

PART 1 - GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

- A. The provisions and intent of the Contract, including the General Conditions and General Requirements, apply to this work as if specified in this section.

1.02 DESCRIPTION OF WORK

- A. The Work of this Section consists of the furnishing, handling, and installation of timber cross ties and switch ties for use in railroad track construction.

1.03 REFERENCED STANDARDS:

- A. Comply with all applicable local, State and Federal codes provisions of most recent edition, including all addenda, of following codes, specifications, standards, and recommended practices, except as otherwise indicated:

- 1. AREMA MANUAL – American Railway Engineering and Maintenance-of-Way Association, Manual for Railway Engineering

- B. AMERICAN WOOD-PRESERVERS' ASSOCIATION (AWPA)

- 1. A1 - Analysis of Creosote and Oil-Type Preservatives
 - 2. M2 - Standard for Inspection of Treated Timber Products

1.04 SUBMITTALS:

- A. Submit the name, address and phone number of the timber tie supplier.
- B. Submit the completed inspectors report form as described by AWPA M2 Standard for Inspection of Treated Timber Products, including step by step work sheets of preservative analysis and retention analysis. Submit to the Engineer prior to shipment of the ties from the treatment plant.
- C. Submit Certificates of Compliance that ties comply with these specifications, AREMA specifications and AWPA standards prior to shipping timber ties.
- D. Certification of Tie Plates
 - 1. Contractor to provide Certifications of compliance from suppliers or manufacturers that Tie Plates delivered to the site are in conformance with AREMA Specifications Chapter 5, Part 1 Tie Plates and these specifications.
 - 2. Contractor to provide shop drawing detailing all tie plates using elastic fasteners.
- E. Certification of Elastic Fasteners on Timber Ties
 - 1. Contractor to provide Certifications of compliance from suppliers or manufacturers that Elastic Fasteners delivered to the site are in conformance with AREMA Specifications Chapter 5, Part 9, Design Qualification Specifications for Elastic Fasteners of Timber Cross Ties.
 - 2. Contractor to provide shop drawing detailing elastic fasteners and clamping force.
- F. Certification of Screw Spikes

1. Contractor to provide Certifications of compliance from suppliers or manufacturers that Screw Spikes delivered to the site are in conformance with AREMA Specifications Chapter 5, Part 10, Section 10.1 Steel Screw Spikes.
- G. Submit a complete bill of ties for all supplied crossties and switch ties.
- H. Bill of Materials: Submit a complete bill of materials for all supplied railroad materials, including but not limited to, all fasteners and plates.

1.05 QUALITY ASSURANCE

- A. The Contractor shall notify the Engineer five (5) business days in advance of all material delivery. Upon delivery, any material identified as unsatisfactory, at the discretion of the Engineer, will be loaded back on to the delivery truck and sent back to the Contractor's plant at the Contractor's expense.

PART 2 - PRODUCTS

2.01 TIMBER TIES:

- A. General:
 1. Crossties and switch ties shall meet the requirements of AREMA Chapter 30 Part 3.
 2. All crossties shall be pre-plated, except for the quantities listed on the Offer Sheet.
- B. Material:
 1. The following woods can be used for crossties and switch ties:
 - a. Mixed hardwood consisting of black or honey locust, red or white oak, gums, ashes, elms, hickories, maples, and birches.
- C. Physical Requirements:
 1. Except as hereinafter provided, all ties shall be free from any defects that may impair their strength or durability as crossties or switch ties, such as decay, large splits, large shakes, slanting grain, or large or numerous holes or knots.
- D. Design:
 1. Standard crossties shall be 7" x 9" x 8'-6". Crossties under pavement shall be 7" x 9" x 10'-0". Thickness, width, and length specified are minimum dimensions for green ties. Dry or treated ties may be 1/4 inch thinner or narrower than the specified sizes. Ties exceeding these dimensions by more than 1 inch shall be rejected. The grade of each tie shall be determined at the point of most wane on the top face of the tie within the rail-bearing areas. The rail-bearing areas are those sections between 20 inches and 40 inches from the center of the tie. The top of the tie shall be the narrowest face and/or the horizontal face farthest from the heart or pith center.
 2. Switch ties shall be sized as shown on the Contract Drawings.
 3. All rail-bearing areas shall measure as follows: 7-inch grade crossties shall be 7" x 9" in cross section with a maximum of 1 inch of wane (uncut edge) in the top rail-bearing areas. A maximum of 20% of the ties in any given quantity may be square-

sawn 7" x 8" in cross section with no wane in the rail-bearing areas. Wane shall be permitted on the bottom face so long as it does not exceed 1 inch at any given point.

E. Inspection:

1. Place: Ties will be inspected when delivered on site, see Article 1.05.
2. Decay: Decay is the disintegration of the wood substance due to the action of wood destroying fungi. "Blue stain" is not decay and is permissible in any wood.
3. Holes: A large hole is one more than 1/2 inch in diameter and 3 inches deep within, or more than one-fourth the width of the surface on which it appears and 3 inches deep outside, the sections of the tie between 20 inches and 40 inches from its middle. Numerous holes are any number equaling a large hole in damaging effect. Such holes may be caused in manufacture or otherwise.
4. Knots: Within the rail bearing areas, a large knot is one having an average diameter more than 1/3 the width of the surface on which it appears; but such a knot will be allowed if it is located outside the rail bearing areas. Numerous knots are any number equaling a large knot in damaging effect.
5. Shake: A shake is a separation along the grain, most of which occurs between the rings of annual growth. One which is not more than 1/3 the width of the tie will be allowed, provided it does not extend nearer than 1 inch to any surface.
6. Split: A split is a separation of the wood extending from one surface to an opposite or adjacent surface. Do not count the end as a surface when measuring the length of a split. In unseasoned cross ties, a split no more than 1/8 inch wide and/or 4 inches long is acceptable. In a seasoned cross tie, a split no more than 1/4 inch wide and/or longer than the width of the face across which it occurs is acceptable. In seasoned cross ties, a split exceeding the limit is acceptable, provided split limitations and anti-splitting devices are approved by the buyer and properly applied.
7. Checks: A check is a separation of the wood due to seasoning which appears on one surface only. Do not count the end as a surface. Ties with continuous checks whose depth in a fully seasoned and/or treated tie is greater than 1/4 the thickness and longer than 1/2 the length of the tie will be rejected.
8. Slope of Grain: Except in woods with interlocking grain a slope in grain in excess of 1 in 15 will not be permitted.
9. Bark Seams: A bark seam or pocket is a patch of bark partially or wholly enclosed in the wood. Bark seams will be allowed provided they are not more than 2 inches below the surface and/or 10 inches long.
10. Manufacturing Defects: All ties must be straight, square-sawn, cut square at the ends, have top and bottom parallel, and have bark entirely removed. Any ties which do not meet the following characteristics of good manufacture will be rejected:
 - a. A tie will be considered straight when a straight line from a point on one end to a corresponding point on the other end is no more than 1-1/2 inches from the surface at all points.

- b. A tie is not well-sawn when its surfaces are cut into with scoremarks more than 1/2 inch deep, or when its surfaces are not even.
- c. The top and bottom of a tie will be considered parallel if any difference at the sides or ends does not exceed 1/2 inch.
- d. For proper seating of nail plates, tie ends must be flat, and will be considered square with a sloped end of up to 1/2 inch, which equals a 1 in 20 cant.

2.02 ANTI-SPLITTING DEVICES:

- A. Timber crossties and switch ties shall be equipped with anti-splitting devices of the type specified regardless of whether or not the wood has shown any tendency to split. Products used shall conform to the AREMA Manual, Chapter 30, Part 1, Section 3.1.6, "Specifications for Devices to Control the Splitting of Wood Ties".
- B. Timber crossties and switch ties shall be equipped on each end with gang nails (steel nail plates).
- C. Anti-splitting devices shall be applied in accordance with the AREMA Manual, Chapter 30, Part 3, Section 3.1.7, "Application of Anti-splitting Devices".

2.03 INCISING:

- A. Timber crossties and switch ties shall be incised on all four sides in the pattern specified in the AREMA Manual, Chapter 3, Part 6, "Wood Preserving".

2.04 TIE PRESERVATIVE TREATMENT:

- A. Timber crossties and switch ties shall be pressure treated in accordance with AREMA Chapter 30 Part 3 Section 3.7.2 "Treatment" by the empty cell process. Process and preservative to be used on material and retention required shall be as follows:
 - 1. Wood 50% Creosote / 50% Oil Process
 - 2. Doug Fir 8 lb. or Refusal L&R
 - 3. Hardwood (non oak) 7-1/2 lb. or Refusal L&R
 - 4. Oak 7-1/2 lb. or Refusal Bethel or L&R
- B. Ties will be accepted by the Engineer based on the Manufacturer's Certification of Compliance and Treatment Inspection Reports.
- C. Ties shall be free of excess preservative. Ties exuding a minor amount of preservative will be permitted.

2.05 TIE PLATES

- A. Tie plates shall conform to AREMA Manual Chapter 5, Part 1, "Specifications for Steel Tie Plates".
- B. Either low carbon or high carbon steel tie plates may be furnished.
- C. Tie plates shall accommodate two elastic spring clips and at least four screw spikes to secure the plates to the timber ties. Tie plates to have a minimum length of 15". Tie

plates shall have minimum width of 7-3/4" and minimum thickness of 1/2" under the rail in base section.

- D. Tie plates to have 1" diameter holes to accommodate 15/16" diameter screw spikes.
- E. Tie plate section to be canted 1:40,+/-5, toward the center line of track.
- F. Tie plates shall have smooth flat bases with no ridges or indentations.
- G. One tie plate shall be placed under each rail at each tie.

2.06 ELASTIC RAIL CLIPS

- A. The elastic rail clips to be used shall be one piece, threadless fasteners of spring steel Pandrol e-2055 Rail or approved equal, which must meet all the following requirements:
 - 1. An easy to install one piece elastic spring steel rail clip without threaded elements which can be easily removed from its housing without any possible damage to or the loss of the lateral support provided by the shoulder.
 - 2. The design and configuration of the clips, their housing and their area in contact with the rail should be such that a nominal rail seat clamping force of 2500 pounds per clip is provided and frequent rail slippage can be allowed without stressing, bending, twisting or damaging the clips or their housing.

2.07 SCREW SPIKES

- A. Screw spikes shall be new, conforming to the current AREMA Manual, Chapter 5, Part 10, Section 10.1.
- B. Screw spikes used to fasten the plates to the timber ties shall be one piece with reinforced throat, 27/32-inch by 1-1/8-inches rectangular head, 15/16-inch diameter, 6-1/2-inches long per BNSF/UP Common Standards Drawing No. 130800.
- C. The head shall be concentric with and firmly joined to the body of the screw. The material shall be free from injurious defects and shall have a workmanlike finish. Screws shall be provided with plain finish.
- D. Finished screws shall conform to the following minimum requirements:
 - 1. High Strength
 - a. Tensile Strength, psi 120,000 Min
 - b. Yield Strength, psi 80,000 Min
 - c. Elongation, % 18 Min
- E. Except for heat-treated screws, steel mill cert data may be used for tensile strength with approval of the Port.
- F. A letter or brand indicating the manufacturer shall be located on the top of the washer of each screw.
- G. Two screw spikes to be provided each side of rail for a total of four screw spikes per tie plate.

PART 3 - EXECUTION

NOT USED

END OF SECTION