

RFQ # 15124

Quotation Due By: 03/05/2013

Bid Due Time: 9:00:00 AM

REPLY TO:

VENDOR INFO:

VENDOR #: 99999.00

NAME: PROVIDE COMPANY NAME, ADDRESS, E-MAIL

CONTACT: QUOTATION DEPARTMENT

ADDRESS 1: _____

ADDRESS 2: _____

CITY: _____ STATE: _____ ZIP: _____

EMAIL: _____

PHONE: _____

FAX: _____

ACCOUNTS PAYABLE DEPARTMENT

PURCHASING DEPARTMENT

Grand River Dam Authority

226 W DWAIN WILLIS AVE

PO BOX 409

VINITA OK 74301

PHONE:

FAX:

EMAIL: ap@grda.com

NOTE: 1. This is a standard bid. You may fax your quote to 918-256-1051 or email it to twest@grda.com - The bid opening date for this RFQ is March 5, 2013 at 9:00 a.m. Central Time.

2. A completed non-collusion certificate is required and must be submitted with your bid.

3. This RFQ form must be signed by an authorized representative of your company in the space provided in the lower right hand corner of this form. Please list or stamp your company name in the upper left portion of the form under Quotation Dept.

4. The award to the successful bidder will be based on the lowest and best bid received that meets the specifications listed below and the requirements herein. Preference may be given to E-pay vendors if analysis estimates that such appears to result in a lower cost to GRDA.

5. The brand names, model(s), part number(s) provided herein are for comparable quality and identification purposes only and equivalent bids may be submitted.

***** Read the General Bidding Instructions attached to this RFQ for further instructions*****

6. GRDA Visa Payment

GRDA provides a Visa payment program which invoices payment by a secure Visa account number assigned to the supplier after award of contract. Notification of payments and required invoice information are issued to your designated Accounts Receivable contact by e-mail remittance payment.

Preference may be shown during the evaluation process to bidders that agree to accept the Visa payment of invoices. To learn more about the benefits of the Visa payment program, and to obtain answers to FAQ, click or copy and paste the following URL into your browser: www.bankofamerica.com/epayablesvendors.

Will accept payment by Visa: Yes ____ No ____ (check one)

Visa acceptance signature: _____

Designated Accounts Receivable Contact for Visa remittance advices:

Name: _____

Phone: _____

Email: _____

7. Delivery: Freight Truck is to offer a self-unloader to off-load the poles at the GRDA Transmission Pole Yard.

8. Specifications: See attached wooden pole specifications. **All poles are to be un-framed, roof only.**

LINE ITEM	DESCRIPTION	NUMBER OF UNITS	UNIT OF MEASURE	UNIT PRICE	LINE COST	LEAD TIME
1	Pole, Power,Transmission, 65' Lg, Round, Douglas Fir Class 1 MUST MEET G.R.D.A POLE SPECIFICATIONS ATTACHED	24.0	EACH	_____	_____	_____



REQUEST FOR QUOTE # 15124

LINE ITEM	DESCRIPTION	NUMBER OF UNITS	UNIT OF MEASURE	UNIT PRICE	LINE COST	LEAD TIME
2	Pole: Power, Distribution, 45' Lg, Round, Douglas Fir Must Meet GRDA Pole Specifications Attached	15.0	EACH	_____	_____	_____

NOTE: All prices must be quoted FOB: Destination. All freight charges to delivery point must be included in the unit price quoted for each line item. All packaging, handling, delivery and any other surcharges must also be included in the price quoted for each line item.

PAYMENT TERMS: _____

QUOTE EXPIRATION DATE: _____

QUOTATION NUMBER: _____

QUOTED BY (please print): _____

SHIP TO: Grand River Dam Authority
TRANSMISSION & ENGINEERING HDQTRS
635 HWY 69A
PRYOR OK 74362

COMPANY NAME: _____

SIGNATURE: _____

DATE OF QUOTE: _____

THIS IS NOT AN ORDER. We would be pleased to receive your quotation for furnishing the above. This form must be completed **in full** (including signature) and returned by the due date above. You may attach additional pages if necessary. If attached, the Non-Collusion form must be completed and returned with your quotation. NO PARTIAL SHIPMENTS OR PARTIAL PAYMENTS WILL BE ALLOWED WITHOUT PRIOR APPROVAL.

All articles purchased hereunder shall be in accordance with the Bidding Procedures and General Terms & Conditions contained on the attached sheets.



GRAND RIVER DAM AUTHORITY

NON-COLLUSION CERTIFICATE

RFQ / RFP # _____

A Non-Collusion Certificate shall be included with any competitive bid or contract submitted to the Authority for goods or services exceeding \$5,000.00 (but not exceeding \$50,000.00), with the exception of those for the purpose of repairs and improvements to GRDA facilities.

A. For purposes of competitive bid or contract, I certify:

1. I am the duly authorized agent of _____, (Company Name), the bidder submitting the competitive bid which is attached to this statement, for the purpose of certifying the facts pertaining to the existence of collusion among bidders and between bidders and state officials or employees, as well as facts pertaining to the giving or offering of things of value to government personnel in return for special consideration in the letting of any contract pursuant to said bid;
2. I am fully aware of the facts and circumstances surrounding the making of the bid to which this statement is attached and have been personally and directly involved in the proceedings leading to the submission of such bid; and
3. Neither the bidder, nor contractor, nor anyone subject to the bidder's or contractor's direction or control, has been a party:
 - a. to any collusion among bidders in restraint of freedom of competition by agreement to bid at a fixed price or to refrain from bidding,
 - b. to any collusion with any state official or employee as to quantity, quality or price in the prospective contract, or as to any other terms of such prospective contract, nor
 - c. in any discussions between bidders and any state official concerning exchange of money or other thing of value for special consideration in the letting of a contract, nor, whether competitively bid or not, has paid, given or donated or agreed to pay, give or donate to any officer or employee of the State of Oklahoma any money or other thing of value, either directly or indirectly, in procuring this contract herein.

B. The contractor further certifies that no person who has been involved in any manner in the development of said contract while employed by the State of Oklahoma shall be employed to fulfill any of the services provided for under said contract.

C. If any contract pursuant to this bid is for professional services as defined in 74 O.S. § 85.2.25, and if the final product is a written proposal, report or study, the contractor further certifies that (s)he has not previously provided the state agency or any other state agency with a final product that is a substantial duplication of the final product of the proposed contract.

Authorized Signature

Certified this Date

Printed Name

Title

Telephone Number

Fax Number

E-Mail

**Grand River Dam Authority is an agency of the State of Oklahoma.
Administrative Headquarters • 226 West Dwain Willis Avenue • Vinita, Oklahoma 74301 • 918-256-5545**

MINIMUM INSURANCE REQUIREMENTS

COMPREHENSIVE GENERAL LIABILITY

To include products/completed operations

Combined Single Limit ----- \$1,000,000.00

COMPREHENSIVE AUTOMOBILE LIABILITY

Should include owned, non-owned and hired autos

Same limits as General Liability

WORKERS' COMPENSATION

As required by the laws of the State of Oklahoma and Employers' Liability limit of \$100,000.00

If delivery is by other than Seller's truck, Certificate of Insurance evidencing above limits to be furnished for other carrier.

These limits could be satisfied by either primary coverage or a combination of primary and umbrella coverage.

A Certificate of Insurance must accompany bids on any work to be performed for GRDA.

The Certificate of Insurance must show the name and address of the insured, the GRDA Purchase Order number and/or description of the job to be performed for GRDA, limits of coverage, policy number, effective and expiration dates, etc. The cancellation clause must provide that the Authority is to receive ten (10) days written notice prior to cancellation or to the making of any material change. The successful bidder must inform the insurance agent to submit a revised Certificate of Insurance at renewal of the coverage if the GRDA work will extend until that time.



GENERAL BIDDING INSTRUCTIONS FOR STANDARD & EMERGENCY BIDS

1. Bids shall be submitted to the designated purchasing agent at the Grand River Dam Authority (hereinafter referred to as "GRDA" or "the Authority") at the address on the attached RFQ or RFP form on or before the date (and time, if applicable) indicated. Bids shall be in conformity with these and any additional instructions to bidders and shall be submitted on GRDA's form. **The RFQ (Request for Quote) or RFP (Request for Proposal) form must be completed in full and signed by the bidder.** If your bid response necessitates additional space, you may attach additional pages; however, the RFQ or RFP form must be completed, signed and reference the additional pages. All bid responses shall be typewritten or handwritten in ink, and any corrections to bids shall be initialed in ink. Quotations or proposals submitted in pencil shall not be accepted.
2. Quotations or proposals may be submitted to GRDA via postal mail, delivery service, fax or e-mail, provided all required signatures can be transmitted successfully.
3. **Non-Collusion Certificate:** RFQs or RFPs anticipated to exceed a total amount of \$5,000 shall be accompanied by a Non-Collusion Certificate. This certificate shall be completed by the bidder and include a signature in ink of an authorized company representative (preferably the bidder) with full knowledge and acceptance of the bid proposal. In the case of bids submitted via fax or e-mail, the Non-Collusion Certificate may be submitted with the bid. Purchase orders in excess of \$5,000 will not be released to the successful bidder without receipt of a properly signed certificate for the bid.
4. In the event the unit price and line total extension do not agree, the unit price shall be considered the quoted price accepted for evaluation.
5. **Freight Terms:** All prices shall be quoted FOB: Destination/Freight Allowed. All packaging, handling, shipping and delivery charges shall be included in the unit price quoted for each line item. No exceptions shall be granted unless approved by the guidelines of the GRDA Chief Financial Officer or designee.
6. **Other Surcharges:** Any additional surcharges (such as HazMat charges, fuel surcharges, set-up fees, etc.) shall be included in the unit price quoted for each line item. All additional charges are considered a part of the cost of the goods, and bids shall be evaluated to include these additional charges.
7. **Tax-Exempt Status:** GRDA is an agency of the state of Oklahoma and is specifically exempt from the payment of sales tax by Oklahoma state statute, Title 68 O.S.A. § 1356 (10). An excerpt from the statute shall be furnished upon request.
8. **Questions arising during the bidding process should be submitted in writing to the GRDA purchasing agent named on the RFQ or RFP.** The GRDA purchasing agent shall coordinate a reply from the end user to ensure that all potential bidders are provided the same information. Under no circumstances shall a bidder discuss pricing with any GRDA employee prior to the bid opening.
9. All bids submitted shall be subject to GRDA's Purchasing Policy and Procedures, General Terms and Conditions, the bidding instructions and specifications, the Oklahoma Open Records Act, other statutory regulations as applicable, and any other terms and conditions listed or attached herein – all of which are made part of this Request for Quote or Request for Proposal.
10. GRDA reserves the right to reject any and all bids, and to contract as the best interests of the Authority may require. GRDA reserves the right to reject any bids that do not comply with the requirements and specifications of the Request for Quote or Request for Proposal. All bid responses become the property of GRDA and are subject to the Oklahoma Open Records Act. GRDA shall endeavor to protect technical information designated by the bidder as proprietary information; however, only technical information (i.e., "trade secrets") may be considered proprietary – pricing and other non-technical aspects of the quote shall be considered non-proprietary.
11. **"Sole Brand" or "No Sub" Items:** Items with a "Sole Brand" or "No Sub" designation in the description shall be furnished as the specified manufacturer and model/part number. No exception may be taken to the specification, and no alternate shall be accepted. In those cases where a manufacturer has discontinued the specified model/part number, the bidder shall indicate so on the RFQ. If a replacement item is available, the new model/part number shall be indicated on the RFQ form and the price quoted. It shall also be noted whether the replacement item is a direct replacement for the obsolete part number originally requested. If not, or if the specifications differ in any way, the bidder shall explain in detail, and corresponding drawings or descriptive literature shall be included with the quote.

12. **Approved Equivalents:** Unless an item is designated as a “Sole Brand” or “No Sub” item, any manufacturer’s name, brand name, information and/or catalog number listed in a specification is for informational or cross-reference purposes and is not intended to limit competition. Bidders may offer any brand/manufacturer for which they are an authorized representative, provided it meets or exceeds the specification of the listed item. However, if quoting an equivalent product, bidders shall indicate on the RFQ form the manufacturer’s name and part number. Bidder shall also submit any drawings, descriptive literature and specifications for evaluation purposes. Reference to literature submitted with a previous bid shall not satisfy this provision. The bidder shall also provide written confirmation that the proposed equivalent will meet the requested specifications and is not considered an exception. Bids which do not comply with these requirements may be rejected. GRDA warehouses are not permitted to accept any item with a part number differing from that quoted by the bidder. Bids lacking any written indication of intent to furnish an alternate brand, model or part number shall be considered to be in complete compliance with the specifications as listed on the RFQ.
13. **Insurance Certificates:** Any service to be performed that requires the vendor’s employee, vehicle or equipment to be on any GRDA property must be covered by minimum insurance requirements. The workscope to be performed for the Authority shall be evaluated and the minimum insurance requirements shall be provided to prospective bidders with the RFQ or RFP. Evidence of insurance coverage shall be furnished in the form of a Certificate of Insurance, and shall be submitted with the bid response. Bidders shall disclose any subcontractors to be used, and the Authority shall consider the supplier as the single point of contact. The supplier shall assume responsibility for the performance of the subcontractor. Policies shall remain current for the duration of the requested service period, and GRDA shall be notified of any cancellation or revision to policies. Purchase Orders shall not be released to the successful bidder without a current Certificate of Insurance naming GRDA as certificate holder on file. A Memorandum of Insurance shall not be acceptable for this requirement.
14. **MSDS:** Material Safety Data Sheets shall be furnished to GRDA’s Safety Department at the address noted on the PO prior to delivery of items.
15. **Purchase Orders** shall be awarded to the “lowest and best” or “best value” bidder. Line items may be split into multiple orders, taking low items from each respective bidder, or orders may be awarded on an “all or none” basis, whichever is in the best interests of the Authority. Award decisions are further subject to consideration of any additional terms and conditions contained in the bid proposal. Vendor protests must be submitted in writing to the Central Purchasing Unit of GRDA within thirty-six (36) hours of award of Contract or Purchase Order.
16. Successful vendor shall deliver the merchandise or perform the service as quoted. Substitutions or changes without prior approval of the GRDA purchasing agent shall be rejected and returned at the vendor’s expense.
17. **Bidder Responsibilities:** Bidders are to transact all phases of the purchasing function directly with the GRDA purchasing agent. Bidders are to conduct all written and verbal communication with the Authority through the GRDA purchasing agent. Bidders are to conduct negotiations ethically, without attempts to influence through offers of valuable personal gifts or entertainment. Bidders are to make available as requested any technical information which might be of benefit in the bid evaluation.
18. **Supplier List:** The Finance Department maintains a current listing of suppliers with a cross-reference as to products and services offered. Suppliers may have their names added to the list by submitting a completed Vendor Registration/Payee Application, and shall notify the Authority of any update information. If a supplier fails to respond to bid requests after four appropriate solicitations, that supplier may be removed from the active list. Suppliers who do not meet quoted shipping dates or lead times, supply products or services of poor quality, substitute items of unequal quality, continually over-ship or under-ship items, or do not invoice properly may be placed under suspension or disqualified from the active supplier list. Suppliers may voluntarily request to be removed from the supplier database.
19. **Service Contracts:** By submitting a bid for services, the bidder certifies that they, and any proposed subcontractors, are in compliance with 25 O.S. §1313 and participate in the Status Verification System. The Status Verification System is defined in 25 O.S. §1312 and includes, but is not limited to, the free Employment Verification Program (E-Verify) available at www.dhs.gov/E-Verify. This shall remain in effect through the entire term, including all renewal periods, of the contract. The State may request verification of compliance for any contractor or subcontractor. Should the State suspect or find the contractor or any of its subcontractors are not in compliance, the State may pursue any and all remedies allowed by law, including, but not limited to: suspension of work, termination of the contract for default, and suspension or debarment of the contractor. All costs necessary to verify compliance are the responsibility of the contractor.

GENERAL TERMS AND CONDITIONS



Any contract or order issued by the Grand River Dam Authority (hereinafter referred to as GRDA) is expressly conditioned upon Seller's assent to these terms and conditions, unless otherwise agreed in writing. Any order issued or filled by Seller shall be deemed to constitute Seller's assent to these terms and conditions. Any additional or different terms submitted by the Seller are hereby expressly objected to by GRDA unless expressly agreed to in writing by GRDA.

1. Mail or deliver all invoices or correspondence pertaining to the payment of this Purchase Order to: Accounts Payable Department, Grand River Dam Authority, P.O. Box 409, 226 West Dwain Willis Avenue, Vinita, Oklahoma 74301. Seller shall submit invoices, with one copy detailing each item with unit prices, with the top copy being distinguishable as an original, accompanied by one copy of complete shipping papers. If shipment is not made by routing instructions as specified on the face of this Purchase Order, GRDA reserves the right to deduct any excess transportation charges resulting therefrom. Copy of original freight bill must be supplied for payment. Time, in connection with any discount offered, will be computed from date of delivery of items, or from date the correct invoice is received in Vinita, Oklahoma, whichever period of time is the later date. No Oklahoma State Sales or Use Tax shall be included in payment of this Purchase Order.
2. All articles, materials, equipment and supplies (hereinafter referred to as "items") covered by this Purchase Order, unless otherwise specified, are purchased subject to inspection before and during manufacture and upon arrival at destination. GRDA reserves the right to return for full credit and/or refund, at Seller's sole risks and expense, including all transportation and storage charges, all items found defective or furnished contrary to instructions and/or specifications contained herein.
3. In case of default by Seller, GRDA may procure the items or services from other sources and hold Seller responsible for any excess cost occasioned thereby; provided, that if necessity requires the use of items not conforming to specifications, they may be accepted, and payment made at a proper reduction in price. Notwithstanding anything herein to the contrary, GRDA reserves the right to terminate this Purchase Order for its convenience. In the event of such termination, GRDA shall pay and Seller shall accept the reasonable value of all work performed and items delivered by Seller up through the effective date of such termination.
4. Seller warrants that all items covered by this Purchase Order will conform to the specifications, drawings, samples or other description furnished by GRDA, or any revisions thereof, and any items purchased pursuant to this Purchase Order shall be subject to all warranties expressed or implied by law, and will be merchantable of good material and fit and sufficient for the purpose intended, and shall satisfy any performance guarantee requirements as specified herein by GRDA. In the event the items and/or services purchased hereunder do not meet the warranty specified hereinabove, Seller shall promptly repair or replace any defective item at its expense, or re-perform any necessary services, and shall hold GRDA harmless from any and all costs and expenses incurred due to said defective item or performance of services, including the cost for removing any part or product to be repaired or replaced, as well as transportation and installation charges in connection with the repair, replacement or servicing of any parts or equipment. Seller further agrees that the manufacturer's warranties and guaranties of the items purchased hereunder extended to Seller shall extend to GRDA.
5. Seller shall indemnify and hold GRDA harmless from and against any and all loss, costs or expenses arising out of any liens or claims in any way related to the items or services furnished hereunder. Seller shall likewise indemnify and hold GRDA harmless from any patent, trademark or copyright infringement, except items supplied in accordance with design originating with GRDA. Seller shall be an independent contractor. Seller shall protect, defend, indemnify and hold GRDA harmless from any damage or injury to any persons, including Seller's employees or property, and from any claim, demand, action, cost or expense arising out of the activities hereunder as a result of Seller's negligent or intentional wrongful acts. In no event shall Seller's liability be limited under this Purchase Order for the negligent or intentional wrongful acts of the Seller.
6. Seller shall, before any items are shipped and/or any services are commenced, provide GRDA with certificates evidencing that the following minimum insurance will remain in force until Seller's obligations are completed: (a) Workmen's Compensation Insurance, including Employer's Liability Insurance, in accordance with the laws of the state in which Seller may be required to pay compensation; and (b) Public Liability Insurance with an individual limit of not less than \$100,000 and a total for any one accident of not less than \$300,000, unless otherwise specified herein.
7. This Purchase Order (including Seller's right to receive payments hereunder) shall not be assigned or subcontracted in whole or in part without GRDA's prior written consent. No assignment hereof shall relieve this assignor of its obligations hereunder.
8. Service Contracts: By submitting a bid for services, the Bidder certifies that they, and any proposed Subcontractors, are in compliance with 25 O.S. §1313 and participate in the Status Verification System. The Supplier/Contractor/Consultant/Construction Manager/etc. certifies that it and all proposed Subcontractors, whether known or unknown at the time a contract is executed or awarded, are in compliance with 25 O.S. §1313 and participate in the Status Verification System. The Status Verification System is defined in 25 O.S. §1312 and includes, but is not limited to, the free Employment Verification Program (E-Verify) available at www.dhs.gov/E-Verify. This shall remain in effect through the entire term, including all renewal periods, of the Contract. The State may request verification of compliance for any Contractor or Subcontractor. Should the State suspect or find the Contractor or any of its Subcontractors are not in compliance, the State may pursue any and all remedies allowed by law, including, but not limited to: suspension of work, termination of the Contract for default, and suspension or debarment of the Contractor. All costs necessary to verify compliance are the responsibility of the Contractor.
9. All Items shipped pursuant to this Purchase Order will conform with all municipal, state and federal laws, ordinances and regulations, and Seller will defend and save harmless GRDA from loss, costs or damage by reason of any actual or alleged violation thereof.
10. GRDA hereby notifies Seller that Seller must comply, and by acceptance of this Purchase Order, Seller represents that it has complied with, and will continue to comply with, all applicable federal, state and local laws, regulations or orders.
11. This Purchase Order shall be construed as being performed by both parties in Craig County, Oklahoma, and shall be governed in accordance with the laws of the State of Oklahoma.

Grand River Dam Authority is an agency of the State of Oklahoma.

Administrative Headquarters • 226 West Dwain Willis Avenue • Vinita, Oklahoma 74301 • Phone: 918-256-5545 • Fax: 918-256-1051

Grand River Dam Authority
Specifications for WOOD POLES, STUBS and ANCHOR LOGS

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 Preservers' Association
CCA Chromated Copper Arsenate
CuN Copper Naphthenate
REA Rural Electrification Administration
SPIB Southern Pine Inspection Bureau
USDA United States Department of Agriculture
WCLIB West Coast Lumber Inspection Bureau

DEFINITIONS

Certificate of Compliance must consist of 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 a contract or order under which it was purchased.

Independent Inspection relates to examination of a "lot" of material by an independent inspector employed by a commercial agency.

Inspection means an examination of material in sufficient detail to insure conformity with all phases of the specification under which it was purchased. Inspection prior to treatment must be made after the products are manufactured and ready for treatment. If poles are trimmed to length, inspection prior to treatment may be done prior to framing, providing inspection hammer brands are not removed during framing. When framing is done after white inspection, the framing must be inspected after treatment.

Producer is used to describe the party who manufactures and treats poles.

Purchaser refers to either the GRDA.

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.

Transmission poles - Unless otherwise indicated, any pole 50 feet or longer is designated as a transmission pole.

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

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

Grand River Dam Authority
Specifications for WOOD POLES, STUBS and ANCHOR LOGS
Update 1-4-13: Poles are to be unframed, roof only.

1. SCOPE This specification describes the minimum acceptable quality of wood poles, stubs, and anchor logs (hereinafter called poles, except where specifically referred to as stubs or anchor logs) purchased by or for the Grand River Dam Authority (GRDA). Where there is conflict between this specification and any other specification referred to herein, this specification shall govern.

2. RELATED SPECIFICATIONS: The following listed specifications may be considered as pertinent to this specification, subject to the restrictions in the paragraph under "Scope." All AWPA references are those in effect in AWPA Book of Standards 1991.

- a. ANSI 05.1-1987 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, 1991
- d. Standard Grading Rules for Southern Pine Lumber, Southern Pine Inspection Bureau, 1991
- e. AWPA C1-91 - All Timber Products - Preservative Treatment by Pressure Processes
- f. AWPA C4-91 - Poles - Preservative Treatment by Pressure Processes
- g. AWPA C8-91 - Western Red Cedar and Alaska Yellow Cedar Poles - Preservative Treatment by the Full-Length Thermal Process
- h. AWPA C10-91 - Lodgepole Pine Poles - Preservative Treatment by Full-Length Thermal Process
- i. AWPA P1-91 - Standard for Coal Tar Creosote for Land and Fresh Water Use and Marine (Coastal Water Use)
- j. AWPA P5-91 - Standards for Waterborne Preservatives
- k. AWPA P8-91 - Standards for Oil-Borne Preservatives
- l. AWPA P9-91 - Standards for Solvents and Formulations for Organic Preservative Systems
- m. AWPA M1-90 - Standards for the Purchase of Treated Wood Products
- n. AWPA M2-91 - Standard for Inspection of Treated Timber Products

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- o. AWPA M3-81 - Standard Quality Control Procedures for Wood Preserving Plants
- p. AWPA M4-91 - Standard for the Care of Preservative-Treated Wood Products
- q. AWPA A1-91 - Standard Methods for Analysis of Creosote and Oil-Type Preservatives
- r. AWPA A2-91 - Standard Methods for Analysis of Water-borne Preservatives and Fire-Retardant Formulations
- s. AWPA A3-91 - Standard Methods for Determining Penetration of Preservatives and Fire Retardants
- t. AWPA A5-91 - Standard Methods for Analysis of Oil-Borne Preservatives
- u. AWPA A6-89 - Method for the Determination of Oil-Type Preservatives and Water in Wood
- v. AWPA A7-75 - Standard Wet Ashing Procedure for Preparing Wood for Chemical Analysis
- w. AWPA A9-90 - Standard Method for Analysis of Treated Wood and Treating Solutions by X-Ray Spectroscopy
- x. AWPA A11-83 - Standard Method for Analysis of Treated Wood and Treating Solutions by Atomic Absorption Spectroscopy
- y. AWPA C12-90 - Western Larch Poles - Full-Length Preservative Treatment by Thermal Process.

3. GENERAL STIPULATIONS

3.1 Provisions of American National Standards Institute (ANSI) 05.1, 1987, "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 an 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 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, as found on the butt, is defined in Appendix A, paragraph 9.5.)

Grand River Dam Authority
Specifications for WOOD POLES, STUBS and ANCHOR LOGS

3.3 Quality control, as 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, reject all material from the plant.

3.4 Poles failing to conform to any provision covered by this specification shall not be shipped to the purchaser.

3.5 Poles shall be warranted to conform to this specification. Any pole found not in conformance with this specification within 1 year from date of shipment to the purchaser shall be replaced as promptly as possible by the producer. (Preservative retention shall meet the requirements of the specification, as a minimum at time of shipment to the borrower (see Table 10, Exhibit H). A reduction in preservative retention of not more than 10 percent shall be acceptable up to 30 days from date of delivery.)

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 quality of the material offered for inspection, or covered by an Insured Warranty or a Quality Assurance Plan.

The quality control procedure of all plants that produce poles 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 inspections and perform chemical analyses and assays required by this specification. The quality control designee shall verify each step in the production before releasing the material to be inspected by an independent inspector. The independent inspector shall independently repeat the quality control designee's inspections and tests.

4.1.2 An inspection agency performing quality control for a producer shall not also act as the independent inspector of the same producer's poles produced for GRDA.

4.1.3 Records, as described in this specification, shall be maintained by the producer.

4.1.4 Poles not meeting specifications 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 twice only, 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.

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

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

4.3 The producer shall maintain or have access to adequate laboratory facilities at or very near the treating plant. All chemical tests or analyses associated with the treatment shall be independently performed in this laboratory by the quality control designee, the borrower's independent inspector, or other Quality Assurance Plan monitor. If acceptable to GRDA on a case-by-case basis, the producer may use a central laboratory.

4.4 Inspection agencies shall maintain their own central laboratory(ies) with a qualified staff capable of completely analyzing the preservative and treatments they are inspecting. The laboratory shall be equipped in accordance with AWWA standards. If acceptable to GRDA, this central laboratory may be used for the inspector's routine assays. When permission is granted for the inspection agency to use this lab for routine analyses (paragraph 4.3), the assays shall be run promptly, and the results shall be made available the next working day.

5. RESERVE TREATED STOCK: Reserve treated stock shall be subject to the following conditions:

5.1 No material treated with creosote, pentachlorophenol, or Copper Naphthenate shall be shipped for use on GRDA's system later than 1 year following the 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 reassay.

b. If the material is below specification requirements for preservative retention at the time of reassay for shipment, the brand shall be removed and the material reinspected, re-treated, and rebranded in accordance with paragraph 8.5.

5.2 Waterborne treated poles need not be reassayed.

6. MATERIAL REQUIREMENTS: All poles shall conform to the material requirements shown in Appendix A, which are primarily extracted from ANSI 05.1-1987.

7. PRESERVATIVES: Preservatives shall be selected from one of the following:

7.1 Creosote: Creosote shall conform to all requirements of AWWA Standard P1 when analyzed in accordance with the methods in AWWA 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 AWWA Standard P8 when analyzed in

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accordance with AWWA Standards A5 or A9. The hydrocarbon solvents for introducing the preservative into the wood shall meet the requirements of AWWA 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 AWWA Standard P8 when analyzed in accordance with AWWA Standard A5. The hydrocarbon solvents for introducing the preservative into the wood shall meet the requirements of AWWA Standard P9 Type A, determined in accordance with reference ASTM standards for physical properties.

8. PRESERVATIVE TREATMENT

8.1 Conditioning Prior to Treatment:

8.1.1 Group "A" poles (see Table 1, Appendix A) which are partially seasoned by natural air circulation shall be air dried within the limits of paragraph 4.2.1, of Appendix A. Extreme care shall be taken to insure that air seasoned poles do not have pretreatment decay in them (refer also to paragraph 5.2 of Appendix A). All poles in this category shall be further artificially conditioned prior to treatment by processes such as Boulton drying, steam conditioning or kiln drying, or heating in the preservative.

8.1.2 Group "B" or group "C" poles which are partially seasoned by natural air circulation, kiln drying, or shed drying shall be further conditioned by Boulton drying (group B, Table 1, Appendix A) or by the steam-vacuum process (group C, Table 1, Appendix A) within the following limits:

8.1.2.1. Boulton Drying:

	Temperature deg. F <u>(maximum)</u>	Duration <u>hours</u>
Green or partially seasoned Douglas-fir (coast)	220	optional*
Western Larch	220	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.)

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8.1.2.2. Steam-Vacuum Process:

Steam (limits)	Temperature deg. F	Max Hours Total Time**
Southern Pine	245 max.	17(1) or 20(2)
Douglas-fir (coast)	240 max.	6(3)
Western Larch	240 max.	6(3)
Ponderosa Pine	240 max.	4 or 6(4)

- (1) Pole classes nominally less than 37.5 inches circumference at 6 feet from butt.
- (2) Pole classes nominally 37.5 inches or larger in circumference at 6 feet from butt.
- (3) Poles to be treated with ACA or ACZA waterborne preservatives and in accordance with provisions of paragraph 4.2.1 Appendix A.
- (4) See Appendix A, paragraph 4.2.1 for specific limitations.

**Initial treatment steaming time plus any re-treatment steaming time, combined, shall not exceed these maximums.

8.2 Treatment (Pressure Process): All species of poles listed below:

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, at least hourly throughout the treating cycle by a qualified representative of the treating plant and independent inspector.

	Preservative Temperature Deg. F			Impregnation Pressure lb/in ²
	Creo. & Oilborne	ACA/ACZA	CCA	
Western Red Cedar	200	150	120	100
Alaska Yellow Ceda	210	150	120	150
Jack & Red Pine	210	150	120	150
Lodgepole Pine	210	150	120	150
Douglas-fir (coast) & Western Larch	210	150	---	150
Southern Pine	210	150	120	200
Ponderosa (Western) Pine	210	150	120	200

All poles treated with waterborne preservatives (paragraph 7.4) shall be by full cell process as described in AWPA Standards C1 and C4 except as modified by the provisions of ANSI 05.1-1987.

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8.3 Treatment (Thermal Process), Full-Length Treatment: Western larch, western red cedar, Alaska yellow cedar, lodgepole pine, northern white cedar poles may be treated by the thermal process:

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 235°F.

8.4 Results of Treatment:

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

- a. Six inches to 12 inches above nominal ground line of western red cedar, northern white cedar, and western larch poles.
- b. Within the zone 1 foot above to 1 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, as determined by:

- a. Penta by AWWA 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.
- b. Copper Naphthenate by AWWA Standards A5, 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. Chrome Azurol S and Penta-Check shall be used to determine penetration of copper containing preservatives and penta, respectively. Under the Independent Inspection Plan, all treating charges shall be tested for penetration using the following sampling. Under the Insured Warranty and Quality Assurance Plans, the frequency for testing penetration of charges may vary according to the plan. When testing, the sampling shall be as follows:

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 100 percent conform; otherwise, bore all poles.
- b. Re-treat the charge if more than 15 percent of the borings are found to be nonconforming.
- c. Re-treat all nonconforming poles found in the penetration sampling.

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d. Re-treated poles shall be 100 percent tested for penetration boring. Poles which are still nonconforming after the second re-treatment shall be permanently rejected. Permanently rejected poles shall have their brands 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 90 degrees apart approximately in the same plane around the pole. Accept only those poles conforming to the penetration requirement in both borings.

c. Nonconforming poles shall be re-treated and 100 percent retested for penetration. Poles which are still nonconforming after a second re-treatment shall be permanently rejected. Permanently rejected poles shall have their brands removed.

d. 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.

e. 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.

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 8.1.2.1.

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.

9. DRAWINGS: Pole stub and anchor log dimensions are shown in the above specifications and drawings or Tables 11 and 12 of this section. The appropriate framing drawings shall be designated and provided by the purchaser.

10. DESTINATION INSPECTION: The detailed requirements cited in this specification shall be adhered to for all materials shipped to purchasers.

The purchaser shall have the prerogative to inspect materials at destination. All provisions of this specification shall apply to material inspected at destination except preservative retention (see paragraph 3.4).

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

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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.
1430 Broadway
New York, New York 10018
Telephone: (212) 354-3300

All AWWA standards may be purchased from:

American Wood-Preservers' Association (AWPA)
P. O. Box 286
Woodstock, Maryland 21163-0286
Telephone: (410) 465-3169

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

Southern Pine Inspection Bureau
4709 Scenic Highway
Pensacola, Florida 32504
Telephone: (904) 434-2611

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

West Coast Lumber Inspection Bureau
P.O. Box 23145
Portland, Oregon 97223
Telephone: (503) 639-0651

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APPENDIX A

Material Requirements

1. SCOPE

The material in Appendix A is reprinted primarily from the American National Standards Institute (ANSI) Standard 05.1-1987, "American National Standard Specifications and Dimensions for Wood Poles." This material is reprinted by permission from ANSI. Copies of ANSI 05.1-1987 may be purchased from the American National Standards Institute, 1430 Broadway, New York, New York 10018.

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 nonaqueous 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.

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

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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 whiteline 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.

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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.

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, 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 1, Appendix A.

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 (see exception for Douglas-fir (coast) and western larch in paragraph 4.2.5). Up to 6 hours steam at temperatures up to 240°F may be employed for ponderosa pine poles, provided that when steaming commences the moisture content (calibrated to the basis of oven dry weight moisture content) measured with a resistance-type moisture meter with insulated pins is not over 25 percent at 2.5

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inches from the surface at midlength. Otherwise, the maximum steaming time for ponderosa pine poles is 4 hours.

All air seasoned poles shall be conditioned prior to or during treatment so that the pith center of the pole shall have been heated for at least 2 hours at a temperature of not less than 150°F. (Heat transfer usually requires 1 hour for each inch of diameter at 150°F.)

Poles to be salt treated which have not been conditioned as stated above shall be kiln dried prior to treatment. Kiln-dried poles shall be treated within 1 month from the time they are removed from the kiln.

Pedestal stubs which are air-seasoned shall have been dried by natural air circulation. They shall be checked by 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 1 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.

4.2.4 Steam Conditioning: The steam temperature employed in steam conditioning for poles of species in Treatment Group C of Table 1 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.

4.2.5 Steaming (Douglas-fir (coast) and Western Larch): Douglas-fir (coast) and western larch poles which are to be treated with waterborne preservatives and which have not been Boulton dried may be steamed at a maximum temperature of 240°F. For poles in this category, the maximum duration starting with the time steam is introduced into the cylinder, including both initial and final steam, shall not exceed eight hours provided each pole before steaming has a maximum moisture content not

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exceeding 25 percent when measured with a resistance type moisture meter with insulated pins at 2.0 inches from the surface at mid-height.

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 6.1, defective butts in 7.4 and decayed knots in 7.6. 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 7.3.

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 metal not specifically authorized by the purchaser.

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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 compression wood visible on either end.

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 1-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.

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TABLE 2**
LIMITS OF KNOT SIZES

	Diameter of any Single Knot (Inches)		Maximum Sizes Permitted Sum of All Diameters of Knots Greater Than 0.5 Inch in Any 1-Foot Section (Inches)
	Classes H6 to 3	Classes 4 to 10	All Classes
<u>Length of Pole</u>			
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"
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"
Upper half of length	6	6	

*Both upper and lower halves.

**Table 2 precedes Table 1

NOTE: See section 3 and Tables 3 through 9 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 gain 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.

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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:

(a) For poles 50 feet and shorter of all 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 in 90 percent or more of an inspection lot. In the remainder of the inspection lot (10 percent), the poles may have a deviation of one inch for each 6 feet of length when measured as above.

(b) Poles 55 feet and longer shall meet the 1-inch-in-10-feet requirement in 75 percent or more of an inspection lot. In the remainder of the lot (25 percent), the poles may have a deviation of 1 inch for each 6 feet of length when measured as above. The deviation for all northern white cedar poles in an inspection lot shall not be more than 1 inch for each 4 feet of length as measured above (see figure 1, diagram 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 Spiral Grain: Spiral grain (twist grain) is permitted as follows:

<u>Length of Pole (Feet)</u>	<u>Maximum Twist of Grain Permitted</u>
0 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.

7.11 Splits and Checks.

7.11.1 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.)

7.11.2 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.

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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.

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.

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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, noncorrosive, tight-fitting and recessed 1/4 inch. It shall be fastened with a barbed or serrated noncorrosive nail. The information in items (5) and (6) below shall be placed on the sawed butt surface. If so desired by the producer or the purchaser, items (1), (3), and (4) below may also be placed on the sawed butt surface.

- (1) The supplier's code or trademark.
- (2) Insured warranty or quality assurance mark, if applicable.
- (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.)

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:

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

<u>Preservatives</u>	<u>Code Letters</u>
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.

<u>Example</u>	<u>Interpretation</u>
HRL	Supplier's Code or Trademark (for example, Harry Roberts' Lumber Company)
IW	Insured Warranty or Quality Assurance Mark, if applicable
S5-74	Plant Location (for example, Syracuse) Month and Year of Treatment (for example, May 1974)
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

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9.6 Framing:

9.6.1 All distribution poles and stubs shall be 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 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 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. When indicated by experience, a deeper penetration may be specified by the purchaser as shown in the table below:

50 thru 65 feet	4.0 inches
70 thru 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.

9.7.3 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.

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.

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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 REA.

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

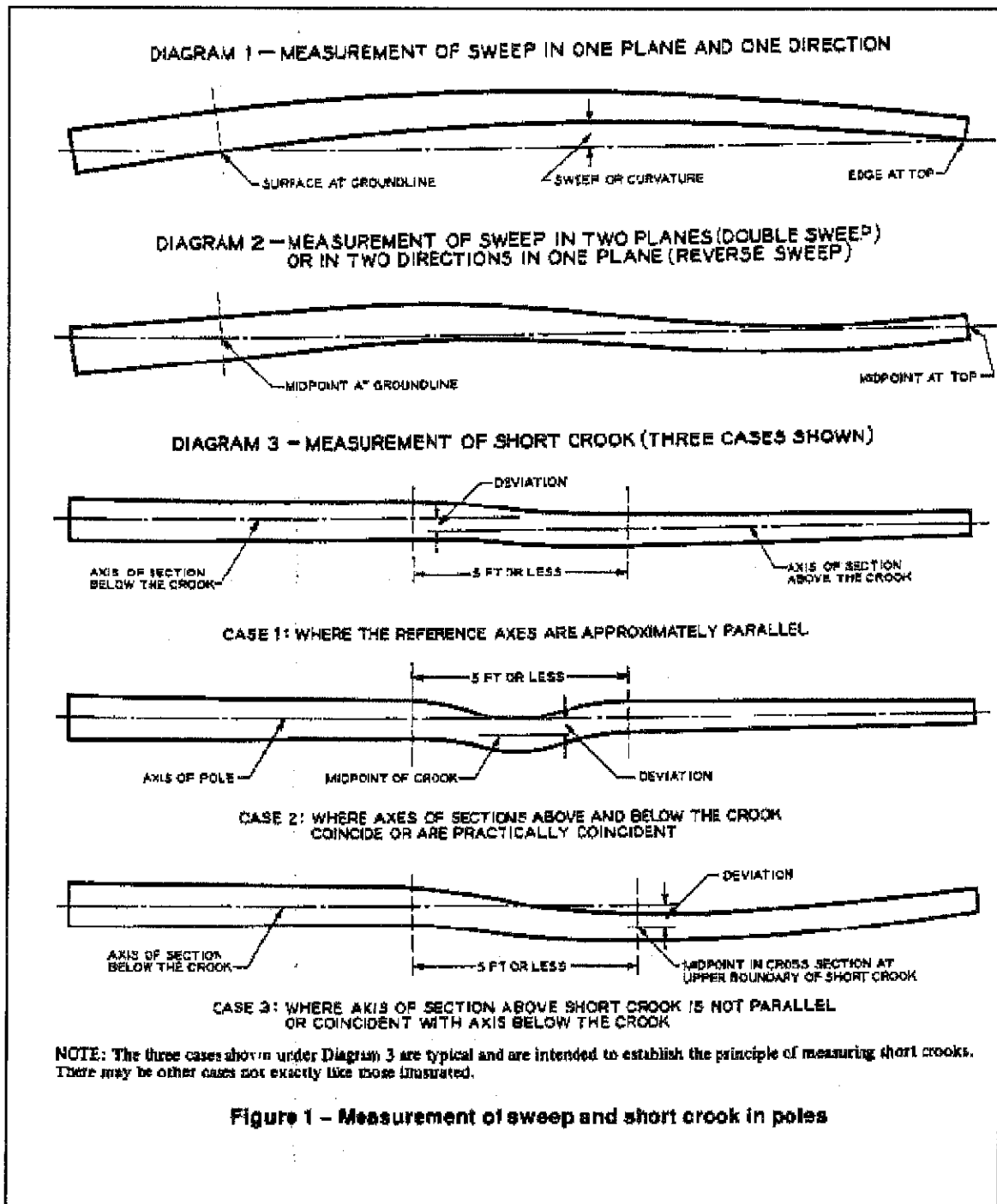
10.3 Mechanical Damage: Poles are not acceptable if they contain indentations attributed to loading or handling slings that are 1/4 inch or more deep over 20 percent or more of the pole circumference, or more than 1/2 inch deep at any point. Other indentations or abrasions, for example, forklift damage, chain-saw damage, etc., shall not be more than 1/10 the pole diameter at the point of damage up to a 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.

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**TABLE 1
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
	Pine, ponderosa	Pinus ponderosa 6000
	Pine, jack	Pinus banksiana 6600
	Pine, lodgepole	Pinus contorta 6600
	Pine, red (Norway)	Pinus resinosa 6660
	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	8000
	Loblolly	Pinus taeda
	Longleaf	Pinus palustris
	Shortleaf	Pinus echinata
	Slash	Pinus elliotii
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	Pinus taeda 8000
	Longleaf	Pinus palustris 8000
	Shortleaf	Pinus echinata 8000
	Slash	Pinus elliotii 8000

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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 distance ¹⁾ 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	-	-	-	-	-

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.

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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.)	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
Groundline² distance from butt (ft.)	4	5	5.5	6	6	6.5	7	7.5	8	8.5	9	9.5	10	10.5	11
Minimum circumference at 6 ft from butt (in.)															
20	-	-	-	-	-	-	33.5	31.5	29.5	27.0	25.0	23.0	21.5	18.5	15.0
25	-	-	-	-	-	-	37.0	34.5	32.5	30.0	28.0	25.5	24.0	20.5	16.5
30	-	-	-	-	-	-	40.0	37.5	35.0	32.5	30.0	28.0	26.0	22.0	-
35	-	-	-	-	48.0	45.5	42.5	40.0	37.5	34.5	32.0	30.0	27.5	-	-
40	-	-	-	53.5	51.0	48.0	45.0	42.5	39.5	36.5	34.0	31.5	-	-	-
45	64.5	62.0	59.0	56.0	53.5	50.5	47.5	44.5	41.5	38.5	36.0	33.0	-	-	-
50	67.0	64.5	61.5	58.5	55.5	52.5	49.5	46.5	43.5	40.0	37.5	-	-	-	-
55	70.0	67.0	64.0	61.0	57.5	54.5	51.5	48.5	45.0	42.0	-	-	-	-	-
60	72.0	69.0	66.0	63.0	59.5	56.5	53.5	50.0	46.5	43.5	-	-	-	-	-
65	74.5	71.5	68.0	65.0	61.5	58.5	55.0	51.5	48.0	45.0	-	-	-	-	-
70	76.5	73.5	70.0	67.0	63.5	60.0	56.5	53.0	49.5	46.0	-	-	-	-	-
75	78.5	75.5	72.0	68.5	65.0	61.5	58.0	54.5	51.0	-	-	-	-	-	-
80	80.5	77.0	74.0	70.5	67.0	63.0	59.5	56.0	52.0	-	-	-	-	-	-
85	82.5	79.0	75.5	72.0	68.5	64.5	61.0	57.0	53.5	-	-	-	-	-	-
90	84.5	81.0	77.0	73.5	70.0	66.0	62.5	58.5	54.5	-	-	-	-	-	-
95	86.0	82.5	79.0	75.0	71.5	67.5	63.5	59.5	-	-	-	-	-	-	-
100	87.5	84.0	80.5	76.5	72.5	69.0	65.0	61.0	-	-	-	-	-	-	-
105	89.5	85.5	82.0	78.0	74.0	70.0	66.0	62.0	-	-	-	-	-	-	-
110	91.0	87.0	83.5	79.5	75.5	71.5	67.5	63.0	-	-	-	-	-	-	-
115	92.5	88.5	84.5	80.5	76.5	72.5	68.5	64.0	-	-	-	-	-	-	-
120	94.0	90.0	86.0	82.0	78.0	74.0	69.5	65.0	-	-	-	-	-	-	-
125	95.5	91.5	87.5	83.0	79.0	75.0	70.5	66.0	-	-	-	-	-	-	-

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 Dimensions of H Classes are applicable for western red cedar only.

² 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.

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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 distance from butt ¹⁾ (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	18.0	14.5
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.

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Table 7 - Dimensions of alaska yellow cedar and western hemlock poles

Class	H6 H5 H4 H3 H2 H1 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	15	12
Length of pole (ft.)	Groundline ¹ distance from butt (ft.)	Minimum circumference at 6 ft from butt (in.)															
20	4	-	-	-	-	-	-	31.5	29.5	27.5	25.5	23.5	22.0	20.0	17.5	14.0	
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	57.0	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, straight-ness, etc.

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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.)														
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	-	-	-	-	-	39.0	36.5	34.0	31.5	29.0	27.0	25.0	-	-
40	6	-	-	-	43.5	41.0	38.5	36.0	33.5	31.0	28.5	26.5	24.5	-	-
45	6.5	-	51.0	48.5	46.0	43.5	41.0	38.5	36.0	33.5	31.0	28.5	26.5	-	-
50	7	58.5	53.5	51.0	48.5	45.5	43.0	40.5	37.5	35.0	32.5	30.0	28.0	-	-
55	7.5	61.0	55.5	53.0	50.5	47.5	45.0	42.0	39.0	36.5	34.0	31.5	29.5	-	-
60	8	63.5	58.0	55.0	52.0	49.5	46.5	43.5	40.5	38.0	35.5	33.0	31.0	-	-
65	8.5	65.5	59.5	57.0	54.0	51.0	48.0	45.0	42.0	39.0	36.5	34.0	31.5	-	-
70	9	67.5	61.5	58.5	55.5	52.5	49.5	46.5	43.5	40.5	38.0	35.5	33.0	-	-
75	9.5	69.0	63.5	60.5	57.0	54.0	51.0	48.0	45.0	41.5	39.0	36.5	34.0	-	-
80	10	71.0	65.0	62.0	59.0	55.5	52.5	49.0	46.0	43.0	40.0	37.5	35.0	-	-
85	10.5	72.5	66.5	63.5	60.0	57.0	54.0	50.5	47.0	44.0	41.0	38.5	36.0	-	-
90	11	74.5	68.0	65.0	61.5	58.5	55.0	51.5	48.0	45.0	42.0	39.5	37.0	-	-
95	11	76.0	69.5	66.5	63.0	59.5	56.0	53.0	49.0	46.0	43.0	40.0	37.5	-	-
100	11	77.5	71.0	67.5	64.5	61.0	57.0	54.0	50.0	47.0	44.0	41.0	38.5	-	-
105	12	79.0	72.5	69.0	65.5	62.0	58.5	55.0	51.0	48.0	45.0	42.0	39.5	-	-
110	12	80.5	74.0	70.5	67.0	63.0	59.5	56.0	52.0	49.0	46.0	43.0	40.5	-	-
115	12	82.0	75.0	71.5	68.0	64.5	60.5	57.0	53.0	50.0	47.0	44.0	41.5	-	-
120	12	83.5	76.5	72.5	69.0	65.5	61.5	58.0	54.0	51.0	48.0	45.0	42.5	-	-
125	12	85.0	77.5	74.0	70.5	67.0	63.0	59.5	55.5	52.0	49.0	46.0	43.5	-	-
	12	86.0	78.5	75.0	71.0	67.5	63.5	59.5	55.5	52.0	49.0	46.0	43.5	-	-

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, straight-ness, etc.

**Grand River Dam Authority
Specifications for WOOD POLES, STUBS and ANCHOR LOGS**

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	-	-	-	-	-	-	-	30.0	28.5	26.5	24.5	22.5	21.0	19.0
25	4	-	-	-	-	-	-	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	-	-	-	-	-	-	38.0	35.5	33.0	31.0	28.5	26.5	24.5	-	-
40	6	-	-	-	-	43.0	40.5	40.0	37.5	35.0	32.5	30.0	28.0	-	-	-
45	6.5	-	-	50.5	48.0	45.5	43.0	42.0	39.5	37.0	34.0	31.5	29.0	-	-	-
50	7	57.5	55.0	52.5	50.0	47.5	45.0	44.0	41.0	38.5	35.5	33.0	28.0	-	-	-
55	7.5	60.0	57.5	55.0	52.0	49.5	47.0	44.0	42.5	40.0	37.0	33.0	29.0	-	-	-
60	8	62.0	59.5	57.0	54.0	51.5	48.5	45.5	44.0	41.0	38.5	35.5	31.0	-	-	-
65	8.5	64.5	61.5	59.0	56.0	53.0	50.0	47.0	46.0	42.5	39.5	37.0	33.0	-	-	-
70	9	66.0	63.5	60.5	57.5	55.0	52.0	48.5	47.0	44.0	41.0	38.5	34.0	-	-	-
75	9.5	68.0	65.0	62.5	59.5	56.5	53.5	50.0	49.0	45.0	42.0	39.5	35.5	-	-	-
80	10	70.0	67.0	64.0	61.0	58.0	54.5	51.5	48.0	46.0	43.0	40.0	36.0	-	-	-
85	10.5	71.5	68.5	65.5	62.5	59.0	56.0	52.5	49.5	46.0	43.0	40.0	36.0	-	-	-
90	11	73.0	70.0	67.0	64.0	60.5	57.5	54.0	50.5	47.0	44.0	41.0	37.0	-	-	-
95	11	74.5	71.5	68.5	65.0	62.0	58.5	55.0	51.5	48.5	45.0	42.0	38.0	-	-	-
100	11	76.5	73.0	70.0	66.5	63.0	60.0	56.5	53.0	50.0	47.0	44.0	40.0	-	-	-
105	12	78.0	74.5	71.0	68.0	64.5	61.0	57.5	54.0	51.0	48.0	45.0	41.0	-	-	-
110	12	79.0	76.0	72.5	69.0	65.5	62.0	58.5	55.0	52.0	49.0	46.0	42.0	-	-	-
115	12	80.5	77.0	73.5	70.0	66.5	63.0	59.5	56.0	53.0	50.0	47.0	43.0	-	-	-
120	12	82.0	78.5	75.0	71.5	68.0	64.0	60.5	57.0	54.0	51.0	48.0	44.0	-	-	-
125	12	83.0	79.5	76.0	72.5	69.0	65.0	61.5	58.0	55.0	52.0	49.0	45.0	-	-	-
	12	84.5	81.0	77.5	73.5	70.0	66.0	62.5	58.5	55.5	52.0	49.0	45.0	-	-	-

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, straight-ness, etc.

**Grand River Dam Authority
Specifications for WOOD POLES, STUBS and ANCHOR LOGS**

TABLE 10
Treatment and Results of Treatment

Species	Preservative Treatments			Assay Zone		
	Minimum Retentions*	Minimum	% of	Inches from Surface	Penetration	Sapwood
	CreosoteB	PentaC	WaterborneD	CuNE	Inches)(Inches)	
PRESSURE PROCESS - FULL LENGTH TREATMENT						
Southern Pine	7.5	0.38	---	.060	0.5 to 2.0	3.0 or 90
Douglas-fir**	9.0	0.45	---	.075	0.25 to 1.0	0.75 and 85
Ponderosa Pine+	7.5	0.38	---	---	0.5 to 2.0	3.0 or 90
Red Pine	10.5	0.53	0.60	---	0.10 to 1.6	2.5 or 85
Jack Pine	12.0	0.60	0.60	---	0.10 to 0.75	1.5 or 85
PRESSURE AND THERMAL PROCESS - FULL LENGTH TREATMENT						
Western Larch	15.0	0.75	0.60	---	0.1 to 0.6	0.5 or 85
Lodgepole Pine+	12.0	0.60	0.60	---	0.1 to 0.75	1.5 or 85
Alaska Yellow Cedar+	16.0	0.80	0.60	---	0.1 to 0.6	0.5 or 100
Western Red Cedar+	16.0	0.80	0.60	.120	0.1 to 0.6	0.5 or 100
Northern White Cedar	16.0	0.80	0.60	---	0.1 to 0.6	0.5 or 100

Note 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.

Note B - Test By Toluene Extraction

Note 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.

Note D - Pressure Treatment Only

Note - In Decay Zone 5, shown in REA Bulletin 161-4, minimum retentions are .130 PCF for Southern Pine and .150 PCF for Douglas-fir, for all poles within 50 miles of coastal waters.

* Minimum pounds/cubic foot (pcf) acceptable at time of shipment to user.

A Reduction of 10 percent from the values shown above in any of the test zones will be acceptable at destination within 30 days from the date of delivery. In the event of rejection of any poles at destination, REA and the producers shall be promptly notified. The producer may examine the poles at destination within 2 weeks of notification.

+ Species native to Pacific coast region as per Agriculture Handbook 541 (1979).

** Coast type

DOUGLAS-FIR TRANSMISSION POLES

DOUGLAS-FIR TRANSMISSION POLES (50' or longer) see Appendix A. paragraph 6.7. Penetration shall be to the depth of the incising or radial drilling and shall be 2.5 inches - minimum. Radial drilling is recommended in areas where the maximum protection in the groundline of the pole is desired.

The minimum retention in the inner zone shall be at least 50 percent of the requirement for the standard assay zone.

Radial Drilling

50' - 65'	4.0"
70' - 85'	4.5"
90' - 125'	5.0"

Retention shall be as specified in the standard assay zone.

For Douglas-fir transmission poles, a second (inner) assay zone is required as follows:

	<u>Radial Drilling Or incising</u>	<u>Recommended for Deeper Radial Drilling</u>
50' - 65'	2.0" - 2.5"	3.5" - 4.0"
70' - 85'	2.0" - 2.5"	4.0" - 4.5"
90' - 125'	2.0" - 2.5"	4.5" - 5.0"

**Grand River Dam Authority
Specifications for WOOD POLES, STUBS and ANCHOR LOGS**

**TABLE 11 - Dimension of Electric Stubs
Lodge pole Pine, Red Pine, Jack Pine**

<u>Length of Stub (feet)</u>	<u>Class of Stub</u>						
	1	2	3	4	5	6	7
	<u>Minimum Top Circumference* (inches)</u>						
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

**Southern Pine, Douglas fir(coast) and
Western Larch**

<u>Length of Stub (feet)</u>	<u>Class of Stub</u>						
	1	2	3	4	5	6	7
	<u>Minimum Top Circumference* (Inches)</u>						
10.5	36.0	33.5	31.0	28.5	26.5	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 plus 4 inches

**TABLE 12 - Dimensions of Anchor Logs
Southern Pine, Lodgepole Pine, Red Pine,
Jack Pine, Douglas fir and Western Larch**

	<u>F2-1</u>	<u>F2-2</u>	<u>F2-3</u>	<u>F2-4</u>	<u>TA-2L</u>	<u>TA-4L</u>
Designation						
Length (feet)	4'-0"	4'-6"	5'-0"	5'-0"	5'-0"	8'-0"
Diameter (Min.)	8"	9"	10"	12"	8"	8"
Boring - as ordered						