

MANUAL ULTRASONIC TESTING OF ROUND ROLLED STEEL BLOOMS

Prepared By	Reviewed & Approved By
R.PARAMESHWARAN MANAGER / NDT LEVEL II	R.J.PARDIKAR AGM / NDT Sr. LEVEL III

EFFECTIVE FROM 09-08-2008

- 1.0 SCOPE:
- 1.1 This procedure deals with the ultrasonic testing of Round Rolled Steel blooms by contact pulse-echo method .
- 2.0 REFERENCE
- 2.1 ASME Section V Article 5
- 2.2 ASTM A 388
- 3.0 PERSONNEL QUALIFICATION:
- 3.1 Personnel performing examinations shall be qualified in accordance with NDE 01 to at least one of the following levels.
- | | |
|------------------------------|-----------------|
| 1) Operator | Minimum Level-1 |
| 2) Evaluation / Report issue | Level-II |
- 4.0 EQUIPMENT and SEARCH UNIT
- 4.1 The examination shall be done with an ultrasonic pulse echo system generating frequencies of 1 MHz to 5 MHz and equipped with a stepped gain control of 2 dB.
- 4.2 Contact testing with manual scanning shall be done with 2 MHz frequency using longitudinal wave Straight beam probe with a crystal size of 20 to 25mm and 35 degree shear wave with crystal dimension 8x9 mm.
- 5.0 COUPLANT
- 5.1 Oil or Oil and grease mix shall be used as couplant.
- 6.0 SURFACE PREPARATION
- 6.1 The testing can be carried out on the Blooms as drawn condition . The surface shall be free from scales and deep pits and other foreign materials that may interfere with interpretation of test results.
- 7.0 EQUIPMENT CALIBRATION
- 7.1 The Screen height linearity and amplitude control linearity shall be performed in accordance with ASME Sec V Article 4 Appendix I, at the beginning of each period of extended use or every 3 months whichever is less.
- 8.0 PROCEDURE
- 8.1 CALIBRATION REFLECTORS
- 8.1.1 STRAIGHT BEAM TESTING

8.1.1.1 For Calibration purpose the mid portion of the bloom shall be taken .

8.1.1.2 The calibration reflector shall be the first back wall echo from the opposite side of a sound area of the bloom.

8.1.1.3 The gain shall be adjusted to get the back wall reflection to 80% of the FSH and this is taken as reference echo (RE)

8.1.2. ANGLE BEAM TESTING

8.1.2.1 For Angle beam, reference block with same curvature and material shall be used with side drilled hole of diameter 2.0 mm at 50 mm depth and the gain shall be adjusted to get a height of 80% of FSH and taken as Reference echo(RE)

8.2 SCANNING

8.2.1 The scanning shall be performed at a gain setting +6dB of the Reference echo(RE).

8.2.2 During inspection, the entire bloom shall be scanned circumferentially through 360 degree.

8.2.3 During inspection, areas showing complete loss of back reflection shall be rechecked to determine whether the loss of back reflection is due to poor coupling and contact.

8.2.5 The rate of probe movement for examination shall be less than 150 mm/sec.

8.2.6 Minimum 10% overlap between successive scanning shall be maintained.

8.3 CALIBRATION CHECK

8.3.1 When any part of the examination system is changed, a calibration check shall be made on the basic reflector at the finish of each examination, every 4 hours during the examination and when examination personnel are changed.

9.0 ACCEPTANCE STANDARD

9.1 Ultrasonic acceptance or rejection criteria for blooms shall be on a realistic appraisal of the end use.

9.2 Any signal greater than 20% of the FSH in the chill depth area shall be identified as defective in normal and angle beam.

9.3.1 For normal beam Central portion being an area of segregation, the defect echo shall be permitted up to 50% of FSH.
