GlobalGauge CORPORATION

Thermal Gradient Imaging System

Camera-Based Slab & Strip Temperature Profiling
for Reheat Furnace Exit & Roughing Mill Applications

Made in America | Respected Worldwide

www.globalgauge.com

Eagle Eye HM3000 Series Hardware Platform

Hot Mill Series

HM3100 | HM3200

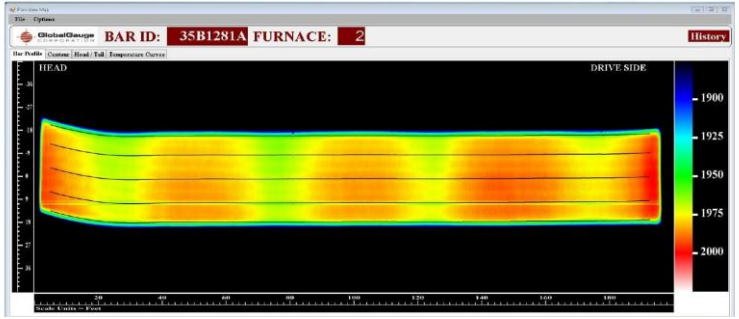
Product	Config	SKU	Cams	Key Features
HM3100	MCA	HM-3100	1	Mono hot mill configuration for strip steering
HM3200	SCA	HM-3200	2	Stereoscopic hot mill configuration enabling 3D & thermal analysis

- Real-time strip width & Centerline deviation
- Camera-based thermal profile analysis
- Improved strip steering accuracy
- Enhanced product quality & reduced wear

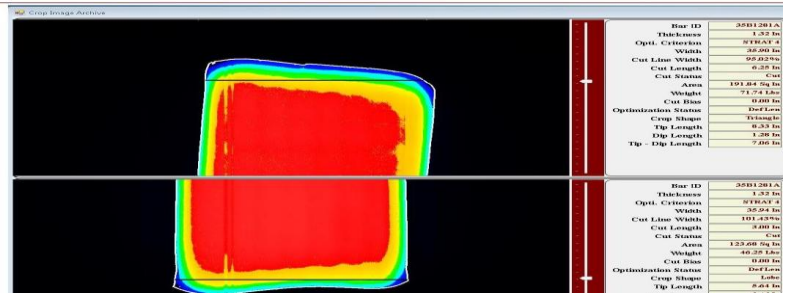
Thermal Gradient Imaging | Technology Overview

How It Works

- Standard industrial line-scan cameras image hot slab/strip as it exits the reheat furnace or roughing mill
- Full-width and full-length 2D thermal maps generated in real time
- Pixel intensity correlates directly to surface temperature via Planck's radiation law — no thermal cameras required
- At reheat furnace exit temperatures (1100–1250°C), radiated energy in the near-IR band falls on the steep Wien's law side of the Planck curve, yielding ~0.8% signal change per °C — enabling ±2-3°C accuracy from standard industrial line-scan cameras without requiring thermal imaging sensors.
- **Accuracy: ±2-3°C across the measurement range**
- Flexible communications with any L2 System



Full-length slab thermal profile — head to tail, operator to drive side



Crop optimization via thermal imaging — head & tail shape analysis

Thermal Gradient Imaging | Detectable Conditions

Blocked / Malfunctioning Burners

Cold spots on the slab reveal furnace burners that are blocked, misaligned, or failing — enabling targeted furnace maintenance before quality is impacted.

Descaler Spray Issues

Clogged or misaligned descaler nozzles create localized cooling patterns visible in the thermal map — catch nozzle failures before they cause surface defects.

Skid Mark Detection

Walking beam furnaces leave characteristic cold stripes where the slab contacts skids. Thermal imaging quantifies severity for process optimization.

Furnace Zone Optimization

Identify if soak zone isn't achieving uniform temperature across width and length — tune furnace settings to reduce fuel consumption and improve uniformity.

Camber & Flatness Prediction

Asymmetric thermal profiles (edge-to-edge gradients) predict downstream camber and flatness issues — enabling proactive rolling adjustments.

Throughput Optimization

Verify slabs reach target temperature across their full area — confidently increase furnace throughput when thermal uniformity targets are consistently met.

Thermal Gradient Imaging | Specifications & Benefits

Key Specifications

Measurement Type	Non-contact, camera-based
Temperature Accuracy	±2–3°C
Coverage	Full width × full length 2D thermal map
Camera Type	Industrial line-scan (visible spectrum)
Measurement Principle	Planck's radiation law (pixel intensity)
L2 Integration	Modbus-TCP, EthernetIP, etc.
Data Output	Thermal profile, contour, temperature curves
Connectivity	Ethernet + GGC remote access

End-User Benefits

- **Reduced scrap & off-spec product**
  - Identify non-uniform heating before it reaches the mill
- **Furnace fuel optimization**
  - Tune burner zones based on actual thermal data, not assumptions
- **Predictive maintenance of furnace & descaler equipment**
  - Detect degrading burners and nozzles early
- **Improved rolling quality & consistency**
  - Uniform thermal input = uniform mechanical properties
- **Historical data archiving & trend analysis**
  - Every slab profiled and stored for quality traceability

No thermal cameras required
Standard line-scan cameras provide ±2–3°C accuracy via Planck's law, at a fraction of the cost of IR systems.

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Thank you!

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For more info, visit www.globalgauge.com.