

# Non-intrusive and wireless instrumentation is crucial to minimize personnel and optimize steel production

Dr. Sergei Mishin, Sales Director Europe Mathias Gehl, Industry Manager Metals & Mining



Asset Performance



ustainability



Supply Chain Robustness



**Digital Plant** 





**Real Plant** 

### The challenge is to fulfill steel demand AND to decarbonize the industry

The share of secondary steel could **rise to 45%**, whilst overall steel demand increases **40% to 2,535 Mt**.



#### **Global demand**

Demand for steel has grown rapidly since 2000, more than doubling, driven by expansion of production primary in Asia.

Each person in the world consumes on average 229 kilograms of finished steel

products per person.

Today's average stock of steel is 4.2 tonnes per

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https://forms.office.com/e/ e40uRSGH4s

Link kopieren

#### Is it possible to have steady state steel operations without personnel on-site?



#### 18 übermittelte Antworten

22% 2025 - 2030

> 5% Already done

### Scannen Sie den QR oder verwenden Sie den Link, um teilzunehmen

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https://forms.office.com/e/ AMKvk4ZTKy

Link kopieren

#### How many more measurement points are needed to operate without personnel?



#### 14 übermittelte Antworten

14%

Already have enough

> 7% 2x more

### **Emerson** is the global automation leader with R&D to resolve specific industry problems



Note: All numbers represent pro-forma 2022 Emerson including full-year heritage AspenTech and excluding Micromine and any announced or completed divestitures.



POWER &







SOFTWARE % OF TOTAL SALES



#### **INSTALLED BASE**

# We commit to reaching **Science-Based Aligned Net Zero GHG Emissions** across all Scopes (1, 2 & 3) <sup>by</sup>2045 from 2021



we commit to achieving...

1.5°C Aligned

Source

Net Zero **Operations** 

Scopes 1 & 2 GHG Emissions

100% **Renewable Electricity** in our offices and facilities

Reduce 25% our Energy











#### Traditional Steel making – Blast Furnace & Basic Oxygen Furnace BF-BOF

#### Blast Furnace & Basic Oxygen Furnace BF-BOF

Select a featured solution below to explore how Emerson can help.



the Emerson products that can help.





### **Measurement solutions BU brings up to 40% new models per year** including non-intrusive, multi-variable, wireless





### Instrumentation designed for steel industry applications in a harsh environment to be flexible & accommodate changes during projects and operations







### In less than 24 hours, the Customer had implemented the arc furnace shell temperature monitoring system with 84 temperature points



#### Challenges

When increasing energy intensity in the EAF, the thermal load of refractory lining is increasing, in particular at the slag zone area. Frequently, hot spots are identified by increased wear of refractory lining because of the electric arc radiation, gas burners, and oxygen injectors.

Today, cooling water system is a system which is integral to the EAF operation. Typically, there are several cooling systems. The main classes of the different developed design of cooling system are spray coolers, plate coolers, stave coolers, internal block, panels and external jackets.

### Solution & Benefits

**84 Temperature Sensors with Magnet** to monitor the skin temperature, detect potential hot spots and prevent reliability issues.

In order to avoid the risk of cables damages due to the harsh environment, **21** WirelessHART Temperature Transmitters were chosen.

Temperature sensors were installed by using magnets, reducing the installation time to just a couple of minutes.

It can also be **easily removed and re-installed** after the maintenance repairs



#### Green Steel making – Natural Gas based with Shaft Furnace







#### Green Steel making – Hydrogen based with Fluidized bed Reactors

### Fluidized bed reactors

Select a featured solution below to explore how Emerson can help.



the application, its challenges and the Emerson products that can help.





5-10 times more measurement points are needed to enable Top Quartile Performance with the industry's broadest integrated Automation Solutions and Connected Services



### **Clamp-on ultrasonic method of flow measurement**

- Two ultrasonic sensor pairs act alternately as transmitter and receive.
- The sound signal is "accelerated" in the flow direction and "braked" against the flow direction.
- The time difference between the signals is proportional to the mean flow velocity.
- From this, the volume flow is calculated on the basis of the pipe parameters.



### **Non-intrusive Measurements Ideal for Upgrading**

#### **Fits all application**

- Water/gas/steam flow measurements
- For any pipe material
- Meters can be applied on pipe sizes from DN6 to DN6000
- Low flow measurement at 0,1 m/s or 0,3 ft/s
- Meters tolerate up to 10% solid contamination

#### Minimal installation effort

- No production shut down required
- No pipe work required

#### Virtually maintenance free

- no wear and tear by the process
- No moving parts



## **Supports Water conservation**

#### **Fits all application**

- Water/gas/steam flow measurements
- For any pipe material
- Meters can be applied on pipe sizes from DN6 to DN6000
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## **Support Energy Conservation**

#### **Compressed air**

- 30 years of gas measuring experience
- Hydrogen compatibility proven in numerous test
- Three successful test with at steel plants

#### Heat exchanger optimization

- Complete wireless portfolio
- Complete non-intrusive portfolio

#### **Steam Measurement**

- Up to 630°C
- No pipe size limitation
- From 0,025 m/s onwards





## **Supports Switch to Hydrogen**

#### **Proven Technology**

- 30 years of gas measuring experience
- Hydrogen compatibility proven in numerous test
- Three successful test with at steel plants

#### **Additional Measurements**

- Mol mass
- Hydrogen Concentration

#### **Highest Safety**

- No additional leakage points
- Suitable for relevant safety zones



## **Application Range**

Fluids	Liquids, gase	es and steam	<b>Pressure:</b> Minimum pressure of 3 (depending on the gas	
Pipe diameter	liquids: 6mm gases: 8mm	to 6500 mm to 1600 mm	No limit on maximum	
Pipe material	almost all pipe ma metal, alloys, pl	terials are suitable lastics, glass, etc.	Temperature Ra	
	Liquids	Gases	- 40°C	standard transducer
Flow velocity	0.01 – 25 m/s	0.01 – 35 m/s		
Precision	0.15%	0.15%	- 40°C	high-temperature tra
Uncertainty	±1%	±2%		
			- 190°C	FLEXIM WaveInjecto











### Let's summarize

#### **Applications**

Water Management	Energy management	Process gases	Ch
<ul> <li>Raw/sea water intake</li> <li>Water treatment plant</li> <li>Water discharge</li> <li>Wash water recirculation</li> </ul>	<ul> <li>Heat exchanger</li> <li>Cooling water &amp; condensate</li> <li>Heat transfer fluids to 630°C</li> <li>Compressed air</li> <li>Steam</li> </ul>	<ul><li>Nitrogen</li><li>Oxygen</li><li>Argon</li></ul>	<ul> <li>Me</li> <li>HC</li> <li>50%</li> <li>Sul</li> </ul>

#### **Operating advantages of Flexim clamp-on flow meters**

- Water/gas/steam flow measurements
- For any pipe material
- Lowest installation costs and virtually zero maintenance
- Unaffected by pressure or erosive conditions in the process
- Meters can be applied on pipe sizes from DN6 to DN6000
- Low flow measurement at 0,1 m/s or 0,3 ft/s
- Meters tolerate up to 10% solid contamination

#### emicals

#### easures flow & concentration I pickling solution % NaOH at >90°C Ifuric acid

### **Transition Net Zero - Emerson engaged on full H2 value chain**



PRODUCTION





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