A) Ammoniacal Copper Arsenates (ACA) and Ammoniacal Copper Zinc Arsenate (ACZA) which shall meet the requirements of AWPA Standard P5, when analyzed in accordance with methods in AWPA Standards A2, A9, or A11; and

(B) Chromated Copper Arsenates (CCA) which shall meet the requirements of one of the formulations given in AWPA Standard P5, sections 4, 5 or 6, and 10. Tests to establish conformity shall be made in accordance with AWPA Standards A2, A9, or A11.

(1) The pH of treating solutions of the waterborne preservatives shown in AWPA Standard P5, section 10, shall be determined in accordance with AWPA Standard A2, section 8.

(2) Waterborne preservatives are available either as oxides, which form non-ionizing chemical compounds in the wood, or as salts, which leave ionizing compounds as well as non-ionizing compounds in the wood. Salt formulations of a waterborne preservative are more corrosive to metal than the oxide formulation and may cause surface deposits. Unless otherwise specified in the purchase order, the oxide formulations of waterborne preservatives shall be supplied.

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

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

(iv) 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 Copper Naphthenate and shall conform to AWPA Standard P8 when analyzed in accordance with AWPA Standard A5. The hydrocarbon solvents for introducing the preservative into the wood shall meet the requirements of AWPA Standard P9 Type A.

(2) [Reserved]

(j) *Preservative treatment.* (1) All timber products treated under this speci-

fication shall be treated by either a pressure or a thermal (nonpressure) 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 Deg. F (max.)
Steam	3	220 (104.4C)
Heating in Preservative	3	210 (98.9C)

(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 (115.6C).

(k) *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 (7.62 cm) from the end of the arm and no closer than 3 inches (7.62 cm) 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) Penetration by the preservative, as determined in accordance with AWPA Standard A3, shall be 100 percent of the sapwood in crossarms. In the heartwood of Douglas-fir crossarms, the penetration shall be not less than 3 inches (7.62 cm) longitudinally from the edge of holes and ends, and at least 3/16 inch (0.45 cm) from the surface of any face.

(4) Retention of preservative in the outer 6/10 of an inch (1.52 cm) for Douglas-fir and one inch (2.54 cm) for Southern Yellow Pine assay zones at the treating plant shall be not less than:

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Preservative	Retention (pcf)	AWPA Analysis Method
Creosote	8	A6
Pentachlorophenol	0.4*	A5
ACA, ACZA, or CCA	0.4	A2, A7, A9, or A11
Copper Naphthenate	0.04	A5, A9, or A11

*This 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.

(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.

(1) *Marks and brands.* (1) All crossarms shall be branded (hot brand) or die-stamped legibly and to a depth of approximately 1/16 of an inch (0.16 cm) before treatment.

(2) The letters and figures shall be not less than 1/2 of an inch (1.27 cm) 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 salts, or N for Copper Naphthenate.

(4) An example is:

M-6-72 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 (30.48 cm) from the midpoint of the arm.

(6) The mark should be approximately the same location on each type of crossarm of each producer.

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

(m) *Storage.* (1) Producers may treat crossarms for reserve stock under any of the RUS approved plans. Prior to treating reserve stock, and annually thereafter, producers shall notify the Director of the Electric Staff Division of their intent to treat reserve stock. The letter of notification shall be addressed to the Director, Electric Staff Division, Rural Utilities Service, Washington, DC 20250-1500.

(2) RUS shall acknowledge, by letter, each notification of intent to treat material for reserve stock under the RUS specification.

(3) RUS's letter acknowledging the plant's advance notice of intent to treat material for reserve treated stock for the calendar year in question shall be evidence of compliance with the notification requirements.

(4) Producers shall notify RUS of:

- (i) The locations of all storage or distribution yards where reserve treated stock will be maintained;
- (ii) The designation of the RUS-approved plan;
- (iii) The name of the selected inspection agency, where applicable; and
- (iv) Any changes that occur during the year.

(5) 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.

(6) The crossarms shall meet the assay after re-treatment in accordance with paragraph (k) of this section.

(7) 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.

(8) Borrowers or their contractors shall not purchase reserve treated

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stock from plants that fail to comply with the notification requirements.

(n) *Drawings.* (1) The drawings of Exhibit 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 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) Technical drawings for transmission crossarms are published in RUS Bulletin 1728F-T805B (formerly 50-1), Electric Transmission Specifications and Drawings, 115kV through 230kV, and RUS Bulletin 1728F-T805A (formerly 50-2), Electric Transmission

Specification and Drawings, 34.5kV through 69kV.

(5) Appropriate drawings for transmission arms are to be specified and included with purchase orders.

(o) *Destination inspection.* (1) When cross-sectional tolerances are measured at destination, average shrinkage allowance shall be considered using the arm's current moisture content and actual size.

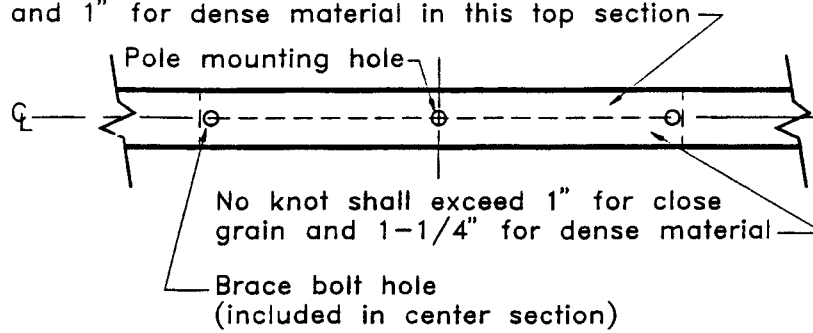
(2) Using the average shrinkage allowances for Douglas-fir and Southern Yellow Pine as 1 percent size change for each four point moisture content change below the fiber saturation point, calculations can be made to determine if the arm met the minimum size at time of manufacture, when the arm was to meet the average moisture content.

EXHIBIT A TO § 1728.201—DISTRIBUTION AND TRANSMISSION ARMS

DISTRIBUTION ARMS

Figure 1

No knot shall exceed 3/4" for close grain and 1" for dense material in this top section

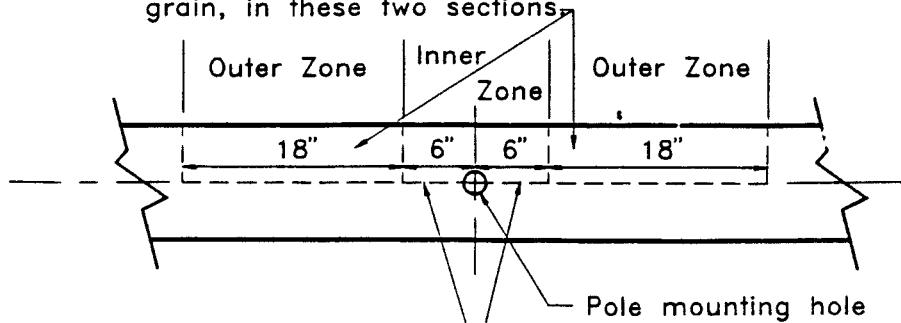


TRANSMISSION ARMS

POLE MOUNTING HOLE ZONE

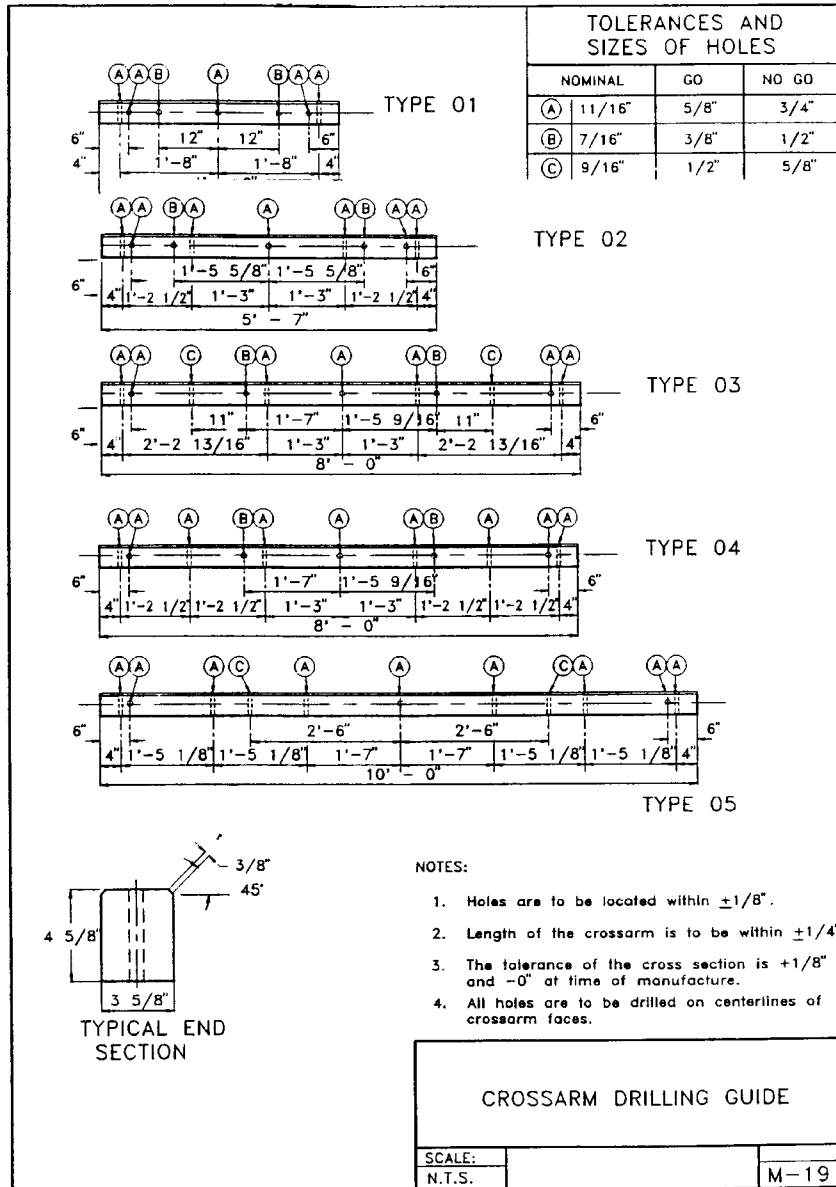
Figure 2

No knot shall exceed a diameter of 1" for close grain, or 1-1/4" for dense grain, in these two sections



No knot in the inner zone shall exceed 3/4" diameter.

EXHIBIT B TO § 1728.201—CROSSARM DRILLING GUIDE



[58 FR 41396, Aug. 3, 1993]