



**Vermont Electric Power Company, Inc.  
366 Pinnacle Ridge Road  
Rutland, Vermont 05701**

**Technical Specification  
for  
Treated Wood Poles**

# **WOOD POLES**

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## **1.0 SCOPE**

These specifications cover the size and quality of timber, manufacturing requirements, preservatives, treatment, inspection, storage and handling for full length pressure treated Pacific Coast Douglas Fir, and Western Red Cedar poles for transmission use.

## **2.0 DEFINITIONS**

- 2.1 The term “Vendor”, as used in these specifications, shall refer to the supplier or suppliers who are contracted to furnish wood poles.
- 2.2 The term “Company” or “Purchaser”, as used in these specifications, shall refer to VELCO with whom the “Vendor” has contracted to supply materials specified herein.
- 2.3 The term “Manufacturer”, as used in these specifications, shall refer to the organization that designed and fabricated the proposed material and is offering the material for sale to the “Company” either directly or through a “Vendor”.

## **3.0 STANDARDS**

Poles, preservatives, methods, treatment and inspection shall be in the accordance with this specification as well as the latest revised editions of the *American National Standard Institute Publication O5.1* and the *American Wood Preservers Association Standards* for deterioration zone two.

In the event of conflict of variation between these specifications and standards referenced, these specifications will apply.

All wood pole harvesting practices shall comply with the guidelines of Forestry Stewardship Council (FSC) and/or Sustainable Forestry Initiative (SFI). The appropriate documentation/certifications will be made available upon request of the Purchaser.

## **4.0 MATERIAL REQUIREMENTS**

- 4.1 All material supplied under these specifications shall be Pacific Coast Douglas Fir, or Western Red Cedar conforming to the American National Standard Specifications and Dimensions for Wood Poles ANSI O5.1 and as specified herein.
- 4.2 Knots – All poles shall be free of loose knots. Decayed matter, dead wood and bark removed from the knots, creating pole voids that could hold water and shall not exceed two (2) inches in depth from below the pole surface.

The allowable size of individual knots and the sum of the diameters of all knots in any one foot section shall be in accordance with ANSI publication O5.1 Paragraph 5.4.6. Poles with excessive knot clusters are subject to rejection. In addition, any poles showing fiber “pop-up” or separation deeper than that allowed in ANSI O5.1, shall be rejected.

The allowable limit will be set by the sum of diameters as measured perpendicular to the axis of the pole. The allowable sum of knots is calculated as one-third the average pole circumference at the cluster location.

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- 4.3 **Scars** – Depressions in the body of the pole resulting from tree wounds wherein the process of healing has not re-established the normal cross-section of the pole will not be permitted.
- 4.4 **Shape** – Any localized deviation from straightness in a five foot section, or less, shall be classified as a short crook, and the deviation from straightness shall not exceed one (1) inch. Bell shaped butts shall be trimmed to natural taper of poles. Trimming shall not expose the heartwood.
- 4.5 **Sweep** – A pole may have sweep subject to the following limitations:
- 4.5.1 Where sweep is in one plane and one direction only, a straight line connecting the midpoint of the butt with the midpoint of the top shall not at any intermediate point pass through the external surface of the pole.
- 4.5.2 Where sweep is in two planes or in two directions in one plane, a straight line connecting the midpoint of the butt with the midpoint of the top shall not deviate from the center of the pole more than one-fourth (1/4) the diameter of the pole, at the point of widest deviation.
- 4.6 **Spiral Grain** – A pole shall have no more than one complete twist of grain in any twenty (20) feet of length.
- 4.7 **Checks** – Poles shall align with the ANSI specification for Checks with the following assumptions:
- 4.7.1 Untreated checks will not be permitted
- 4.7.2 A check is defined in the ANSI standard definitions section 5.4.11.
- 4.7.3 The pole butt shall be considered the section of pole within 6 feet of the pole bottom. Check or combination of checks for the butt section of the pole shall meet the ANSI requirements (section 5.4.11.2)
- 4.7.4 The rest of the pole (6 feet and up) shall conform to the Pole Top section of the ANSI specification. In addition, no check or combination of checks in this section of the pole shall exceed ½ inch in width and 12 inches in length, whether the check reaches the pith or not
- 4.8 **Splits** – A Pole shall be free of splits as defined in the ANSI Standards.

### **5.0 MANUFACTURING REQUIREMENTSSS**

The manufacture, storage, and handling of material supplied under these specifications shall conform to the ANSI Specifications and as specified herein. The Vendor shall manufacture and handle material in accordance with the latest recognized industry standards. All pole deliveries shall be secured to above ground-level skids, separated from other material in order to facilitate a customer inspection.

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- 5.1 Sawing – All poles shall be neatly sawed at the top in accordance with reference drawings. The butts shall be sawed as specified in ANSI O5.1 except that the out of square limit for the butt plane shall be one (1) inch per foot of diameter.
- 5.2 Trimming – All poles shall be smoothly shaved by machine with the depth of cut kept to a practicable minimum. The circumference at any point between knot whorls shall not be reduced by more than one (1) inch.
- 5.3 Mechanical Damage – Poles with untrimmed mechanical damage are not acceptable. Poles having trimmed indentation, or abrasions resulting from handling slings, forklift or chainsaw damage deeper than that allowed in ANSI O5.01, Paragraph 8.3, Mechanical Damage, shall be rejected.
- 5.4 Marking
  - 5.4.1 All poles shall be branded in the butt and face with the appropriate coded information in accordance with Section M-6 of the AWPAs Standards. The face marking shall be burn branded and a recessed metal tag nailed to the pole. Additionally the butt marking should consist of a burn brand and a metal tag nailed to the cut bottom surface of the pole. Marking shall be as follows on the burn brand on the face of the pole:
    - 5.4.2 Company's initials shall be burn-branded using one (1) inch letter immediately above the supplier's code or trademark. A batch specific traceable ID (also known as the "Charge Number"), in addition to the plant designation and year produced, is required.
    - 5.4.3 Numerals showing the pounds per cubic foot preservatives retention specified shall follow the species and preservative code letter.
    - 5.4.4 The bottom of the brand and tags shall be within  $\pm 2$  inches from the designated location on all poles. Brand and tags will be 12 feet from butt of 45 feet or shorter poles, 14 feet from the butt of 75 feet or shorter poles and 17 feet from the butt of 110 feet or shorter.
    - 5.4.5 All numerals and letters shall be one (1) inch high and 1/8 inch deep.
    - 5.4.6 Transmission poles shall have a two (2) inch high framing type letter stencilled or branded on the butt of each pole if such a letter is given on the reference framing drawing.
    - 5.4.7 A sample of a typical brand with information required is shown in Figure 5A for purposes of illustration.

TYPICAL BRAND AND KEY

<b>VELCO</b>	COMPANY'S INITIALS
<b>PTC</b>	SUPPLIER'S BRAND
<b>F-05</b>	PLANT DESIGNATION YEAR OF TREATMENT
<b>WRC 9</b>	SPECIES, PRESERVATIVE, AND RETENTION
<b>3-60</b>	CLASS AND LENGTH
<b>B-1234</b>	TREATMENT BATCH IDENTIFICATION (CHARGE NUMBER)

Figure 5A

### 6.0 PREPERATION OF POLES

- 6.1 Seasoning – The methods of conditioning poles prior to treatment shall be in accordance with AWWA Standards M-1, C-1 and C-4. Method to be selected by producer unless specified in purchase order. The moisture content shall be no more than 25% at a depth of 2” from the surface. Moisture content shall be measured in accordance with ASTM D-4442.
- 6.2 Soundness – Whenever there is any sign of decay in untreated timber, and in all cases where the condition of the timber is doubtful, the inspector shall require that a section one (1) inch thick, or more, be cut from the top and butt of each pole. (On all air seasoned stock, the top and butt of each pole must be sawed off for inspection.) Any pole containing signs of decay shall be rejected.
- 6.3 Framing – Poles shall be framed and bored as specified on purchase order prior to treatment.
- 6.4 Pretreated Stock – Pretreated poles will be accepted provided the pole was treated no more than 1 year from the time of delivery. Each stock pole must be inspected and those not meeting the requirements of this specification will be rejected.

### 7.0 PRESERVATIVES

- 7.1. Pentachlorophenol– The ingredients of the pentachlorophenol solution shall conform to the requirements of AWWA Standards P-8 and P-9.
- 7.2. Other Preservatives – Other preservative options will be handled on a case by case basis at the request of the Purchaser.

### 8.0 TREATMENT

- 8.1 All poles shall be “double” vacuum treated, or shall include the treatment practice of extending the treatment to twice the typical treatment time.
- 8.2 Poles shall not “weep” or discharge treatment solution. Poles exhibiting evidence of excessive “weeping” or discharge of treatment solution will be rejected.
- 8.3 All poles shall be treated by the re-upping empty cell process in accordance with AWWA Standards C-1 and C-4 and the specific requirements of this specification.
- 8.4 Loading For Treatment – Poles shall be loaded on properly cushioned trams to preclude warping and miss-shaping during the conditioning and treating process. Poles fifty (50) feet and longer to be steam conditioned shall be loaded on three (3) or more trams equally spaced.
- 8.5 Penetration and Retentions – The minimum depth of penetration of preservative into the wood and the minimum of retention of preservative per cubic foot of wood shall meet the AWWA Standards for deterioration zone two.

- 8.5.1 In accordance with AWPA and ANSI, Penetration Improvement Methods (PIM's) shall be used to improve the depth and uniformity of preservative penetration into the wood. At the option of the supplier, poles shall be either full-length incised, deep incised, radial drilled or through bored in preparation of the material for drying and/or treatment. The recommended minimum depth of incising and drilling of transmission poles 50' and longer is 2.5" in the area 2' above and 4' below the standard ground line (ground line penetration zone, GLP).
- 8.5.2 All poles should be treated for Use Category 4C of U1-14 in the AWPA Standards which outlines retention rates based on different species of wood.
- 8.5.3 In accordance with the latest revision of AWPA C1 Section 6, poles not conforming to assay retention or penetration requirements may be retreated once. However, processing limitations for steaming, temperature and pressure shall be imposed as stipulated in these Standards.
- 8.6 Penetration Testing – Penetration shall be determined from inspection of increment borer cores in accordance with the following:
  - 8.6.1 Borer cores shall be taken from within the zone as defined in AWPA T1 Standard.
  - 8.6.2 Only those poles in a charge meeting the penetration requirement shall be accepted. If four or more of the first 20 poles checked, or if more than 15% of the poles in a charge, fail to meet penetration requirements, the entire charge shall be rejected.
- 8.7 Retention Determination – Preservative retention shall be determined by assay method described in AWPA Standards, Section A, Analysis Methods. Borings which are taken from the first 20 poles for check of penetration shall be used for retention tests.
  - 8.7.1 All increment borer penetration test holes shall be neatly circled with aluminium keel.
  - 8.7.2 All treated poles must be free of residual materials on the pole surface. There shall be no bleeding areas of liquid preservative at the pole surface. Pole surface shall be clean and dry. Poles with these deposits shall be rejected prior to delivery. The Company reserves the right to reject poles at destinations which exhibit these deposits, to be returned to the supplier for replacement at supplier's expense, for a period of 2 years.

**9.0 RETREATMENT OF POLES**

- 9.1 Material not conforming to the specified minimum treatment requirements may be retreated once and offered for re-inspection in accordance with AWPA Standard C-1, paragraph 6.

- 9.2 Retreated material shall be subject to the same provisions, conditions, and inspection as required for the original treatment within the limitations of AWWA Standard C-1.

10.0 INSPECTION

- 10.1 The treating plant operator shall provide at no cost to the Purchaser suitable facilities and necessary assistance as required in AWWA Standard M-2 for inspection, by the Purchaser or his representative. The plant operator shall have his own quality control program and shall inspect all poles. Poles shall be rejected if they do not meet the requirements of these specifications before poles are offered for inspection by the Purchaser.
- 10.2 The Purchaser or Purchaser's representative shall have the right at any time to test the preservative used in treating poles by taking samples from any source in which the preservatives actually used in treatment of the poles may have been stored or used.
- 10.3 The Purchaser shall have the right to inspect all poles at the time of loading for shipment to ensure conformance with the specifications. Advance notice shall be provided to the Purchaser at least two (2) weeks prior to the loading date. Each pole approved for loading will be marked with the Purchaser's inspector's approval.
- 10.3 Inspection by the Purchaser, or a representative, does not release the supplier of the responsibility of furnishing material in accordance with these specifications. Material not meeting these specifications may be rejected after delivery unless the deviations were authorized in writing by the Purchaser.
- 10.4 Purchaser will require the following to be included in his Inspection Service:
  - 10.5 All necessary inspection prior to final treatment to insure strict compliance with the material, dimension, and manufacturing requirements of these specifications.
    - 10.5.1 All necessary tests and inspection to insure strict compliance with the conditioning, treating and preservative requirements and of AWWA M-2 requirements plus modifications within these specifications. The inspector shall assure that all increment borer penetration test holes shall be neatly circled with aluminium keel.
    - 10.5.2 A complete report to the Purchaser in an approved form covering data for all material inspected.
    - 10.5.3 A report to the Purchaser of any chronic treating plant situation wherein only minimum standards can be maintained with regard to quality of materials, manufacturing, handling, processing and preservative, care of equipment and operating efficiency.
    - 10.5.4 Any poles that exhibit signs of improper treatment, such as; emitting treatment solution (i.e. sweating, bleeding, dripping, etc.), will be rejected.

11.0 CERTIFIED TEST REPORT

- 11.1 When specifically requested by the Purchaser, the supplier shall furnish a certified test report. This report shall at a minimum, include information which will enable the



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identification of a poles treatment “batch” , including treatment information, as well as re-treatments, sampling and inspection data.

- 11.2 The Supplier shall certify in this report that all poles have been inspected and tested and that they meet the requirements of these specifications. Data regarding actual penetration and retentions from the poles shall be reported to make this certificate valid.

### **12.0 ORDERING INFORMATION**

- 12.1 Purchase orders for poles to be supplied under these specifications shall include the following information: quantity, poles, timber species, length, class, type of preservative, type carrier, and framing instructions.

### **13.0 LOADING FOR SHIPMENT**

Before loading on either railroad cars or trucks, all metal or debris that could injure the bottom poles must be removed. All painted or paintable poles should be protected from any contaminants during transportation. Railroad shipments shall be loaded on flat cars only in accordance with methods approved by the American Association of Railroads.

- 13.1 Poles shall be placed on at least three (3) cross timbers with the two top edges chamfered or rounded. There shall be one near each end and one near the middle of the load and these timbers shall have a minimum height of 4 inches and a minimum width of 6 inches.

### **14.0 UNLOADING**

Unloading of material from railroad cars or trucks shall be by or in cooperation with Company’s representative and in accordance with appropriate standards. Inspection by these representatives prior to or unloading will occur to determine:

- 14.1. What, if any, damage to the material is evident.
- 14.2. Any apparent unsatisfactory material conditions and/or deviations from the specification including but not limited to:
- Cracking/Checks in accordance with Section 4
  - Improper treatment, such as; emitting treatment solution (i.e. sweating, bleeding, dripping, etc.)
  - Damage
  - Sweep in accordance with Section 4

All results of such inspection shall be reported in accordance with the established procedures for necessary action.

TABLE 1 – Groundline Distances

<u>Length Of Pole (Feet)</u>	<u>Groundline Distance From Butt (Feet)</u>
50	7
55	7-1/2
60	8
65	8-1/2
70	9
75	9-1/2
80	10
85	10-1/2
90	11
95	11-1/2
100	12
105	12-1/2
110	13

END OF DOCUMENT