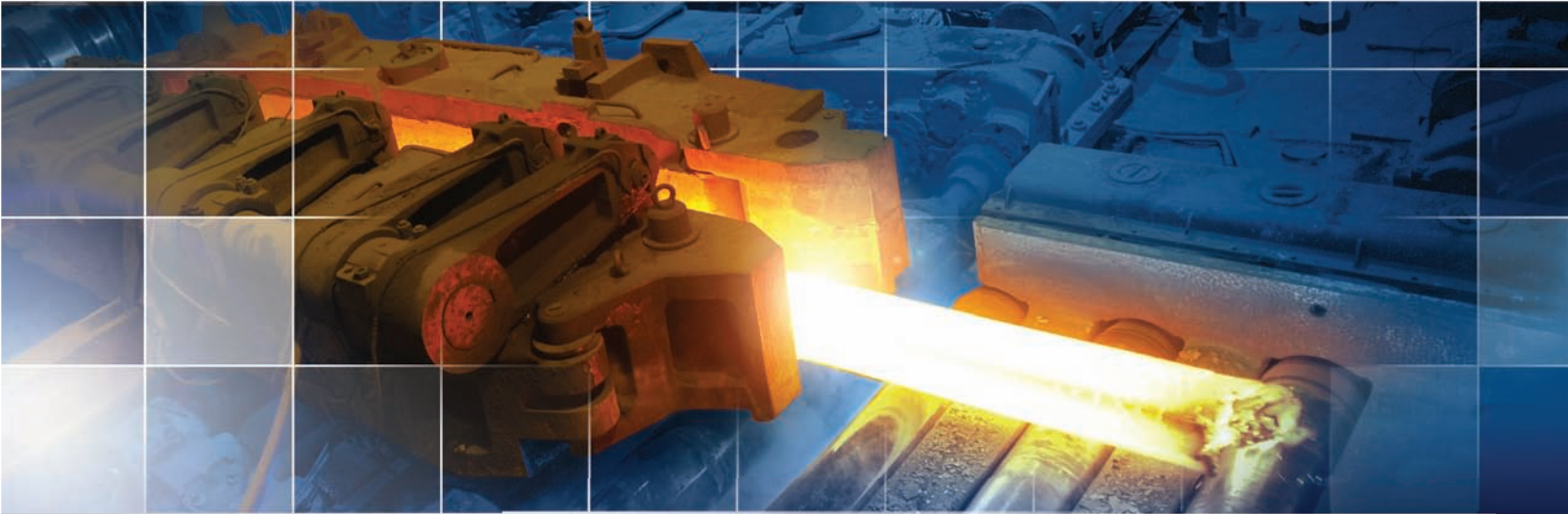




Steel Rolling & Annealing

Sensors That Stand up to the Harsh, High Temperature and Extreme Environments of Steel Mills



 **IMI SENSORS**
A PCB PIEZOTRONICS DIV.

Predictive Maintenance Steel Rolling & Annealing

Steel Mills not only have typical fans, pumps, compressors, gearboxes and cooling towers but also have machines and processes unique to the steel industry. The machine sizes, machine designs, operating speeds, cycle times, batch operations and harsh mill environments often command the use of carefully selected sensors and methods for effective equipment monitoring. Iron making and steel making areas often have an abundance of large belt conveyors, critical ultra-low speed machines with limited rotation, critical large EOT cranes and large volume turbo blowers coupled with >2300 °F hot blast air, molten liquid iron, red hot slabs, often carbon monoxide risks and of course, rolling mills.

Sensor Selection - IMI® recognizes the varied needs and challenges of the steel industry and has successfully designed a wide variety of transducers and accessories to help meet the needs of their customers. While most sensors can be used in a wide range of applications, some sensors are better suited for the harsh conditions encountered in steel mill applications and have been pointed out in this section.

Cold Rolling Areas - Process Monitoring & Protection

Cold Rolling Mills have similar operating and cyclic challenges as hot rolling, but add in large numbers of roll "chock" bearings that are inherently difficult to instrument, run at varying speeds/loads in batch cycles. These "chocks" are removed and reinstalled into the mill with new rolls many times a day, after only minutes of operation at times. Couple this with stringent product quality critical requirements and again, many more extreme monitoring challenges are raised.



Precision ICP® Accelerometer
Model 626B01

- Low noise floor
- Low frequency response to 12 cpm (0.2 Hz)
- Full sweep calibration



Bearing Fault Detector
Model 682B05

- Provides early warning of bearing and gear faults
- Operates with PLC, DCS, SCADA, alarm and control systems
- Outputs 4-20 mA signals for peak acceleration and overall vibration



4-20 mA Output Sensor
Model 640B01

- Available in top or side exit casings
- Peak or RMS, acceleration or velocity
- Intrinsically safe / explosion proof versions available



Bearing Fault Detector PLUS
Model 649A03

- Combination 4-20 mA Sensor PLUS vibration transmitter
- USB Programmable: Fine tune transmitter to your specific machine parameters
- Various output options: Integrates with your PLC system
- Output specifically tuned for sensing early faults/failures in rolling element bearings



Low Cost ICP® Accelerometer
Model 608A11, Model 608A11/020BZ
Model 608A11/030BZ, Model 608A11/050BZ
Model M608A11, Model M608A11/030BZ



- Ideal for submersible applications
- Small installation footprint
- Stock integral cable lengths of 10 ft, 20 ft, 30 ft and 50 ft





Hot Rolling Machines - Predictive Maintenance

Hot Rolling Mills have large low speed gearboxes, pinion stands, drive shafts and large diameter rolls in bearings to reduce the thickness of red hot steel slabs. Running these at variable loads/speeds and cycle times which may last only 30 seconds during speed variations of >500% presents challenges. Environmental factors here include reheat furnace temperatures, steam and scale from cooling water sprays and of course coiling red hot steel traveling at thousands of feet per minute.





High Temperature ICP® Accelerometer
Model HT602D01

-  **325°F**
(162 °C)
- 
- Ceramic sensing element
- Low profile design
- Through-bolt mount




High Temperature Precision ICP® Accelerometer
Model HT628F01

-  **325°F**
(162 °C)
- 
- Quartz sensing element
- Excellent thermal stability
- Welded hermetic



Very High Temperature Accelerometer
Series EX600B1X

-  **900°F**
(482 °C)
- Sensitivity: 10 to 100 mV/g (1.02 mV/(m/s²) to 10.2 mV/(m/s²))
- Frequency Range: (±5%) 282 to 240,000 cpm (4.7 to 4 kHz)
- Measurement Range: ±50 to 500 g peak (±490 to 4900 m/s²)
- Mounting: Through Holes (3)



Model 600A02
High Temperature Accelerometer Kit

- Includes accelerometer, cable and charge amplifier
- Sensor temperature range up to 500 °F (260 °C)
- Compatible with ICP® signal conditioners

Predictive Maintenance Steel Rolling & Annealing

Annealing and Coated Products - Predictive Maintenance

Annealing and coated product operations often run at quite low speeds and also have product quality critical requirements. Temperatures from annealing furnaces and molten zinc and aluminizing baths add many temperature, personnel safety and monitoring concerns as well.



- Low Cost ICP® Accelerometer**
Model 603C01, Model M603C01
- General purpose, hermetically sealed
 - IMI's most popular accelerometer
 - Small footprint



- Low Cost ICP® Accelerometer**
Model 607A11, Model 607A11/030BZ
Model M607A11
- Ideal for submersible applications
 - Smallest true industrial accelerometer on the market
 - Armored integral cable options available



- Precision Accelerometer**
Model 622B01, Model M622B01
- Full frequency sweep calibration: 5% sensitivity deviation tolerance
 - 15 kHz high frequency response ideal for early detection of bearing fluting conditions
 - Ideal for route-based data collection



Universal Transmitter Model 682A16

- Optional front panel programmer with LCD display
- Provides ICP® sensor power
- Accepts mA, ohm, RTD and thermocouple



IMI SENSORS

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