

SECTION 20120

TRACK APPURTENANCES AND OTHER TRACK MATERIAL

PART 1 – GENERAL

1.01 DESCRIPTION

- A. Section includes specifications for other track materials (OTM) for concrete and timber ties. OTM includes rail fastening systems, screw spikes, track bolts, nuts, spring washers, tie plates, tie hole plugging material, rail anchors, standard toeless joint bars, compromise joint bars, and insulated joints.

1.02 GENERAL

- A. Section 01005, Contractor's Personnel and Equipment: Includes general requirements and submittals regarding railroad construction equipment used for work of this Section, including adzing equipment.

1.03 REFERENCE STANDARDS

- A. American Railway Engineering and Maintenance of Way Association (AREMA):
 - 1. Manual for Railway Engineering (Manual)
- B. American Society for Testing and Materials (ASTM International):
 - 1. A325 Specifications for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
 - 2. F436 Specification for Hardened Steel Washers
- C. Caltrain Standard Drawings

1.04 DEFINITIONS

- A. Tie Plate: Plate which has a rail seat, either flat or canted, double shoulder parallel to the rail it supports, and with holes for spikes or other fasteners. The bottom of the tie plate is usually flat, but may be ribbed or of other design.
- B. Resilient Fastening System: Rail fastening system consisting of clips, insulators and pad on tie plate to fasten rail to ties.
- C. Rail Anchor: Device which clamps to base of rail and bears against side of cross-tie (timber tie) to restrain longitudinal movement of rail.
- D. Standard Joint Bar: Device used to connect the abutting end of contiguous rails of the same cross section.
- E. Compromise Joint Bar: Joint bar used to connect contiguous rails of different cross section.

- F. Insulated Rail Joint: Pre-fabricated or field-fabricated joint used to inhibit the flow of electric current between contiguous rails.

1.05 SUBMITTALS

- A. Submit plan showing details for installation of OTM. Include manufacturer's installation instructions, where applicable.
- B. Submit Certificates of Compliance for all OTM. Include material qualification test reports for materials, components, and assemblies.
- C. If field fabricated bonded insulated joints approved by the Engineer, submit the insulated rail joint installation procedures at least 30 days prior to beginning joint installation work. Include, at a minimum, the following items for insulated rail joints:
 - 1. Contractor performing the field fabrication is certified by the supplier.
 - 2. Care and storage of materials
 - 3. Date of glue manufacture
 - 4. Glue shelf life
 - 5. Rail end preparation
 - 6. Weather and temperature restrictions
 - 7. Mixing and application of glue
 - 8. Installation of insulated joint bar and pin bolts
 - 9. Curing restrictions
 - 10. Detection of glue bond failures
- D. Submit product data for kegs proposed for shipping screw spikes.
- E. Submit samples of track materials, if requested by the Engineer

1.06 QUALITY ASSURANCE

- A. Perform material qualification testing for all materials, components, and assemblies.

1.07 DELIVERY

- A. Deliver screw spikes to the work site in Engineer approved containers (kegs).

1.08 EXTRA MATERIALS

- A. Any excess materials that are property of the Owner shall be packaged as specified and hauled to stockpile area designated by the Engineer.
 - 1. Place excess new spikes in containers.
 - 2. Palletize and band excess tie plates.
 - 3. Place the excess rail anchors in nylon sacks on pallets.

PART 2 – PRODUCTS

2.01 TIE PLATES

- A. Tie plates shall conform to the requirements as indicated in Caltrain Standard Drawings.
- B. Tie plates for use with elastic fasteners shall be standard 7-3/4 inches by 16 inches in accordance with Caltrain Standard Drawings.

2.02 TRACK SPIKES

- A. Screw spikes shall be new 15/16 inch by 6 inches straight shank screw spikes with a minimum tensile strength of 73,000 psi. Head shall be hot forged and centered relative to the shank in accordance with Caltrain Standard Drawings.
- B. Stamp screw spikes with manufacturer's identification and date of manufacture (month and year).

2.03 RAIL ANCHORS

- A. Rail anchors shall be Channeloc-type rail anchors manufactured by Chemtron True Temper or Engineer approved equal.
- B. Rail anchors shall be sized to conform to the rail section used.
- C. Rail anchors shall conform to the AREMA Manual, Chapter 5, Part 7, Section 7.1, "Specifications for Rail Anchors."

2.04 TRACK BOLTS, NUTS AND SPRING WASHERS

- A. Track bolts and nuts shall conform to the dimensions specified in the AREMA Manual, Chapter 4, Part 3, Section 3.3, Rail Drillings, Bar Punching, and Bolts
- B. Track bolts and nuts shall conform to the requirements of the AREMA Manual, Chapter 4, Part 3, Section 3.5, Specifications for Heat-Treated Carbon-Steel Track Bolts and Carbon-Steel Nuts.
- C. Spring Washers shall conform to the requirements of the AREMA Manual, Chapter 4, Part 3, Section 3.6, Specifications for Spring Washers.

2.05 RESILIENT FASTENING SYSTEM

- A. Furnish Pandrol E-2055 clip type or equal elastic fastening systems for use on timber switch ties.
- B. Furnish modified Pandrol E-2063 or E-2063B clips, painted yellow, for insulated joint locations.

2.06 STANDARD AND COMPROMISE JOINT BARS

- A. Standard 36-inch toeless joint bars shall be 6-hole bars, and shall be of the size, shape, and punch necessary to fit the rail sizes, conforming to the requirements in Caltrain Standard Drawings.
- B. Compromise joint bars shall be of the size, shape, and punch necessary to fit the rail sizes and sections being joined in conformance with Caltrain Standard Drawings.
- C. Compromise joint bars shall conform to the requirements of the AREMA Manual, Chapter 4, Part 3, Section 3.4, Specifications for Quenched Carbon-Steel Joint Bars, Microalloyed Joint Bars, and Forged Compromise Joint Bars.
- D. Furnish only factory designed and produced (forged or cast) compromise joint bars for joining rails of different sizes or sections.
- E. Make all permanent connections between different sizes of rail by using forged taper rails or compromise field welds.

2.07 INSULATED RAIL JOINTS

- A. Furnish pre-fabricated insulated joints unless otherwise noted or approved by the Engineer. Where noted, furnish field fabricated bonded insulated rail joints.
- B. Furnish insulated rail joints of the epoxy-bonded type as manufactured by Allegheny Rail Products, Co., American Track Systems, Inc., Portec Rail Products, Inc., Railway Bonded insulated joints, or Engineer approved equal, in accordance with the following:
 - 1. Joint Components: Furnish insulated joints complete with bars, end posts, bushing, washers, pin bolts, collars, washers and adhesives as recommended by the manufacturer for final installation.
 - 2. Furnish new, smooth, straight bars providing full face contact, conforming to the applicable rail section, and fabricated from micro alloyed steel or quenched carbon-steel as specified in AREMA, Specification for Quenched Carbon Steel Joint Bars. The toe of the joint bar shall properly fit against the web of the rail. When elastically fastened, the joint bar shall provide adequate clearance to maintain electrical isolation.

3. Provide pin bolts of ASTM A325 structural steel furnished with the appropriate collar. Provide flat circular hardened steel washers in accordance with ASTM F436.
 4. Bolt hole size shall be in accordance with the bonded insulated joint manufacturer's recommendation. If bolt hole diameter is larger than 1-3/16 inches, place ASTM A325 hardened washers between the joint bars and the nut.
- C. Insulating paint for use in conjunction with insulated joints: As recommended by the insulated joint manufacturer and approved by the Engineer.

2.08 TIE PLUGS

- A. Tie hole plugging material shall be SpikeFast by Willamette Valley Company, or Engineer approved equal.

2.09 SUPERELEVATION TAGS

- A. Furnish metal superelevation tags manufactured from 16-gauge aluminum in accordance with Caltrain Standard Drawings. Stamp tags in 1/4-inch increments from zero to maximum superelevation.
1. Nails for Securing Tags to Timber Crossties: Galvanized No 10.
 2. Adhesive for Securing Tags to Concrete Ties must be approved by the Engineer.

PART 3 - EXECUTION

3.01 TIE PLATES

- A. Install tie plates as specified in Section 20400, Track Construction.
- B. Adze existing ties to receive new ties plates, prior to installing new rail and turnouts. Tie adzing shall only be of sufficient depth to allow for a full level seat for the new tie plate and remove indentation of old tie plate. The width of adze shall be the full width of the tie, and the length of the adze shall extend beyond the width of the tie plate seat by a minimum of one half inch of each side. Install the tie hole plugging material in all open spike holes prior to adzing.
- C. Use only approved power operated adzing equipment for adzing, with an approved back-up adzer available on site at all times.

3.02 TRACK SPIKES

- A. Install track spikes as specified in Section 20400, Track Construction.

3.03 RAIL ANCHORS

- A. Install rail anchors in accordance with the requirements of Section 20400, Track Construction.

3.04 BOLTS, NUTS, AND SPRING WASHERS

- A. The various rail drillings and joint bar punches require various lengths and diameters of bolt assemblies. Determine the number of bolt assemblies of each size requires. In general, all bolt diameters shall be the largest possible for a given rail drilling and joint bar punching. Bolts shall be the proper length for the joint bar to allow at least one full bolt thread to extend past the outside of the nut. Spring washers and nuts shall be of a size sufficient to ensure that the spring washer develops its full reactive force and does not jam into the joint bar hole.
- B. Install bolt assemblies in accordance with the requirements of Section 20400, Track Construction.

3.05 RESILIENT FASTENERS

- A. Install resilient fasteners in accordance with the requirements of Section 20400, Track Construction and Section 20500, Special Trackwork.

3.06 STANDARD AND COMPROMISE JOINT BARS

- A. Install compromise joint bars in accordance with the requirements of Section 20400, Track Construction.
- B. Temporary bolted joints will be permitted for the Contractor's convenience to facilitate construction, unless otherwise directed by the Engineer. The use of bolted joints during the construction of CWR track shall be kept to a minimum, and all bolted joints shall be replaced by field welds prior to de-stressing.

3.07 INSULATED RAIL JOINTS

- A. Install pre-fabricated and field-fabricated insulated joints at locations shown on the Contract Drawings and in conformance with the manufacturer's recommended procedures. Install two insulated joints, on opposite rails at each callout on the Contract Drawing, with a stagger of two (2) cross-tie spacings, unless otherwise noted.
- B. Notify the Engineer 24 hours in advance of installation of insulated joints at each location.
- C. Test all insulated joints after installation into track in accordance with the requirements in Section 18600, Signal Systems Testing.
 - 1. Remove, replace, and retest any bonded insulated joint that fails the electrical test in track. Obtain Engineer's approval of insulated joint replacement procedure prior to making replacement.
- D. Properly fasten the elastic fasteners to secure the insulated joints in place using Pandrol clips specified herein for resilient fastening at insulated joints. Use overdrive protectors when using E-2063B clips to obtain proper installation. Do not overdrive the clips.

- E. Apply insulating paint to the circumference of the rail head and post after assembly and curing of bonded insulated joint adhesive. Apply the insulating paint as a stripe centered on the end post, one inch plus or minus 1/4 inch wide.

3.08 RAIL BONDS

- A. Bond all jointed rail, both permanent and temporary, in accordance with the requirements in Section 18400, Rail Bonding.

3.09 TIE PLUGS

- A. Plug all spike holes where spikes have been removed in existing ties that are to remain in track and that are to receive new tie plates or new spikes. Use tie hole plugging materials.
- B. Install tie hole plugging material in accordance with the manufacturer's instructions. Top of tie hole plugging material shall be flush with top of hole.

2.10 SUPERELEVATION TAGS

- A. Install tags in accordance with the Contract Documents and Caltrain Standard Plans. At concrete ties, follow adhesive manufacturer's instructions.

END OF SECTION