

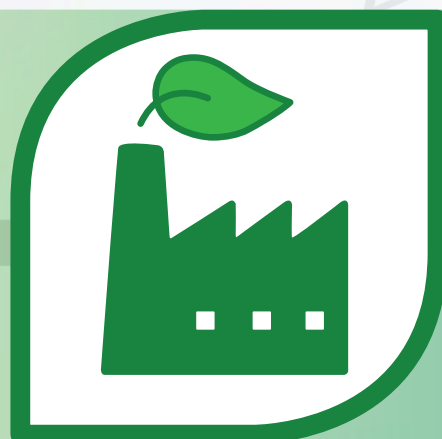
LAND

AMETEK[®]

THE ROAD TO INDUSTRIAL DECARBONISATION



KEY STEPS TOWARDS A DECARBONISED FUTURE



ENERGY
EFFICIENCY



ALTERNATIVE
FUELS



CARBON
CAPTURE

As the global economy moves to a decarbonised future, accurate and reliable measurements will be more important than ever. Monitors and analysers for infrared non-contact temperature measurement, combustion efficiency and environmental pollutant emissions are key to the three pillars of decarbonisation – energy efficiency, alternative fuels, and carbon capture.

AMETEK Land has provided solutions to help energy-intensive heavy industries improve thermal efficiency, increase product quality, and control emissions for more than 70 years.

Our expert advice and innovative technology will help improve process efficiency and enhance

product quality, delivering trusted, proven solutions that are ready to face these new application challenges – and those to come.

Thermal imaging is just one example; well-used in industry for high-accuracy temperature measurement, it is now increasingly being utilised as a solution for furnace monitoring and optimisation, supporting greater process efficiency.

As decarbonisation technology advances and expands, our expert understanding of industrial applications and measurement methodology leaves us well placed to find new solutions that will improve reliability and productivity in an increasingly competitive, highly regulated environment.

In this brochure, we look at AMETEK Land's solutions for overcoming the challenges of emissions reduction in the power sector and other heavy industries such as metals, glass, hydrocarbon processing, and cement.

By supporting applications such as increasing energy efficiency, decarbonising energy supplies, and capturing carbon dioxide, our products support these industries in successfully managing the transition from fossil fuels to bioenergy, hydrogen and electrification.



TAKE YOUR NEXT STEP ON THE ROAD TO DECARBONISATION

VISIT: WWW.AMETEK-LAND.COM/INDUSTRIAL-DECARBONISATION

INCREASING

ENERGY EFFICIENCY

Decarbonisation trends will change how industrial operators work – forcing end-users, technology licensors, and instrument manufacturers to continuously seek incremental and radical improvements to process efficiency.

For many heavy industrial processes, increasing energy efficiency can be a serious challenge. The key aims are to minimise energy use, maximise combustion efficiency, achieve optimum quality, reduce emissions, and capture waste heat sources to be reused.

CHALLENGES

Many tasks require only slight behavioural changes – for example, switching equipment off rather than leaving it on standby can significantly reduce energy usage over time.

However, the extremely aggressive nature of many industrial processes due to the process media, the surrounding environment, or both – can make other energy-reducing

measures, such as optimising combustion, or thermal processing, challenging to achieve.

These measures require precise measurement particularly in combustion optimisation, where changing fuel sources or quality can impact the reaction and useable energy.

In addition, ever-increasing demand for high-specification products means that achieving quality goals becomes a never-ending race. Products that fail to meet the necessary criteria may be rejected, scrapped, or require rework, all of which can double emissions.



SOLUTIONS

AMETEK Land's high-definition thermal imaging technology, working alongside portable and fixed emissions monitoring equipment, helps optimise combustion, delivering benefits including reduced fuel consumption and compliance with regulated emissions such as NOx.

With combustion under control, blueprinting of process parameters for maximum product throughput and quality can be performed.

A “right first time” approach is essential for quality, and to minimise environmental impact. With instrumentation capable of measuring in extremely harsh environments, AMETEK Land provides a complete measurement solution, ranging from a single measurement point to high-definition radiometric thermal imaging with approximately 3 million pixels.

These solutions can provide vital insight into critical process parameters, optimising thermal processing, ensuring maximum efficiency, and increasing sustainability in industries as diverse as steel, aluminium, glass, cement, power, and HPI.

STEEL

ALUMINIUM

GLASS




















CEMENT

POWER

HPI

INCREASING ENERGY EFFICIENCY



	RECOMMENDED SOLUTIONS												
	 FIXED SPOT NON-CONTACT PYROMETERS			 PORTABLE NON-CONTACT THERMOMETERS	 FIXED THERMAL IMAGERS & LINE SCANNERS						 THERMAL SURVEYS	 COMBUSTION EFFICIENCY MONITORS	 PORTABLE GAS ANALYSERS
APPLICATIONS													
METALS REHEAT FURNACES Product temperature measurement	■		■	■	■		■				■		
Combustion and emission monitoring											■	■	■
METALS EAF/BOF TAPPING Slag detection to reduce inclusions and associated rejection later in the process									■		■		
METALS HOT ROLLING MILL AND CAL/CGL ANNEALING FURNACES Edge-to-edge through coil temperature profile to ensure homogenous mechanical properties										■	■		
GLASS FURNACES – REGENERATIVE AND RECUPERATIVE Product/refractory temperature measurement		■		■		■		■			■		
Electric – Product/refractory temperature measurement	■	■		■		■		■			■		
Hybrid (Hydrogen/Biofuel) – Combustion optimisation	■	■		■		■		■			■		■
ETHYLENE CRACKERS/STEAM METHANE REFORMERS Tube Wall/Metal temperature measurement			■	■	■		■				■		
FIRED HEATERS Combustion optimisation											■		■
THERMAL POWER BOILERS/FIRED HEATERS Combustion optimisation for hydrocarbon and biomass fuel-fired applications					■	■					■		■
Acid Dew Point measurement to allow operators to run at the minimum safe operating temperature to prevent acid corrosion											■		■
Slag monitoring and boiler optimisation for traditional and biomass-fired applications					■	■					■		
Flue gas measurement (CO, O ₂ , NO _x) to optimise fuel/air ratio without creating excessive pollution											■	■	■
CEMENT AND MINERAL PYRO PROCESSING Combustion optimisation – natural gas/carbonising fuel				■	■	■	■				■	■	■
Product quality improvement	■			■	■	■	■				■	■	■
Asset integrity monitoring				■	■			■		■	■		

DECARBONISING ENERGY SUPPLIES

CO₂ emissions can be reduced or even eliminated by replacing fossil fuels with bio-fuels, and waste-derived fuels, or through electrification. Already common in some markets, this trend is likely to accelerate as the goal of net-zero carbon is sought.

CHALLENGES

Standardised hydrocarbon fuels such as natural gas or diesel are much easier to manage than the often-changeable nature of alternative energy sources such

as refuse-derived fuel (RDF) and biomass. As supply chains for these resources mature, the consistency of these sources is likely to improve; however, optimising combustion

with these fuels can be a major test for operators with quality, efficiency and emissions targets still needing to be met.







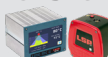




















SOLUTIONS

Thermal imaging is ideal for monitoring and optimising carbon rich flames from the combustion of biomass and waste sources. Mid-infrared imaging is able to see

through the gases of combustion, providing a rich data source for optimising combustion, monitoring slagging and deposition, and revealing early warning signs

of refractory damage, enabling proactive repairs to maintain maximum up-time.

	RECOMMENDED SOLUTIONS								
	FIXED SPOT NON-CONTACT PYROMETERS		PORTABLE NON-CONTACT THERMOMETERS	FIXED THERMAL IMAGERS & LINE SCANNERS			CARBON MONOXIDE DETECTORS		
APPLICATIONS	SPOT 	GOLD CUP 	CYCLOPS L 	MWIR-B-640 	NIR-B-2K 	NIR-B-640 (EX) 	HOTSPOTIR 	SILOWATCH 	MILLWATCH 
FIRED HEATERS (HYDROGEN): Tube Wall temperature measurement									
BIOMASS BOILERS: Combustion optimisation									
BIOMASS SUPPLY CHAIN PROTECTION: Early warning for self-ignition of biomass during transport and storage									
BIOMASS AND WASTE FIRED: Combustion optimisation									
ALUMINIUM: Reverb furnace									

CAPTURING

CARBON DIOXIDE

Carbon dioxide (CO₂) can be captured either as emissions resulting from the combustion of hydrocarbons, or from the process itself where CO₂ is produced, such as cement manufacture. In many cases, this can be carried out by adapting existing technology, for example amine sequestration, while a range of new processes and technologies are also under development.

Regardless of the method used, success will depend on minimising the additional energy and cost required for carbon capture, and on the sustainability of the material used in the capture process.



CHALLENGES

Capturing carbon dioxide is a common process in oil and gas applications, with well-proven technology. However, it relies on an energy-intensive amine sequestration process, with a feed of high-purity CO₂. Other heavy industrial processes are challenged by the economics of this requirement, or technically due to contamination of CO₂ streams and lower concentrations.

As the CO₂ economy develops and matures, new measurement points will emerge, and AMETEK Land will be on hand to provide the expertise required to ensure accuracy and reliability.



SOLUTIONS

Thermal imaging can monitor the outer skin of absorber towers and vessels to provide early warning of hotspots that may indicate incorrect process operation. This helps maintain asset integrity and up-time.

APPLICATIONS

AMINE SEQUESTRATION TOWER/VESSEL MONITORING

Hotspot monitoring

RECOMMENDED SOLUTIONS



FIXED THERMAL IMAGERS & LINE SCANNERS

LWIR-640



KEY PRODUCT SOLUTIONS

FIXED SPOT NON-CONTACT PYROMETERS

SPOT

A family of fully-featured, high-performance pyrometers for fixed non-contact infrared spot temperature measurements, available in a range of operating wavelengths, temperature ranges and process requirements.

Designed for easy single-person installation, SPOT pyrometers deliver the accurate measurements to optimise application processes and maintain high product quality.



FIXED SPOT NON-CONTACT PYROMETERS

FG

A simple fibre-optic, two-wire, loop-powered thermometer with 4-20mA output, specifically designed to improve process control in the glass industry.

Offering accurate, high-resolution, and reliable temperature measurements, the FG's flexible design makes it ideal for spot measurements throughout the glass production process.



FIXED SPOT NON-CONTACT PYROMETERS

GOLD CUP

A unique reference pyrometer designed specifically for temperature measurements on the surface of reformer tubes.

The only instrument that can provide a repeatable, reliable temperature for reformer tubes, Gold Cup eliminates inherent errors that affect other infrared devices. This makes it ideal for checking and correcting other measurement devices.



PORTABLE NON-CONTACT THERMOMETERS

CYCLOPS L

High-quality, precision-accuracy hand-held pyrometers providing easy point-and-measure temperature readings in a rugged yet lightweight design.

Designed for single-handed use, the ergonomic Cyclops L uses trigger control for datalogging, storing up to 9,999 readings internally for later analysis.



FIXED THERMAL IMAGERS & LINE SCANNERS

MWIR-B-640

A highly accurate radiometric infrared borescope imaging camera with spectral filtering for continuous temperature measurement and furnace profiling applications.

With a clear view through smoke and furnace gases, the MWIR-B-640 allows highly accurate and fully radiometric temperature measurement image data to be taken, stored, and trended over the lifetime of the furnace/boiler.



FIXED THERMAL IMAGERS & LINE SCANNERS

NIR-B-2K

A high-resolution, short-wavelength radiometric infrared borescope imaging camera designed for a range of continuous process monitoring and control applications.

The NIR-B 2K produces continuous, live, high-definition thermal images at an outstanding resolution of up to 3 million pixels, allowing furnace temperatures to be optimised to save energy, increase efficiency and reduce emissions.



FIXED THERMAL IMAGERS & LINE SCANNERS

NIR-B-640 (EX)

NIR-B-640 is short-wavelength radiometric infrared borescope imaging camera for continuous temperature measurement in furnace applications with a higher differential temperature in the field of view.

NIR-Borescope-640-EX is used for steam reformer and cracker tube continuous temperature measurement and furnace optimisation and monitoring.



FIXED THERMAL IMAGERS & LINE SCANNERS

LWIR-640

A long-wavelength thermal imager providing continuous and reliable temperature measurements in harsh industrial and environmental conditions.

With smart Industry 4.0 functionalities, digital interfaces and bi-directional communications, the LWIR-640 is particularly suited to field applications where fully autonomous operation of the camera is required.

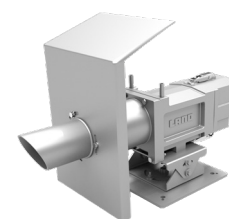


FIXED THERMAL IMAGERS & LINE SCANNERS

SDS-640

A proven solution for accurate and timely detection of slag carryover in the steelmaking process, allowing plants to improve product quality, reduce slag carryover and improve operator safety.

The SDS-640 uses high-resolution thermal imaging to detect the transition between steel and slag, delivering improved yields, higher-quality steel and a reduction in costly downstream processing.



FIXED THERMAL IMAGERS & LINE SCANNERS

HOTSPOTIR

Highly compact, fast-response infrared scanning system designed to detect emerging hotspots on conveyor belt materials.

Designed for industrial environments, the HotSpotIR monitors across 1000 temperature spots at speeds up to 100Hz, protecting conveyors against hot particles as small as 25 mm (1in.) in diameter.



FIXED THERMAL IMAGERS & LINE SCANNERS

LSP HD

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

Offering industry-leading scanning performance of 1000 data points even at scan speeds as high as 150 scans per second, LSP-HD sets a new benchmark for process imaging definition.



THERMAL SURVEYS

IN-FURNACE THERMAL SURVEYS

A unique service providing essential insights into the thermal processes within industrial furnaces and boilers, with accurate, real-time measurements to increase efficiency, productivity, and extend asset life.

Combining near-infrared borescope thermal imaging with portable multi-gas analysis, the survey helps to improve application productivity, increase efficiency, and protect the refractory from damage.

COMBUSTION EFFICIENCY MONITORS

FGA SERIES

A compact, reliable multi-gas analyser for measuring flue gas emissions in processes burning natural gas and biomass.

The FGA series provides accurate, reliable measurement of carbon monoxide, nitric oxide and oxygen in flue gases and is an integrated solution for Continuous Emissions Monitoring Systems (CEMS) applications.



PORTABLE GAS ANALYSERS

LANCOM 4

A compact portable multi-gas analyser, capable of measuring several flue gases simultaneously in combustion and emission processes.

LANCOM 4 is simple to set up and operate, enabling highly accurate spot and semi-continuous gas testing of all major flue gas emissions, with advanced real-time processing techniques.



CARBON MONOXIDE DETECTORS

MILLWATCH

An advanced carbon monoxide detector designed to provide early warning of spontaneous combustion in pulverisers for coal and biomass.

Continuously extracting sample gases from the mill outlet, the Millwatch monitors and quickly responds to sudden carbon monoxide build-up, allowing preventative action to be taken before a hazardous condition develops.



CARBON MONOXIDE DETECTORS

SILOWATCH

Advanced carbon monoxide detector specifically developed to detect and warn of spontaneous combustion in coal and biomass storage silos at an early stage.

Silowatch works by extracting the sample gas from the silo headspace and continuously monitoring the CO level, quickly responding to sudden carbon monoxide build-up and allowing action to be taken to prevent a more serious condition.



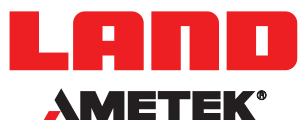
THE ROAD TO INDUSTRIAL DECARBONISATION

If you want to improve your existing processes, or explore the potential for change, please speak to our experts. Working in partnership with AMETEK Land, you'll benefit from best practice and knowledge sharing between energy-intensive industries to meet your decarbonisation challenges.



TAKE YOUR NEXT STEP ON THE ROAD TO DECARBONISATION

VISIT: WWW.AMETEK-LAND.COM/INDUSTRIAL-DECARBONISATION



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