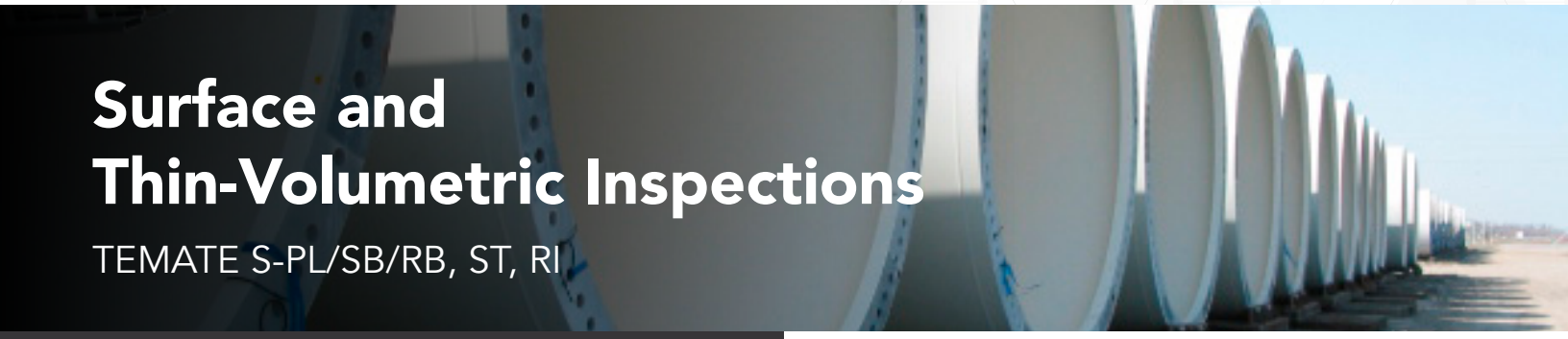
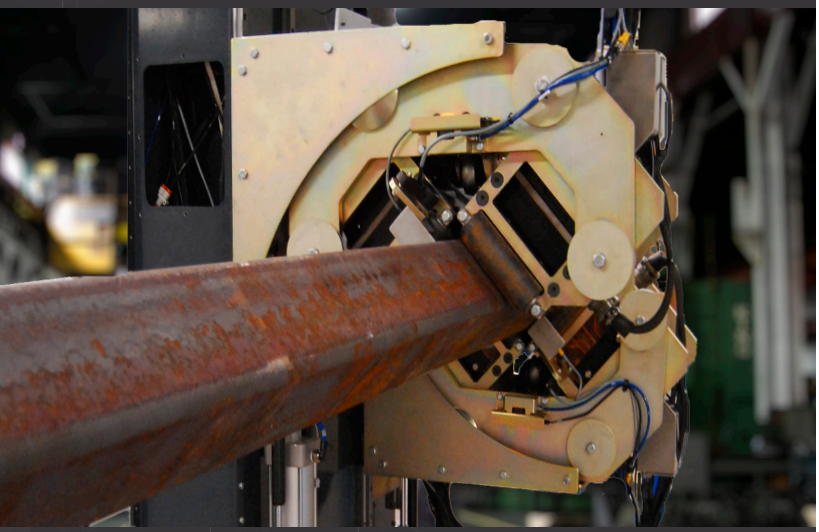


Surface and Thin-Volumetric Inspections

TEMATE S-PL/SB/RB, ST, RI

Equipment Highlights

- Non-contact EMAT permits high-speed measurements at extreme temperatures.
- Couplant-free inspection to avoid contamination of sensitive materials and processes.
- Permits inspection of rough and dirty materials.
- Requires minimum amount of sensors to cover large spans of material.
- Easy to install, simple to operate with very low maintenance and operating costs compared to other methods.
- Completely automated operation. Easy to program and to interpret results.



The TEMAT surface and thin-volumetric inspection systems use Electro Magnetic Acoustic Transducer (EMAT) technology to perform ultrasonic, non-destructive testing of metallic materials without couplant. EMAT sensors permit generation of surface and volumetric guided waves to suit many different applications:

- Surface Waves (Rayleigh Waves). Penetrate one wavelength in the material (typically 1-5 mm) to inspect the surface and near surface areas. The technique is used on plates, square and round billets, tubes, and structures with complex geometries (e.g. gears).
- Volumetric Waves (Lamb and Shear Horizontal Waves). Provide full volumetric inspection of thin parts (typically less than 12 mm thick) including tubes, strip, and rods/wires. The sensors are used in attenuation and/or reflection mode to adapt to the geometry of the part and detect defects oriented in different directions.

The advantages of ultrasonic EMAT over other non-destructive testing options include:

- Coverage of large areas with a limited number of transducers. It also permits inspection of hidden, non-accessible areas.
- Detection of non-visible internal defects such as laminations, tight cracks, and long, rolled-in, defects.
- Imperviousness to surface conditions. Permits inspection of in-process and processed materials.
- Suitable for steel, copper, aluminum, titanium and most metals (including metallic laminations and composites).

TEMATE systems which include EMAT sensors, and Innerspec's high-power instrumentation and custom software are designed to be fully integrated in a production line and provide immediate disposition of the material using flaw-marking devices or sending outputs to other equipment.

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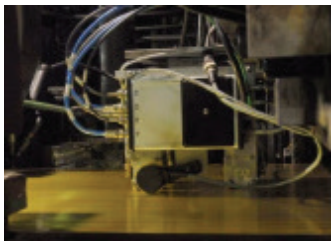
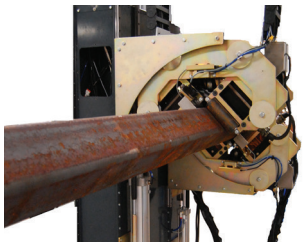
Surface and Thin-Volumetric Inspections



Plates (Surface)

TEMATE S-PL

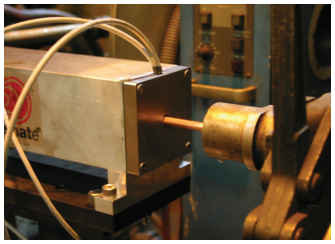
- Detects surface and near-surface defects on copper, aluminum, bronze, and steel plates.
- Detects defects in the rolling direction with a limited number of sensors
- Not affected by changes in color or reflectivity.



Round & Square Billets (Surface)

TEMATE S-RB/SB

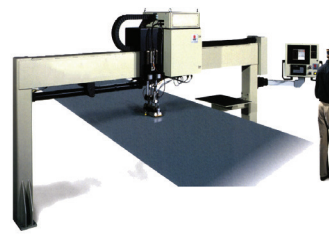
- Detects surface and near-surface defects on square and round billets.
- Capable of detecting as cast materials
- Available for temperatures up to 350°C



Rod & Wire (Volumetric)

TEMATE RI

- Permits detection of long (axial) defects on the surface and internally at production speeds.
- Avalable for copper, aluminum, titanium, steel, and other metals.
- Compliments eddy current solutions for inspection of rod and wire.



Steel Strip (Volumetric)

TEMATE ST-SC(HR)

- Full volumetric inspection of steel coils after pickling
- Detects laminations, inclusions, and rolling defects.
- Permits inspection at speeds up to 400 m/min.

Laminated Strip (Volumetric)

TEMATE ST-LA

- Detects lamination defects in single sheet and composite strip.
- Used for inspection of coin stock, steel-aluminum bearings, and other laminated components.
- Custom integration to fit the line requirements.

Portable Applications for:

- Tanks
- Pipelines
- Windmill towers
- Large gears
- Structural elements