

SPECIFICATIONS FOR HARDWOOD AND SOFTWOOD CROSSTIES AND SWITCH TIES TREATED WITH COPPER NAPHTHENATE

NOTE: This specification relates to preservative treatment only and should be inserted into existing railroad specifications covering inspection for acceptable wood species, strength properties and defects, framing tolerances, post-treatment handling, etc.

This procurement specification establishes the minimum detailed technical requirements for wood crossties and switch ties for use by _____ (hereafter referred to as “the Company”). Where current specifications or recommended practices of technical associations such as AREMA and the American Wood Protection Association (AWPA) are appropriate, they are made part of this specification by reference.

A. Seasoning - Drying green crossties prior to pressure treatment with copper naphthenate, whether by air seasoning, kiln drying, Boultonizing or steam conditioning, is required to provide adequate treatability as evidenced by penetration and retention of copper. Consult AREMA Manual Chapter 30, Section 3.6.3 and AWPA Standard T1 for seasoning guidance and limitations. Time limits for steaming and heating in the preservative may vary between commodities and species.

As a conditioning process used prior to treatment, steam conditioning is limited to Southern Pine to be treated with copper naphthenate, or for thawing ice-coated or frozen material prior to treatment.

All kiln-dried Southern Pine timber & lumber will be dried below 25% moisture content in accordance with the Southern Pine Inspection Bureau (SPIB) Dry Kiln Manual.

B. Copper Naphthenate Treatment - Wood crossties and switch ties will be treated with Copper Naphthenate in accordance with the latest version of the AREMA Manual

Chapter 30 – Ties, Sections 3.6.4.3 and 3.7.2.3, which reference the current version of AWPA Standards U1, T1, P36 and HSA. The following specific requirements will also be followed:

1. Air-dry treatment with copper naphthenate only: All air-dried charges of ties shall be held at an elevated temperature and length of time for sterilization in accordance with AREMA Manual Chapter 30 and AWPA Standard T1. This time will be a combination of preheating in oil and pressure to achieve sterilization and deeper distribution of copper naphthenate in air-dried material.
2. Treatment shall be by the empty cell method with a copper naphthenate solution in accordance with AWPA Standard P36. Copper naphthenate treating solutions shall contain between 0.5% - 1.5% as copper metal, preferably 0.8-1.0% copper, with the exact concentration used that provides adequate retention and penetration in the wood. The minimum solution concentration for treatment to refusal is 0.8% as copper metal.
3. The copper naphthenate concentrate shall be an EPA-registered product and shall be diluted in petroleum-based oils that conform to AWPA Standard HSA (formerly P9-A). Always read, understand and follow label directions.
4. The preservative solution shall be analyzed for copper concentration prior to each charge in accordance with the methods of AWPA Standard A9, A21 or A88, with a copy retained for inspection by the Company.
5. Treatment shall comprise a minimum 130 psi (psig) pressure but not to exceed 150 psi for Douglas-fir and most western softwoods, 200 psi for Southern Pine, and 250 psi for hardwoods. Refer to AWPA Standard T1 Section C: Crossties and Switch ties.
6. Copper naphthenate treatment should be conducted at 140° - 185°F (60° - 85°C). Preservative temperature during the entire pressure period shall not exceed 212°F (100°C).
7. A final vacuum of not less than 22" Hg shall be applied and maintained until the wood is free of dripping preservative when removed from the cylinder.
8. Penetration in material treated with copper naphthenate can usually be determined visually due to the dark coloration. When depth of penetration is indistinct or questionable, penetration shall be determined using indicators in accordance with AWPA Standard A69 (Chrome Azurol S) or Standard A72 (Rubeanic Acid).
9. The Company minimum retention for standalone copper naphthenate treatment is 0.055 pcf (as copper) for oak and hickory, and 0.060 pcf (as copper) for mixed hardwoods and softwoods, per AWPA Standard U1 Commodity Specification C: Crossties and Switch Ties, unless higher retentions are expressly specified.

10. Retention of copper naphthenate (pcf as copper metal) may be determined by gauge or assay. Copper assay shall follow AWPA Standard A9, A21 or A88, with a copy retained for inspection by the Company.

C. Care and Handling After Treatment

All post-treatment cuts, daps, drilled holes and injuries such as abrasions, nail and spike holes which may penetrate the treated zone shall be field treated with copper naphthenate containing 2% copper in accordance with AWPA Standard M4.