Document Title: Procedure for Ultrasonic Examination

1.0 SCOPE

This Procedure specifies the requirements for ultrasonic testing of Seamless or Welded Pipe Fittings, Flanges and Forgings for detecting longitudinal & transverse discontinuities by evaluation of ultrasonic pulse-reflection.

R1 The Stage, Extent and Location of examination shall be specified in the Quality Plan.

Ultrasonic Flaw Detection

2.0 PERSONNEL

Personnel PERFORMING shall have (at least) valid NDT Level I Certificate in accordance with the requirements of ASNT SNT-TC-1A.

Personnel INTERPRETING/EVALUATING shall have valid NDT Level II Certificate in accordance with the requirements of ASNT SNT-TC-1A.

3.0 METHOD

EQUIPMENT:

A] Ultrasonic Flaw Detector

The UFD used shall be pulse echo reflection type with "A" scan presentation, capable of generating and receiving frequencies. The equipment used may be either Modsonic Einstein II TFT, DGS or Equivalent confirming to the following specifications,

- Frequency Range : 1 to 5 MHz
- Calibrated gain control : 0 to 80 dB (stepped gain control in units upto 2dB or less)
- Horizontal linearity : ±1% FSL Max, deviation
- Vertical linearity : ±5% FSL Max, deviation

The instrument, flaw detector, shall be calibrated on an annual basis, or following repair.

Certificates of conformance shall accompany each flaw detector and may be reviewed by the NDT operator.

B] Probe

Probes or transducers shall be selected to produce the desired signal to noise ratio (S/N).

Each flaw detector shall have a set of normal probes / angle probes of different frequencies / angles with cables.

Probes may be 4Mhz, 8x9mm, 45°/60°/70°; 2/4Mhz, 10/24mmØ, TR; 4Mhz, 10/24mmØ, Normal.

C] Couplant

Couplant shall be used to give maximum acoustic transmission between probe face and material under inspection. Couplant may be oil, grease, water or similar which has good wetting characteristics.

D] Calibration Block:

IIW V1 OR V2 Calibration Block.

Longitudinal and Circumferential ID & OD 'V' notches Calibration Block, Notch Depth: 5% of Wall Thickness, Width: 2.5mm & Length: 25mm, as per ASME Sec V Article 23 SE-213 & Article-IV.

Surface Preparation:

The surface of the material under test shall be such that uniform full ultrasonic coupling is achieved over the scanned area. All surfaces shall be free from such loose scale, paint and other foreign matter as would interfere with the interpretation of the test. The methods of cleaning and preparing the surfaces for ultrasonic testing shall not be detrimental to the material.

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Testing Parameters:

Technique

The following section covers the method employed for the ultrasonic examination using Pulse Echo Angle beam & Normal or Dual (TR) Transducers.

Calibration

Range will be calibrated by using V2 Block (IIW) and 1/2 to 1 1/2 'V' Beam path on Calibration Blocks.

For Sensitivity, obtain the response from ID notch at 1/2 V sound path, using gain control, adjust the highest peak to 80% mark it on the screen and freeze the dB. At same dB setting, obtain 40%/50% at 1 V and 20% at 1 1/2 V, mark them and plot a reference line joining the marks of peaks.

Scanning

The scanning may be performed in both longitudinal and circumferential directions covering 100% surface area, adding 6dB to reference dB, using Angle Probes. Scanning speed shall not exceed 150mm/sec.

If wall thickness of items is more than 8mm it shall additionally be scanned by Normal or Dual (TR) Probe.

Observation

Following indications will be recorded

1) Any individual indications equal to or exceeding Plotted DAC
2) Any indications that is continuous on the same plane regardless of amplitude and found over an area larger than twice the diameter of the search unit

Acceptance Criteria:

Following indications will be not acceptable,

Normal beam – record all indications with amplitude equal to or greater than 20% of initial back wall reflection and accompanied by 50% loss of back wall reflection.

Angle beam – Any flaw indications equal to or exceeding Plotted DAC.

Final decision of acceptance and rejection shall be as per Standard.

REPORTING:

R1 Ultrasonic Examination Report Format (NDT0300) is to be used

SAFETY:

All required safety precautions shall be ensured (Safety Shoes, Safety Helmet, Safety Gloves, Safety Goggles, etc).

4.0 RESPONSIBILITY

This procedure is the responsibility of the NDT Level II Engineer.

5.0 REFERENCES

ASME Section V, Article 23, E / SE-213 'Standard Practice for Ultrasonic testing of Pipe Fittings' (Latest Edition)

A / SA 388 'Standard Practice for Ultrasonic Examination of Heavy Steel Forgings' (Latest Edition)

R1 ASME Sec VIII Div1 (Latest Edition)

SNT-TC-1A of ASNT (Latest Edition)

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PAN No. : AABCF3645C
CIN No. : U74900MH2009PTC192904

ULTRASONIC EXAMINATION REPORT

CLIENT:		**REPORT NO:**	UT/
PROJECT (if any):		**DATE:**	
PO NO:		**PART TEMP:**	Ambient

REFERENCE PROCEDURE:	* SE / E 213 / SA / A 388 / FTI/SOP/12 / Others
ACCEPTANCE CRITERIA:	* ASME Sec VIII Div 1 / Others
MATERIAL FORM:	* Weld / Bar / Pipe / Plate / Forging / Fitting / Others
MANUFACTURING PROCESS:	* Forged / Formed / Others
SURFACE CONDITION:	* Welded / Ground / Machined / Rough / As-Forged / As-Formed / Others
TESTED AREA	* All Accessible Surfaces / Bevel Edges / Side Wall Areas / Others
STAGE:	* Initial / In-process / Final / Others

SR NO	**DESCRIPTION** (Include Material Specification)	**QUANTITY** (nos)	**HEAT / ID NO**	**DETAILS OF RECORDABLE INDICATIONS** (Location / Size / Type)	**RESULT**

Equipment

Make:
Model:
Range:
Frequency:
Calibration Valid Till:
Test Method: Pulse Echo, Direct Contact

Probe Type:
Probe (Size / Angle):
Reference dB:
Gain Used dB:
Scanning: 100% scanning with 10% overlap

Calibration Blocks:

Basic Calibrations Block:
Reference Calibration Block:

Couplant:

Make:

Post Cleaning: Done

FitTech Industries Private Limited (NDT Level II UT)	**Client / Third Party Inspection Agency**

* Strike out whatever is not applicable.