

3.1.2. Manner of Piling—All stacks of seasoning ties shall be supported on treated or other non-decaying sills, and the first layer shall be off the ground a minimum of 300 mm (1 ft.). Space between piles shall be not less than 900 mm (3 ft.). To allow for proper air circulation, the alley between the stacks should extend in continuous lines across the seasoning yard.

There shall be at least 50 mm (two inches) of space between the layers and 25 mm (one inch) between ties. The two-inch space between layers will not apply in areas of the West Coast where 19 mm (3/4 in.) stickers are considered sufficient. Layer strips should be treated. Other methods are 1 and 8 or 9, and 2 and 8 or 9. In the most humid climates, the more open piling method should be followed, in arid climates the minimum spacing should apply.

3.1.3 Covered Piles—When species of ties that are very susceptible to decay during seasoning, or for ties of other species where shorter seasoning time is desired, piling in open sheds or roofed piles is desirable, especially in warm, rainy, humid climates.

3.1.4 Determination of Seasoned Ties—Ties being air-seasoned should be held in stacks until the amount of moisture in the wood is lowered enough to permit adequate penetration and retention of preservative. The length of time required varies with species and climatic conditions. The following may be used as a guide, but if there is a doubt, moisture content shall be run, and the maximum moisture shall not be more than shown below.

	Percent of Oven	
	Seasoning Calendar	Dry Moisture Content
Locust, Oak, Black Walnut	9-14	50
Douglas-Fir Western Larch	5-10	20
Gum—Black Tupelo, Sweet	4-7	40
Southern Pine	3-6	30
Hickory and other Hardwoods	4-10	40

The moisture contents are to be obtained from 50 mm (2-in.) borings taken midway between the ends and midway between the top and bottom faces of ties located near the center of each row of stacks of ties.

3.2 Boulton Drying Process—Ties may be conditioned by the Boulton drying process.

Ties shall be trammed with each layer separated by 9 mm (3/8") minimum sticker placed at each end of ties or other suitable separation which is acceptable to the purchaser.

To condition by this process, the ties are heated in oil under vacuum in the treating cylinder. The water obtained during the period shall pass through a condenser and be collected in a receiver so that it can be weighed or measured. The light oils that evaporate from the preservative and collect on top of the water shall be drawn off and returned to the preservative tank. Such boiling is continued until the moisture content of the wood is low enough to allow proper treatment and meet the requirements of paragraph 3.1.4.

3.3 Kiln Drying—Ties may be conditioned by kiln drying in such manner and at a temperature that will cause no serious damage from checking, splitting, or occurrence of timber collapse.

3.4 Vapor Drying—Ties may be conditioned by the vapor drying process.

Ties shall be trammed with each layer separated by a 9 mm (3/8") minimum sticker placed at each end of ties.

Conditioning by this process involves the condensing of organic vapor under the green ties which raises the temperature of the wood so that the water is evaporated from the wood. This is done by boiling a suitable organic solvent with a boiling point between 132°C and 170°C (270°F and 340°F) and passing the vapors over the ties in the retort. This may be done at atmospheric pressure or at subatmospheric pressure. The temperature of the effluent organic vapor and water vapor mixture coming from the cylinder should be maintained at a temperature around 115°C (240°F) by controlling the boiling rate of the solvent. The vapors leaving the retort should be condensed and the water and solvent separated. The solvent is returned to the system for reuse and the water is weighed or measured and discharged to waste. Such heating in vapor is continued until the moisture content of the wood is low enough to allow proper treatment and meet the moisture requirements after pressure treatment of section 3.1.4.

After the heating period, a vacuum of not less than -77 kPa (22 in. Hg.) should be pulled on the retort through the condenser for not less than one hour. This vacuum cools the ties, recovers solvent from the wood and removes additional water from the ties. Any of the normal pressure treatments may follow the Vapor-Drying of ties.

3.5 Controlled Air-Seasoning (C-A-S)—Deleted in 1992 due to lack of use.

4. TREATMENT

4.1 Manner of Treatment—Following the conditioning period, ties shall be treated by an empty-cell process by use of initial air to control retention whenever practical to obtain as deep and uniform penetration as possible with the amount of preservative stipulated; or ties shall be treated by the full-cell process by use of initial vacuum when maximum net retention is desired. The range of pressure, temperature, and time duration shall be controlled so as to obtain maximum penetration with the quantity of preservative injected.

4.1.1 Initial Air or Vacuum—The initial air pressure or vacuum shall be maintained while the cylinder is being filled with preservative. The initial air or vacuum shall be an amount that allows the ties to retain the amount of preservative stipulated.

4.1.2 Pressure Period—After filling the cylinder, the pressure shall be increased to at least the minimum, but not higher than the maximum allowed. It shall then be applied for a period of time sufficient to achieve a gross absorption that

7. SPECIFIC REQUIREMENTS

Note: This Table is expressed in metric units with English units shown in parentheses.

	Oak and Hickory	Mixed Hardwoods	Southern and Ponderosa Pine	Douglas-Fir, W. Hemlock, W. Larch	Intermountain Douglas-Fir	Jack, Red, and Lodgepole Pine
	Optional	Optional	Optional	Required	Required	Required
2.2 Incising	Not Permitted	Not Permitted	Permitted	Not Permitted	Not Permitted	Permitted
3.0 Conditioning						
Steaming	Not Permitted	Not Permitted	Permitted	Not Permitted	Not Permitted	Permitted
Temp. -- Deg. C (Deg. F) -- Max.	-----	-----	118 (245)	-----	-----	116 (240)
Duration -- hr -- Max.	-----	-----	18	-----	-----	3
Vac. -- Millimeters (Inches) -- Min.	-----	-----	-77 kPa (22 in. Hg)	-----	-----	-77 kPa (22 in. Hg)
3.2 Boulton Drying.	Permitted	Permitted	Permitted	Permitted	Permitted	Permitted
3.3 Kiln Drying.	Permitted	Permitted	Permitted	Permitted	Permitted	Permitted
4.0 Treatment						
4.12 Pressure -- kPa (psig.) -- Max.	1750 (250)	1750 (250)	1400 (200)	1050 (150)	1050 (150)	1225 (175)
kPa (psig.) -- Min.	1050 (150)	1050 (150)	350 (50)	350 (50)	350 (50)	350 (50)
4.13 Temp. -- Deg. C (Deg.F) -- Max.	99 (210)	99 (210)	99 (210)	99 (210)	93 (200)	104 (220)
Deg. C (Deg.F) -- Min.	82 (180)	82 (180)	82 (180)	82 (180)	82 (180)	82 (180)
5.0 Results of Treatment						
5.1 Retention -- kg/m ³ (pcf), Min. [note 1]						
5.11 Creosote	112 (7) or Refusal	112 (7)	128 (8)	128 (8) or Refusal	Refusal	96 (6)
Creosote Solution	112 (7) or Refusal	112 (7)	128 (8)	128 (8)	Refusal	112 (7)
Creosote -- Petroleum Solution	112 (7) or Refusal	112 (7)	128 (8)	128 (8)	Refusal	112 (7)
5.12 Pentachlorophenol (4.5% Solution Min.)	5.6 (0.35) or Refusal	5.6 (0.35)	6.4 (0.4)	6.4 (0.4)	Refusal	----
5.2 Penetration in millimeters (inches) and/or % of Sapwood --Min.	White Oak -- 95% of Sapwood	38 (1.5) or 75%	63 (2.5) or 85%	12 (0.5) and 90%	12 (0.5) and 90%	12 (0.5) and 90%
	Red Oak -- 65% of Annual Rings					
5.21 Penetration Determination	A borer core shall be taken from the center of 20 ties in each charge. If 80% of the borings meet the above requirements the charge shall be accepted. Except for oak, if the average penetration of the 20, 75 mm (3.0-in.) borings meet the penetration requirements, the charge shall be accepted.					

[1] Note: Users requiring retention results by assay for softwood ties should use the requirements in AWPA Standard C2.

AMERICAN WOOD-PRESERVERS' ASSOCIATION
STANDARD

(This Standard is promulgated according to a consensus procedure and is under the jurisdiction of AWPAs Subcommittee P-3)

P1/P13-01®

STANDARD FOR CREOSOTE PRESERVATIVE

Note: AWPAs Standard P1/P13-01 consists of one page.

1. The creosote shall be a distillate derived entirely from tar produced by the carbonization of bituminous coal.
2. The new material and the material in use in treating solutions shall conform to the following detailed requirements:

	New Material	Material In Use
	Not Less Than	Not More Than
2.1 Water, % by Volume	1.5	1.5
2.2 Matter Insoluble in Xylene, % by wt.	0.5	-
2.3 Specific Gravity at 38°C Compared to water at 15.5°C:		
Whole Creosote	1.070	1.070
Fraction 235-315°C	1.028	-
Fraction 315-355°C	1.100	1.100
2.4 Distillation: The distillate, % by wt. on a water free basis, shall be within the following limits:		
Up to 210°C	-	2.0
Up to 235°C	-	12.0
Up to 270°C	10.0	40.0
Up to 315°C	40.0	65.0
Up to 355°C	65.0	77.0

3. Tests to establish conformance with the foregoing requirements shall be made in accordance with American Wood-Preservers' Association Standard A1.

Standard P1/P13-95 was reaffirmed in 2000 and 2001 with minor editorial corrections.
The title was amended in 1999, 2000 and 2001.