



QUALITY CONTROL - IRAQ

Revision: 01
Effective: 20.July.2020

WORK INSTRUCTION

QC UFD/2015/01

ULTRASONIC FLAW DETECTION INSPECTION PROCEDURE

Record of Amendments

The following is a brief summary of the most recent revisions to this document.

Date	Revision No.	Amended By	Description of Changes
01 Mar 2015	00	Quality Control	Initial Issue.
20 July 2020	01	Quality Control	Update Edition SNT TC 1A 2001 to SNT TC 1A 2016



Checked by: Ahmed Mohamed Abd Al Kader
Operations Manager

Approved by: Syed Muhammad
General Manager



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1.0 SCOPE

- 0.1 This procedure describes the requirements for ultrasonic examination of full penetration welds of wrought ferrite materials.
- 0.2 The principal objective of this procedure describes the detection, location and evaluation of discontinuities within the weld, heat affected zone and adjacent base material. All welds shall be examined by angle beam method from both the sides of weld from a single surface or combination or surfaces so that volume of the weld is covered.

2.0 INSPECTION APPARATUS

2.1 Ultrasonic flaw detector: pulse echo with A-scan presentation type apparatus. The system shall have a minimum capability for operating frequency from 0.5 to 10 MHZ. company will use flaw Detector USM 35 X of USN 52, EEC DS-322 or similar flaw detectors.

2.1.1 The instrument performance shall be verified in accordance with ASTM E 317.

2.2 Search units.

2.2.1 Straight beam probe with nominal test frequency of 4 Mhz and size 10-25 mm diameter probes shall be used. Company shall use DA 301, MSEB 4 probes or similar probes.

2.2.2 Angle beam probe: shall have nominal element size 10 to 13 mm with frequency 2 to 4 Mhz and angle 45°-70° shall be used. Company shall use MWB 45-4E, MWB 60-4E and MWB 70-4E or similar probes.

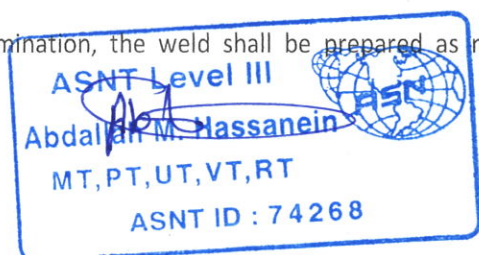
2.3 Calibration Block: IIW Block V1 or V2 and ASME basic calibration block shall be used.

2.4 Couplant: machine oil SAE 20 or water paste or yellow grease.

3.0 PRE PROCESS ACTIVITIES

3.1 Base Metal: the base metal on each side of weld shall be free of weld spatter, surface irregularities or foreign matter that might interfere with the examination.

3.2 Weld Metal: Where the weld surface interfere with the examination, the weld shall be prepared as needed to permit the examination.





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4.0 STRAIGHT BEAM METHOD

- 4.1 Sweep range normal probe calibration shall be performed by using V1 or V2 block by using its flat surface.
- 4.2 The scanning of adjacent base material shall be performed to detect reflectors that might affect interpretation of angle beam indications.
- 4.3 Conduct the general scanning with an instrument adjustment that will produce a first reflection from the opposite side of the sound area of the plate of 75% of F.S.H.
- 4.4 Location and areas of discontinuities and area where considerable reduction of back wall echoes shall be recorded.

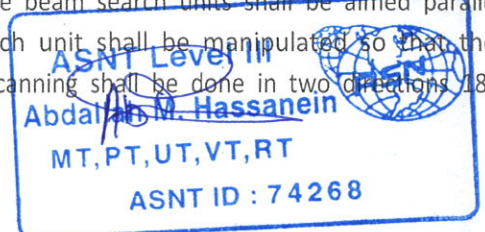
5.0 ANGLE BEAM METHOD:

- 5.1 An angle shall be selected as appropriate for the configuration being examined.
- 5.2 Sweep range angle probe calibration shall be performed by using V1 or V2 block. The range shall be at least 1 ½ beam path distance.
- 5.3 The sensitivity shall be established using the reflection indication from the side drill hole of calibration block.
 - 5.3.1 Position the search unit for maximum response from the side drill hole which gives the highest amplitude.
 - 5.3.2 Adjust the dB control to provide indication at 80% of F.S.H. Mark the peak of the indication on the screen.
 - 5.3.3 Position the search unit for the maximum response from 1/2T and 3/4T hole and mark the peak of indication on the screen.
 - 5.3.4 Connect the screen mark to provide a distance amplitude correction curve (DAC)

6.0 ANGLE BEAM SCANNING

- 6.1 Scanning for reflections oriented parallel to the weld: the beam shall be directed approximately at right angles to the weld axis from two directions wherever possible, the search unit shall be manipulated so that the ultrasonic waves passes through the required volumes of the weld and adjacent base metal. The scanning shall be performed at a gain setting of at least 6 dB more than the primary reference level, Evaluation shall be performed with respect to the primary reference level plus the transfer correction.

- 6.2 Scanning for reflections oriented transverse to the weld: the angle beam search units shall be aimed parallel to the axis of longitudinal and circumferential weld. The search unit shall be manipulated so that the ultrasonic beam passes through all of the examination volume. Scanning shall be done in two directions 180° to each other to the extent possible.





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7.0 EVALUATION

Any imperfection that ensures an indication in excess of 20% of DAC shall be investigated to the extent that it can be evaluated in terms of acceptance or rejection standard.

8.0 ACCEPTANCE/REJECTION CRITERIA

Discontinuities are unacceptable if the amplitude exceeds the reference level and discontinuities whose dimensions exceed those specified in the relevant code.

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