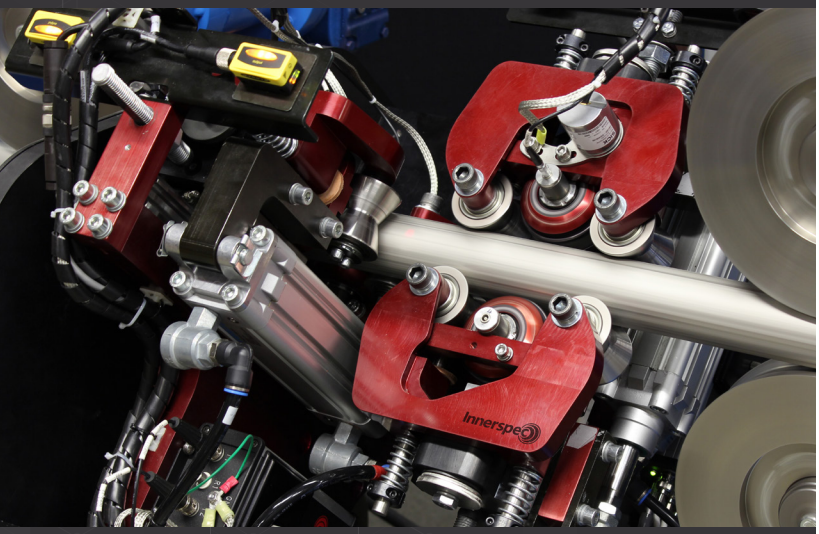
Thickness Measurement

TEMATE & PowerUT TG-IL Systems

Equipment Highlights

- Non-contact EMAT permits measurements at extreme temperatures at up to 5 mm from the surface of the material.
- EMAT not affected by surface conditions, can be used on very coarse, coated, oxidized or dirty surfaces.
- EMAT does not require the probe to be perfectly perpendicular to the part to perform the measurement.
- Dry-Coupled piezoelectric sensors permit inspection without couplant on non-metallic components.
- Great accuracy (+/-2.5 µm) and lateral resolution (1 mm - DCUT, 3 mm - EMAT).
- Compact, industrial instrumentation accessible via WiFi or Ethernet from any internet browser.



The TG-IL systems are designed for automated in-line thickness measurement of metallic and non-metallic materials using ultrasonic technology. The measurement is made by calculating the time it takes for an ultrasonic pulse that has been generated in the material to reflect back from an opposite wall or boundary. The systems can be integrated in-line to measure thin strip, plates, billets, ingots, tubes or odd geometries for quality and process control. On seamless tube manufacture, multi-channel systems provide eccentricity and ovality at production temperatures and speed.

These systems use non-contact EMAT or dry-coupling methods to provide rapid non-destructive measurements without couplant. On temate systems EMAT sensors can use electromagnets or permanent magnets depending on the type of material and the conditions of inspection. On PowerUT systems, proprietary dry-coupled piezoelectric transducers are combined with Innerspec's high-power instrumentation to permit inspection of non-metallic or highly-resistive materials without the need for liquid couplant.

The TG-IL instrumentation is housed in a small industrial enclosure located near the point of inspection that broadcasts its own wireless signal. Display and control are available from any device connected to the instrument via WiFi or the industrial Ethernet port using a regular internet browser.

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temate®/PowerUT® TG-IL - Specifications

	temate®	PowerUT®
Technique	• Non-contact Electro Magnetic Acoustic Transducer (EMAT).	• Dry-coupled, high-power piezoelectric transducer.
Materials Inspected	• Ferromagnetic and non-ferromagnetic metals, including carbon steel, stainless steel, aluminum, copper and brass. • Minimum thickness: 1 mm (0.039") contact Innerspec for thinner material. • Surface temperature: from -30° C (-22° F) to 750° C (1,382° F).	• Metallic and non-metallic materials including most plastics and composites. • Minimum thickness: 1 mm (0.039") contact Innerspec for thinner material. • Surface temperature: from -10° C (14° F) to 200° C (392° F).
Measurement Accuracy and Lateral Resolution	• Accuracy: +/-2.5 µm (+/-0.0001"). • Lateral Resolution: Up to 3 mm.	• Accuracy: +/-2.5 µm (+/-0.0001"). • Lateral Resolution: Up to 1 mm.
Sensor Head Assembly	• Magnetic element and EMAT coil in a protective casing. • Sensors for high-temperature applications may incorporate air and/or water cooling depending on temperature and exposure time. • Designed for easy attachment to different mountings, and can incorporate air bearings or other systems to maintain adequate lift-off. • Automatic temperature compensation for high-temperature applications.	• Touch probe and wheel options for scanning applications. • Non-marring rubber coupling. • Designed for easy attachment to different mountings.
Inspection Technique	• Pulse-echo sensor configuration produces and measures the time-of-flight (TOF) arrivals of UT reflections. • Thickness is derived by calculation: Thickness = Velocity of Sound x (TOF/2). • Maximum sampling rate of 2000 samples per second for speeds of up to 2 m/s.	
Instrumentation	• IP54 industrial enclosure can be located up to 2 m from point of inspection. • Different enclosures can handle from 1 to 8 channels simultaneously. • 1 Channel Enclosure. Dimensions: 252 mm L x 169 mm W x 57 mm T. Weight: 1.5 kg. • Encoder, thermocouple, and programmable I/O ports for line integration. • Accessible by any device connected to the instrument's IP address via WiFi or Ethernet.	
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). • Permits easy customization of user controls and display without affecting the operation of the equipment. • Includes built-in features for web support and ordering of spare parts when connected to the internet.	
Power & Environment Range	• 115V-220V AC or 24VDC-2A supplied directly to the instrumentation. • Operating temperature 0°C (32°F) to 40°C (105°F). • Humidity non-condensing 5% to 95%.	