

REMOVE AND RESET CONTINUOUS WELDED RAIL

****From New Haven RREW001B**

- xx. DESCRIPTION. This work shall consist of removing and resetting existing continuous welded rail (CWR) as shown on the Plans and as directed by the Engineer. The work shall include furnishing all labor, materials, and equipment for removing and resetting the existing CWR, including but not limited to re-installing existing rail anchors and tie plates. The Contractor shall supply new track spikes and rail anchors if the existing hardware is not suitable for re-installation.

The work shall also consist of surfacing and aligning track beyond the limits of rail removal and resetting as necessary to achieve adequate superelevation and profile, as determined by the Engineer in coordination with the Railroad. The Contractor shall supply new steel shim plates as necessary to achieve adequate superelevation and profile.

- xx. GENERAL REQUIREMENTS. Upon completion of the removing and resetting of rail, the roadbed shall be left level and free of any depressions or irregularity which will create a safety hazard or prevent proper drainage.

The Contractor shall remove from the railway company's property all rubbish and waste from the work and dispose of it as directed by the Engineer. After completing the work, the Contractor shall remove from the railway company's property, and from all public and privately owned property, at the Contractor's expense, all temporary structures and waste resulting from the Contractor's operations.

- xx. MATERIALS. Unless otherwise specified, all new materials shall conform to the requirements of the AREMA Manual as follows:

- (a) Tie plates shall meet the requirements of Chapter 5, Part 1 "Tie Plates".
- (b) Track spikes shall meet the requirements of Chapter 5 Track, Part 2 "Track Spikes". The Contractor shall supply all new track spikes of the same size as the existing if the existing hardware is not suitable for re-installation.
- (c) Rail anchors shall meet the requirements of Chapter 5 - Track, Part 7 "Rail Anchors". The Contractor shall supply all new rail anchors of the same type as the existing if the existing hardware is not suitable for re-installation. Use of a type different from the existing is acceptable if approved by the Railroad.
- (d) Shim plates for use under tie plates shall be ASTM A36 or ASTM A709 Grade 36 steel, and shall have the same plan area and spike hole configuration as the tie plates.

- xx. CONSTRUCTION REQUIREMENTS.

- (a) Track construction shall meet the requirements of Chapter 5, Sections 4 and 5 of the AREMA Manual.

- (b) Track shall be raised and ballast shall be installed and tamped in the cribs and shoulders as required to align the track to the existing profile.
- (c) As directed by the Engineer, defective track spikes, rail anchors, tie plates, and shim plates shall be removed and replaced. No additional compensation for installation of new materials will be paid.
- (d) Existing rail shall be removed within the limits shown on the Plans and stockpiled and protected from damage due to construction operations.
- (e) All track hardware removed that will not be reset, and any waste material, shall become the property of the Contractor and shall be removed from the site at the Contractor's expense.
- (f) The track shall be re-tamped after rail has been installed and rail has been back in service for 4 or 5 days. The track shall be monitored for an additional 30 days and, if necessary as directed by the Engineer, re-tamped.
- (g) Spiking Requirements. Rail holding spikes shall be started with the head pointed toward the rail and driven vertically and square with the rail, and so driven as to allow 1/8 to 3/16 inch in the space between the underside of the head of the spike and the top of the base of the rail. Alternating holes shall be used for rail holding spikes. Spikes shall not be overdriven. Rail holding spiking arrangement shall be in accordance with the Tie Spiking Table below and the existing layout.

Plate holding spikes shall be started with the head pointed toward the rail and driven vertically so the head has full bearing against the tie plate. Plate holding spiking arrangements shall be in accordance with the Tie Spiking Table below and the existing layout.

TIE SPIKING TABLE

Degree of Curve	Tie Spiking Arrangement
0°-00' to 3°-00'	2 Rail Holding and 1 Plate Holding Field Side
3°-01' to 8°-00'	2 Rail Holding and 2 Plate Holding - 1 Field Side and 1 Gage
8°-01' to 12°-30'	3 Rail Holding and 2 Plate Holding - 1 Field and 1 Gage Side

Gaging shall be done at every fourth tie and shall match the existing. Gage shall be measured 5/8 inch below the top of rail and at right angles (or radial on curves) to the inside faces of the running rails.

- (h) Adjusting CWR. When being laid, CWR must be installed at, or adjusted for, a rail temperature as directed by the Engineer. A rail thermometer shall be used to ascertain the temperature of the rail on the rail base close to the web, on the side away from the sun. CWR shall be adjusted or anchored at rail temperature between 95 and 110°F.

Where CWR has been anchored at a rail temperature below 95°F it should be adjusted as soon as conditions permit the rail to be properly anchored.

Tie plates on a wood crosstie track may be tapped with a sledgehammer or an approved mechanical device to free the rail. Do not attempt to vibrate rail by striking it with hammers or other hand tools.

Uniformity of expansion is to be controlled by marking each quarter of the string introducing expansion as follows:

- (1) $\frac{1}{4}$ point - $\frac{1}{4}$ of total required expansion
- (2) $\frac{1}{2}$ point - $\frac{1}{2}$ of total required expansion
- (3) $\frac{3}{4}$ point - $\frac{3}{4}$ of total required expansion

Quarter points should be marked with a continuous line from the base of the rail to the tie plate so the amount of expansion can be accurately determined. The reference point shall be one that will not move as rail expands.

CWR should be heated so that expansion is introduced from one end of each string to the other. Heat should be steadily applied while moving forward until the required expansion has been obtained at the end of the string.

In the event any quarter point does not have the required expansion, the rail heater shall be back over that portion (without applying heat), and then the rail reheated until the necessary expansion is obtained.

As adjusting is progressed, a minimum of four ties should be box anchored per 39' of rail to prevent the rail from losing adjustment.

At the end of the completely expanded string, a minimum of 20 ties should be box anchored after the gap is closed to hold the expansion.

The number of inches by which a segment of CWR should be adjusted for temperature between 95 and 110°F may be calculated by taking the difference between the actual rail temperature at that time of adjustment and that desired rail temperature, multiplying that difference in degrees Fahrenheit by the length of the CWR string in feet, and multiplying by 0.000078.

It is important to maintain the desired neutral temperature of CWR so that the track remains stable.

The Contractor installing the CWR shall be responsible for recording the rail temperature at which each CWR string is anchored for all CWR laid or adjusted. The Contractor shall forward this information to the Engineer and retain a copy.

At the new rail limits, as indicated on the Contract Plans, the rail ends shall be square saw cut with space allowance for expansion being provided between rail ends.

- (i) Rail Anchoring. Sufficient ballast shall be placed in the crib area prior to temperature adjustments and application of anchors. CWR strings are to be adjusted or anchored at a rail temperature of 95 to 110°F.

A standard rail thermometer shall be used to ascertain the temperature of all CWR before it is laid in track. The thermometer shall be placed on the rail base close to the web on the side away from the sun and left long enough to determine the temperature accurately.

Rail anchors shall be applied to CWR strings after rail has been adjusted for temperature. Anchors shall be installed so that they bear firmly against the tie face. Sufficient ballast in the crib area must be in place to provide restraint for temperature stress.

The rail anchoring operation will be no more than 100' behind the rail heater.

- (j) Welding of Rail. Welding of CWR shall be by Thermite Welding or In Track Electric Flash Butt Welding.

Electric Flash Butt Welding shall meet the requirements of the specification entitled: Chapter 4, Section 3.10 General Specification for In Track Rail Welding Using Electric Flash Butt (EBF) Welding, and Section 3.11 Specification for the Quality Assurance of Electric Flash Butt Welding of Rail, AREMA Manual - current edition.

Thermite Welding shall meet the requirements of the specification entitled: Chapter 4, Section 3.14 Specification for the Quality Assurance of Thermite Welding of Rail, AREMA Manual - current edition.

Field welds shall be used to connect continuous welded rail strings.

Rail end cuts made to perform thermite welding shall be made with rail saw or abrasive saw. Torch cuts will not be permitted and will be rejected. No bolt holes shall be within 6 inches of the rail end. Thermite welds shall be located at least four inches from a tie plate. If necessary, ties shall be spaced to provide this clearance prior to the welds being made.

Excessive rail grinding of the weld that causes a depression on the head and/or gage face of the rail after a weld is completed will not be accepted. Re-welds shall be cut out beyond the heat affected zone of the previous weld.

Welds shall be visually inspected for obvious defects, such as any incomplete portion or inclusions, the existence of which will cause the weld to be rejected and replaced. When a plug rail is

used to replace a defective weld, the plug rail shall be a minimum of 14 feet.

Any welds of rail found to be defective as determined by the Engineer shall be removed from the track and replaced by an appropriate plug, and be re-welded at no cost to the Owner.

The Contractor shall prepare a record for each weld completed as directed by the Engineer. The record shall contain the following:

- (1) Location of weld.
- (2) Sequence number of weld.
- (3) Rail end gap noted during the process.
- (4) Weather conditions.
- (5) Rail and air temperature.
- (6) Name of Welder and Supervisor.
- (7) Any irregularities noted.

Originals of the weld records shall be submitted to the Engineer.

Making Thermite Welds in rainy weather should be avoided wherever possible. If this is not possible:

- (1) All precautions shall be taken to ensure the weld is protected from the rain, including use of umbrellas or tarps. Thermite welds shall not be made in blowing rain.
- (2) All precautions shall be made to ensure that the weld is protected from the large temperature drop that rainfall can cause. The rails shall be positively anchored against movement.

Thermite Welds shall be made no closer than 10 feet from any existing weld in the same rail or as directed by the Engineer.

Thermite Welds will not be made opposite any weld (in the same crib) in the opposite rail. Thermite welds shall be staggered 4 ties from any weld in the opposite rail or as directed by the Engineer.

All Thermite Welds shall be ground before the heat leaves the weld. Do not re-introduce heat into the sides of the weld where it will be ground.

All welds shall be certified by an approved testing method as directed by the Engineer.

Upon completion, the Contractor shall remove all waste materials produced from the welding procedure.

The Contractor shall be responsible for the integrity of all welds made for a minimum of two years from the date the track is put back in service for train traffic.

- xx. METHOD OF MEASUREMENT. The quantity of Special Provision (Remove and Reset Continuous Welded Rail) to be measured for payment will be the number of meters (linear feet) of rail removed, reset, and realigned within the limits shown on the Plans and as directed by the Engineer in the complete and accepted work.
- xx. BASIS OF PAYMENT. The accepted quantity of Special Provision (Remove and Reset Continuous Welded Rail) will be paid for at the Contract unit price per meter (linear foot). Payment will be full compensation for supplying new rail hardware as required including tie plates, spikes, and other miscellaneous materials; removing, handling, and resetting rails and rail hardware; gaging and welding rail; realigning and tamping track; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

The Contractor shall submit all appropriate documentation supporting the removal and resetting of CWR, including Thermite Welds and/or Electric Flash Butt Welds, and heat adjustments to the Engineer prior to payment. Payment will be considered incidental to Special Provision (Remove and Reset Continuous Welded Rail).

Surfacing and aligning of track to provide adequate superelevation and profile beyond the limits of removing and resetting rail shown on the Plans will not be paid separately but will be considered incidental to Special Provision (Remove and Reset Continuous Welded Rail).

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.640 Special Provision (Remove and Reset Continuous Welded Rail)	Meter (Linear Foot)