



Iowa Department of Transportation

SPECIAL PROVISIONS FOR RAILROAD INDUSTRY TRACK

Pottawattamie County
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Effective Date
June 16, 2015

THE STANDARD SPECIFICATIONS, SERIES 2012, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

120321.01 DESCRIPTION.

Railroad Industry Track consists of ties, rails, fastenings, ballast, asphalt underlayment, and appurtenances delivered in conformity with the contract documents.

120321.02 MATERIALS.

A. Rail.

New 115 RE (115 pounds/yard) or 136 RE (136 pounds/yard) rail per the project plans shall be provided in 39 or 80 foot lengths. Rail shall conform to Chapter 4, Part 2 of American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual for Railway Engineering. Rail shall be standard strength commercial grade.

B. Fastenings.

1. Tie Plates.

Shall be new double-shoulder tie plates per AREMA Plan No 7 for 115 RE rail and AREMA Plan No 13 for 136 RE rail. Tie Plates shall conform to Chapter 5, Part 1 of AREMA.

2. Track Bolts and Nuts.

Shall be new, appropriately sized for the bolt holes in the rail section with length sufficient for a full nut and heavy-duty spring washers (new), including length sufficient to leave at least two threads exposed after the nut is tightened. Track Bolts and Nuts shall conform to Chapter 4, Part 3.5 of AREMA.

3. Spring Washers.

Spring washers shall be sized to ensure that the spring washer develops its full reactive force and does not jam into the joint bar hole. Spring washers shall be of the size to fit the bolt and nut used, shall be new, and shall conform to Chapter 4, Part 3.6 of AREMA.

4. Track Spikes.

Shall be new cut spikes per Common Standard 130005.

5. Rail Anchors.

Shall be new bar stock anchors for the appropriate rail base width per Common Standard 135010.

6. Joint Bars.

Joint bars shall be new and of the size, shape, and punching pattern to fit the rail being joined per the IAIS Typical Specifications & Criteria for Construction of Industrial Tracks. Joint bars shall be of the "toeless" and "head free design" to match rail section. New joint bars shall conform to Chapter 4, Part 3.4 of AREMA.

7. Compromise Joint Bars.

Compromise joint bars shall be new and of the size, shape, and punching pattern to fit the rail sizes and sections being joined per the IAIS Typical Specifications & Criteria for Construction of Industrial Tracks. Only factory designed and constructed compromise joint bars shall be used to join rails of different sizes. New joint bars shall conform to Chapter 4, Part 3.4 of AREMA.

C. Wood Ties.

Wood ties shall conform to Chapter 30, Part 3 of AREMA. All ties shall be new hardwood species. No industrial grade ties will be accepted.

1. Splits shall not be longer than 4 inch and not wider than 1/4 inch at either end. Splits longer than 4 inch but not longer than the width of the face in which the split appears, will be acceptable if specified anti-splitting devices are installed with the splits compressed. Any required adzing and drilling for spikes shall be performed prior to treatment.
2. Wood ties shall be sawed and shall be not less than 7 inch thick and 9 inch wide. The length shall be 10.0 feet at road crossings and 8.5 feet for all other track construction. Transition zones shall have tie lengths and quantities per the track drawings.

D. Steel Ties.

Steel ties shall conform to Chapter 30, Part 6 of AREMA. Steel ties shall be constructed with hook-in shoulders of a 7 inch minimum spade. Ties shall be designed and furnished with an elastic type rail fixation system for e clips. Ties shall have a brand rolled into the material indicating the section and manufacturer. Steel ties shall have the following minimum section:

Length:	102 inch
Width	11.8 inch
Thickness	0.4 inch
Section Depth	4.6 inch
Moment of inertia	14.6 in ⁴

Ties shall be manufactured from steel free of injurious segregation with a minimum tensile strength of 45,000 psi.

E. Railroad Crossings.

Concrete panels for use with wood ties shall be per Common Standards 200100, 200101, 200102, 200900, 200901, and 200902. Concrete panels for use with steel ties shall be per the project plans and steel tie manufacturer recommendations. Concrete panels shall be supplied for 10 foot lengths at all crossings. Crossing panels shall be supplied with flangeway fillers attached.

F. Turnouts.

All turnout components for wood tie construction shall be new of the size and type shown in the plans per the IAIS Typical Specifications & Criteria for Construction of Industrial Tracks. All turnout components for steel tie construction shall be new of the size and type shown in the plans

per manufacturer recommendations. Turnout components shall be manufactured by a company regularly engaged in the manufacture of turnout components. All components need not be made by the same manufacturer but each turnout shall be the product of a single firm. Switch assemblies, stands, frogs, and guardrail assemblies shall conform to applicable requirements in AREMA.

G. Derails.

All derail components shall be new and of a standard design that has been in use by the commercial railroad industry for at least 5 years. Derails shall be of all-steel construction and all necessary components shall be provided as a unit.

H. Crossing Diamonds.

All components for crossing diamonds shall be new and shall be manufactured by a company regularly engaged in the manufacture of crossing diamond components. All components need not be made by the same manufacturer but each crossing diamond shall be the product of a single firm. Frogs and guardrail assemblies shall conform to applicable requirements in AREMA. Crossing diamonds shall be designed by the manufacturer to match the geometry provided in the plans and shall be submitted to the Engineer for approval prior to fabrication. Submittal shall include all components associated with crossing diamond including tie type, size, and location; frog type and angle; and any associated rails, guardrails, and miscellaneous fasteners.

I. End of Track Bumpers.

End of Track Bumpers shall be new and of a standard design that has been in use by the commercial railroad industry for at least 5 years. Bumpers shall be manufactured by a company regularly engaged in the manufacture of end of track bumpers.

End of track bumpers shall be of an all-steel construction, shall bolt firmly onto the rail, and shall be of a type designed for general service. Bumpers shall have tension members with 6 square inch cross-sectional area and compression members with a moment of inertia not less than 37 inch⁴ of A36 steel. Bumpers shall be capable of withstanding a yield load of 550,000 pounds.

End of track bumpers shall be equipped with a cushion head of all steel construction, firmly bolted, attached, or clamped onto the bumper. Cushion head shall resist 80,000 pounds of compression.

J. Ballast.

Ballast shall be crushed granite or quartzite and conform to the mainline ballast material requirements in Chapter 2 Part 2 of AREMA. Ballast utilized for track constructed with 136 RE rail shall conform to AREMA Standard 4A gradation. Ballast utilized for track constructed with 115 RE rail and ballast utilized for track resurfacing shall conform to AREMA Standard 5 gradation.

120321.03 CONSTRUCTION.

A. General.

Track construction not covered specifically herein shall be in accordance with AREMA recommendations and recommended practices. All work shall be supervised by experienced personnel skilled in railroad track construction. Track construction not covered by this specification shall be per AREMA Chapter 5, Parts 4, 5, and 8.

B. Wood Ties.

Ties will be unloaded and handled in such a manner as to not damage ties using approved handling equipment such as tie tongs. Standard center-to-center spacing of ties shall be 24 inch. Tie spacing within the limits of the crossing panels shall be per crossing panel manufacturer recommendations. Ties shall be laid perpendicular to the center line of the track with the grain up (heartwood side down) for wood ties. The best ties shall be used at the rail joints. The ends of ties on one side of the track shall be parallel to the rail and the center of the tie shall be on the

approximate center line of the track. The top surface of ties shall provide full bearing for the tie plates. Adzing of wood ties shall be restricted to that necessary to provide a sound true bearing for the tie plate. Adzing in excess of 0.2 inch will not be permitted. Where adzing is necessary, the cut surface of the wood tie shall be completely saturated with creosote or other approved preservatives.

C. Steel Ties.

Ties will be unloaded and handled in such a manner as to not damage ties. Standard center-to-center spacing of ties shall be 24 inch in tangent track and 22 inch in horizontal curves. Tie spacing within the limits of the crossing panels shall be per crossing panel manufacturer recommendations. Ties shall be laid perpendicular to the center line of the track. The top surface of ties shall provide full bearing for the tie plates.

D. Tie Plates.

Track shall be fully plated with double-shouldered tie plates set in position with cant surface sloping toward the center of the track. Tie plates shall be free of dirt and other foreign material when installed. Tie plates shall be placed so that the rails will have full bearing on the plate, and the plate will have full bearing on the tie. Tie plates shall be set at right angles to the rail with the outside shoulder against the base of the rail, and centered on the tie. Tie plates shall be applied at the time the rail is laid to avoid unnecessary spiking.

E. Rail.

The base of the rail and the surface of the tie and tie plate shall be free of dirt and other foreign materials prior to laying rail. Rail shall be laid without bumping or striking, to standard gauge (4 feet 8 1/2 inches between points 5/8 inch below the top of the rail). A track gauge manufactured for the purpose of measuring gauge shall be used rather than a tape measure and gauge shall be checked every third tie.

Any joints shall be assembled prior to fastening rail to ties using joint bars with full number of track bolts and spring washer for each bolt. Loose mill scale and rust shall be removed from rail contact surfaces and joint bars prior to installation.

Continuous welded rail (CWR) will need to be distressed as soon as possible after laying per BNSF "Procedures for the Installation, Adjustment, Maintenance, and Inspection of CWR in Industry Tracks." All welds shall be installed by an individual qualified by the manufacturer of the weld kit and have documentation to support such qualification. All welds must conform at a minimum to the latest addition of the AREMA Manual.

Rails shall be cut square and clean by means of a rail saw. Holes for complete bolting of cut rails shall be drilled and under no circumstances shall new holes be drilled between two holes already drilled. Cutting rails or drilling holes in cut rails by means of acetylene or electric torch will not be permitted.

F. Fastenings.

1. Joints.

Joints shall be installed at connection to existing jointed rail. Jointed rail shall be laid with staggered joints located as nearly as possible to the middle of the opposite rail. Bolted joints will not be permitted within 20 feet of the crossing panels. Rails of miscellaneous lengths shall be used at suitable intervals for maintaining the proper stagger of joints in curves. Rails of less than 15 feet in length shall not be used except for temporary closures.

Allowance for expansion shall be provided at rail joints by using rail-expansion shims of softwood not over 1 inch width. Shims shall be of the thickness shown in TABLE I. The

temperature of the rail shall be determined by use of a thermometer placed on the rail base on the side away from the sun. Typical rail gap gauges are as shown.

TABLE I. SHIM THICKNESS

Rail Temperature (°F)	Shim Thickness per 39 foot rail length (inch)
Below 25	1/4
25 to 50	3/16
51 to 75	1/8
76 to 100	1/16
Over 100	None

Rails shall be laid to ensure good alignment and the rail ends shall be brought squarely together against the expansion shims and shall be bolted before spiking.

Joint bars shall be clean. Rail joints shall be installed so that bars are not cocked between the base and head of the rail. Bars shall be properly seated in the rail and the full number of correct-size bolts, nuts, and spring washers installed. Bolts shall be placed with nuts alternately on inside and outside of rail. A corrosion resistant lubricant shall be applied to the bolt threads prior to application of nuts. Bolts shall be tightened to an initial bolt tension of between 20,000 and 30,000 pounds, beginning at the center of the joint and working both ways to the ends of the joint.

2. Continuously Welded Rail.

Continuously Welded Rail shall be installed per the current BNSF Procedures for the Installation, Adjustment, Maintenance, and Inspection of CWR in Industry Tracks.

3. Track Spikes.

Rail shall be spiked promptly after being laid. The right-hand rail going away from the switch points or the outside rail on curves shall first be spiked in position in its proper relation to the lined end of ties. The opposite rail shall then be spiked to true gauge (4 feet 8 1/2 inches). Track shall be laid to standard gauge on tangents and curves of less than 6 degrees; track shall be laid to a gauge of 4 feet 8 3/4 inches on curves 6 degrees or greater. In no case shall gauge less than 4 feet 8 1/2 inches be allowed. Rail shall not be struck with maul or heavy tool when spiking, gaging, or lining.

Track shall be spiked in accordance with the IAIS Typical Specifications & Criteria for Construction of Industrial Tracks. Spikes shall be started vertically and square and be driven straight with full bearing against the base of the rail. Straightening with maul of spikes started crooked shall not be permitted. Spikes started crooked shall be pulled, the holes plugged, and spikes re-driven. Spikes shall not be driven against the ends of joint bars. Immediately after completion of track surfacing, spikes shall be settled in place with the underside of the head of the spike contacting the top of the base with a minimum of pressure.

If spikes are withdrawn from wood ties, the holes shall be swabbed with creosote and plugged with creosoted tie plugs of proper size to fit the hole. If spikes are withdrawn and spikes are to be reinserted in existing spike holes, the holes shall be swabbed with creosote and plugged with creosoted tie plugs prior to re-driving the spike. Tie plugs shall not be installed in pre-bored holes unless spikes have been driven and withdrawn.

4. Rail Anchors.

Rail anchors shall be utilized for track constructed without elastic fasteners. Rail anchors shall be applied out-of-face along each rail, directly across from each other on the same tie. Box anchor every other tie in standard track construction and every tie in turnouts and at road crossings. Rail anchors shall grip the base of the rail firmly and shall have full bearing against the face of the tie. Rail anchors shall not be moved by driving them along the rail. Rail shall be anchored immediately after spiking and before rail has experienced a large temperature change.

G. Ballast.

The track, after being aligned, shall be brought to grade and surface in lifts not exceeding 4 inches. After each lift, the ballast shall be tamped. When using jacks, they shall be placed close enough together to prevent undue bending of the rail or stress of rail and joint. Both rails shall be raised at one time and as uniformly as possible, except where superelevation is required. Superelevation shall be obtained by raising the outside rail of the curve; the inside rail shall be maintained at grade.

Every tie in the track shall receive two or more full insertions of the tamping heads. Ballast shall be power-tamped under both sides of ties from each end to 15 inches inside each rail. The center shall be filled with ballast, but tamping will not be permitted in the center of the tie between the above stated limits. Both ends of the ties shall be tamped simultaneously and tamping inside and outside of the rail shall be done at the same time. Tamping tools shall not be used with more than 35% wear and shall be worked opposite each other on the same tie. All ties shall be tamped to provide solid bearing against the base of the rail after the track or turnout is raised to grade at final surfacing. All down ties shall be brought up to the base of rail and shall be machine tamped. The resultant track surface and alignment shall be uniform and smooth. Tamping of track in snow or frozen ballast conditions will not be permitted.

For road crossings, tamping of ballast materials shall be performed by setting the tamping force and insertion depth to the minimum necessary to adequately tamp the track. The tamper operator shall monitor the depth of tamping and limit the depth to prevent detrimental effects of the tamper feet on the HMA underlayment.

The ballast between the ties shall be thoroughly compacted with a vibratory compactor, or other approved means, after each raise. The ballast shall be tamped for the entire length of the crossties for the crossing. The track shall receive final alignment and surfacing prior to placement of the crossing surface. The ballast in the cribs and on the shoulders shall be compacted using a vibratory plate compactor or other approved means.

Ballast for steel tie track shall be tamped per steel tie manufacturer recommendations. Tamping tool depths shall be adjusted to the appropriate depth for the type of tie being tamped.

H. Railroad Crossings.

Concrete crossing panels shall be installed per manufacturer recommendations.

I. Turnouts.

Turnouts shall be fabricated and installed to IAIS standards for wood tie turnouts and per manufacturer recommendations for steel tie turnouts.

J. Derails.

Derails shall be fabricated and installed per manufacturer recommendations,

K. End of Track Bumpers.

End of Track Bumpers shall be fabricated and installed per manufacturer recommendations.

L. Crossing Diamonds.

Crossing diamonds shall be fabricated and installed per manufacturer recommendations.

M. Track Resurfacing.

Existing track shall have ties replaced per the percentage listed in the plans and surfaced with new ballast to the proposed track alignment and profile. Additional track spikes shall be required as necessary to keep existing ties attached to the existing track during the surfacing operation.

N. Removal of Railroad Track.

The former track zone shall be shaped to drain and allow a wheeled vehicle to drive the grade at 20 mph. All materials including the rails, ties, tie plates, ballast, fasteners, and other associated track materials shall become the property of the contractor and shall be removed from the project and properly and legally disposed of off the property of the owner.

O. Remove Turnout.

The turnout refers to all track materials including the ballast within the limits of the switch ties, switch ties, rail, switch points, frog, guard rails, switch stand, tie plates, fastenings, and other associated materials. The former turnout zone shall be graded as directed by the Engineer. All turnout materials shall become the property of the contractor be removed from the project and be properly and legally disposed of off the property of the owner.

P. Rail Remove and Reinstall.

Track to be removed and reinstalled shall be disassembled in such a way as to minimize damage to the existing track components, stockpiled and protected from damage while stockpiled, and reinstalled at proposed alignment and grade. Contractor shall be responsible for replacement of any track components damaged during disassembly, stockpiling, and reassembly. At contractor's option the existing track can be removed and salvaged and new track constructed.

120321.04 METHOD OF MEASUREMENT.**A. Rail.**

Track linear feet installed measured along the centerline of track for each rail weight and tie type.

B. Railroad Ballast.

Per ton for each ballast gradation, satisfactorily placed.

C. Railroad Crossing.

Per track linear feet of installed crossing measured along the centerline of track for each rail weight and tie type.

D. Turnout.

Per each installed turnout for each size, rail weight, and tie type.

E. Derail.

Per each installed derail.

F. End of Track Bumper.

Per each installed bumper.

G. Crossing Diamond.

Per each installed crossing diamond.

H. Track Resurfacing.

Track linear feet adjusted measured along the centerline of track.

I. Removal of Turnout.

Per each turnout removed.

J. Removal of Railroad Track.

Per track linear feet removed measured along the centerline of track.

K. Rail Remove and Reinstall.

Per track linear feet removed, stockpiled, and reinstalled at proposed alignment and grade measured along the centerline of the proposed track.

120321.05 BASIS OF PAYMENT.

A. Rail.

Payment is full compensation for furnishing and installing rail, ties, fasteners, joint bars, welding, and incidental items and accessories.

B. Railroad Ballast.

Payment is full compensation for furnishing, installing and tamping of ballast.

C. Railroad Crossing.

Payment is full compensation for furnishing and installing concrete railroad crossing panels.

D. Turnout.

Payment is full compensation for assembly and installation of turnout, including rail, ties, fasteners, joint bars, welding, and all accessories and equipment.

E. Derail.

Payment is full compensation for assembly and installation of derail, including all accessories and equipment.

F. End of Track Bumper.

Payment is full compensation for assembly and installation of end of track bumper, including all accessories and equipment.

G. Crossing Diamond.

Payment is full compensation for assembly and installation of diamond, including rail, ties, fasteners, joint bars, welding, and all accessories and equipment.

H. Track Resurfacing.

Payment is full compensation for tie replacement, additional tie spiking, and adjustment of existing track to proposed alignment and profile.

I. Removal of Turnout.

Payment is full compensation for removal and disposal of all turnout components.

J. Removal of Railroad Track.

Payment is full compensation for removal and disposal of all track components.

K. Rail Remove and Reinstall.

Payment is full compensation for disassembly, stockpiling, and reassembly of existing track including replacement of any damaged or worn track components.