

THE AMERICAN RAILWAY ENGINEERING AND MAINTENANCE OF WAY
ASSOCIATION

Committee: 4 (Rail), **Subcommittee:** 2 (Rolling of Rail)

Letter Ballot Number:

Assignment: None

Explanation of Ballot:

This ballot proposes the removal of subsection 2.1.17.1 End Hardening from Section 2.1.17 Supplementary Requirements.

Reason: End Hardening of rails is no longer a recommended practice.

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2.1.17 SUPPLEMENTARY REQUIREMENTS ~~(1988)~~ (2022)

The following supplementary requirements shall apply only when specified by the purchaser in the inquiry, order, and contract.

2.1.17.1 End Hardening

~~The drilled ends may be specified to be end hardened. When so specified, end hardening and chamfering shall be in accordance with paragraph a through paragraph g.~~

- ~~a. End hardened rails may be hot stamped with letters "CH" in the web of the rail ahead of the heat number.~~
- ~~b. Water shall not be used as a quenching medium except in oil water or polymer water emulsion process approved by the purchaser.~~
- ~~c. Longitudinal and transverse sections showing the typical distribution of the hardness pattern produced by any proposed process shall, upon request of purchaser, be submitted for approval before production on the contract is started.~~
- ~~d. The heat affected zone defined as the region in which the hardness is above that of the parent metal shall cover the full width of the rail head and extend longitudinally a minimum of 12 inches from the end of the rail. The effective hardness zone 2 inch from the end of the rail shall be at least 3 inch deep.~~
- ~~e. The hardness measured at a spot on the center line of the head 3 inch to 2 inch from the end of the rail shall show a Brinell hardness number range of 341 to 401 when decarburized surface has been removed. A report of hardness determination representing the product shall be given to the purchaser or his representative.~~
- ~~f. The manufacturer reserves the right to retreat any rails which fail to meet the required Brinell hardness number range.~~
- ~~g. Chamfering rail ends shall be done in such a manner as will avoid formation of grinding cracks.~~

~~2.1.17.2~~ 2.1.17.1 Manual Ultrasonic Testing

- a. The rail may be specified by the purchaser to be ultrasonically tested for internal imperfections subject to the provisions of [paragraph b](#).
- b. Manual Ultrasonic Test of Web at the Rail Ends for Weld Plant Application.
 - (1) Manual End testing shall be performed using standard ultrasonic testing equipment acceptable to the purchaser and manufacturer.
 - (2) The search unit shall be a standard dual element crystal or similar transducer acceptable to the purchaser and manufacturer.
 - (3) The calibration test block shall be of the following characteristics: Material 4340 AISI Steel/Nickel plated, manufactured in accordance with ASTM E428. As an alternate, reference standards may be fabricated from a section of rail as agreed upon between the purchaser and manufacturer.
 - (4) Dimensions of the calibration test block and calibration references shall be agreed upon by the purchaser and manufacturer. (For calibration reference the recommended thickness of the block

should approximate the thickness of the rail web and contain a 1/16 inch flat bottom hole drilled to one-half the thickness.)

- (5) Calibration of the instrument shall be performed before the commencement of testing, every 100 rail ends thereafter, and after any test delay exceeding 30 minutes.
- (6) When the search unit is coupled to the calibration test block, the indication height from the calibration reference shall serve as a reference level for the test. (Recommended reference levels should appear from 40% to 80% of the maximum height on the display graticule.)
- (7) Couplant shall be distributed over the entire web area at least 12 inches from the end of the rail and the search unit moved over the entire area in vertical and/or horizontal sweeps.
- (8) An indication equal to or exceeding the reference level shall be cause for rejection.
- (9) Rejected rails may be cut back to sound metal as indicated by the ultrasonic testing, subject to the length restrictions in [Paragraph 2.1.11](#).

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