



# ***COMBUSTION SOLUTIONS FOR STEEL***

COMBUSTION CONTROL, EMISSIONS AND PARTICULATES MONITORING FOR THE STEELMAKING INDUSTRY

**AMETEK**<sup>®</sup>  
PROCESS & ANALYTICAL INSTRUMENTS



## COMBUSTION SOLUTIONS FOR STEEL

COMBUSTION CONTROL, EMISSIONS AND PARTICULATES  
MONITORING FOR THE STEELMAKING INDUSTRY

AMETEK, INC. IS A LEADING GLOBAL MANUFACTURER OF ELECTRONIC INSTRUMENTS AND ELECTROMECHANICAL DEVICES, WITH ANNUAL SALES OF APPROXIMATELY \$4 BILLION.

AMETEK HAS MORE THAN 15,000 COLLEAGUES AT MORE THAN 150 MANUFACTURING LOCATIONS AROUND THE WORLD. THESE OPERATIONS ARE SUPPORTED BY MORE THAN 100 SALES AND SERVICE LOCATIONS ACROSS THE UNITED STATES AND IN 30 OTHER COUNTRIES.

**LAND**  
AMETEK

AMETEK Land has been manufacturing precision measuring equipment since 1947.

We are specialists in non-contact temperature measurement and combustion monitoring, with applications across such diverse industries as steel, glass-making, power generation and cement manufacture.

Our success rests on award-winning technologies that push the limits demanded by the ever-increasing technical demands of global industry. Aligned with our expert knowledge, we meet the challenges of a wide range of applications, delivering process safety, process control, and product quality our customers depend on.

**AMETEK**<sup>®</sup>  
PROCESS INSTRUMENTS

AMETEK Process Instruments is a worldwide manufacturer of process analysers and instrumentation. We focus our experience on designing new, innovative analysers that help our customers achieve the highest levels of productivity and quality.

Through this focus, we have created some of the most capable technologies in the world. Our primary emphasis in analyser design is reliability. We understand that you must have complete confidence that the analyser will provide the information you need, when you need it.

Combustion operations during steel production processes produce emissions which are subject to strict environmental regulations. Monitoring and controlling these emissions is a regulatory requirement, and also provides process efficiency benefits.

In addition, monitoring carbon monoxide (CO) and oxygen (O<sub>2</sub>) supports combustion control, leading to significant savings in fuel costs and safer operation.

Controlling the emissions of particulate matter, such as dust and other pollutants, is also a key application, but can prove challenging. The high-particulate environment adversely affects both the measurements and the instrument itself

Continuous emissions monitoring helps ensure that plants meet the necessary control regulations, avoiding

the prospect of sizeable fines. In some cases, this monitoring supports the improvement of operational efficiency, lowering production costs. It can also reduce emissions damage to the plant, extending equipment life.

AMETEK Process & Analytical Instruments offers a comprehensive range of monitoring options for combustion in steel production. Our specialised advanced solutions monitor flue gases to prevent harmful emissions and ensure efficient combustion.

Designed to operate in the harsh environments found in the steel industry, these instruments deliver critical measurements for process control, reducing costs and improving product quality.

### LANCOM 4

GET ALL THE FLUE GAS MEASUREMENTS THAT MATTER WITH THIS PORTABLE, EASY-TO-USE SOLUTION FOR SIMULTANEOUS ANALYSIS OF MULTIPLE GASES.

# COMBUSTION SOLUTIONS FOR STEEL

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## COKE OVENS

To ensure optimum blast furnace operation and hot metal quality, coke is a critical raw material. High quality coke provides the lowest amounts of impurities along with the highest thermal energy and metal reduction. Introducing high quality coke to a blast furnace will result in a lower coke rate, higher productivity and lower metal cost.

Typically, coke is produced by carbonising coal at high temperatures. Waste combustion gases from this process are either removed via a stack or transferred to a waste heat recovery boiler,

which converts the excess heat into steam for power generation.

Both these methods require monitoring of the combustion gases, for optimisation of the process and control of emissions.

At the oven stack, AMETEK provides solutions for opacity monitoring and measuring particulate concentration.

Solutions for the waste heat boiler provide O<sub>2</sub> and combustibles measurements that help optimise combustion, and also measure gas emissions.

| SEGMENT   | APPLICATION       | MEASUREMENT                  | THE AMETEK SOLUTION |
|-----------|-------------------|------------------------------|---------------------|
| Coke oven | Coke oven stack   | Opacity Emissions            | 4500 MkIII          |
| Coke oven | Coke oven stack   | Particulate Matter Emissions | 4650-PM             |
| Coke oven | Waste heat boiler | Oxygen                       | WDG-1200 / 1210     |
| Coke oven | Waste heat boiler | Oxygen & Combustibles        | WDG-VC              |
| Coke oven | Waste heat boiler | Gas Emissions                | Lancom 4            |

### 4500 MkIII

Industry-leading opacity monitor for PS-1 and ASTM D6216 compliance measurements. Installed on the stack or ducts leading to the stack.

- The most accurate and reliable opacity monitor available
- Combines three patented technologies for the highest performance
- Reliable, user-friendly, trouble-free operation
- Lowest possible drift and highest thermal stability

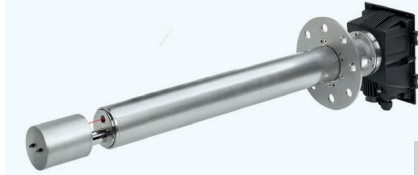


COMBUSTION & EMISSION MONITORING

### 4650-PM

Continuous measurement of the concentration of low-level particulate matter in stacks and ducts. Can be used as a PM-CEMS or PM-CPMS.

- Better detection limit through large-area collection optics
- Meets US EPA regulations
- Wide measurement and temperature ranges
- No moving parts in the measurement path, for high stability and reliability



COMBUSTION & EMISSION MONITORING

### WDG-1200/1210

Stack-mounted, in-situ oxygen probe for combustion optimisation, featuring integrated control and display electronics

- Simple user interface for easy, flexible operation
- Fully field-serviceable with removable inner tube structure
- Versatile probe and mounting
- Rugged, reliable design



COMBUSTION & EMISSION MONITORING

### LANCOM 4

A portable flue gas analyser featuring up to nine sensors for emissions measurement and combustion optimisation, used for stack emission monitoring.

- Simple to set up and operate
- Monitors all major flue gases
- Robust design for use in harsh environments
- Lightweight for easy portability



COMBUSTION & EMISSION MONITORING

### WDG-VC

Fully field-serviceable oxygen (O<sub>2</sub>) and combustibles analyser with a close-coupled extractive design for a fast response in a wide range of flue gas applications.

- A complete solution for combustion control and safety
- Measures O<sub>2</sub> and combustibles in one unit
- SIL 2 certified for safety compliance
- Suitable for hazardous locations with Zone 1 enclosure



COMBUSTION & EMISSION MONITORING

## SERVICES

Our in-house service centres provide after-sales services to ensure you get the best performance from your system. This includes technical support, certification, calibration, commissioning, repairs, servicing, preventative maintenance and training. Our highly trained technicians can also attend your site to cover planned maintenance schedules and repair emergency breakdowns.

# COMBUSTION SOLUTIONS FOR STEEL

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## ELECTRIC ARC FURNACES

An Electric Arc Furnace (EAF) does not use coal or coke; instead it uses the heat generated from an electric arc to form molten steel, usually from scrap metal and direct reduced iron (DRI).

Combustion control is not an issue for the EAF, as there is no requirement to balance fuel and O<sub>2</sub> levels. Process

efficiency can be controlled by measuring the temperature as the steel is tapped from the furnace.

However, it is still critical to monitor emissions and dust generated by the furnace. These pollutants exit via the EAF stack, so measurements here are key to ensuring compliance with environmental regulations.

| SEGMENT              | APPLICATION | MEASUREMENT                  | THE AMETEK SOLUTION |
|----------------------|-------------|------------------------------|---------------------|
| Electric arc furnace | EAF stack   | Opacity Emissions            | 4500 MkIII          |
| Electric arc furnace | EAF stack   | Particulate Matter Emissions | 4650-PM             |

### 4500 MkIII

Industry-leading opacity monitor for PS-1 and ASTM D6216 compliance measurements. Installed on the stack or ducts leading to the stack.

- The most accurate and reliable opacity monitor available
- Combines three patented technologies for the highest performance
- Reliable, user-friendly, trouble-free operation
- Lowest possible drift and highest thermal stability



COMBUSTION & EMISSION MONITORING

### 4650-PM

Continuous measurement of the concentration of low-level particulate matter in stacks and ducts. Can be used as a PM-CEMS or PM-CPMS.

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- Meets US EPA regulations
- Wide measurement and temperature ranges
- No moving parts in the measurement path, for high stability and reliability



COMBUSTION & EMISSION MONITORING

## ROLLING MILL

A reheat furnace is used to bring the steel to the correct temperature before it passes into the rolling mill.

Controlling the reheat furnace is key to reducing fuel costs and the time required for this stage of the steel-making process.

While temperature measurements play an important role in the uniformity of heating and quality of the steel,

the efficiency of the combustion process itself depends on the ratio of the air to fuel.

AMETEK offers a combined measurement solution for both oxygen and combustibles, which enables closer control of the air-fuel ratio. This in turn allows optimisation of the combustion reaction, increasing furnace efficiency and reducing fuel costs.

| SEGMENT      | APPLICATION    | MEASUREMENT           | THE AMETEK SOLUTION |
|--------------|----------------|-----------------------|---------------------|
| Rolling mill | Reheat furnace | Oxygen & Combustibles | WDG-VC              |

### WDG-VC

Fully field-serviceable oxygen (O<sub>2</sub>) and combustibles analyser with a close-coupled extractive design for a fast response in a wide range of flue gas applications.

- A complete solution for combustion control and safety
- Measures O<sub>2</sub> and combustibles in one unit
- SIL 2 certified for safety compliance
- Suitable for hazardous locations with Zone 1 enclosure



COMBUSTION & EMISSION MONITORING

## AMETEK LAND HAS BEEN MANUFACTURING PRECISION MEASUREMENT INSTRUMENTATION SINCE 1947.

We are specialists in non-contact temperature measurement and combustion monitoring with applications across diverse industries such as steel and glass making, electricity generation and cement manufacture.

As part of AMETEK Process and Analytical Instruments Division since 2006, our customers benefit from the worldwide AMETEK sales and service team.

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## AMETEK LAND NON-CONTACT TEMPERATURE MEASUREMENT

### SPOT

Single-spot, non-contact infrared pyrometers, optimised for a wide span of temperature ranges and process requirements.



FIXED SPOT THERMOMETERS

### LSP-HD

Ethernet-controlled compact infrared linescanner, designed to produce advanced thermal imaging in moving processes.



LINESCANNING

### SDS-E

High-resolution thermal imaging system designed to accurately and rapidly detect the onset of slag carry-over.



PROCESS IMAGING

### CYCLOPS L

Portable, handheld, non-contact spot pyrometers enabling easy and accurate point-and-measure temperature readings.



PORTABLES

### NIR-B

Short wavelength borescope thermal imager providing high-resolution images with a wide, 90-degree view, in a through-the-wall design.



PROCESS IMAGING

SEE OUR OTHER RELATED LITERATURE:



4500 MkIII  
PRODUCT  
BROCHURE



4650 PM  
PRODUCT  
BROCHURE



LANCOM 4  
PRODUCT  
BROCHURE



WDG-VCM  
PRODUCT  
BROCHURE

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DISCOVER HOW OUR BROAD  
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FOR YOUR PROCESS

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