Ultrasonic Testing Trolley for Plate Lamination Defect Inspection

FLAW HUNTER TPT 120

The Importance of Plate Inspection

Ultrasonic Testing

Ultrasonic Testing Trolley for Plate Lamination Defect Inspection (TPT 120)

The Importance of Plate Inspection

Steel plates and sheets, as vital raw materials in various critical industries, including the construction of oil and gas transmission pipelines, the production of CNG cylinders, pressure vessels, and heavy metal structures, have a wide range of applications. In accordance with reputable international standards, performing non-destructive ultrasonic testing to identify lamination defects and other internal discontinuities in these products, before they enter the manufacturing and final conversion processes, is of utmost importance. This precise inspection enables the early detection of potential defects during the production process for both manufacturers and buyers, effectively preventing the occurrence of unfortunate incidents and financial losses resulting from the improper performance of manufactured components. The lamination test is crucial for ensuring the integrity of these materials.

Ultrasonic Testing

With the continuous advancement of Non-Destructive Testing (NDT) technologies, the ultrasonic testing method is recognized as one of the most powerful and efficient techniques for identifying internal defects, particularly plate lamination defects, in steel plates and sheets.

By transmitting high-frequency sound waves into the material and analyzing their reflections, this method allows for the accurate determination of the location, size, and type of defect without causing any damage to the material's structure. Consequently, it has found widespread use in related industries. The lamination test is a key application of this technology.

In the process of ultrasonic testing, a probe or transducer transmits ultrasonic waves of a specific frequency into the inspected part. These waves, after propagating through the material and encountering internal surfaces, including the bottom surface, internal defects

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(cracks, cavities, inclusions, and lamination), or density variations, are reflected and received by the same probe or other receiving probes. The ultrasonic waves received by the probe are converted into electrical pulses and sent to the ultrasonic testing instrument. The ultrasonic testing instrument performs complex processing, such as amplification and filtering, on the received electrical signals and displays them on its screen.

By precisely analyzing the transit time of the waves and the amplitude of the reflected signals, the instrument can accurately calculate the depth, location, and estimate the size of defects present in the part. The lamination test relies on this analysis.

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The FLAW HUNTER TPT 120 is an advanced system designed and manufactured for semi-automatic ultrasonic testing of lamination defects in large-sized steel sheets and plates. Given the significant dimensions of these products, sometimes reaching a width of 4 meters and a length of 12 meters, and their high daily consumption in pipe manufacturing plants and other related industries, performing manual ultrasonic testing faces limitations in speed, accuracy, and coverage, rendering it practically impossible. On the other hand, the use of fully automatic systems with a large number of channels and probes, along with complex automation systems, requires very high initial investment.

The Ultrasonic Testing Trolly TPT 120, utilizing a mobile structure (trolly) and four independent ultrasonic channels with four dual crystal (T/R) probes with a crystal length of 28 mm, offers a cost-effective and efficient solution for inspecting these products.

This system employs the Water Gap technique for coupling ultrasonic waves, which provides benefits such as optimized couplant consumption (usually water) and prevention of direct probe abrasion with the plate surface. The optimized arrangement of the four probes with a 10% overlap allows for a 100 mm coverage of the plate width in each scan, ensuring complete surface inspection along the length of the part. This Ultrasonic Testing Trolly is specifically designed for lamination test applications.

The main body of the device is made of lightweight and durable aluminum alloy to reduce weight and increase maneuverability during movement. Furthermore, all components of the device are protected with an electrostatic powder coating to enhance lifespan and resistance to environmental factors, minimizing the possibility of corrosion and rust. Utilizing both dual crystal and single crystal probes, this system can test sheets and plates with thicknesses ranging from 5 to 200 mm and is capable of identifying a Flat Bottom Hole with a diameter of 3 mm (FBH Ø 3mm) at various depths from the surface (minimum 3 mm) to near the back surface of the part (minimum 2 mm from the back surface).

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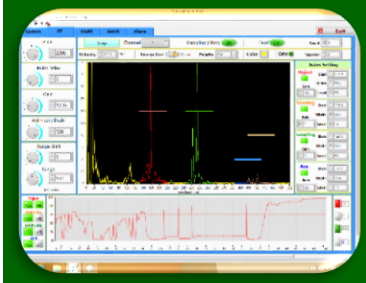

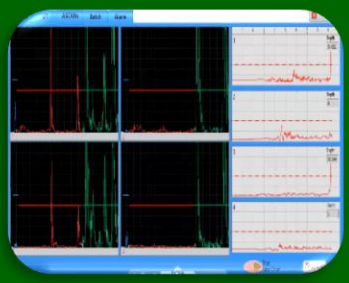

With this device, the user can inspect plates at an adjustable scanning speed of up to 30 meters per minute, which significantly increases inspection speed and efficiency compared to manual methods.

The Ultrasonic Testing Trolly streamlines the lamination test process. The test results for each channel are recorded separately on a strip chart, and upon detection of any defect, the device's audible and visual alarms are activated, alerting the operator to the presence of a discontinuity.

The software processor of this system is an industrial laptop with a metal protective case, ensuring stability and reliable performance in industrial environments.

The user-friendly software of this device, with its diverse capabilities, allows for the adjustment of test parameters, simultaneous display of A-Scan and Strip Chart, manual input of test information (including plate number, test time, and operator details), data saving, and the generation of inspection reports.

The Ultrasonic Testing Trolly facilitates comprehensive lamination test procedures.

- Performance highlights of the Trolly (FLAW HUNTER TPT 120)

- **Corrosion resistant**
- **Easy to use**
- **Audible and visual alarms**
- **Test result recording**
- **Ability to scan plate edges**
- **No external power source required**
- **High resolution in near-surface areas**
- **High testing speed**
- **No probe abrasion due to Water Gap**
- **Uses water as a couplant**
- **High sensitivity in defect detection**
- **Robust and stable structure**
- **High repeatability of results**

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General Specifications of the Ultrasonic Testing Trolly for Steel Plates (Sheets), Model Flaw Hunter TPT 120	
Feature	**Specification**
Device Capability	Detection of lamination defects in plates
Number of Channels	4 Channels
Alarm System	Audible and visual alarms
Display System	Simultaneous display of A-SCAN, Strip Chart
Testing Speed	High-speed testing capability, 1 to 40 meters per minute
Electronic Boards	4-channel electronic boards equipped with FPGA microprocessor
Couplant	Equipped with a stainless steel couplant tank and related connections
Device Processor	Industrial laptop
Coupling Failure Warning	If any probe or cable is disconnected, the coupling failure alarm light turns on, informing the operator.
Probes	4 T/R probes with a frequency of 4 MHz, along with special cables manufactured by Pejwak Rayan Company
Calibration Storage	Ability to store up to 5000 different calibrations and settings in the device memory and recall them.
Test Result Recording	All received signals are manually recorded on the Strip Chart for each channel, indicating the plate number, test time, and operator details, and are exportable.
Power Supply	Two batteries with 8 hours of continuous operation capability (one in operation and one spare)
Device Dimensions	1200 × 400 × 1150 (L × W × H) mm
Device Weight	Approximately 110 kg, including the couplant tank
Device Operating Temperature	4 to 50 degrees Celsius

Advantages of choosing Pejvak Rayan Company

Industrial Ultrasonic Testing Equipment Manufacturer

-Trusted Expertise:
Over 20 years of experience in ultrasonic testing systems.

-Advanced Technology:
High-accuracy flaw detection with global standards; suitable for pipes, billets, rebars, ingots, sheets, and plates.

-Cost-Effective Quality:
Competitive pricing tailored for Asian markets — without compromising performance.

-Complete Service:
On-site installation, professional training, and ongoing technical support.

Experience world-class technology with region-friendly pricing

Pejvak Rayan – Precision You Can Rely On

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