Innerspec

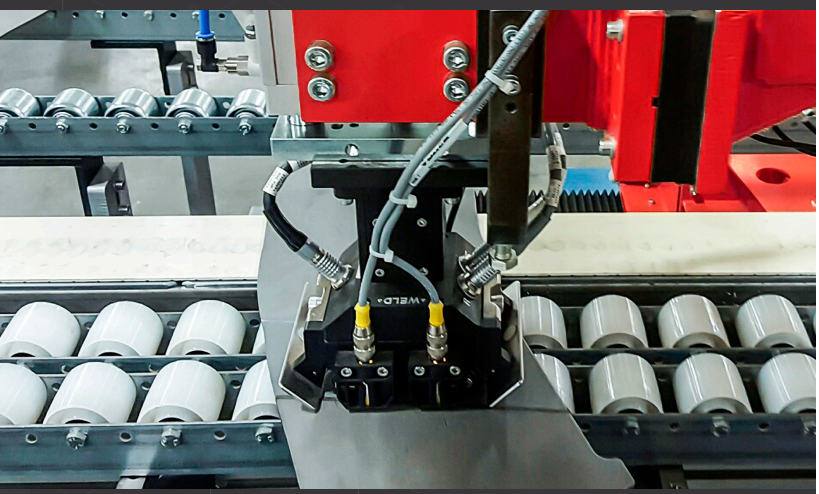
HIGH-PERFORMANCE NDT SOLUTIONS

Tailor Welded Blank Inspection

TEMATE SI-WB

Equipment Highlights

- Non-contact EMAT technique.
- Guided waves fill up the volume of the material and provide thru thickness inspection in one pass.
- Detects and discriminates "planar" defects such as lack of fusion, lack of penetration, concavity or mismatch, and "point" defects such as holes and porosity.
- Less sensitive to probe positioning, no "rastering" motion or "phased array" of sensors necessary. Self-calibrated sensor. No need for teaching period or regular calibrations. Permits inspection at up to 1m/s in completely automated environments.
- Exclusive flexible sensor technology that conforms to the surface and undulations of the part.
- Multi-sensor capabilities with one system controlling up to three sensor heads.
- Optional 3D cameras detect surface and cosmetic defects as required by ISO.



The TEMATE SI-WB is the industry standard for automated inspection of laser welds in Tailor Welded Blanks. The TEMATE SI-WB can detect all internal and external defects including porosity, pinholes, lack-of-fusion, lack-of-penetration, concavity, convexity, mismatch, excessive root and crown, and blank misalignment.
Advantages of the TEMATE SI-WB over other techniques:

- Adaptable to carbon steel, aluminum, and stainless steel blanks.
- Detects and flags all structural defects that can compromise the quality of the weld, including internal defects invisible to the naked eye.
- Detects all defects that will cause stamping failures while keeping rejects to a minimum.
- Self-calibrated sensor inspects at speeds up to 1 m/s.
- Optional 3D camera module available for measurement of surface defects (meets ISO 13919 standards).
- Process monitoring package with advanced algorithms to track deviations and provide early warnings before defects occur.
- Only inspection system endorsed by OEMs for inspection of safety parts.

The system can be installed in-line or off-line and adapted to any line configuration. The TEMATE SI-WB can be installed on a robotic positioner (articulating or Cartesian) or on a stationary mount. Custom Integrations for tailor welded blank inspection, such as the TEMATE WB-TableScan are also available.

The system meets ISO 13919 requirements, the most stringent quality standards, and is most proven and reliable system in the market with hundreds of systems installed.

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TEMATE SI-WB Specifications

Materials Inspected

- Steel and Aluminum, all grades coated and uncoated.
- 0.010" (0.3 mm) to 0.138" (3.5 mm) thickness.

Defect Detection

* t2 = Thickness of thinnest blank | H = Height	EMAT	VISION	
		3D (top)	3D (bottom)
Lack of Fusion	10% t2 x 12mm	NA	
Lack of Penetration	10% t2 x 12mm	NA	H ≥ 50µm*
Porosity & Pinholes	≥ 0.3mm	NA	
Concavity	10% t2 x 12mm	H ≥ 50µm*	
Mismatch	10% t2 (negative only)	H ≥ 50µm*	
Blank Misalignment	NA	0.5mm @ 50m/min, 0.05mm @ 10m/min	
Excess Weld Metal	NA	H ≥ 50µm*	NA
Excessive Root Penetration	NA	NA	H ≥ 50µm*
Exceeds ISO 13919 requirements Actual resolution of camera is 2 microns			

Inspection Technique

- Volumetric guided waves for inspection of the weld (i.e. top and bottom surface, and internal).
- Dry-coupled piezoelectric testing provides the high accuracy and repeatability of EMAT and conventional UT for applications where liquid couplant is not an option.
- Pitch-catch and pulse-echo configurations.
- Maximum sample rate of 2000 pulses per second.

Sensor Head Assembly

- 6" (152 mm) W x 7.1" (180 mm) L x 5.9" (150 mm) H. Weight 10 lbs (4.5 kg).
- Includes pulsed electromagnet, EMAT coil circuit, protective wear pad, vertical compliancy unit.
- Replaceable protective wear pad is in contact with the part surface during inspection and provides protection for the EMAT coil circuit.
- Vertical compliancy to the part surface accommodated in the sensor up to 0.25" (6 mm).

Data Acquisition Electronics

- Industrial enclosure; NEMA 12 and IP 55 per EN 60 529/10.91 protection rating, located up to 165 cabling feet (50 m) from sensor.
- Enclosure is 24" (610 mm) W x 32.3" (820 mm) L x 69" (1750 mm) H, weighing 500 lbs (225 kg).
- Includes EMAT T/R electronics, magnet pulser, power supplies, computer, communication interfaces, monitor, keyboard and mouse.
- TEMATE software capable of operating under multiple operating systems.
- Automatic and manual operation modes.
- Easy-to-use interface to define and save inspection settings.

Software Features

Real Time Acquisition & Processing

- Uses fast FPGA-based signal acquisition and processing.
- Provides uninterrupted control and analysis of all time sensitive operations, including real-time display and disposition.

Processing Link

- Connects real-time acquisition & processing with the user interface.
- Decouples acquisition from user interface for easy hardware upgrades, and rapid customization.
- Organizes and prepares data received from real time acquisition & processing for representation.

NDT-WEB User Interface

- Provides display and user controls customized for the application using proprietary NDT-WEB real-time web technology.
- Broadcasts its own Wi-Fi signal for simple access by any device using a regular browser and IP address (no client software needed). Alternatively, users can connect to the equipment using an external video monitor or ethernet port.
- Permits easy customization of user controls and display without affecting the operation of the equipment.
- Includes built-in features to connect to NDT-LINK, Innerspec's web portal for support, spares purchasing, and automated/remote operation and process control tools.

Power and Environmental Ranges

- 115v AC to 220v AC (Electrical power and air requirements may vary depending on the integration.)
- Operating temperature 32°F (0°C) to 105°F (40°C).
- Humidity non-condensing 5% to 95%.