

Small Test Rig for Laboratory Work

Introduction

At the request of the Joint Research Center (JRC) in Petten, Netherlands, **WESDYNE**[®] developed an advanced mechanized scanning rig for thermal fatigue crack investigation of small samples using the Time of Flight Diffraction (TOFD) technique.

The JRC in Petten is part of the Institute for Energy under the European Commission. The JRC facility is a focal point for a research project to advance the understanding of the initiation and propagation of thermal fatigue cracks in nuclear power plant components.

The test specimens used in the thermal fatigue crack investigation consist of cylindrical steel (316L) structures. The specimens are induction heated from the outside of the structure and subsequently quenched by a flow of room temperature water (from the inside of the specimen). The resulting thermal stress distributions produce crack initiation and growth at the inner surface. The crack depth propagation is monitored using the TOFD technique and the progress is recorded and evaluated.

WESDYNE previously delivered an early model of the scanning system to the JRC in Petten. The current model is a refined evolution in terms of performance and ease of use.

Description

The new scanning system consists of a lightweight structure with a linear rail guide, a rotation unit and a motor/encoder. All electrical components are sealed against water and moisture intrusion.

A spring-loaded TOFD probe wedge is mounted on the motor unit, providing for secure and consistent contact between the wedge and the specimen surface while scanning.

A quick-release dub holds the test object in position for scanning while allowing for a full 360-degree rotation of the specimen.

Two handles allow for easy insertion/extraction of the unit into a water enclosure. The ability to collect foreign material allows the utility to analyze it, identify its source and take action to stop the material from entering the system in the future.

Technical Data

Weight	4 kg (approximate)
LxWxH	594x377x166 mm
Number of axis	2
Operating range (circ)	No limit
Axial stroke	174 mm*

* Limited by test specimen geometry in current application, theoretical maximum stroke is 200.5 mm

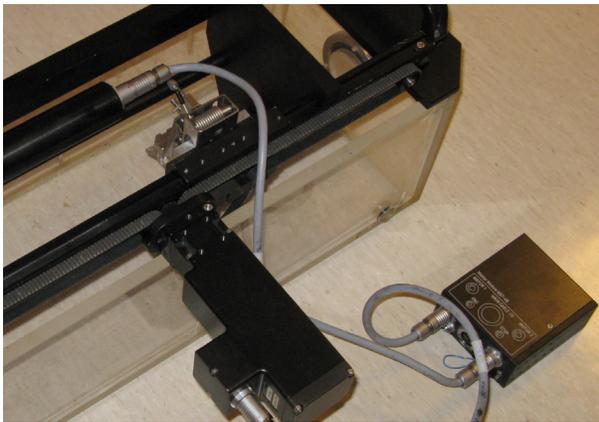
Benefits

The benefits offered by the JRC TOFD rig include:

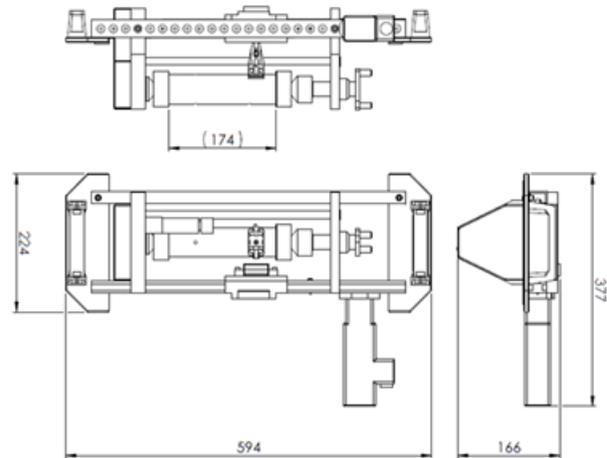
- High accuracy positioning
- Small and lightweight
- Easy to use

Experience

The current version of the JRC TOFD rig has been in operation in Petten since 2008.



WESDYNE Sweden TOFD scanning system assembled and inserted into water enclosure



Physical dimensions (mm)

WESDYNE is the nondestructive inspection branch of Westinghouse and a leading supplier of mechanized nondestructive examination (NDE) products for all inspection needs worldwide. As such providing turnkey and one-off-type solutions with a focus on the nuclear market. WESDYNE's expertise spans all aspects of remote and mechanized inspections, from problem analysis and solutions generation to development and manufacturing to field deployment of personnel and equipment. Inspection capabilities cover all key NDE areas such as ultrasonic, visual, eddy current, magnetic particle, dye penetrant and X-ray.

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