



## QUALITY CONTROL - IRAQ

Revision: 01  
Effective: 20.July.2020

### WORK INSTRUCTION

QC UT/2015/01

#### ULTRASONIC THICKNESS GAUGING 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 |
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**WORK INSTRUCTION****QC UT/2015/01****ULTRASONIC THICKNESS GAUGING INSPECTION PROCEDURE****1.0 SCOPE**

This practice provides guidelines for measuring the thickness of material using contact pulse -echo compression wave method.

- 1.1 This procedure is applicable to any material in which ultrasonic wave will propagate at constant velocity through the part and from which back reflection can be obtained and resolved to determine wall thickness.

**2.0 INSPECTION APPARATUS**

- 2.1 Ultrasonic thickness gauging instrument may be direct thickness read out or digital thickness readout with "A" scan presentation or flaw detector with CRT and direct thickness readout. The company uses Stresstel "T" Mike and Pocket Mike, Krautkramer OMDL, DM4, DMS-2, DME. DL, USM 35X, Panametrics MG-2-XT or similar equipment shall be used.
- 2.2 The search unit shall be Dual crystal probe. Any transducer worn to a degree that is visible under its face when placed on the reference standard shall be made flush or replaced.
- 2.3 Linearity calibration: the instrument shall be calibrated for linearity over an interval of 0.100 inch to 2.0 inches after any repair of the instrument or at least 1 years .
- 2.4 The same type of couplant shall be used for both calibration and gauging.
- 2.5 Range Calibration: the reference shall be the same material of the object to be gauged and shall have two thicknesses that meet the following requirements.

Thick section=nominal wall + 0.100 inches

Thick Section=70% of nominal wall-0.100 inches

- 2.6 For flaw detector, multiple wall echoes shall be used for calibration.





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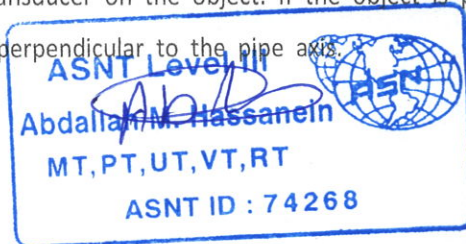
- 2.7 The equipment will be calibrated at the same temperature as the pipe to be inspected. This minimizes electronic drift and temperature velocity effects.
- 2.8 The parting line of the twin crystal transducer will be applied perpendicular to the axis of the pipe.
- 2.9 Reading will only be taken when they are stable for 3 seconds.
- 2.10 The instrument will be re-calibrated whenever a reject condition is encountered or when reading are within 0.005" of the distance that would alter a colour band.
- 2.11 The instrument is normally supplied with a flat carbon steel test block cut in 0.100" intervals. Should a client require inspection of high alloy or corrosion resistant then the client is asked to provide a certified test block of the same materials as that to be inspected.
- 2.12 Couplant having good wetting characteristics such as SAE NO.20 or NO.30 motor oil or similar oil shall be used.

### 3.0 PRE-PROCESS ACTIVITIES

- 3.1 Verify work order.
- 3.2 Determine that there are no frayed cable connections to the UT Gauge.
- 3.3 Calibrate the gauge on a test block (see above) which spans the wall thickness to be measured and which is at the same temperature as the object

### 4.0 INSPECTION

- 4.1 Apply sufficient couplant to the object surface and place the transducer on the object. If the object is pipe, the parting line between transmitter and receiver shall be held perpendicular to the pipe axis.





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- 4.2 When inspecting new casing or tubing, clean the areas to be tested with brush or file, take reading 2 ft from either end and also in the center of the tube, so as to determine the maximum and minimum wall thickness. Note the minimum reading on the inspection report. Clean off the couplant and spray the area with a protective rust inhibitor.
- 4.3 When inspecting used casing or tubing, clean the areas to be inspected to bare metal, removing all rust and scale. Take the UT reading with a calibrated gauge and consult API 5CI (or customer specifications) for downgrade criteria.
- 4.4 When inspecting used drill pipe, take the minimum reading as being indicative of the wall thickness at that point.
- 4.5 When inspecting pressure vessels refer ASME SEC.VIII and for pressure piping ASME B.31.3.
- 4.6 If the object is structured parts consult relevant specification or classification society's procedure.
- 4.7 If lower than suspected reading are encountered, the inspector will determine if the reading originates from an internal pit, or possible mid-wall lamination.
- 4.8 Recalibrate the gauge every 50 readings, every time it is turned on and off.

#### 5.0 POST INSPECTION PROCEDURE

- 5.1 Record measurements on the inspection report.
- 5.2 Follow the relevant procedure for outlining and marketing rejects.
- 5.3 Spray corrosion inhibitor over bare metal areas.



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