

## Ultrasonic Test (UT) of Rail Welds

All thermite rail welds installed as part of the project shall be hand tested ultrasonically for defects or inclusions before track is placed into service. Prior to ultrasonic inspection, each weld will be ground to a finish that eliminates grooves, heavy facets, or debris that could interfere with hand test operation. All test surfaces will be free of debris, scale, grease and heavy rust, which may inhibit inspection.

The operator in charge of the testing crew shall have a minimum of American Society of Nondestructive Testing (ASNT) Level II training and experience. Documentation of each qualified operator's certification and a proposed written procedure for testing will be provided to Railroad for approval. The written procedure shall be prepared and the approved testing program shall be administered by a certified ASNT Level III or comparable individual. The written procedure shall describe the program for the control and administration of the testing personnel training, examination and certification. Qualifications shall be specific to the equipment and method used. The Railroad reserves the right to disqualify an operator from testing on Railroad property because of previous experience with operator's performance or operator's ability without further explanation. Any exceptions to these rail testing qualifications shall be pre-approved in writing by the Railroad.

Functionality of the UT hand testing instrumentation shall be checked, and the equipment shall be calibrated and normalized by use of a calibration standard at the beginning and end of the daily testing operation, after inactivity or delay if practical, and any time when a malfunction is suspected. If any malfunction is discovered, all material shall be reexamined to the previous valid calibration and normalization.

Each weld will be hand tested with each of the following transducer angles: 70 degree, 37.5 or 45 degree, and 0 degree.

The 70 degree (+/-) sound envelope hand test transducer, full railhead coverage (gage, center and field) shall be capable of detecting transverse flaws, with calibration and detection minimums of a 1/32 inch flat bottom hole.

The 37.5 (+/-) degree or 45 (+/-) degree transducer will inspect fillet, web and base of rail with calibration and detection minimums of a 1/32-inch flat bottom hole.

The 0 degree transducer will inspect the head, web and base. Detection capabilities for web, head web flaw minimums 1/32 inch. In addition to detection of transverse or horizontal flaws from top of rail, the 0 degree transducer will be employed to inspect the head from side of the rail, at 90 degrees to vertical, for vertical split head separations. 0-degree detection minimums shall be 1/32-inch flat bottom hole.

All testing shall be performed by personnel qualified and certified in accord with the approved written procedure. The testing operator will locate and mark defects found according to Railroad specifications and accuracy requirements. Each defective weld shall be marked with a highly visible marking on both sides of the rail web and base. The Railroad also reserves the right to independently re-test suspect welds at the Contractor's expense.

Welds with single 1/16 inch or greater reflective surface shall be rejected. Welds with three or more 1/32 inch reflective surfaces within range of transducer scan shall be rejected also. Defective welds will be reported and subsequently repaired at Railroad's direction.

The Railroad will be provided all test records following the UT inspection. The Contractor shall certify all test records and maintain a copy of all test records for a minimum of four years following the test.