

Testing and Measurement Technology

Ultrasonic Testing in Immersion

Sulzer Innotec**Testing Services for Highest Demands****Automatic ultrasonic testing services for single part and series testing**

For manufacturing companies with a demand for non-destructive ultrasonic testing of single parts or small to medium batch sizes, it is more convenient to outsource the testing service to a specialised company.

How to test by ultrasonic testing in immersion

Ultrasonic testing is an acoustic, **non-destructive testing** method for detecting material defects. An emitter sends a sound pulse which is transmitted over a coupling fluid into the test piece. Boundary Surfaces (cracks) inside the test material reflect the sound pulse to the emitter that is working both as a sending and as a receiving device. The time between sending and receiving is a measure for the distance covered by the sound (Pulse-Echo-Procedure).

Ultrasonic Testing in Immersion takes place under water, so that the water functions as the coupling fluid between sound probe and test piece. This facilitates the contact-less, automatic inspection of parts.

Benefits of this method

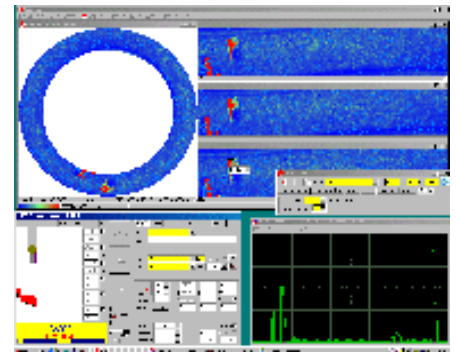
Due to the fact that the ultrasonic sensor need not to be driven in direct contact to the test piece surface, it is possible to mount the sensor onto a multi-axis probe driving unit and thus to automate the inspection process. All inspections, regardless of the shape of the test piece, can be performed at a high rate and with low man power.

Ultrasonic testing in immersion has a wide range of applications: We are testing for the automotive industry, for the aviation and the aerospace industries, as well as for the metal and plastic processing industries.



By means of a rotary table, axisymmetric parts can be tested.

The complete set of testing parameters, as well as scan and sensor positions are stored on the facility integrated computer system. They can be immediately recalled for recurrent tests. Thus a time-consuming new set up of the testing system is not necessary and the inspection of part series in shifted batches is easy, quick, and convenient.



Display of the inspection results with the indication of defects

Application

Ultrasonic testing is a well-suited testing procedure for sound conducting materials for the detection of internal or surface defects, e.g. for brazings, forged steel, castings, rolled material, semi-finished parts, or pipes.

Apart from the volume inspection, surface cracks, laser-, electron beam, and conventional welds on parts are investigated.

Examples

Technical Data

Ultrasonic Testing in Immersion Facility

type AIMS Labscan 1200 x 900 mm
 tank size L / W / H 1600 mm x 1200 mm x 800 mm
 motion X / Y / Z / B-Axis and rotary table

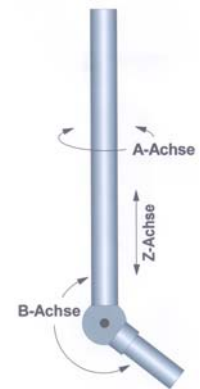
Driving Frame with Air Suspension

	X Longitudinal	Y Transversal	Z Vertikal
scan range			
distance	1200 mm	900 mm	800 mm
max. speed	150 mm/sec.	150 mm/sec.	150 mm/sec.
max. acceleration	150 mm/sec.	150 mm/sec.	150 mm/sec.
max. resolution	0.01 mm	0.01 mm	0.01 mm
accuracy, repeatable	< 0.005 mm	< 0.005 mm	< 0.01 mm

Plunging Bar for Z-Axis-Drive

range

scan range 800 mm
 max. speed 150 mm/sec.
 max. acceleration 150 mm/sec.
 max. resolution 0.01 mm
 accuracy, repeatable < 0.01 mm



Precision Manipulator B-Axis

adjustable range

primary axis 270°
 secondary axis 280°
 max. resolution 0.02°
 accuracy, repeatable 0.01°
 max. speed 45°/sec.
 max. acceleration 45°/sec.

Rotary table with Jaw Chuck

data

loading area Ø 700 mm
 max. Load 270 kg
 speed 0 – 1 U/sec.
 resolution 614.400 P/U
 parallel to X / Y 0.1 mm/m
 perpendicular to Z 0.05°
 driving unit gearless drive 3-phase motor

System Controller

probe head hardware 2-channel each emitting and receiving
 IBM-compatible 2 GHz Pentium-Industry Computer
software AIMS NDT Winscan-Package

Mobile Precision Platform

platform dimensions 1200x900x400/600 mm

- 4 adjustable struts
- 4 Precision-ball bearings
- Table with precision ball feet and fine adjustment
- Height adjustable from 400 – 600 mm
- Precision plate for easy and accurate scanning of parts loaded.
- Part loading outside the tank