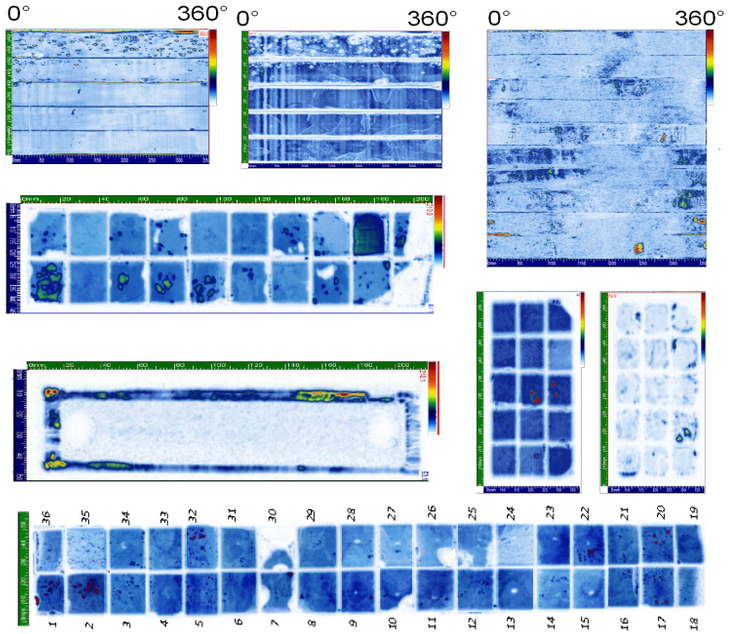
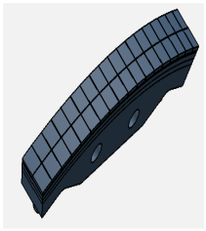
Ultrasonic C-Scan Result

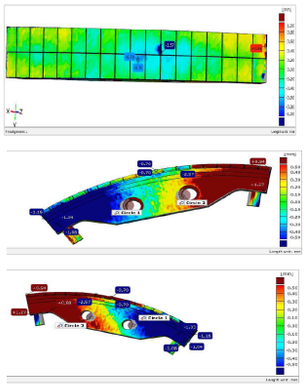


Dimensional Inspection Result

MeasuredLaser scan Cloud of point (COP)



Nominal 3D Model



Deviation Plot after comparison with Nominal 3D Model

Systems utilisation

To check the integrity of various joints in Divertor plasma facing components at various stage of manufacturing as well as at in-service inspection

To optimize the various metal joining processes such as brazing, diffusion bonding, welding etc.

To characterize mechanical property of materials

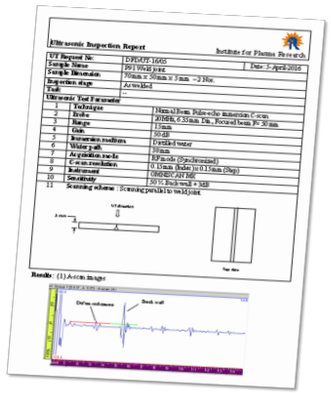
To inspect raw materials

To inspect Componenets at various stages of manufecturing

To compare the shape of componenents using Laser Scanning technique

To assist in performing reverse engineering

Reports



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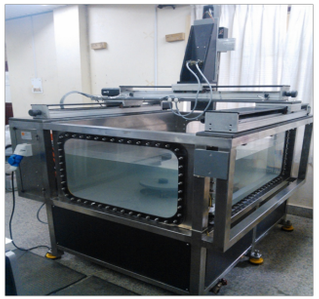
ULTRASONIC TEST & DIMENSION MEASUREMENT FACILITY

High Temperature Technologies Division

Institute for Plasma Reserach
Bhat, Gandhinagar, Gujarat,
India-382428
www.ipr.res.in

Ultrasonic testing system

Ultrasonic testing is most promising non destructive testing method which utilized high frequency sound wave to characterize the integrity of structural materials and components



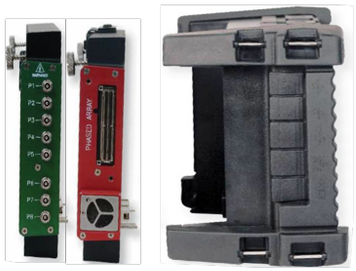
High resolution Scan up to 0.05 mm step for C -scan imaging.

Immersion tank area: 900 x 700 x 700mm with 300mm Dia.Turntable Rotating Chuck.

A 6 - axis manipulator for maneuvering the probe head.

Scanning speed : 100mm/sec

Ultrasonic water immersion tank



ONISCAN MX flAW Detector with Phased Array and 2 channel modules

Overall dimensions (W x H x D)	244 mm x 182 mm x 57 mm (9.6 in. x 7.1 in. x 2.1 in.)
Weight	1 kg (2.2 lb)
Connectors	LEMO 00 (2, 4, or 8)
Pulse output	50 V, 100 V, 200 V, 300 V ±10 % (variable pulse width)
Pulse width	Adjustable from 30 ns to 1000 ns ±10 %, resolution of 2.5 ns
Quantity	3: I (synchro), A and B (measure)
Synchronization	I, A, B referenced on main bang; A and B referenced on gate I (post-synchronization)
A-scan recording (TOFD)	6000 A-scans/s (512-point A-scan) (3 MB/s transfer rate)
C-scan type data recording	12 000 (A1, A2, A3, T1, T2, T3) (3 gates) 12 kHz
Aperture	16 elements*
Number of elements	128 elements

Omniscan MX UFD can be used with Immersion scanner and also can be used as stand lone system for site inspection

Ultrasonic Probes

Ultrasonic Immersion probes : 5,10,15,20,25 MHz Focused and unfocused

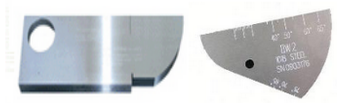
Contact Probes: 2,4,6 MHz for 0 ˚,38˚,45˚,60˚,70˚ angles

Phased array probe:2.25 MHz, 64 elemets

special probe: side looking immersions probe

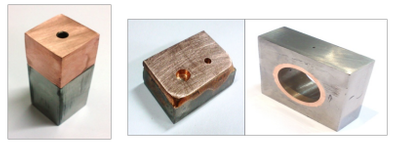
Calibration and Reference Standards

IIW V1 and V2 Block are used as calibration standards



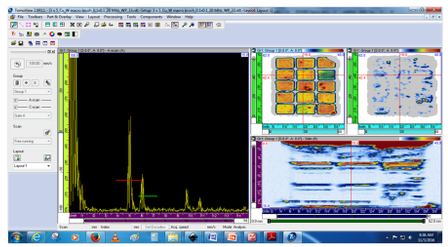
Calibration standards

Known defect samples are used as referece standards for various mettalic joints



Refernce standard for various metallic joints

Ultrasonic Data aquisition,Dispay and Post Processing



Aqu-UT enables the data aquisition and Tomoview enables powerful Tools for Detection, Sizing,and Characterization of Flaws

Flexible Data Display as A,B,C and D scan

Drives R/D Tech UT and Phased Array Systems

Data can be extracted in any format for Post processing

Post Processing of C-scan images provide information of Defect **size, location, area and its distribution** which improve the validity of ultrasonic testing

Tomoview Software and Data Post Proccesing

Dimensional Inspection system- ROMER ARM 2000 SIGMA Portable CMM

The Exclusive Portable Measuring Arm For a Precise and Simple Dimensional Measurement of Componenets up to 2.5 meter length

3D Laser Scanning probe compatible

Touch trigger, contact or non-contact (infrared) probes (quick change and automatic detection)

Specifications

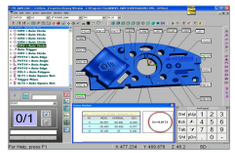
- Measurement Accuracy : +/- 100 microns
- Measurement Repeatability : +/- 140 microns
- Measurement Range : Spherical Volume of 5.2 meters
- No of axes for arm movement : Six Axis Movement
- Allows precision 3-D coordinate measurements of solid objects with complex 3D shapes and longest dimensions ranging from few centimeters to few meters

Touch Trigger Probes

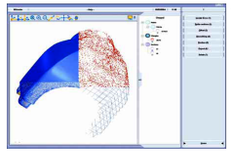
Non-Contact Type Measurements Using Laser Scan Probe

- Measurement Accuracy : +/- 44 microns
- Measurement Repeatability : +/- 44 microns
- Laser Scanning Width : Max 110mm
- Maximum speed measurement = 30 laser lines per second
- Max. no. of points per measured line = 640 points

G-scan Laser Probe



PC-DMIS Software



G-Scan Software

The main functions of G-Scan are:

To measure points
To create surfaces (triangles) and sections
To export data

G-Scan can also be used for reverse engineering by exporting points to inspection software.

PC-DMIS software enables following features

- Use of CAD models in the inspection process
- Digitally simulating measurement in an offline virtual CMM environment
- Easily aligning complex contoured parts using breakthrough iterative alignment technology