TruPhase 360°

Phased Array Ultrasonic Flaw Detection and Wall Thickness Measurement

System Overview

The Tuboscope™ TruPhase™ 360° 2-D Phased Array Ultrasonic Technology provides a more sophisticated inspection for critical service tubulars during manufacturing, finishing and post service. In a single pass, the system detects, evaluates and classifies internal/external surface-breaking transverse, longitudinal and oblique-oriented flaws; as well as wall thickness measurement and laminations detection.

The patented TruPhase 360° 2-D phased array technology uses a single 2-dimensional array to transmit multi-directional ultrasonic beams in a single shot for simultaneous flaw detection.

System Operations

The inspection system utilizes ultrasonic principles to detect both inside and outside diameter surface breaking defects, wall thickness variations and laminations. Adjustable rotational speed rollers on the pipe rotating mechanism *(rotators)* are used to synchronize pipe surface motion to the movement of the overhead UT scanner, providing full-body inspection *(less untested ends)*.

A water coupling system supplies water flow to the scanning heads. Phased-Array probes inside the scanning heads are mounted within a chamber containing water; hence ultrasonic beams are coupled into the pipe wall through the water chamber. The ultrasonic inspection scanning heads contain both shear-wave *(flaw detection)* and compression wave *(wall thickness variations and lamination detection)* probes for 100% pipe surface inspection *(less untested ends)*. The probes are controlled by the proprietary TruPhase 360° software and hardware to detect customer specified pipe defect orientations of the tubulars under inspection.

Each defect orientation has its own individual gains, gates, and Time Compensated Gain *(TCG)* controls. The signals generated by the UT arrays are amplified, digitized and filtered; and then transmitted to processor electronics within Tuboscope's Digital Server-Based Instrumentation.

This data may then be stored on backup media.

System Features

The combination of the TruPhase 360° UT Flaw Detection and Wall Thickness Measurement Unit with Tuboscope's Server Based Digital Instrumentation offers the pipe and tube producer or processor:

- ID/OD flaw detection and wall thickness measurement and lamination detection
- Flaw detection in multiple orientations with a single 2-D probe in a single shot
- Capability for data storage in SQL database and traceability
- Ability for process control and final inspection, with interface to a host (mill) computer

System Specifications

Standard Configuration for Pipe Sizes (OD)		**Signal Processing**	
2⅜″ (60 mm) to 24″ (609.6 mm)		Automated Calibration	**Yes**
		System Diagnostics	**Yes**
		Maintenance Diagnostic	**Yes**
		Manual Adjustment	**Yes**
Defect Orientations	**Longitudinal ID/OD, Transverse ID/OD**, Obliques ID/OD (Oblique angles can be easily configured and changed in minutes by software virtual machine definitions without any mechanical changes)	Operation Diagnostic	**Yes**
		Output Signal Sorting	**Yes**
		Database Architecture	**MS-SQL**
Calibration Notches Dimensions	5% deep, 25.4 mm or 12.7 mm long	Scanning Heads Control Mode	PLC Actuated
Phased Array Probes	2 MHz 2-D Arrays for flaws, 5 MHz 1-D Arrays for wall thickness and lamination	Maximum Pipe Temperature	131°F (55°C)

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