

**UNITED STATES DEPARTMENT OF AGRICULTURE
Rural Development Utilities Programs**

BULLETIN 1728F-700

SUBJECT: RD Specification for Wood Poles, Stubs and Anchor Logs

Incorporated by reference in 7 CFR Parts 1728

TO: All RD Electric Borrowers

EFFECTIVE DATE: [Insert effective date of Final Rule]

OFFICE OF PRIMARY INTEREST: Transmission Branch, Electric Staff Division.

AVAILABILITY: This bulletin replaces RUS Bulletin 1728F-700, RUS Specification for Wood Poles, Stubs and Anchor Logs, issued September 1993. File with 7 CFR Part 1728 (Electric Borrowers).

PURPOSE: To describe: (1) The minimum acceptable quality of wood poles, stubs, and anchor logs permitted to be purchased by or for RD borrowers; and (2) the plans of procurement under which these wood products may be purchased.

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Poles
Specifications
Timber Products

ABBREVIATIONS:

ACA	Ammoniacal Copper Arsenate
ACZA	Ammoniacal Copper Zinc Arsenate
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
AWPA	American Wood Protection Association
CCA	Chromated Copper Arsenate
CuN	Copper Naphthenate
RD	Rural Development
RUS	Rural Utilities Service
SPIB	Southern Pine Inspection Bureau
USDA	United States Department of Agriculture
WCLIB	West Coast Lumber Inspection Bureau

DEFINITIONS:

Butt treated means poles that are only treated in the section of the pole in contact with the ground.

Certificate of compliance means a certification, signed by an authorized employee of the producer, that the material shipped meets the requirements of this specification and any supplementary requirements cited in the contract or order under which the material was purchased.

Contractor means an organization retained by a RD borrower to construct a power line and in accordance with the contract under which the RD borrower and contractor execute. The contractor agrees to provide and utilize only wood products that are compliant with this specification.

Independent inspection means the examination of a "lot" of material by an independent inspector employed by a commercial agency.

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

Pole broker means an organization that brokers the sale of poles between RD borrowers and pole producers. Brokers may represent more than one producer.

Producer means the party who manufactures and treats the wood products covered by the specification.

Purchaser means either a RD borrower or a contractor acting as a RD borrower's agent.

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

Reserve treated stock means 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 means a producer or a pole broker that is responsible for supplying poles procured by RD borrowers.

Transmission poles, unless otherwise indicated, are any poles 50 feet or longer.

Treating charge means all the material treated in a cylinder at one time.

Treating plant means the organization that applies the preservative treatment to the poles.

1. SCOPE

1.1 This specification describes the minimum acceptable quality of wood poles, stubs, telephone pedestal stubs, and anchor logs (hereinafter called poles, except where specifically referred to as stubs or anchor logs) purchased by or for RD borrowers, and the plans of procurement under which these poles may be purchased. Where there is conflict between this specification and any other specification referred to herein, this specification shall govern.

1.2 The requirements of this specification implement contractual provisions between RD and borrowers receiving financial assistance from RD. The contractual agreement between RD and a RD borrower requires the borrower to construct its system in accordance with RD accepted plans and specifications. Each RD electric and telecommunications borrower shall purchase only wood poles and stubs produced in accordance with this specification. Each RD electric or telecommunications borrower shall require a written confirmation from their selected contractor that all material utilized shall be produced in accordance with this specification.

2. RELATED SPECIFICATIONS

The following specifications may be considered as pertinent to this specification, subject to the restrictions in the paragraph under "Scope." All AWPAs references shall be those in effect in AWPAs Book of Standards 2007.

- a. ANSI O5.1-2008 - American National Standard Specifications and Dimensions for Wood Poles
- b. ANSI/ASTM D9-87 - American National Standard Definitions of Terms Relating to Timber
- c. Standard No. 17 Grading Rules for West Coast Lumber, West Coast Lumber Inspection Bureau, 2004
- d. Standard Grading Rules for Southern Pine Lumber, Southern Pine Inspection Bureau, 2002
- e. AWWA U1-07- Use Category: System User Specification for Treated Wood
- f. AWWA T1-07- Use Category System: Processing and Treatment Standard
- g. AWWA P1/P13-06 - Standard for Coal Tar Creosote for Land and Fresh Water Use and Marine (Coastal Water Use)
- h. AWWA P5-07 - Standards for Waterborne Preservatives
- i. AWWA P8-06 - Standards for Oil-Borne Preservatives
- j. AWWA P9-06 - Standards for Solvents and Formulations for Organic Preservative Systems
- k. AWWA M1-07 - Standards for the Purchase of Treated Wood Products
- l. AWWA M2-07 - Standard for Inspection of Treated Timber Products
- m. AWWA M3-05 - Standard Quality Control Procedures for Wood Preserving Plants
- n. AWWA M4-06 - Standard for the Care of Preservative-Treated Wood Products

- o. AWPA A1-06 - Standard Methods for Analysis of Creosote and Oil-Type Preservatives
- p. AWPA A2-07 - Standard Methods for Analysis of Waterborne Preservatives and Fire-Retardant Formulations
- q. AWPA A3-05 - Standard Methods for Determining Penetration of Preservatives and Fire Retardants
- r. AWPA A5-05 - Standard Methods for Analysis of Oil-Borne Preservatives
- s. AWPA A6-01 - Method for the Determination of Oil-Type Preservatives and Water in Wood
- t. AWPA A7-04 - Standard Wet Ashing Procedure for Preparing Wood for Chemical Analysis
- u. AWPA A9-01 - Standard Method for Analysis of Treated Wood and Treating Solutions by X-ray Spectroscopy
- v. AWPA A11-93 - Standard Method for Analysis of Treated Wood and Treating Solutions by Atomic Absorption Spectroscopy
- w. AWPA A15-03 - Referee methods

3. GENERAL STIPULATIONS

3.1 Quality control and inspection shall be in accordance with Bulletin 1728H-702, RD Specification for Quality Control and Inspection of Timber Products. Provisions of this specification and American National Standards Institute (ANSI) O5.1, 2008, "American National Standard Specifications and Dimensions for Wood Poles," which are positive in their wording, shall not be interpreted or subjected to judgment by the quality control designee or independent inspector. Judgment, although used by quality control personnel and independent inspectors, shall not be the basis for acceptance of material which does not conform to the minimum requirements of this specification.

3.2 Each purchase order shall contain a provision that requires the producer to comply with the provisions of this specification. 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 RD to inspect such to determine compliance with this specification.

3.3 Plans: Plans which are acceptable for supplying poles under this specification include:

3.3.1 Insured Warranty Plan: Under this plan, the producer furnishes poles meeting this specification and furnishes a warranty. The warranty shall be issued by an insurance company under terms and conditions acceptable to RD. The insurance company shall submit its plan for assuring quality control to RD for specific approval prior to issuance of these warranties.

3.3.2 Independent Inspection Plan: Under this plan, the producer furnishes poles meeting this specification, and all poles are inspected by a qualified independent inspector in accordance with Bulletin 1728H-702, RD Specification for Quality Control and Inspection of Timber Products.

The RD borrower has the prerogative to contract directly with the agency for the inspection service. The borrower shall, where practical, select the inspection agency so that the inspector's

continued employment is dependent only on performance acceptable to the borrower. The selected agency shall not subcontract the service to any other agency.

The producer shall not interfere with the work of the inspector except to provide notification of the readiness of material for inspection. When circumstances warrant, the producer may deal directly with the agency. The producer shall not treat material before it has been properly inspected in the white, as evidenced by the inspector's hammer mark.

3.3.3 Quality Assurance Plans: Under such plans, the producer furnishes poles conforming to this specification as monitored by a quality assurance program acceptable to RD. RD borrower groups or agents for borrower groups endeavoring to operate Quality Assurance Plans shall submit their plans for assuring quality control and receive written RD approval. These requests shall be submitted to the Chairman, Technical Standards Committee "A" Electric Staff Division, Utilities Programs, Stop 1569, Washington, DC 20250-1569.

3.4 With the exception of reserve treated stock, all invoices for treated timber products shall be accompanied by a copy of the producer's Certificate of Compliance and either a copy of the Independent Inspection Report, the Insured Warranty Certificate, or, for other acceptable plans, a comparable certificate of compliance. The certificate shall be presented to the purchaser with the invoice. For reserve treated stock under the Independent Inspection Plan, inspection reports shall be available from the inspection agencies. The purchaser may obtain these reports from the inspection agency after the purchaser has provided the inspection agency with a list of the charge numbers. (The charge number found on the butt is defined in Appendix A, paragraph 9.5.)

3.5 Quality control exercised by the plant quality control designee is an important component in the satisfactory production of treated wood. If the purchaser considers the quality control to be inadequate, the purchaser, or an inspection agency which it retains, may, at the time of material inspection at the plant or at destination, reject all material from the plant.

3.6 Poles failing to conform to any provision covered by this specification shall not be shipped to the purchaser, and all brands, quality or inspection marks or codes removed.

3.7 Poles shall be warranted to conform to this specification. Any pole found not in conformance with this specification, within 1 year from date of delivery to the purchaser, shall be replaced as promptly as possible by the producer.

3.8 The methods of inspection described herein and in Bulletin 1728H-702, RD Specification for Quality Control and Inspection of Timber Products, shall be used no matter which plan is used in producing poles, i.e., Insured Warranty Plan, Independent Inspection Plan or Quality Assurance Plans.

3.9 Pole producers shall take out and maintain liability insurance and a surety bond or errors and omissions insurance for not less than \$1 million and \$500,000, respectively. Upon request, evidence of compliance shall be forwarded to RD. The evidence shall be in the form of a dated certificate of insurance signed by a representative of the insurance company, that includes a provision that no changes in, or cancellation of said insurance will be made without prior written notice to the Director, Electric Staff Division, Rural Development Utilities Programs.

4. QUALITY CONTROL

4.1 Producers shall maintain plant and yard conditions that do not promote decay. Producers shall maintain acceptable quality control procedures as evidenced by the conditions of the plant and quality of the material offered for inspection.

The quality control procedure of all plants that produce under any of the plans described in paragraph 3.3 shall contain at least the following elements:

4.1.1 Quality control shall be the responsibility of a competent individual designated for that specific purpose (quality control designee), together with such staff as may be required. The quality control designee shall be qualified to make the necessary product inspections and analytical work required by this specification. The quality control designee shall verify each step in the production before releasing the material for inspection by a third-party inspector. The third-party inspector shall independently repeat the quality control designee's inspections and tests.

4.1.2 The quality control designee and the independent inspector shall each perform all examinations, tests, and assays, individually and independently. Neither shall rely on the other individual's results in the discharge of their duties.

4.1.3 An inspection agency, its subsidiaries, or any organization with any affiliation and/or financial ties to any one in the inspection agency performing quality control for a producer, shall not also act as the independent inspector of the same producer's poles produced for RD borrowers.

4.1.4 Records, as described in this specification and in Bulletin 1728H-702, shall be maintained by the producer.

4.1.5 Poles not meeting provisions of this specification at any stage shall be withdrawn from production by the quality control designee and shall not be offered for acceptance or shipment under any plan until defects have been corrected. Poles not meeting the requirements for penetration or retention of preservative may be re-treated not more than twice, provided that the total allowable preservative steaming times and temperatures are not exceeded. The identification brand shall be promptly removed from all material found to be nonconforming, subject to the foregoing provision for re-treatment.

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

4.3 Providing "Treating Service Only" does not relieve the treating plant of any responsibilities. The plant quality control designee shall verify that all poles are treated within 10 days after passing white wood inspection by third-party inspection, where applicable, and within 1 month of conditioning if kiln dried.

4.4 The producer shall maintain its own laboratory or contract with an independent testing laboratory at or near the treating plant. The laboratory shall be equipped in accordance with AWP standards. All chemical tests or analyses associated with treatment performed under this specification shall be independently conducted in this laboratory by both the quality control designee and third-party inspector. If acceptable to RD on a case-by-case basis, the producer may use a central laboratory.

5. RESERVE TREATED STOCK

Reserve treated stock shall be subject to the following conditions:

5.1 Producers shall treat material for reserve treated stock under any of the plans (paragraph 3.3) described in the specification.

5.2 No material treated with creosote, pentachlorophenol, or copper naphthenate shall be shipped for use on an RD borrower's system later than 1 year following the original treatment date branded on the material, unless it complies as follows:

- a. The material shall be reassayed by the producer. If conforming to preservative retention requirements, as shown in Table 10, Exhibit H, it may be shipped. Reassayed poles shall be identified on the sawed butt surface with a metal tag showing reassayed date. Such poles shall be acceptable for shipment for 1 year from the date of re-assay. Poles shall not be shipped to a RD borrower where their treatment date is two years or older.
- b. If the material is below specification requirements for preservative retention at the time of re-assay for shipment, and otherwise meets the requirements of this specification, the brand shall be removed and the material re-inspected, re-treated, and re-branded in accordance with paragraph 8.5.

5.3 Waterborne treated poles need not be reassayed.

6. MATERIAL REQUIREMENTS (see Appendix A)

All poles shall conform to the material requirements shown in Appendix A.

7. PRESERVATIVES

Preservatives shall be selected from one of the following:

7.1 Creosote: Creosote shall conform to all 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.

7.2 Pentachlorophenol: Pentachlorophenol shall contain not less than 95 percent chlorinated phenols and shall conform to AWPA Standard P8 when analyzed in accordance with AWPA Standards A5 or A9. The hydrocarbon solvents for introducing the preservative into the wood shall meet the requirements of AWPA Standard P9 Type A, determined in accordance with reference ASTM standards for physical properties.

7.3 Copper Naphthenate: 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, paragraphs 2.1 through 2.7. The hydrocarbon solvents for introducing the preservative into the wood shall meet the requirements of AWPA Standard P9 Type A, determined in accordance with reference ASTM standards for physical properties.

7.4 Waterborne Preservatives: Certain formulations of waterborne preservatives are corrosive to metals. Purchasers are advised to contact suppliers for specific information on the formulation they use.

7.4.1 Ammoniacal Copper Arsenate (ACA) and Ammoniacal Copper Zinc Arsenate (ACZA) shall meet the requirements of AWPA Standard P5, when analyzed in accordance with methods

in AWPA Standard A2, A9, or A11. Poles treated with ACA or ACZA shall be held by the treater to allow a minimum of 30 days of drying time after treatment before delivery to a RD borrower.

7.4.2 Chromated Copper Arsenate (CCA) shall meet the requirements of one of the formulations given in AWPA Standard P5, sections 4, 5 or 6, and 10 and AWPA Standards U1 and T1. Tests to establish conformity shall be made in accordance with AWPA Standard A2, A9, or A11.

7.4.3 Treating solutions of the waterborne preservatives mentioned in AWPA Standard P5, Section 10, shall conform to the pH requirements set forth in AWPA Standard A2, Section 9.

7.4.4 Unless otherwise specified in the purchase order, the oxide formulation of waterborne preservatives shall be supplied.

7.4.5 Douglas-fir and western larch poles shall not be treated with CCA preservatives.

7.5 All poles shall be free of excessive bleeding and visible surface deposits. If visible surface deposits appear on the wood within the 1-year warranted period, the wood shall be considered not to be in compliance with this specification and shall be replaced by the supplier.

8. PRESERVATIVE TREATMENT

8.1 Conditioning Prior to Treatment: All poles, except as stated below, shall be sterilized by heating the pith center of the pole for one hour, at not less than 150°F, unless stated otherwise. Heat transfer usually requires 1 hour for each inch of diameter at 150°F.

8.1.1 Treatment Group "A" poles (see Table 2, Appendix A) may be seasoned by natural air circulation. Extreme care shall be taken to ensure that air seasoned poles do not have pretreatment decay in them. (refer also to paragraph 5.2 of Appendix A). Treatment Group "A" poles are not required to be sterilized

8.1.2 Treatment Group "B", "C" and "D" poles from Table 2, Appendix A of this bulletin, shall be conditioned by Boulton drying, by the steam-vacuum process or by kiln drying. Douglas-fir poles shall be sterilized by heating the pith for a duration of at least 2 hours, at not less than 150°F. The Boulton drying process and steam vacuum process shall follow the following limits:

8.1.2.1 Boulton Drying:

Boulton Drying		
Species	Temperature °F	Duration (hours)
Green or partially seasoned Douglas - fir (coast)	220 max.	optional*
Western Larch	220 max.	optional*
*The duration of the Boulton drying shall reduce the moisture content in the poles sufficiently to minimize subsequent season-checking through the treated sapwood. (Frozen poles shall require additional heating to thaw the wood. Time of Boulton drying shall be counted from the time the wood surface is warmed to approximately 150°F.)		

8.1.2.2 Steam-Vacuum Process:

Steam (limits)		
Species	Temperature °F	Total Time⁽⁴⁾ Max Hours
Southern Pine	245 max.	17 ⁽¹⁾ , 20 ⁽²⁾
Ponderosa Pine	240 max.	6 ⁽³⁾
<p><i>Notes:</i></p> <ol style="list-style-type: none"> 1. Pole classes nominally less than 37.5 inches in circumference at 6 feet from butt. 2. Pole classes nominally 37.5 inches or larger in circumference at 6 feet from butt. 3. See Appendix A, paragraph 4.2.4 for specific limitations. 4. Initial treatment steaming time plus any re-treatment steaming time, combined, shall not exceed these maximums. 		

8.1.2.3 Kiln Drying: See paragraph 4.2.3 of Appendix A for limitations.

8.2 Treatment (Pressure Process): All poles treated by this process shall be treated in a cycle in which the temperatures and pressures shown are not exceeded. These pressures and temperatures shall be recorded on a recording chart and shall be verified by visual observations of the direct reading gauges throughout the treating cycle by a qualified representative of the treating plant.

Pressure Process				
Species	Preservative Temperature in °F			Impregnation lb/in ²
	Creo. & Oilborne	ACA/ACZA	CCA	
Western Red Cedar	200	150	120	100
Alaska Yellow Cedar	220	150	120	100
Jack & Red Pine	220	150	120	150
Douglas-fir (coast) & Western Larch	220	150	---	150
Southern Pine	220	150	120	200
Ponderosa (Western) Pine	220	150	120	200

All poles treated with waterborne preservatives (paragraph 7.4), shall use the full cell process as described in AWPAs Standards U1 and T1 except as modified by the provisions of ANSI O5.1-2002.

8.3 Treatment Full-Length Thermal Process Treatment and Butt Treatment: Poles species shown in Table 10 may be treated by the Thermal process or Butt treated. AWPAs Standards U1 and T1 shall apply.

8.3.1 All poles treated by this process shall be adequately seasoned by natural and artificial methods prior to treatment so that specification requirements for penetration and retention are met.

8.3.2 The temperature of the preservative during the hot oil phase shall not exceed 230°F.

8.4 Results of Treatment:

8.4.1 Penetration and retention of preservative shall be tested using borings taken at any point on the pole periphery approximately:

- a. 1 foot below nominal ground line of all butt treated poles.
- b. Six to twelve inches above the nominal ground line of western red cedar, northern white cedar and western larch poles.
- c. Within the zone one foot above to one foot below the brand on all other species of poles.

8.4.2 Retention of preservative shall be no less than that specified in Table 10 of Appendix A, as determined by:

- a. Creosote by AWPAs Standard A6.
- b. Penta by AWPAs Standard A5 or A9. 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 has not been in

contact with salt water or has been shown by analysis to have contained no additional chlorides in the wood before treating.

- c. Copper Naphthenate by AWWA Standards A5, paragraph 7, A9, or A11.
- d. Waterborne preservatives by tests in accordance with the recognized standards methods for chromium, copper, zinc, and arsenic ions listed in AWWA Standards A2, A7, A9, or A11.

8.4.3 Penetration of preservative, as determined in accordance with AWWA Standard A3, shall not be less than that specified in Table 10 of Appendix A. Chrome Azurol S and Penta-Check shall be used to determine penetration of copper containing preservatives and penta, respectively. Penetration depth shall be measured along a boring from the outer end toward the inner end for a distance throughout which there is continuous preservative penetration, as indicated by evidence of preservative in each annual ring included.

8.4.3.1 For poles with a circumference of less than 37.5 inches at 6 feet from butt:

- a. Bore 20 percent of poles in a charge or 20 poles from charge, whichever is greater. Accept if all sampled poles conform; otherwise, bore all poles.
- b. Re-treat the charge if more than 15 percent of the sampled poles are found to be nonconforming.
- c. Re-treat all nonconforming poles found in the penetration sampling.
- d. All re-treated poles shall be bored for penetration. Poles which are still nonconforming after the second re-treatment shall be permanently rejected. Permanently rejected poles shall have their brands and inspection marks removed.

8.4.3.2 For poles with a circumference of 37.5 inches or more at 6 feet from the butt:

- a. Forty-five feet and shorter: Bore each pole and re-treat only those found to be nonconforming unless more than 15 percent fail, in which case the entire lot shall be re-treated.
- b. Fifty feet and longer: Bore each pole twice at approximately 90 degrees apart in the same plane around the pole. Accept only those poles conforming to the penetration requirement in both borings.
- c. All re-treated poles shall be bored for penetration. Poles which are still nonconforming after a second re-treatment shall be permanently rejected. Permanently rejected poles shall have their brands and inspection marks removed.
- d. When poles which have been deep incised or radial drilled are bored for penetration and retention testing, the borings shall be taken midway on a diagonal between an incision or hole and an incision or hole in the next vertical row above or below.

8.5 Re-treatment: Poles may be retreated only twice. Distribution poles that are bored, gained or cutback after treatment shall be re-treated.

8.5.1 Creosote, Penta, and Copper Naphthenate: Total steaming time, both for initial treatment and re-treatment, are cumulative and shall not exceed the limits for steam found in paragraph 8.1.2.2.

Re-treatment of reserve treated stock poles shall be by submersion in preservative for not less than 10 minutes under 25 pounds per square inch gauge pressure or not less than 30 minutes at atmospheric pressure.

8.5.2 Waterborne Preservatives: Poles which require re-treatment shall be air dried sufficiently to accept re-treatment. Re-treatment shall be within original treatment limitations. Re-treated poles shall conform fully to all the requirements of this specification; otherwise, they shall be permanently rejected.

8.5.3 Re-treated poles shall have a letter "R" die-stamped, hammer-stamped or burnbranded in the sawed butt surface following the charge number to indicate that the poles have been re-treated. (See paragraph 9.5 in Appendix A for branding information.)

9. DRAWINGS

The attached drawing W1.1G or M-20 in Appendix A shows in detail the standard framing (gains and bolt holes) for electric distribution poles ordered under this specification. Other distribution pole framings are shown in RD specifications and drawings: Bulletin 1728F-803, Specifications and Drawings for 24.9/14.4 kV Line Construction and Bulletin 1728F-804, Specifications and Drawings for 12.5/7.2 kV Line Construction. Framing drawings for electric transmission poles are shown in Electric Transmission Specifications and Drawings: Bulletin 1728F-810, "Electric Transmission Specification and Drawings 34.5 through 69 kV" and Bulletin 1728F 811, "Electric Transmission Specifications and drawing 115 kV through 230 kV." Pole stub and anchor log dimensions are shown in the above specifications and drawings or Tables 11, 12 and 13 of Appendix A of this bulletin. The appropriate framing drawings shall be designated and provided by the purchaser.

10. DESTINATION INSPECTION

The RD borrower shall have the prerogative to inspect materials at destination. All provisions of this specification shall apply to material inspected at destination.

Judgment, although used by quality control personnel and independent inspectors, shall not be the basis for acceptance of material which does not conform to the minimum requirements of this specification. Where a difference of opinion arises as to the compliance of materials with this specification, when inspected at destination, it shall be the responsibility of the supplier to attempt to resolve this matter with the purchaser.

11. PURCHASE OF RELATED SPECIFICATIONS AND STANDARDS

All ANSI standards may be purchased from:

American National Standards Institute, Inc.
25 West 43rd St.
New York, New York 10036
Telephone: (212) 642-4900

All AWWA standards may be purchased from:

American Wood Protection Association (AWPA)
P.O. Box 361784
Birmingham, Alabama 35236-1784
Telephone: (205)733-4077

Standard Grading Rules for Southern Pine Lumber may be purchased from:

Southern Pine Inspection Bureau
4709 Scenic Highway
Pensacola, Florida 32504-9094
Telephone: (334) 874-9800

Standard Grading Rules for West Coast Lumber may be purchased from:

West Coast Lumber Inspection Bureau
P.O. Box 23145
Portland, Oregon 97281
Telephone: (503) 639-0651

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APPENDIX A MATERIAL REQUIREMENTS

1. INTRODUCTION

The material specifications described in this section is based in large part on, but not the same as, the ANSI O5.1-2008 Specification and Dimensions (for Wood Poles). Certain modifications and/or additions to the ANSI O5.1 standard have been made. Copies of ANSI O5.1-2008 may be obtained at www.atis.org/docstore/default.aspx. The scope of this document is to describe the minimum acceptable quality of wood poles, stubs and anchor logs permitted to be purchased by or for RD borrowers.

2. DEFINITIONS

The following definitions shall apply to the terms used in this standard:

Air Seasoning: Drying by the use of air where the air temperature is not more than 140°F either in the open or under cover.

Boulton Drying: Drying by heating in non-aqueous solution under vacuum.

Check: The lengthwise separation of the wood that usually extends across the rings of annual growth and commonly results from stresses set up in wood during seasoning.

Compression Wood: Abnormal wood formed on the lower side of branches and inclined trunks of softwood trees. Compression wood is identified by its relatively wide annual rings, usually eccentric; relatively large amount of summerwood, sometimes more than 50 percent of the width of the annual rings in which it occurs; and its lack of demarcation between springwood and summerwood in the same annual rings. Compression wood, compared with normal wood, shrinks excessively lengthwise.

Cross Break: A separation of the wood cells across the grain. Such breaks may be due to internal strains resulting from unequal longitudinal shrinkage or to external forces.

Dead Streak: An area, devoid of bark, resulting from progressive destruction of the growth cells of wood and bark at the edges of the streak. On a pole, a dead streak is characterized by a discolored weathered appearance and by lack of evidence of overgrowth along the edges of the deadened surface.

Decay: The decomposition of wood substance by fungi.

Decay, Advanced (or Typical): The older stage of decay in which the destruction is readily recognized because the wood has become punky, soft and spongy, stringy, ring-shaked, pitted, crumbly, or, in poles not stored or rafted in water, is in a soggy condition. Decided discoloration or bleaching of the rotted wood is often apparent.

Decay, Incipient: The early stage of decay that has not proceeded far enough to soften or otherwise perceptibly impair the hardness of the wood. It is usually accompanied by a slight discoloration or bleaching of the wood. Incipient decay can occur in living trees.

Decayed Knot: A knot containing decay. Two types of decayed knots are recognized.

- Type I Knots containing soft or loose fibers (decay) which may extend the full length of the knot into the pole and which are associated with heart rot.

Type II Knots containing soft or loose fibers (decay) which are not associated with heart rot.

Face of Pole: The concave side of greatest curvature in poles with sweep in one plane and one direction, or the side of greatest curvature between groundline and top in poles having reverse or double sweep.

Ground Line Section: That portion of a pole between 1 foot above and 2 feet below the ground line, as defined in the pole dimension tables (see Tables 3 through 9). (For purposes of defining the ground line when incising or radial drilling, see paragraphs 9.7.1 and 9.7.2.)

Hollow Heart: A void in the heartwood caused by decay or insect attack.

Hollow Pith Center: A small hole at the pith center of the trunk or of a knot caused by disintegration of the pith (small soft core occurring in the structural center of a tree or branch).

Insect Damage: Damage resulting from the boring into the pole by insects or insect larvae. Scoring or channeling of the pole surface is not classed as insect damage.

Kiln Drying: Drying by the use of heated air in batch or progressive-type kilns.

Knot Cluster: Two or more knots grouped together as a unit, the fibers of the wood being deflected around the entire unit; distinct from the group of single knots in which each is a unit. A knot cluster shall be considered as a single knot.

Knot Diameter: The diameter of a knot on the surface of the pole measured in a direction at right angles to the lengthwise axis of the pole. The sapwood as well as the heartwood portion of a knot shall be included in the measurement.

NOTE: For a description of means for defining the limits of knots, see American National Standard Definitions of Terms Relating to Timber, ANSI/ASTM D9-87.

Lot: A quantity of poles of like size, conditioning, and fabrication usually making up one treating charge.

Red Heart: A condition caused by a fungus, *Fomes pini*, that occurs in the living tree. It is characterized in the early stages of infection by a reddish or brownish color in the heartwood; known as "firm red heart." Later the wood of the living tree disintegrates (decays) in small, usually distinct, areas that develop into white-lined pockets.

Sap Stain: A discoloration of the sapwood, caused by the action of certain molds and fungi, that is not accompanied by softening or other disintegration of the wood.

Scar: A depression in the surface of the pole resulting from a wound where the living tree has not compartmentalized the wound and reestablished the normal cross section of the pole.

Scar, Turpentine Acid Face: An area in the lower portion of a southern pine pole where bark hack removal with acid applied has caused resin to flow. No removal of sapwood has occurred.

Scar, Turpentine Cat Face: A depression in the surface of a southern pine pole resulting from a wood hack into the sapwood, where the tree has not compartmentalized the wound and reestablished the normal cross section of the pole.

Shake: A separation along the grain, the greater part of which occurs between the rings of annual growth.

Shelling: Ring separation extended to the surface of round or sawn timber normally following the growth rings and often associated with limiting defects such as knots, compression wood or shake. Ring separation usually becomes more pronounced as the product dries and may be further aggravated by stress developed during horizontal lifting or loading.

Short Crook: A localized deviation from straightness which, within any section 5 feet or less in length, is more than 1/2 the mean diameter of the crooked section (see Fig. 1, Diagram 3).

Spiral-Grained (Twist-Grained) Wood: Wood in which the fibers take a spiral course about the trunk of a tree instead of a vertical course. The spiral may extend in a right-hand or left-hand direction around the tree trunk. Spiral grain is a form of cross grain.

Split: A lengthwise separation of the wood extending completely through the piece from one surface to another.

Steam Conditioning: Subjecting poles in a closed vessel to steam prior to treatment.

Sweep: Deviation of a pole from straightness (see Fig. 1, Diagrams 1 and 2, Exhibit A).

3. POLE CLASSES

Poles meeting the requirements of this standard are grouped in the classes identified in Tables 3 through 9 of this Appendix, based on their circumference measured 6 feet from the butt. **Poles of a given class and length are designed to have approximately the same load carrying capacity regardless of species.**

4. MATERIAL REQUIREMENTS: GENERAL

4.1 Species:

4.1.1 **Poles:** See Table 2, Appendix A.

4.1.2 Telephone Pedestal Stubs:

4.1.2.1 All round pedestal stubs shall conform to material requirements for poles. Plywood peeler cores, and similar material where the sapwood has been largely removed, are not acceptable.

4.1.2.2 All sawn stubs shall conform to the following material requirements:

All sawn stubs furnished under this specification shall be free of brashy wood, cross breaks, decay, insect holes larger than 3/32 of an inch, and dried to a moisture content of not more than 19 percent. The stubs shall be surfaced on four sides, shall meet additional requirements as shown on specification drawings, and shall be made of one of the following:

Douglas-fir conforming to provisions of No. 1 "Structural Joists and Planking," as per paragraph 123b, of Rule 17 of the Standard Grading Rules for West Coast Lumber (WCLIB Number 17-revised 2000). Only coastal origin Douglas-fir shall be used for Douglas-fir pedestal stubs under this specification.

Southern Yellow Pine conforming to the provision of No. 1 "Structural Joist and Planks" as per paragraph 312 of the 2002 Southern Pine Inspection Bureau (SPIB) Grading Rules except for the applicable overriding provisions of the RD specification.

Other Species acceptable for pedestal stubs under this specification, shall be equivalent in grade to those specified in paragraph 4.1.2.2 of this section.

4.2 Conditioning, Seasoning, and Treatment Limitations:

4.2.1 Air Seasoning: Air seasoning shall be in conformance with this specification for preservative treatment without developing pretreatment decay. Presteaming or after steaming is permitted for species in Treatment Group A. However, if such steaming is employed, the maximum temperature shall not exceed 240°F. The total steaming time from the time steam is introduced into the cylinder, including both initial and final steam, shall not exceed 4 hours duration.

Pedestal stubs which are air-seasoned shall have been dried by natural air circulation. They shall be checked to the heartwood. The moisture content shall not exceed 25 percent at a depth of 1-1/2 inches or at the sapwood heartwood line, whichever is less. All sawn pedestal stubs shall be dried to a moisture content of not more than 19 percent prior to treatment.

4.2.2 Boulton Drying Temperature: The temperature employed in Boulton drying poles of species listed under Treatment Group B of Table 2 shall not exceed 220°F. These poles may be steamed up to 240°F for a maximum time of 4 hours, but such steaming shall be limited to steaming after treatment.

4.2.3 Kiln Drying: Where kiln drying is employed on southern pine, ponderosa pine, red pine, jack pine, lodgepole pine, Douglas-fir (coast), and western larch, the maximum dry bulb temperature shall be increased gradually and shall not exceed 170°F (with the exception noted below). Where kiln drying is employed on western red cedar, the maximum dry bulb temperature shall be increased gradually and shall not exceed 160°F. In compartment kilns operating at temperatures up to 170°F, the maximum wet bulb depressions shall not exceed 50°F with the exception that during the first 24 hours there is no limitation on wet bulb depression. In progressive-type kilns operating at temperatures up to 170°F, the maximum wet bulb depression shall not exceed 50°F in the body of the kiln and 90°F at the entrance to the kiln. Exception: Drying over 170°F is permitted for southern pine, lodgepole pine, Douglas-fir (coast), and western larch species. The maximum dry bulb temperature shall not exceed 230°F for these species. For dry bulb temperatures over 200°F, the wet bulb depression shall be not less than 50°F with the exception that during the first 24 hours there is no limitation on wet bulb depression.

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. Kiln-dried poles shall be treated within 1 month from the time they are removed from the kiln.

4.2.4 Steam Conditioning: The steam temperature employed in steam conditioning for poles of species in Treatment Group C of Table 2 shall not exceed 245°F. The time duration for poles with specified circumferences 37.5 inches or less at 6 feet from the butt shall not exceed 17 hours. Poles with specified circumferences larger than 37.5 inches at 6 feet from the butt shall not exceed 20 hours.

4.3 Solvent Recovery: When poles of any species have been treated with a system using an organic solvent-based preservative solution, a solvent recovery cycle of not over 15 hours at a maximum temperature of 225°F is permitted provided each pole before treatment has a maximum moisture content of 25 percent when measured with a resistance-type moisture meter (calibrated to the basis of oven dry weight moisture content) with insulated pins at 2 inches from the surface at mid-height.

4.4 Rate of Growth: The average rate of growth measured on the sawed butt surface in the outer 2 inches of poles having a circumference of 37.5 inches or less at 6 feet from the butt, and in the outer 3 inches of poles having a circumference of more than 37.5 inches at 6 feet from the butt, shall not be less than six rings per inch. Exception: Poles with four and five rings per inch are acceptable if 50 percent or more summerwood is present.

As an alternative, the ring count and summerwood measurements mentioned above may be made on an increment core taken at 6 feet from the butt directly above the place where the average rate of growth is indicated on the butt surface.

5. MATERIAL REQUIREMENTS: PROHIBITED DEFECTS

5.1 Cross breaks (cracks).

5.2 Decay, except as permitted for firm red heart in paragraph 6.1, defective butts in paragraph 7.4 and decayed knots in paragraph 7.6 in this Appendix. When conditions indicate on distribution poles and transmission poles (in the white), a boring to the center of the pole shall be taken at approximately 1 foot above the ground line, at midpoint, near (within 2 inches) a check or at any other suspicious area. The borings shall be examined by the quality control supervisor and the inspector for any signs of decay.

Where a question of possible decay and infection remains, the pole shall be further tested using techniques such as the culturing or microscopic examination. Evidence of fungal fruiting bodies and mycelium on or in a piece of wood shall be considered as evidence of decay and the piece of wood shall be permanently rejected as nonconforming.

5.3 Dead streaks, except as permitted in paragraph 7.3 in this Appendix.

5.4 Holes, other than drilled holes provided for in the specification, open or plugged, except holes for test purposes, which shall be plugged with treated plugs.

5.5 Hollow butts or tops, except as permitted under hollow pith centers and defective butts.

5.6 Marine borer damage.

5.7 Nails, spikes and other metals not specifically authorized by the purchaser.

6. MATERIAL REQUIREMENTS: PERMITTED DEFECTS

6.1 Firm Red Heart: Firm red heart not accompanied by softening or other disintegration (decay) of the wood is permitted.

6.2 Hollow Pith Centers: Hollow pith centers in tops or butts and in knots are permitted in poles that are to be given full-length treatment.

6.3 Sap Stain: Sap stain that is not accompanied by softening or other disintegration (decay) of the wood is permitted.

6.4 Scars: Turpentine acid face scars are permitted anywhere on the pole surface.

7. MATERIAL REQUIREMENTS: LIMITED DEFECTS

7.1 Bark Inclusions: Depressions containing bark inclusions shall not be more than 2 inches in depth, measured from the surface of the pole.

7.2 Compression Wood: The outer 1 inch of all poles shall be free from visible compression wood.

7.3 Dead Streaks: A single, sound dead streak is permitted in western red cedar and northern white cedar, provided the greatest width of the streak is less than 1/4 of the circumference of the pole at the point of measurement.

7.4 Defective Butts: Hollowing in the butt caused by "splinter pulling" in felling the tree is permitted, provided that the area of such a hollow is less than 10 percent of the butt area. Hollow heart or decay, or both, is permitted in cedar poles only, provided the aggregate area of the hollow heart or decay, or both, does not exceed 10 percent of the entire butt area and does not occur closer than 2 inches to the side surface and provided that the depth of the hollow does not exceed 2 feet, measured from the butt surface.

7.5 Insect Damage: Insect damage, consisting of holes 1/16 inch or less in diameter, or surface scoring or channeling is permitted. All other forms of insect damage are prohibited, except those associated with hollow heart in cedar poles.

7.6 Knot: The diameter of any single knot and the sum of knot diameters in any 1-foot section shall not exceed the limits of Table 2. In determining the sum of knot diameters in any 1-foot section, only those knots with diameters over 0.5 inch whose pitch centers fall within the section shall be included in the sum, and the one-foot section shall be located so as to include the maximum number of knots, i.e., the most severe condition. Type II "decayed knots" are permitted.

TABLE 1 LIMITS OF KNOT SIZES			
	Maximum Knot Sizes Permitted		
	Diameter of any single knot		Sum of Diameters of All Knots Greater Diameter of any Single Knot Than 0.5 Inch in Any 1-Foot Section
Length of Pole	Classes H6 to 3 (Inches)	Classes 4 to 10 (Inches)	All Classes
45 Feet and Shorter			
Lower Half of Length	3	2	1/3 of the average circumference of the same 1' section or 8", whichever is greater, but not to exceed 12" (Note 1)
Upper Half of Length	5	4	
50 Feet and Longer			
Lower Half of Length	4	4	1/3 of the average circumference of the same 1' section or 10", whichever is greater, but not to exceed 14" (Note 1)
Upper Half of Length	6	6	

Notes:

- Both upper and lower halves.
- See section 3 and Tables 3 through 9 of Appendix A for pole classes.

7.7 Scars (Cat Face): A scar is the result of injury to the living tree which has begun to compartmentalize and contain the injury. This provision does not refer to damage done to the tree (pole) after it has been cut. No pole shall have a scar or turpentine cat face (southern pine) located within 2 feet of the ground line. Turpentine scars need be trimmed only to the extent necessary for examination for evidence of fungus infection and insect damage. Other sound scars are permitted elsewhere on the pole surface, provided they are smoothly trimmed and do not interfere with the cutting of any grain and provided that:

- (1) The circumference at any point on trimmed surfaces located between the butt and 2 feet below the ground line is not less than the minimum circumference specified at 6 feet from the butt for the class and length of the pole; and
- (2) The depth of the trimmed scar is not more than 2 inches, if the diameter is 10 inches or less, or 1/5 the pole diameter at the location of the scar if the diameter is more than 10 inches.

7.8 Shakes: Shakes in the butt surface which are not closer than 2 inches to the side surface of the pole are permitted, provided they do not extend to the ground line. Shakes or a combination of connected shakes which are closer than 2 inches to the side surface of the pole are permitted, provided they do not extend further than 2 feet from the butt surface and do not have an opening wider than 1/8 inch. Shakes in the top surface are permitted in poles that are to be given full-length preservative treatment, provided that the diameter of the shake is not greater than 1/2 the diameter of the top of the pole and is not closer than 2 inches from the surface.

7.9 Shape: Poles shall be free from short crooks. A pole may have sweep subject to the following limitations:

- (1) Where sweep is in one plane and one direction only: For all poles species except northern white cedar, a straight line joining the surface of the pole at the ground line and the edge of the pole at the top shall not be distant from the surface of the pole at any point by more than 1 inch for each 10 feet of length between these points. The deviation for northern white cedar poles is 1 inch for each 5 feet in length. (see figure 1).
- (2) Where sweep is in two planes (double sweep), except in northern white cedar poles, or in two directions in one plane (reverse sweep), a straight line connecting the midpoint at the ground line with the midpoint at the top shall not at any intermediate point pass through the surface of the pole (see figure 1, diagram 2). The double sweep limitation for northern white cedar poles shall be as follows:

Where sweep is in two planes (double sweep), the sum of the sweeps in the two planes (each sweep being measured as shown in figure 1, diagram 1) shall not be greater than the allowance for sweep in one plane and one direction for a pole of the same length.

7.10 Shelling: Shelling on the surface of a pole shall be limited to no more than 1 inch in depth.

7.11 Spiral Grain: Spiral grain (twist grain) is permitted as follows:

Length of Pole (Feet)	Maximum Twist of Grain Permitted
30 and shorter	1 complete twist in any 10 ft.
35-45, inclusive	1 complete twist in any 16 ft.
50 and longer	1 complete twist in any 20 ft.

7.12 Splits and Checks:

7.12.1 In the Top: A split or a combination of two single checks (each check terminating at the pith center and separated by not less than 1/6 of the circumference) having one or both portions located in a vertical plane within 30 degrees of the top bolt hole shall not extend downward along the pole more than 6 inches. All other combinations of checks or a split shall not extend downward along the pole more than 12 inches. (Two checks of approximately the same width, each check terminating at the pith center and separated by 1/2 inch or less of wood fiber at any point on the pole circumference, shall be considered as a single continuous check.)

7.12.2 In the Butt: A split or a combination of two single checks, as defined in 7.11.1, in its entirety, shall not extend upward along the pole more than 2 feet.

7.13 Shelling: Shelling on the surface shall be limited to no more than one inch in depth.

8. DIMENSIONS

For dimensions of particular species of poles, see Tables 3 through 9, Exhibits B to G. For dimensions of stubs and anchor logs, see Tables 11, 12, and 13 respectively, Exhibits I and J.

8.1 Length: Poles less than 50 feet in length shall not be more than 3 inches shorter or 6 inches longer than nominal length. Poles 50 feet or more in length shall not be more than 6 inches shorter or 12 inches longer than nominal length.

Length shall be measured between the extreme ends of the pole.

8.2 Circumference: The minimum circumferences at 6 feet from the butt and at the top, for each length and class of pole, are listed in Tables 3 through 9. The circumference at 6 feet from the butt of a pole shall not be more than 7 inches or 20 percent larger than specified minimum, whichever is greater. The top dimensional requirement shall apply at a point corresponding to the minimum length permitted for the pole. Since poles are classed in the green condition, a reduction of up to 2 percent in circumference anywhere is acceptable after conditioning.

8.3 Classification: The true circumference class shall be determined as follows: Measure the circumference at 6 feet from the butt. This dimension shall determine the true class of the pole, provided that its top (measured at the minimum length point) is large enough. Otherwise, the circumference at the top shall determine the true class, provided that the circumference at 6 feet from the butt does not exceed the specified minimum by more than 7 inches or 20 percent, whichever is greater.

9. MANUFACTURING REQUIREMENTS

9.1 Bark Removal: Outer bark shall be completely removed from all poles.

On all poles, no patch of inner bark more than 1 inch wide shall be left on the pole surface between the butt and 2 feet below the ground line.

On poles that are to be given full-length treatment, no patch of inner bark larger than 1 inch wide and 6 inches long shall be left on the pole surface between the top and 2 feet (below the ground line).

NOTE: These provisions are intended to allow an occasional patch of bark and shall not be interpreted to allow numerous patches of bark.

9.2 Sawing: All poles shall be neatly sawed at the top and at the butt along a plane which shall not be out of square with the axis of the pole by more than 2 inches per foot of diameter of the sawed surface. Beveling at the edge of the sawed butt surface not more than 1/12 the butt diameter in width, or an equivalent area unsymmetrically located, is permitted. The sawed surface shall be smooth enough to allow the inspector's mark to be clear and legible after treatment.

9.3 Trimming: Completely overgrown knots, rising more than 1 inch above the pole surface, branch stubs, and partially overgrown knots shall be closely trimmed. Completely overgrown knots less than 1 inch high need not be trimmed. Trimming may be done by shaving machine or by hand.

9.4 Shaving: If shaving is used, the depth of cut shall not be more than necessary to remove inner bark and to trim smoothly and closely all branch stubs and overgrown knots. There shall be no abrupt change in the contour of the pole surface between the ground line and the aboveground sections. The lower 2 feet of poles may be trimmed to remove wood fibers causing butt flare, provided sufficient sapwood remains to obtain customer's minimum penetration requirement.

9.5 Marking and Code Letters: The information in items (1) through (5) below shall be burnbranded legibly and permanently on the pole face or included on a metal tag affixed thereto. The metal tag for the face of the pole shall be round, non-corrosive, tight-fitting, recessed 1/4 inch, and of such gauge to remain readable and last for the life of the pole. It shall be fastened with a barbed or serrated non-corrosive nail. The information in items (5) and (6) below shall be placed on the sawed butt surface. If desired by the producer or the purchaser, items (1), (3), and (4) below may also be placed on the sawed butt surface.

- (1) The treater's code or trademark*
- (2) Independent inspection agency designation or quality assurance mark.
- (3) Plant location and month and year of treatment.
- (4) Code letters denoting the pole species, preservative, and required retention.
- (5) The true circumference-class numeral and numerals showing the length of the pole.
- (6) The charge number. (An "R" shall also be die-stamped, hammer-stamped or burnbranded in the sawed butt surface of re-treated poles.)

NOTE: Broker's designation may also appear on pole, but shall be subordinate to the treater's code.

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The code letters, not less than 5/8-inch high if burnbranded, and not less than 1/8-inch high if on a metal tag, designating the pole species and preservative used, shall be as follows:

Pole Species	Code Letters
Cedar Alaska Yellow Northern white (eastern) Western red	YC EC WC
Douglas-fir (coast)	DF
Larch (western)	WL
Pine Jack Lodgepole Ponderosa Red (Norway)	JP LP WP NP
Southern Pine Loblolly Longleaf Shortleaf Slash	SP

Preservatives	Code Letters
Creosote	C
Pentachlorophenol-Petroleum (Heavy Solvent)	PA
Ammoniacal Copper Arsenate	SB
Ammoniacal Copper Zinc Arsenate	SZ
Chromated Copper Arsenate Type A	SC
Type B	SJ
Type C	SK
Copper Naphthenate	N

For poles, the bottom of the brand or mark shall be placed squarely on the face of the pole and at 10 feet \pm 2 inches from the butt of poles 50 feet or less in length and at 14 feet \pm 2 inches from the butt of poles 55 feet or more in length or as otherwise specified in the purchase order. Anchor logs shall have the brand or mark at the midpoint and the designation for length and diameter (as prescribed in Table 12) on an end. For pedestal stubs the brand shall be placed 5 feet \pm 2 inches from the butt or end.

Example	Interpretation
HRL	Treater's Code or Trademark (for example, Harry Roberts' Lumber Company)
XYZ	Independent Inspection Agency Designation or Quality Assurance Mark.
S5-08	Plant Location (for example, Syracuse) Month and Year of Treatment (for example, May 2008)
SPC-9	Species and Preservative (for example, southern pine, creosote) Retention (actual retention required by this specification)
5-35	Size (for example, Class 5-35 foot pole) or Designation

9.6 Framing:

9.6.1 All distribution poles and stubs shall be bored, gained, and cut to length prior to final treatment.

9.6.2 Transmission poles may be bored and gained after treatment, provided that the cut surfaces are subsequently pressure treated or treated with a supplemental groundline type preservative.

9.6.3 All framing shall be in accordance with the attached drawings or with the drawings which accompany the order. Anchor logs shall be bored as required by the order for them.

9.6.4 When gains are required on one side only, they shall be cut on the face of the pole, and the gained surfaces shall be in approximately parallel planes. Transmission poles (e.g., poles 50 feet or longer) may be treated undrilled.

9.6.5 Transmission poles may be bored before treatment for fumigation if designated in the purchase order.

9.6.6 Bolt holes in poles treated with waterborne preservatives shall be drilled to the maximum dimension permitted by the RD standard drawings (i.e., 1/16 inch over the nominal size).

9.6.7 Anchor logs shall be bored as required by the order for them.

9.7 Incising:

9.7.1 **Distribution Poles:** Western red cedar and northern white cedar distribution poles to be treated by the thermal process shall be ground line incised in the area 2 feet above and 4 feet below the designated ground line with a pattern and depth sufficient to insure uniform penetration of the total sapwood in the incised area.

9.7.2 **Transmission Poles:** Western red cedar and northern white cedar transmission poles to be treated by the thermal process shall be ground line incised in the area 2 feet above and 4 feet below the designated ground line, with a pattern and depth sufficient to insure uniform penetration of the total sapwood in the incised area. All Douglas-fir (coast) transmission poles (poles 50 feet or longer) shall be deep-incised or radial drilled to a minimum depth of 2 1/2 inches in the area 2 feet above and 4 feet below the designated ground line.

9.7.3 When indicated by experience, a deeper penetration may be specified by the purchaser as shown in the table below:

Deeper Incising or Boring Suggestions	
Length of Pole	Penetration
50 through 65 feet	4.0 inches
70 through 85 feet	4.5 inches
90 feet or longer	5.0 inches

Deep incising or radial drilling shall be, as minimum spacing, a 3x6-inch vertical diamond pattern. Radial-drilled holes shall not exceed 5/16 inch in diameter.

Incising or Drilling: Incising or drilling shall be cleanly done to prevent tearing or excessive shattering of fibers. Incisions shall be along (in line with) the axis of the pole.

9.7.4 Pedestal Stubs: Western red cedar, northern white cedar and western larch that are to be treated by thermal process shall be incised in the groundline section in accordance with AWWA Standards U1 and T1. The lengthwise surface of sawn Douglas-fir stubs shall be incised. The incisions shall be approximately 0.4 inch deep, clean-cut and the pattern shall insure uniform penetration of preservative.

10. STORAGE AND HANDLING

10.1 Storage: When it is necessary to hold poles in storage, they shall be stacked on treated or other nondecaying skids, stickers, etc., of such dimensions, and so arranged, as to support the poles without producing noticeable distortion of any of them. The height of the poles shall be limited to avoid damage to poles on the bottom layers. All wood skids, stickers, etc., shall be treated.

Poles shall be piled and supported in such a manner that all poles are, at any point, at least 1 foot above the general ground level and any vegetation growing thereon. Stacks of poles shall not be allowed to settle at any point to less than 1 foot above the ground or any adjacent vegetation growing thereon. No decayed or decaying wood shall be permitted to remain underneath stored poles or in the yard area adjacent to the stored poles. Unseasoned poles shall not be dead piled at any time for air seasoning. This restriction does not apply to short-term piling associated with normal manufacturing procedures. Where special conditions exist, such as in arid areas, a waiver to this dead piling restriction may be requested from RD.

10.2 Handling: Poles shall not be dragged along the ground. Cant hooks, pole tongs, or other pointed tools shall not be applied to the ground line section of any pole.

10.3 Mechanical Damage: Poles are not acceptable if they contain indentations attributed to loading or handling slings that are 1/4 inch or more deep over 20 percent or more of the pole circumference, or more than 1/2 inch deep at any point. Other indentations or abrasions, for example, forklift damage, kiln sticker damage, chain-saw damage, etc., shall not be more than 1/10 the pole diameter at the point of damage up to a cumulative cross-sectional maximum of 1 inch. Such damage is permitted in an oversized section, where the excess of wood shall be taken into consideration in evaluating the effects of the damage. In any case, the remaining circumference shall meet or exceed the specification minimum.

TABLE 2 GENERAL REQUIREMENTS

Treatment Group	Genus Species	Fiber Stress (psi)
Treatment Group A (air seasoned)		
Cedar, northern white (eastern)	Thuja occidentalis	4000
Cedar, western red	Thuja plicata	6000
Cedar, Alaska yellow	Chamaecyparis Nootkatensis	7400
Treatment Group B (Boulton drying)		
Douglas-fir, (coast)	Pseudotsuga Menziesii	8000
Larch, western	Larix occidentalis	8400
Treatment Group C (steam conditioned)		
Pine, southern Loblolly Longleaf Shortleaf Slash	Pinus taeda Pinus palustris Pinus echinata Pinus elliottii	8000
Treatment Group D (kiln drying)		
Cedar, western red	Thuja plicata	6000
Douglas-fir, (coast)	Pseudotsuga menziesii	8000
Larch, western	Larix occidentalis	8400
Pine, jack	Pinus banksiana	6600
Pine, lodgepole	Pinus contorta	6600
Pine, ponderosa	Pinus ponderosa	6000
Pine, red	Pinus resinosa	6600
Pine, southern Loblolly Longleaf Shortleaf Slash	Pinus taeda Pinus palustris Pinus echinata Pinus elliottii	8000

FIGURE 1 MEASUREMENTS OF SWEEP AND SHORT CROOK IN POLES

DIAGRAM 1 - MEASUREMENT OF SWEEP IN ONE PLANE AND ONE DIRECTION

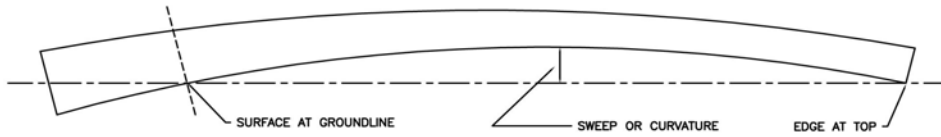


DIAGRAM 2 - MEASUREMENT OF SWEEP IN TWO PLANES (DOUBLE SWEEP)
 OR IN TWO DIRECTION IN ONE PLANE (REVERSE SWEEP)

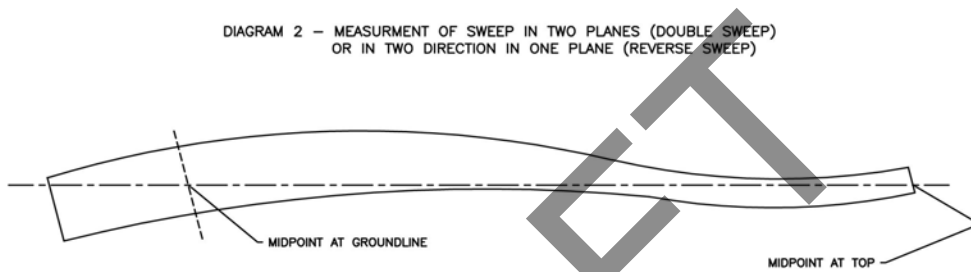
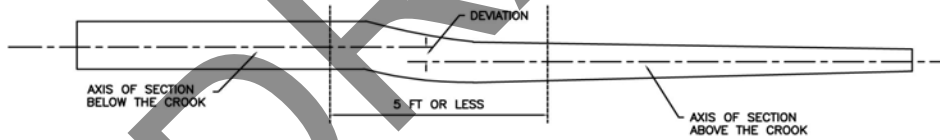
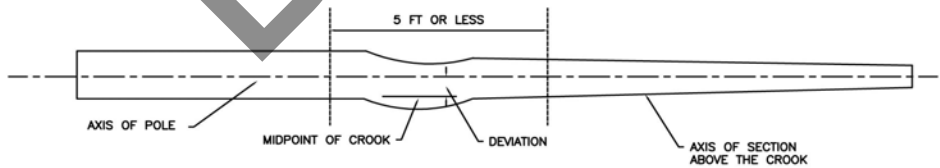


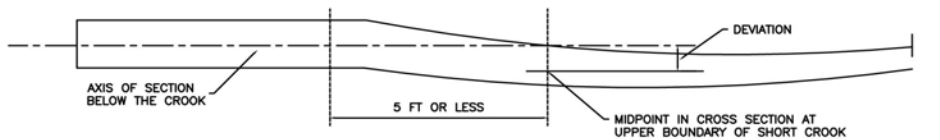
DIAGRAM 3 - MEASUREMENT OF SHORT CROOK (THREE CASES SHOWN)



CASE 1: WHERE THE REFERENCE AXES ARE APPROXIMATELY PARALLEL



CASE 2: WHERE AXES OF SECTIONS ABOVE AND BELOW THE CROOK
 COINCIDE OR ARE PRACTICALLY COINCIDENT



CASE 3: WHERE AXIS OF SECTION ABOVE SHORT CROOK IS NOT PARALLEL
 OR COINCIDENT WITH AXIS BELOW THE CROOK

TABLE 3: DIMENSIONS OF NORTHERN WHITE CEDAR POLES

Class		1	2	3	4	5	6	7	9	10
Minimum circumference at top (in.)		27	25	23	21	19	17	15	15	12
Length of Pole (ft.)	Groundline ⁽¹⁾ Distance From butt (ft.)	Minimum circumference at 6 ft. from butt (in.)								
20	4.0	38.0	35.5	33.0	30.5	28.0	26.0	24.0	22.0	17.5
25	5.0	42.0	39.5	36.5	34.0	31.5	29.0	27.0	24.0	19.5
30	5.5	45.5	43.0	40.0	37.0	34.5	32.0	29.5	26.0	-
35	6.0	49.0	46.0	42.5	39.5	37.0	34.0	31.5	-	-
40	6.0	51.5	48.5	45.0	42.0	39.0	36.0	-	-	-
45	6.5	54.5	51.0	47.5	44.0	41.0	-	-	-	-
50	7.0	57.0	53.5	49.5	46.0	43.0	-	-	-	-
55	7.5	59.0	55.5	51.5	48.0	-	-	-	-	-
60	8.0	61.0	57.5	53.5	50.0	-	-	-	-	-
<p>NOTE – Classes and lengths for which circumferences at 6 feet from the butt are listed in boldface type are the preferred standard sizes. Those shown in light type are included for engineering purposes only.</p> <p>⁽¹⁾ The figures in this column are intended for use only when a definition of groundline is necessary in order to apply requirements relating to scars, straightness, etc.</p>										

TABLE 5: DIMENSIONS OF WESTERN RED CEDAR¹ AND PONDEROSA PINE POLES

Class	H-6	H-5	H-4	H-3	H-2	H-1	1	2	3	4	5	6	7	9	10	
Minimum Circumference at top (in.)	39	37	35	33	31	29	27	25	23	21	19	17	15	15	12	
Length of pole (ft.)	Groundline distance from butt (ft.)	Minimum circumference at 6 ft from butt (in.)														
20	4	-	-	-	-	-	-	33.5	31.5	29.5	27.0	25.0	23.0	21.5	18.5	15.0
25	5	-	-	-	-	-	-	37.0	34.5	32.5	30.0	28.0	25.5	24.0	20.5	16.5
30	5.5	-	-	-	-	-	-	40.0	37.5	35.0	32.5	30.0	28.0	26.0	22.0	-
35	6	-	-	-	-	48.0	45.5	42.5	40.0	37.5	34.5	32.0	30.0	27.5	-	-
40	6	-	-	56.5	53.5	51.0	48.0	45.0	42.5	39.5	36.5	34.0	31.5	-	-	-
45	6.5	64.	62.	59.0	56.0	53.5	50.5	47.5	44.5	41.5	38.5	36.0	33.0	-	-	-
50	7	67.	64.	61.5	58.5	55.5	52.5	49.5	46.5	43.5	40.0	37.5	-	-	-	-
55	7.5	70.	67.	64.0	61.0	57.5	54.5	51.5	48.5	45.0	42.0	-	-	-	-	-
60	8	72.	69.	66.0	63.0	59.5	56.5	53.5	50.0	46.5	43.5	-	-	-	-	-
65	8.5	74.	71.	68.0	65.0	61.5	58.5	55.0	51.5	48.0	45.0	-	-	-	-	-
70	9	76.	73.	70.0	67.0	63.5	60.0	56.5	53.0	49.5	46.0	-	-	-	-	-
75	9.5	78.	75.	72.0	68.5	65.0	61.5	58.0	54.5	51.0	-	-	-	-	-	-
80	10	80.	77.	74.0	70.5	67.0	63.0	59.5	56.0	52.0	-	-	-	-	-	-
85	10.5	82.	79.	75.5	72.0	68.5	64.5	61.0	57.0	53.5	-	-	-	-	-	-
90	11	84.	81.	77.0	73.5	70.0	66.0	62.5	58.5	54.5	-	-	-	-	-	-
95	11	86.	82.	79.0	75.0	71.5	67.5	63.5	59.5	-	-	-	-	-	-	-
100	11	87.	84.	80.5	76.5	72.5	69.0	65.0	61.0	-	-	-	-	-	-	-
105	12	89.	85.	82.0	78.0	74.0	70.0	66.0	62.0	-	-	-	-	-	-	-
110	12	91.	87.	83.5	79.5	75.5	71.5	67.5	63.0	-	-	-	-	-	-	-
115	12	92.	88.	84.5	80.5	76.5	72.5	68.5	64.0	-	-	-	-	-	-	-
120	12	94.	90.	86.0	82.0	78.0	74.0	69.5	65.0	-	-	-	-	-	-	-
125	12	95.	91.	87.5	83.0	79.0	75.0	70.5	66.0	-	-	-	-	-	-	-

NOTES:

- Dimensions of H Classes are applicable for western red cedar only.
- The figures in this column are intended for use only when a definition of groundline is necessary in order to apply requirements relating to scars, straightness, etc
- Classes and lengths for which circumferences at 6 feet from the butt are listed in bold face type are the preferred standard sizes. Those shown in light type are included for engineering purposes only.

TABLE 6
DIMENSIONS OF JACK PINE, LODGEPOLE PINE, RED PINE, REDWOOD, SITKA
SPRUCE, WESTERN FIR, AND WHITE SPRUCE POLES

Class		1	2	3	4	5	6	7	9	10
Minimum circumference at top (in.)		27	25	23	21	19	17	15	15	12
Length of Pole (ft.)	Groundline ⁽¹⁾ Distance From butt (ft.)	Minimum circumference at 6 ft. from butt (in.)								
		20	4	32.5	30.5	28.5	26.5	24.5	22.5	21.0
25	5	36.0	33.5	31.0	29.0	27.0	25.0	23.0	20.0	15.5
30	5.5	39.0	36.5	34.0	31.5	29.0	27.0	25.0	21.0	-
35	6	41.5	38.5	36.0	33.5	31.0	28.5	26.5	-	-
40	6	44.0	41.0	38.0	35.5	33.0	30.5	-	-	-
45	6.5	46.0	43.0	40.0	37.0	34.5	32.0	-	-	-
50	7	48.0	45.0	42.0	39.0	36.0	-	-	-	-
55	7.5	49.5	46.5	43.5	40.5	-	-	-	-	-
60	8.	51.5	48.0	45.0	42.0	-	-	-	-	-
65	8.5	53.0	49.5	46.0	43.0	-	-	-	-	-
70	9	54.5	51.0	47.5	44.5	-	-	-	-	-
75	9.5	56.0	52.5	49.0	-	-	-	-	-	-
80	10	57.5	54.0	50.5	-	-	-	-	-	-
85	10.5	58.5	55.0	51.5	-	-	-	-	-	-
90	11	60.0	56.5	52.5	-	-	-	-	-	-
95	11	61.5	57.5	-	-	-	-	-	-	-
100	11	62.5	58.5	-	-	-	-	-	-	-
105	12	63.5	60.0	-	-	-	-	-	-	-
110	12	65.0	61.0	-	-	-	-	-	-	-
115	12	66.0	62.0	-	-	-	-	-	-	-
120	12	67.0	63.0	-	-	-	-	-	-	-
125	12	68.0	64.0	-	-	-	-	-	-	-

NOTE - Classes and lengths for which circumferences at 6 feet from the butt are listed in boldface type are the preferred standard sizes. Those shown in light type are included for engineering purposes only.

¹⁾The figures in this column are intended for use only when a definition of groundline is necessary in order to apply requirements relating to scars, straightness, etc.

TABLE 7: DIMENSIONS OF ALASKA YELLOW CEDAR AND WEST HEMLOCK POLES

Class		H-6	H-5	H-4	H-3	H-2	H-1	1	2	3	4	5	6	7	9	10
Minimum Circumference at top (in.)		39	37	35	33	31	29	27	25	23	21	19	17	15	15	12
Length of pole (ft.)	Groundline ¹ distance from butt	Minimum circumference at 6 ft from butt (in.)														
		20	4	-	-	-	-	-	-	31.5	29.5	27.5	25.5	23.5	22.0	20.0
25	5	-	-	-	-	-	-	34.5	32.5	30.0	28.0	26.0	24.0	22.0	19.5	15.0
30	5.5	-	-	-	-	-	-	37.5	35.0	32.5	30.0	28.0	26.0	24.0	20.5	-
35	6	-	-	-	-	45.0	42.5	40.0	37.5	35.0	32.0	30.0	27.5	25.5	-	-
40	6	-	-	52.5	50.0	47.5	45.0	42.0	39.5	37.0	34.0	31.5	29.0	25.5	-	-
45	6.5	60.0	57.5	55.0	52.5	49.5	47.0	44.0	41.5	38.5	36.0	33.0	30.5	-	-	-
50	7	62.5	60.0	57.0	54.5	51.5	49.0	46.0	43.0	40.0	37.5	34.5	-	-	-	-
55	7.5	65.0	62.0	59.5	56.5	53.5	50.5	47.5	44.5	41.5	39.0	-	-	-	-	-
60	8	67.0	64.0	61.5	58.5	55.5	52.5	49.5	46.0	43.0	40.0	-	-	-	-	-
65	8.5	69.0	66.0	63.0	60.0	57.5	54.0	51.0	47.5	44.5	41.5	-	-	-	-	-
70	9	71.0	68.0	65.0	62.0	58.5	55.5	52.5	49.0	46.0	42.5	-	-	-	-	-
75	9.5	73.0	69.5	66.5	63.5	60.0	57.0	53.5	50.5	47.0	-	-	-	-	-	-
80	10	74.5	71.5	68.0	65.0	61.5	58.5	55.0	51.5	48.5	-	-	-	-	-	-
85	10.5	76.0	73.0	70.0	66.5	63.0	59.5	56.0	53.0	49.5	-	-	-	-	-	-
90	11	78.0	74.5	71.0	68.0	64.5	61.0	57.5	54.0	50.5	-	-	-	-	-	-
95	11	79.5	76.0	72.5	69.5	66.0	62.0	58.5	55.0	-	-	-	-	-	-	-
100	11	81.0	77.5	74.0	70.5	67.0	63.5	60.0	56.0	-	-	-	-	-	-	-
105	12	82.5	79.0	75.5	72.0	68.5	64.5	61.0	57.0	-	-	-	-	-	-	-
110	12	84.0	80.5	77.0	73.0	69.5	65.5	62.0	58.0	-	-	-	-	-	-	-
115	12	85.5	81.5	78.0	74.5	70.5	67.0	63.0	59.0	-	-	-	-	-	-	-
120	12	86.5	83.0	79.5	75.5	72.0	68.0	64.0	60.0	-	-	-	-	-	-	-
125	12	88.0	84.5	80.5	76.5	73.0	69.0	65.0	61.0	-	-	-	-	-	-	-

NOTE – Classes and lengths for which circumferences at 6 feet from the butt are listed in bold face type are the preferred standard sizes. Those shown in light type are included for engineering purposes only.

¹⁾The figures in this column are intended for use only when a definition of groundline is necessary in order to apply requirements relating to scars,

TABLE 8: DIMENSIONS OF DOUGLAS FIR (BOTH TYPES) AND SOUTHERN YELLOW PINE POLES

Class		H-6	H-5	H-4	H-3	H-2	H-1	1	2	3	4	5	6	7	9	10
Minimum Circumference at top (in.)		39	37	35	33	31	29	27	25	23	21	19	17	15	15	12
Length of pole (ft.)	Groundline ¹⁾ distance from butt (ft.)	Minimum circumference at 6 ft from butt (in.)														
		20	4	-	-	-	-	-	-	31.0	29.0	27.0	25.0	23.0	21.0	19.5
25	5	-	-	-	-	-	-	33.5	31.5	29.5	27.5	25.5	23.0	21.5	19.5	15.0
30	5.5	-	-	-	-	-	-	36.5	34.0	32.0	29.5	27.5	25.0	23.5	20.5	-
35	6	-	-	-	-	43.5	41.5	39.0	36.5	34.0	31.5	29.0	27.0	25.0	-	-
40	6	-	-	51.0	48.5	46.0	43.5	41.0	38.5	36.0	33.5	31.0	28.5	-	-	-
45	6.5	58.5	56.0	53.5	51.0	48.5	45.5	43.0	40.5	37.5	35.0	32.5	30.0	-	-	-
50	7	61.0	58.5	55.5	53.0	50.5	47.5	45.0	42.0	39.0	36.5	34.0	-	-	-	-
55	7.5	63.5	60.5	58.0	55.0	52.0	49.5	46.5	43.5	40.5	38.0	-	-	-	-	-
60	8	65.5	62.5	59.5	57.0	54.0	51.0	48.0	45.0	42.0	39.0	-	-	-	-	-
65	8.5	67.5	64.5	61.5	58.5	55.5	52.5	49.5	46.5	43.5	40.5	-	-	-	-	-
70	9	69.0	66.5	63.5	60.5	57.0	54.0	51.0	48.0	45.0	41.5	-	-	-	-	-
75	9.5	71.0	68.0	65.0	62.0	59.0	55.5	52.5	49.0	46.0	-	-	-	-	-	-
80	10	72.5	69.5	66.5	63.5	60.0	57.0	54.0	50.5	47.0	-	-	-	-	-	-
85	10.5	74.5	71.5	68.0	65.0	61.5	58.5	55.0	51.5	48.0	-	-	-	-	-	-
90	11	76.0	73.0	69.5	66.5	63.0	59.5	56.0	53.0	49.0	-	-	-	-	-	-
95	11	77.5	74.5	71.0	67.5	64.5	61.0	57.0	54.0	-	-	-	-	-	-	-
100	11	79.0	76.0	72.5	69.0	65.5	62.0	58.5	55.0	-	-	-	-	-	-	-
105	12	80.5	77.0	74.0	70.5	67.0	63.0	59.5	56.0	-	-	-	-	-	-	-
110	12	82.0	78.50	75.0	71.5	68.0	64.5	60.5	57.0	-	-	-	-	-	-	-
115	12	83.5	80.0	76.5	72.5	69.0	65.5	61.5	58.0	-	-	-	-	-	-	-
120	12	85.0	81.0	77.5	74.0	70.0	66.5	62.5	59.0	-	-	-	-	-	-	-
125	12	86.0	82.5	78.5	75.0	71.0	67.5	63.5	59.5	-	-	-	-	-	-	-

NOTE – Classes and lengths for which circumferences at 6 feet from the butt are listed in bold face type are the preferred standard sizes. Those shown in light type are included for engineering purposes only.

¹⁾ The figures in this column are intended for use only when a definition of groundline is necessary in order to apply requirements relating to scars, straightness, etc.

TABLE 9: DIMENSIONS OF WESTERN LARCH POLES

Class		H-6	H-5	H-4	H-3	H-2	H-1	1	2	3	4	5	6	7	9	10
Minimum Circumference at top (in.)		39	37	35	33	31	29	27	25	23	21	19	17	15	15	12
Length of pole (ft.)	Groundline ¹⁾ distance from butt (ft.)	Minimum circumference at 6 ft from butt (in.)														
		20	4	-	-	-	-	-	-	30.0	28.5	26.5	24.5	22.5	21.0	19.0
25	5	-	-	-	-	-	-	33.0	31.0	29.0	26.5	24.5	23.0	21.0	18.5	14.5
30	5.5	-	-	-	-	-	-	35.5	33.5	31.0	29.0	26.5	24.5	23.0	19.5	-
35	6	-	-	-	-	43.0	40.5	38.0	35.5	33.0	31.0	28.5	26.5	24.5	-	-
40	6	-	-	50.5	48.0	45.5	43.0	40.0	37.5	35.0	32.5	30.0	28.0	-	-	-
45	6.5	57.5	55.0	52.5	50.0	47.5	45.0	42.0	39.5	37.0	34.0	31.5	29.0	-	-	-
50	7	60.0	57.5	55.0	52.0	49.5	47.0	44.0	41.0	38.5	35.5	33.0	-	-	-	-
55	7.5	62.0	59.5	57.0	54.0	51.5	48.5	45.5	42.5	40.0	37.0	-	-	-	-	-
60	8	64.5	61.5	59.0	56.0	53.0	50.0	47.0	44.0	41.0	38.5	-	-	-	-	-
65	8.5	66.0	63.5	60.5	57.5	55.0	52.0	48.5	46.0	42.5	39.5	-	-	-	-	-
70	9	68.0	65.0	62.5	59.5	56.5	53.5	50.0	47.0	44.0	41.0	-	-	-	-	-
75	9.5	70.0	67.0	64.0	61.0	58.0	54.5	51.5	48.0	45.0	-	-	-	-	-	-
80	10	71.5	68.5	65.5	62.5	59.0	56.0	52.5	49.5	46.0	-	-	-	-	-	-
85	10.5	73.0	70.0	67.0	64.0	60.5	57.5	54.0	50.5	47.0	-	-	-	-	-	-
90	11	74.5	71.5	68.5	65.0	62.0	58.5	55.0	51.5	48.5	-	-	-	-	-	-
95	11	76.5	73.0	70.0	66.5	63.0	60.0	56.5	53.0	-	-	-	-	-	-	-
100	11	78.0	74.5	71.0	68.0	64.5	61.0	57.5	54.0	-	-	-	-	-	-	-
105	12	79.0	76.0	72.5	69.0	65.5	62.0	58.5	55.0	-	-	-	-	-	-	-
110	12	80.5	77.0	73.5	70.0	66.5	63.0	59.5	56.0	-	-	-	-	-	-	-
115	12	82.0	78.5	75.0	71.5	68.0	64.0	60.5	57.0	-	-	-	-	-	-	-
120	12	83.0	79.5	76.0	72.5	69.0	65.0	61.5	58.0	-	-	-	-	-	-	-
125	12	84.5	81.0	77.5	73.5	70.0	66.0	62.5	58.5	-	-	-	-	-	-	-

NOTE – Classes and lengths for which circumferences at 6 feet from the butt are listed in bold face type are the preferred standard sizes. Those shown in light type are included for engineering purposes only.

¹⁾The figures in this column are intended for use only when a definition of groundline is necessary in order to apply requirements relating to scars, straightness, etc.

**TABLE 10
TREATMENT AND RESULTS OF TREATMENT**

		Preservative Treatments Minimum Retentions ^H (Pounds per Cubic Foot)				Assay Zone	Penetration		
Species	Area Use ^A	Creo- sote ^B	Penta ^C	Water- borne ^D	CuN ^E	Inches from Surface	Inches from Surface		Percent of Sapwood
PRESSURE PROCESS - FULL LENGTH TREATMENT									
Southern Pine	1	9.0	0.45	0.60	0.080	0.50 to 2.0	3.50	or	90
Southern Pine	2	7.5	0.38	---	0.060	0.50 to 2.0	3.00	or	90
Douglas-fir ^{G,I}	1	12.0	0.60	0.60	0.095	0.25 to 1.0	0.75	and	85
Douglas-fir ^{G,I}	2	9.0	0.45	---	0.075	0.25 to 1.0	0.75	and	85
Ponderosa Pine ^G	1	9.0	0.45	0.60	---	0.50 to 2.0	3.50	or	90
Ponderosa Pine ^G	2	7.5	0.38	---	---	0.50 to 2.0	3.00 ^J	or	90
Red Pine	1	12.0	0.60	0.60	---	0.10 to 1.6	3.00	or	90
Red Pine	2	10.0	0.53	0.60	---	0.10 to 1.60	2.50	or	85
Jack Pine	2	12.0	0.60	0.60	---	0.10 to 0.75	1.50	or	85 ^K
Western Larch	2	18.0	0.80	0.60	---	0.10 to 0.60	0.50	and	100 ^L
Western Red Cedar	2	20.0	1.0	0.60	0.12	0.0 to 0.50	0.50	or	100
Jack Pine	2	12.0	0.60	0.60	---	0.10 to 0.75	1.50	or	85
PRESSURE AND THERMAL PROCESS - FULL LENGTH TREATMENT									
Western Larch	2	20.0	0.80	---	---	0.0 to 0.50	0.50	or	85
Western Red Cedar	2	20.0	1.0	---	0.15	0.0 to 0.50	0.50	or	100
Alaska Yellow Cedar	2	20.0	1.0	---	---	0.0 to 0.50	0.50	or	100
THERMAL PROCESS- BUTT TREATMENT									
Alaska Yellow Cedar	2 ^F	20.0	1.0	---	---	0.0 to 0.50	0.50	or	100
Western Red Cedar	2 ^F	20.0	1.0	---	---	0.0 to 0.50	0.50	or	100
Northern White Cedar	2 ^F	20.0	1.0	---	---	0.0 to 0.50	0.50	or	100
<p><i>Notes:</i></p> <p>A. Use Area 1- South of the 40th parallel of north latitude and east of the 95th meridian of west longitude, including the Gulf Coast of Texas. Use Area 2- Elsewhere than as defined for Use Area 1.</p> <p>B. Test By Toluene Extraction</p> <p>C. This retention for lime ignition or x-ray spectroscopy method. Copper pyridine method, which equals 90% of lime ignition results, is required when poles may have been in contact with salt water, and for all species native to the Pacific Region, unless it specifically states on the raw material invoice that the material has not been in contact with salt water or shown by analysis that there are no additional chlorides present in the wood before treating.</p> <p>D. Pressure Treatment Only</p> <p>E. In Decay Zone 5, shown in RUS Bulletin 1730B-121, minimum retentions are 0.130 PCF for Southern Pine and 0.150 PCF for Douglas-fir, for all poles within 50 miles of coastal waters.</p> <p>F. Allowed for use in arid areas only.</p> <p>G. Species native to the Pacific Coast region as per Agriculture Handbook 541 (1979).</p> <p>H. A reduction of 10 percent from the values shown above in any of the test zones will be acceptable at destination within 6 months from the date of delivery. In the event of rejection of any poles at destination, RD and the producers shall be promptly notified. The producer may examine the poles at destination within 2 weeks of notification.</p> <p>I. Coast type</p> <p>J. 3.5 inches of penetration for waterborne preservatives.</p> <p>K. 3.0 inches of penetration or 90% penetration for waterborne preservatives.</p> <p>L. Up to a maximum of 0.75 inches.</p>									

**TABLE 11
DIMENSION OF ELECTRIC STUBS**

Lodge pole Pine, Red Pine, Jack Pine

Length of Stub (Feet)	Minimum Top Circumference * (Inches) Class of Stub						
	1	2	3	4	5	6	7
10.5	37.0	34.5	32.0	29.5	27.0	25.0	22.5
11	39.5	37.5	34.0	31.5	29.5	26.5	24.0
11.5	42.0	39.0	36.0	33.5	31.0	28.5	26.0
12.5	43.5	40.5	37.5	34.5	32.0	29.5	27.0
13	45.5	42.5	39.5	36.5	33.5	31.0	28.5

*Maximum circumference not more than these figures plus 4 inches

Southern Pine, Douglas fir (coast) and Western Larch

Length of Stub (Feet)	Minimum Top Circumference * (Inches) Class of Stub						
	1	2	3	4	5	6	7
10.5	36.0	33.5	31.0	28.5	26.0	24.5	22.5
11	38.0	35.5	33.0	30.0	28.0	25.5	23.5
11.5	40.0	37.5	35.0	32.0	29.5	27.0	25.0
12.5	42.0	39.5	36.5	34.0	31.0	28.5	26.5
13	43.5	40.5	37.5	35.0	32.0	29.5	27.0

*Maximum circumference not more than these figures plus 4 inches

**TABLE 12
DIMENSIONS OF ANCHOR LOGS**

**Southern Pine, Lodgepole Pine, Red Pine,
Jack Pine, Douglas fir and Western Larch**

	Log Designation					
	F2-1	F2-2	F2-3	F2-4	TA-2L	TA-4L
Log Length (Feet)	4.0	4.5	5.0	5.0	5.0	8.0
Minimum Diameter (Inches)	8.0	9.0	10.0	12.0	8.0	8.0

TABLE 13
TELEPHONE STUBS FOR MOUNTING BURIED PLANT TERMINAL HOUSINGS

Telephone Round Type Stubs

Dimensions: Top Diameter shall be 4 1/2" minimum. Butt Diameter shall be 5" minimum.

<u>Bid Limit</u> <u>Designation</u>	<u>Length</u>
BA-2	6'-6"
BA-3	8'-0"
BA-4	10'-0"
BA-5	13'-6"

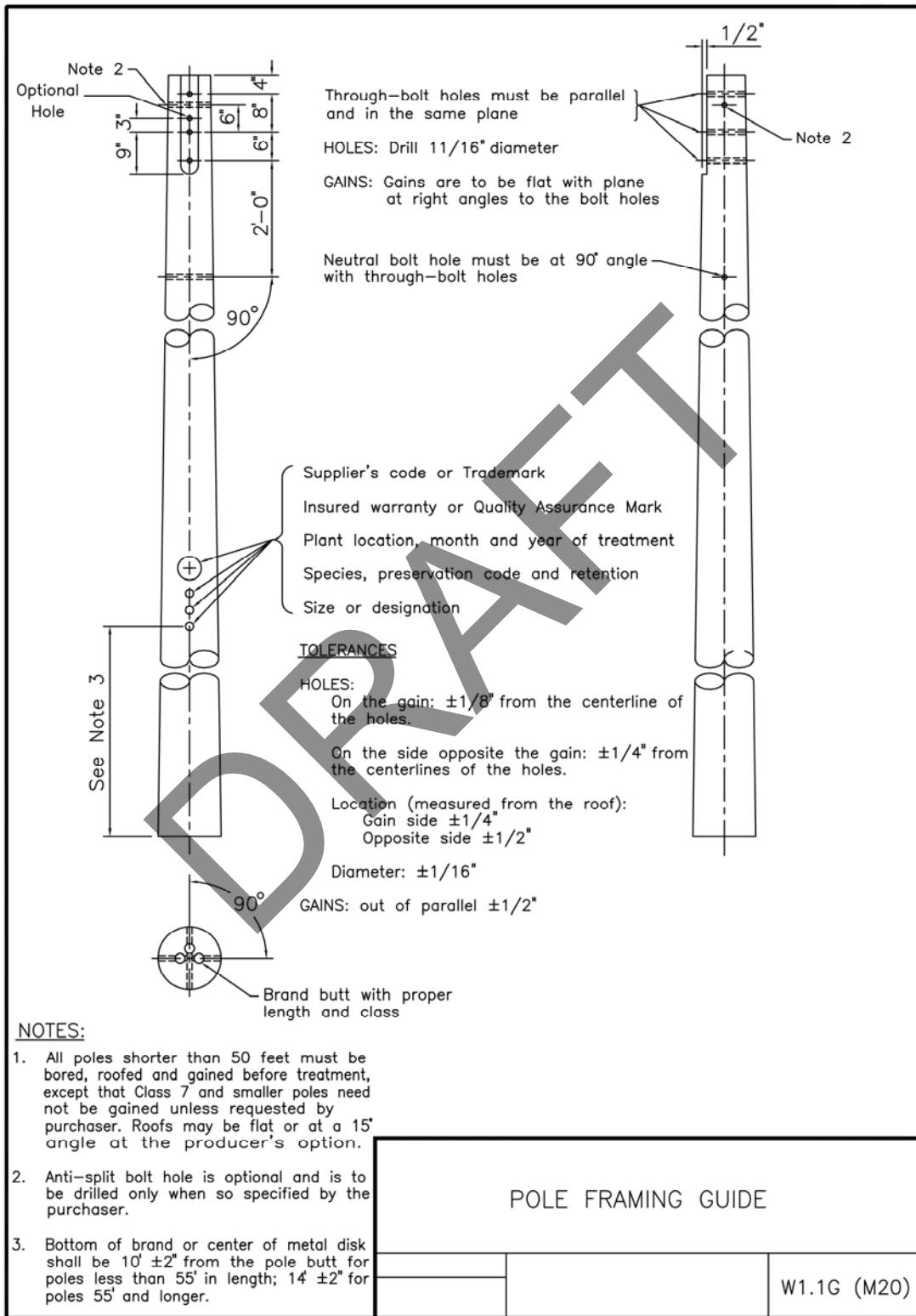
Telephone Sawn Pedestal Stubs

Dimensions: Finished Minimum Cross-section of 3 1/2" x 4 1/2".

<u>Bid Limit</u> <u>Designation</u>	<u>Length</u>
BA-21	6'-6"
BA-22	8'-0"
BA-23	10'-0"

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FIGURE 2 ELECTRIC POLE FRAMING DRAWINGS



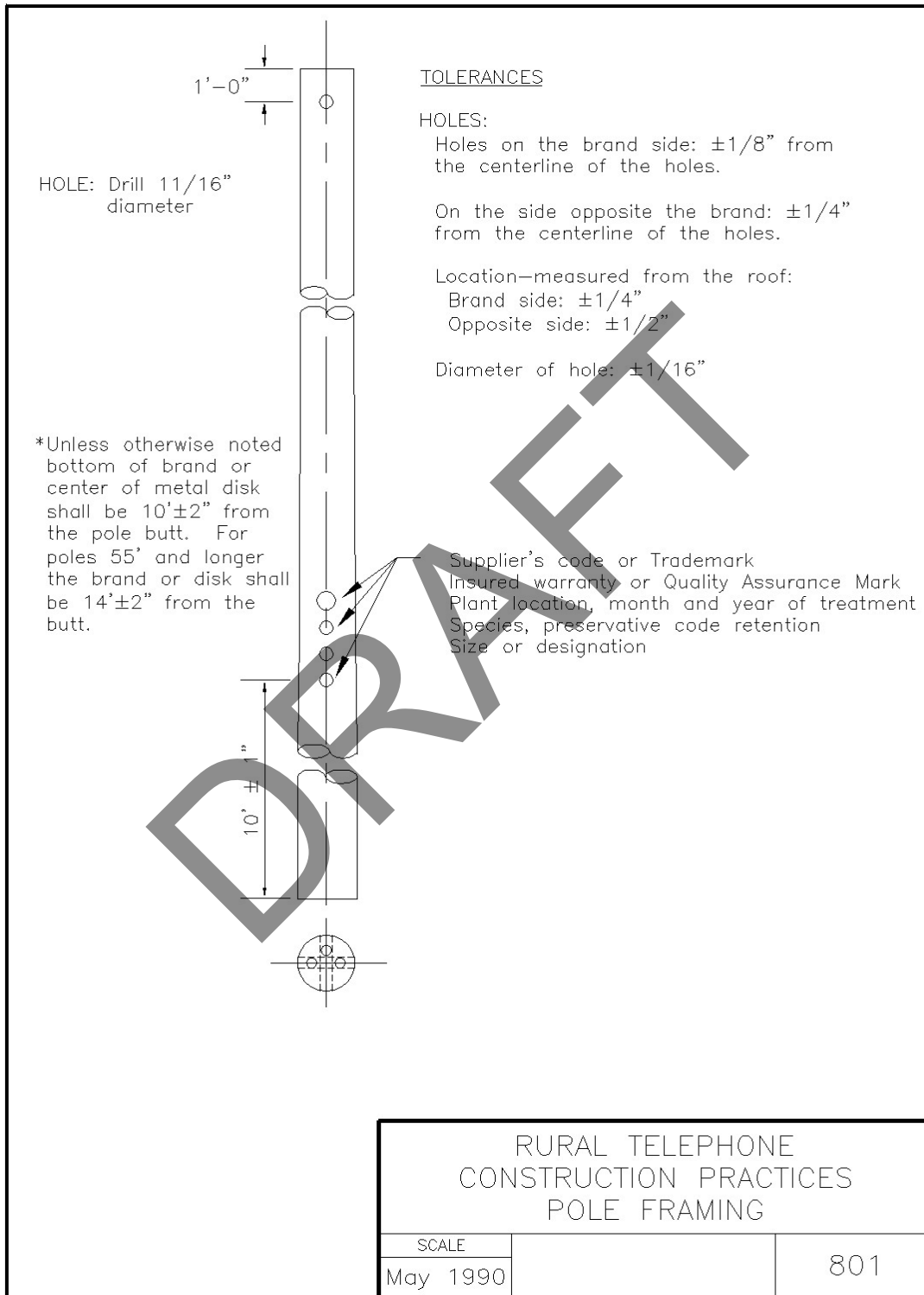
NOTES:

1. All poles shorter than 50 feet must be bored, roofed and gained before treatment, except that Class 7 and smaller poles need not be gained unless requested by purchaser. Roofs may be flat or at a 15° angle at the producer's option.
2. Anti-split bolt hole is optional and is to be drilled only when so specified by the purchaser.
3. Bottom of brand or center of metal disk shall be 10' $\pm 2"$ from the pole butt for poles less than 55' in length; 14' $\pm 2"$ for poles 55' and longer.

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W1.1G (M20)

FIGURE 3 TELECOMMUNICATIONS POLE FRAMING DRAWING



METRIC CONVERSION FACTORS

TO CONVERT FROM	TO	MULTIPLY BY
Foot (ft)	meter (m)	0.3048
Inch (in)	centimeter	2.54
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)

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