

# Coil Weld Inspection

TEMATE SI-CJ

## Equipment Highlights

- Non-contact EMAT inspection technique.
- In-line and fully automated.
- Detects internal voids, laps, misalignment and poor trim quality.
- Self-calibrated sensor.
- Inspects while trimming with no additional cycle time.
- Provides immediate feedback on weld and trim quality.
- Average payback for the system is less than six months.

The temate SI-CJ is an automated system for volumetric inspection of flash-butt welds in steel mills. Flash-butt welders are installed at the beginning of the pickle line to weld the end of one coil with the beginning of the next one.

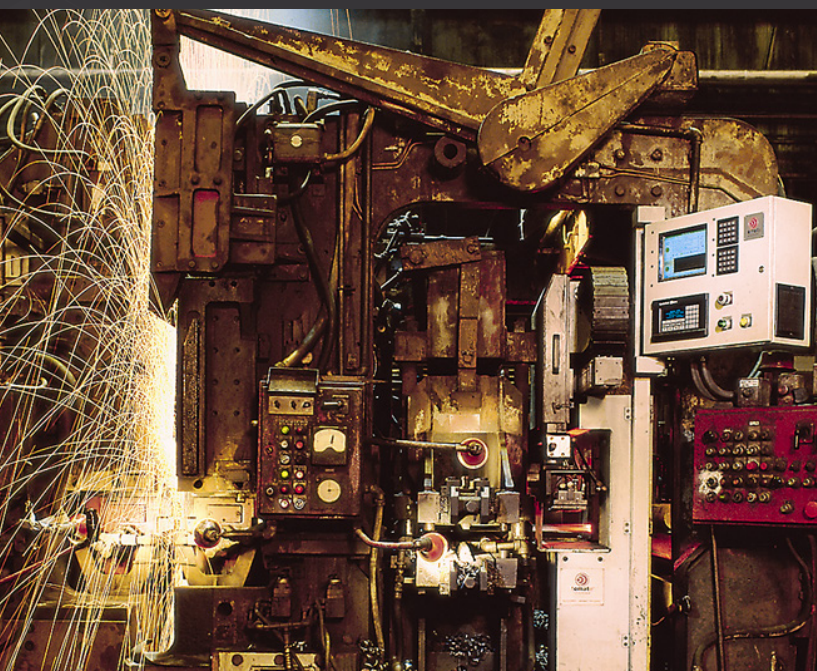
The system uses Electro Magnetic Acoustic Transducer (EMAT) technology to detect weld defects such as; internal voids and inclusions, lack of fusion, strip mismatch (laps), strip misalignment, and under/over trim conditions. For each weld inspected, the system features an immediate disposition of weld quality, and saves a complete record for later post-analysis, tracking, and process monitoring.

Users consistently report complete elimination of weld breaks in pickle lines, and near-complete elimination in cold mill reduction.

Advantages of the TEMATE SI-CJ include:

- Non-contact EMAT technique.
- Inspects a variety of different steel types, including TRIP, Dual-Phase and all High-Speed Steel (HSS) grades.
- Self-calibrated sensor. No need for teaching period or regular calibrations.
- Inspects while trimming with no additional cycle time (Taylor Winfield & Miebach).
- Optional weld monitoring system (two options).
- Over 25 installations around the world.

The TEMATE SI-CJ is the only system for automated, volumetric inspection of flash-butt welds available for steel mills. Average payback for the system is less than six months, considering the reduction of inspection cycle time, break reduction and increased production speeds.



## TEMATE SI-CJ - Specifications

<b>Materials Inspected</b>	<ul style="list-style-type: none"> <li>• Flat rolled carbon steel, all grades.</li> <li>• 0.060" (1.5 mm) to 0.260" (6 mm) thickness.</li> </ul>
<b>Defect Detection</b>	<ul style="list-style-type: none"> <li>• Nominal detection of notches: 0.010" deep</li> <li>• Plate mismatch (laps)</li> <li>• Strip misalignment</li> <li>• Over/under trim</li> <li>• Lack of fusion</li> <li>• Full plate width inspection (no width limitations)</li> </ul>
<b>Inspection Technique</b>	<ul style="list-style-type: none"> <li>• Volumetric guided waves for inspection of the weld (i.e. top and bottom surface, and internal).</li> <li>• Pitch-catch configuration with signal normalization.</li> <li>• Maximum sample rate of 2000 pulses per second.</li> </ul>
<b>Sensor Head Assembly</b>	<ul style="list-style-type: none"> <li>• 4.25" (108 mm) W x 5.50" (140 mm) L x 25.69" (653 mm) H when fully extended.</li> <li>• Weight 34 lbs (15 Kg).</li> <li>• Includes pulsed electromagnet, EMAT coil circuit, protective wear pad, vertical compliancy unit and signal conditioning electronics.</li> <li>• Replaceable protective wear pad is in contact with the part surface during inspection and provides protection for the EMAT coil circuit.</li> <li>• Vertical compliancy to the part surface accommodated in the sensor up to 4" (100 mm).</li> </ul>
<b>Data Acquisition Electronics</b>	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Enclosure is 24" (610 mm) W x 32.3" (820 MM) L x 69" (1750 mm) H, weighing approximately 500 lbs (225 kg).</li> <li>• Includes EMAT T/R electronics, magnet pulser, power supplies, computer, communication interfaces, monitor, keyboard and mouse.</li> </ul>
<b>Software Features</b>	<p><b>Real Time Acquisition &amp; Processing</b></p> <ul style="list-style-type: none"> <li>• Uses fast FPGA-based signal acquisition and processing.</li> <li>• Provides uninterrupted control and analysis of all time sensitive operations, including real-time display and disposition.</li> </ul> <p><b>Processing Link</b></p> <ul style="list-style-type: none"> <li>• Connects real-time acquisition &amp; processing with the user interface.</li> <li>• Decouples acquisition from user interface for easy hardware upgrades, and rapid customization.</li> <li>• Organizes and prepares data received from real time acquisition &amp; processing for representation.</li> </ul> <p><b>NDT-WEB User Interface</b></p> <ul style="list-style-type: none"> <li>• Provides display and user controls customized for the application using proprietary NDT-WEB real-time web technology.</li> <li>• 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.</li> <li>• Permits easy customization of user controls and display without affecting the operation of the equipment.</li> <li>• 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.</li> </ul>
<b>Weld Machine Diagnostic System(optional)</b>	<ul style="list-style-type: none"> <li>• Base system includes necessary instrumentation, mounting hardware, signal conditioners, and electrical interconnections used to monitor 8 welder inputs; welding voltage and current, platen movement on each side of the welder, and pressure on the high and low side of both upset hydraulic cylinders.</li> <li>• Standard package includes statistical trend charts, time/amplitude plots, averages, max/min signal amplitudes easily customizable for each welder.</li> </ul>
<b>Power and Environmental Ranges</b>	<ul style="list-style-type: none"> <li>• 220 VAC (+/-10%) 3-phase at 25 Amps.</li> <li>• Operating temperature 32°F(0°C) to 105°F(40°C).</li> <li>• Humidity non-condensing 5% to 95% RH.</li> </ul>