

SPOT+

SMART HIGH-PRECISION
PYROMETERS

WITH ADVANCED CONNECTIVITY AND
PROCESS VIDEO



50 to 3500 °C / 122 to 6332 °F



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SPOT+

SMART HIGH-PRECISION PYROMETERS

The SPOT+ range of smart infrared pyrometers offers advanced industrial connectivity and visible light process video

The technologies utilized in SPOT+ make non-contact temperature measurement accurate, flexible and easy to use.

Combining Ethernet/IP, REST API, web server, Modbus TCP, image streaming, analogue and alarm outputs within one device, SPOT+ makes all these conveniently available to the operator.

Pyrometer readings and configuration settings are available on the rear display and remotely via webserver or through IMAGEPro SPOT software. The standard body models use a focus assist flashing green patented* LED and provide visible light process video to confirm measurement SPOT+ size and location. The M/R100 and M/R160 models offer a fiber-optic variant which uses a red LED for alignment.

Flexible design with adapters provide simplified installation and easy replacement of older pyrometers. SPOT+ is designed to be interchangeable with any existing fixed spot pyrometers.

Dedicated software extends the usability.

AMETEK Land IMAGEPro software can be used to configure, display and log data and process images from multiple SPOT+ pyrometers, or a combination of AMETEK Land thermal imagers and SPOT+ pyrometers. Advanced software functionality allows SPOT+ measurements to be used for live background temperature, emissivity or dirty-window compensation of imaging systems.

AMETEK Land SPOTPro software provides datalogging at as fast as 1 ms response time, setup and control of multiple SPOT+ pyrometers and / or SPOT Actuators.

To ensure security with multiple users, various levels of access are available in both SPOTPro and IMAGEPro software. Data log frequency, file size, save and archive locations are all configurable. AMETEK Land software is the perfect choice for smaller operations where traditional process control systems may be absent.

SPOT+ IS AN INNOVATIVE STAND-ALONE PYROMETER DESIGNED WITH ADVANCED INTEGRATED PROCESSING CAPABILITIES.



SPOT AL application pyrometer in aluminium extrusion



SPOT MM application pyrometer in liquid metal tapping applications

* Patent Number GB2497609

FEATURES

BENEFITS

High-precision temperature measurement	Precise process temperature control improves product quality and reduces scrap.
Wide temperature ranges	Full process measurement and control
Data interfaces: Multiple analogue, digital and Ethernet	Easily intergrates with process control systems including Ethernet/IP (Industrial Ethernet) and REST API protocols as well as Modbus TCP/IP
Rapid response times and smart onboard processing	Provides immediate live process control
Password protection	Safe, remote process monitoring
Onboard camera	Visible process view alongside spot temperature measurements
IMAGEPro Software	Emissivity and background correction of thermal imaging systems. Configuration, display and data logging, plus more.
Application-dedicated pyrometer models	Enable measurement of complex materials such as aluminium and galvanized steel
Hazardous area options	Can used in the harshest of environmental conditions



HAZARDOUS EXSH1 SPOT HOUSING



MOUNTINGS AND ACCESSORIES

COMMUNICATION OPTIONS

AMETEK LAND OFFERS A RANGE OF MOUNTINGS AND ACCESSORIES FOR SPOT+ PYROMETERS

SPOT+ is designed to be interchangeable with existing fixed spot pyrometers, and can be used with the SPOT Actuator for remote alignment.

To view the full range of mountings and accessories available, see our [SPOT Mountings and Accessories Brochure](#) and [SPOT Actuator Brochure](#)

For specific recommendations on the choice of mountings, brackets, cables, or other accessories please contact an AMETEK Land sales manager or representative.



INDUSTRIAL INTERNET OF THINGS

SPOT+ has been designed to support multiple communication interfaces and is ideal for connection to Industrial Internet of Things (IIoT). It supports the popular Ethernet/IP (Industrial Ethernet) and REST API protocols as well as Modbus TCP/IP. Its built-in web server interface allows SPOT+ to communicate with any web browser for configuration and diagnostics.

Traditional analogue connections are supported via two 4-20 mA outputs, one 4-20 mA input, relay output and contact closure CMD input.



SPECIFICATION & DESIGN

MONOCHROMATIC PYROMETERS

M100, M160 and M210 Standard Body

The M-Series pyrometers have a measurement range of 500 to 1800 °C / 932 to 3272 °F, 700 to 3500 °C / 1292 to 6332 °F, 250 to 1600 °C / 482 to 2912 °F and 50 to 1100 °C / 122 to 2012 °F. Proven, reliable electronics and a precision optical system combine to give a pyrometer which delivers accurate, repeatable temperature measurement.

FIBER-OPTIC VARIANTS

M100, M160, R100 and R160

The M and R Series fiber-optic versions measure at the same temperature range and wavelength. The use of flexible fiber-optics allows the optic head to be mounted in a hostile environment and the detector and electronics enclosure to be located in a less hostile environment, several metres away.

The use of the fiber-optic variant permits measuring of targets that are inaccessible, in areas with electromagnetic interference or in high ambient temperature environments where water cooling may not be possible.

RATIO AND APPLICATION SPECIFIC PYROMETERS

SPOT+ R100, R160, R210 and application specific pyrometers offer several user-selectable operating modes.

Ratio and multimodes allow compensation for reduced or changing obstruction in dusty and smoky atmospheres.

Application specific modes provide full compensation for changing surface chemistry during specific processes.

- 1: Ratio** - Combined ratio signal from both detectors
R100: 550 to 1800 °C / 1022 to 3272 °F
700 to 3500 °C / 1292 to 6332 °F
R160: 550 to 1600 °C / 1022 to 2912 °F
R210: 125 to 1100 °C / 257 to 2012 °F
- 2: Mono 1** - Signal from detector 1 only
R100: 550 to 1800 °C / 1022 to 3272 °F
700 to 3500 °C / 1292 to 6332 °F
R160: 550 to 1600 °C / 1022 to 2912 °F
R210: 125 to 1100 °C / 257 to 2012 °F
- 3: Mono 2** - Signal from detector 2 only
R100: 400 to 1800 °C / 752 to 3272 °F
700 to 3500 °C / 1292 to 6332 °F
R160: 250 to 1600 °C / 482 to 2912 °F
R210: 125 to 1100 °C / 257 to 2012 °F
- 4: Multi** - Extended range with low temperature monochromatic and high temperature ratio signal
R100: 400 to 1800 °C / 752 to 3272 °F
700 to 3500 °C / 1292 to 6332 °F
R160: 250 to 1600 °C / 482 to 2912 °F
R210: 125 to 1100 °C / 257 to 2012 °F
- 5: Duo** - Uses detector 2 at low temperatures, detector 1 at high temperatures and both in between
R100 Detector 1: 800 to 3500 °C / 1472 to 6332 °F
R100 Transition: 700 to 800 °C / 1292 to 1472 °F
R100 Detector 2: 400 to 700 °C / 752 to 1292 °F
R160 Detector 1: 800 to 1600 °C / 1472 to 2912 °F
R160 Transition: 700 to 800 °C / 1292 to 1472 °F
R160 Detector 2: 250 to 700 °C / 482 to 1292 °F
R210 Detector 1: 300 to 1100 °C / 572 to 2012 °F
R210 Transition: 200 to 300 °C / 392 to 572 °F
R210 Detector 2: 125 to 200 °C / 257 to 392 °F
- 6: Application modes** - Use the signal from both detectors and extensive process knowledge to measure both emissivity and emissivity-corrected surface temperature in specific processes.



TYPICAL APPLICATION -
BLAST FURNACE ▲



- 1: THROUGH-THE-LENS INTEGRATED CAMERA**
Easy target alignment and verification in low and high brightness environments (standard body only); 512x288 pixel live image at 30 fps (via webservice), 112x100 (rear display) and full remote control and process view
- 2: PATENTED* PULSED HIGH BRIGHTNESS LED SIGHTING**
Indicates both target size and location using an easily visible pattern; no laser safety requirements; Fiber-optic variant uses a red LED circle with manual focus
- 3: SIGNAL PROCESSING**
All processing features are integrated into SPOT+. No need for any separate processor unit or PLC calculations
- 4: HIGH QUALITY OPTICS**
Features a durable sapphire protection window and ensures precise targeting and quality measurements (not available on fiber-optic variant)
- 5: INTEGRATED WEB SERVER**
Allows for remote adjustment and readings via any web browser; firmware updates through the webservice
- 6: REAR DISPLAY & CONTROLS**
Target viewing, temperature reading and set-up through simple menu driven choices; no need for separate software
- 7: POWER OPTIONS**
Power over Ethernet or 24 to 30 V DC at the instrument
- 8: FIBER-OPTIC VARIANT**
Optic head and flexible fiber-optic (Not available on 210 models)
- 9: ADVANCED I/O FUNCTIONALITY**
Intelligent communications via Ethernet/IP, REST API and Modbus TCP/IP as well as 4-20 mA output

APPLICATIONS

Heat Treatment	Heat Treatment
Hot Rolling Mill	Polysilicon
Cement	Forging
Iron and Steel	Steel
Metal Forging	Induction Heating
Carburizing	Silicon Carbide
Plasma Nitriding	
Continuous Galvanizing Lines	

Aluminium Extrusion	Strip Mill
Aluminium Forming and Forging	Liquid Aluminium
Aluminium processing	CGL / CAL Processes
Annealing Furnace	Melting Furnaces
Ladle and Mold	Automatic Casting Lines and Mold Casting
Liquid Iron, Steel, Bronze, Brass, Copper, Non ferrous metals	

SOFTWARE

SPOT^{PRO}

SPOTPro software provides a single control point to configure, store and view data for multiple SPOT or SPOT+ pyrometers and SPOT Actuators. Giving a complete overview of all devices on your network, SPOTPro allows you to independently configure data logging at response times down to 1ms for each pyrometer and set automatic triggers for data storage.

SPOTPro allows users to compare live and historical data to trend and diagnose process issues. Data can be logged to an SQLite database for easy configuration or an MS SQL Server database for enterprise-level data requirements. All data can be exported to CSV or XML for integration into other processes or further processing.

SPOTPro supports a flexible window layout with multiple monitor support – see all the data that is most important to you prominently on screen all at once.

CONTROL MULTIPLE SPOT PYROMETERS AND SPOT ACTUATORS

With regular or temperature-triggered datalogging of all configuration and output parameters.

RICHER DATA ANALYSIS

With the facility to view up to 40 pyrometers, users can compare and contrast data from multiple devices on a single or multiple screens. Switching between live and historical data enables a comprehensive review and analysis of your measurements.



IMAGE^{PRO}

IMAGEPro software provides a single control point to configure, store and view data for multiple SPOT+ thermometers, or a combination of SPOT+ thermometers and thermal imagers. Each device can be independently controlled and data logging configured with automatic triggers for image and temperature data storage.

IMAGEPro advanced software functionality allows SPOT+ measurements to be used for live background temperature, emissivity or dirty-window compensation of combined thermal imaging systems, as well as for single-point temperature measurements with a visible light process view.

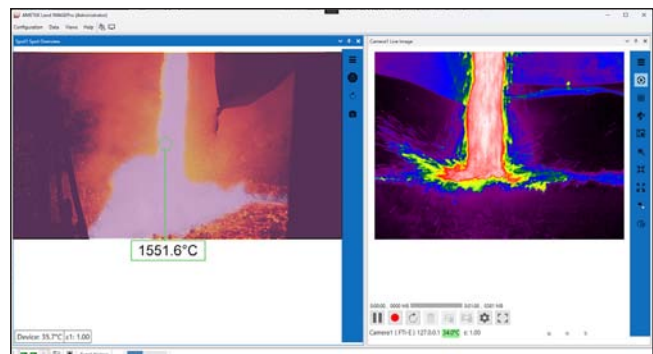
With a flexible window layout and multiple monitor support, IMAGEPro allows you to see all the data that is most important to you prominently on screen all at once.

CONTROL MULTIPLE SPOT+ PYROMETERS AND THERMAL IMAGERS

View visible light SPOT+ process video alongside full thermal imaging, with regular or temperature-triggered image and data logging for essential measurements during important events.

ADVANCED DATA PROCESSING

Use multiwavelength SPOT+ measurements for live background temperature or emissivity correction of thermal video streams.



IMAGEPro Software monitoring SPOT+ pyrometer and thermal imager data simultaneous

MODEL SPECIFICATIONS

	M100	M100 F.O.	M160	M160 F.O.	M210
Measurement Range:	500 -1800 °C / 932 - 3272 °F	500 -1800 °C / 932 - 3272 °F	250 -1600 °C / 482 - 2912 °F	250 -1600 °C / 482 - 2912 °F	50 -1100 °C / 122-2012 °F
Extended Range: (special order)	500 -2500 °C / 932 - 4532 °F	500 -2300 °C / 932 - 4172 °F	-	-	-
Field of View (90% of energy):	200:1	100:1; 3 lengths of light guides available	200:1	100:1; 3 lengths of light guides available	60:1
Detector Type:	Single Wavelength 1.0 µm detector		Single Wavelength 1.6 µm detector		Single Wavelength 2.3 µm detector
Display:	Local with video streaming	Local display	Local with video streaming	Local display	Local with video streaming
Settings:	Configure locally using the pyrometer interface or remotely (using the Webserver or SPOTPro or IMAGEPro. Emissivity, mode, current output range, alarm logic output and thresholds, network settings, focus and LED, language and user name (focus and LED on standard body only)				
Sighting Image:	Local display and remote video streaming	Not available	Local display and remote video streaming	Not available	Local display and remote video streaming
Focus Range:	300 mm to infinity, locally or remotely adjusted	100 mm to 500 mm manually adjusted	300 mm to infinity, locally or remotely adjusted	100 mm to 500 mm manually adjusted	300 mm to infinity, locally or remotely adjusted
LED Targeting:	Patented* pulsed green LED focus pattern	Red circle LED	Patented* pulsed green LED focus pattern	Red circle LED	Patented* pulsed green LED focus pattern
Mounting:	Full range of mountings and accessories available - see Mountings and Accessories Brochure or visit our website				
Uncertainty:	±0.25% K or 2 K**				
Repeatability:	<1 °C				
Resolution:	0.1 °C				
Noise:	<0.5 °C RMS**				
Sealing:	IP65				
Response Time:	Adjustable 1 ms to 10 s				Adjustable 10 ms to 10 s
Analogue I/O:	Two 4-20 mA outputs, One 4-20 mA input, Contact closure input, Relay output				
Communications:	Ethernet/IP, REST API, Modbus TCP/IP, web server				
Processing Functions:	Peak/Valley Picking, Averager, Modemaster, CMD in sampling, CMD out alarms				
Power Req.:	Power over Ethernet or 24 to 30 V DC at the instrument				
Software:	Live configuration and temperature display on any web browser. Optional SPOTPro or IMAGEPro software with datalogging, live and historical data trending, plus remote image capture, control of multiple instruments (image capture not available on fiber-optic versions)				
Languages:	Integrated multiple language selections: English, German, French, Italian, Spanish, Portuguese (Brazilian), Japanese, Chinese (simplified Mandarin), Korean, Russian, Polish				
Ambient Temp. Range:	5-60 °C specified, 0-70 °C operating before cooling required	Optic head up to 200 °C / 392 °F before cooling required	5-60 °C specified, 0-70 °C operating before cooling required	Optic head up to 200 °C / 392 °F before cooling required	5-60 °C specified, 0-70 °C operating before cooling required
Warranty:	See our website at www.ametek-land.com for warranty details				

* Patent Number GB2497609

**Measurements within specification over 5-95% of range

†Measurements within specification between 700 - 3000 °C / 1292 - 5432 °F

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	R100	R100 F.O.	R160	R160 F.O.	R210
Measurement Range:	550 -1800 °C / 1022 - 3272 °F (ratio) 400 -1800 °C / 752 - 3272 °F (overall) 700 to 3500 °C / 1292 to 6332 °F (all modes) [†]	550 -1800 °C / 1022 - 3272 °F (ratio) 400 -1800 °C / 752 - 3272 °F (overall)	550 -1600 °C / 1022 - 2912 °F (ratio) 250 -1600 °C / 482 - 2912 °F (overall)	550 -1600 °C / 1022 - 2912 °F (ratio) 250 -1600 °C / 482 - 2912 °F (overall)	125 -1100 °C / 257-2012 °F
Field of View (90% of energy):	200:1	100:1; 3 lengths of light guides available	200:1	100:1; 3 lengths of light guides available	60:1
Detector Type:	Ratio Short Wavelength; Detector 1: 1.0 µm, Detector 2: 1.2 µm		Ratio Short Wavelength; Detector 1: 1.0 µm, Detector 2: 1.5 µm		Ratio Mid Wavelength; Detector 1: 2.1 µm, Detector 2: 2.4 µm
Display:	Local with video streaming	Local display	Local with video streaming	Local display	Local with video streaming
Settings:	Configure locally using the pyrometer interface or remotely (using the Webserver or SPOTPro or IMAGEPro. Emissivity, mode, current output range, alarm logic output and thresholds, network settings, focus and LED, language and user name (focus and LED on standard body only)				
Sighting Image:	Local display and remote video streaming	Not available	Local display and remote video streaming	Not available	Local display and remote video streaming
Focus Range:	300 mm to infinity, locally or remotely adjusted	100 mm to 500 mm manually adjusted	300 mm to infinity, locally or remotely adjusted	100 mm to 500 mm manually adjusted	300 mm to infinity, locally or remotely adjusted
LED Targeting:	Patented* pulsed green LED focus pattern	Red circle LED	Patented* pulsed green LED focus pattern	Red circle LED	Patented* pulsed green LED focus pattern
Mounting:	Full range of mountings and accessories available - see Mountings and Accessories Brochure or visit our website				
Uncertainty:	Mono & Duo: ±0.25% K or 2 K** Ratio & Multi: ±0.5% K or 5 K**				
Repeatability:	<1 °C				
Resolution:	0.1 °C				
Noise:	<0.5 °C RMS**				
Sealing:	IP65				
Response Time:	Adjustable 1 ms to 10 s				Adjustable 15 ms to 10 s
Analogue I/O:	Two 4-20 mA outputs, One 4-20 mA input, Contact closure input, Relay output				
Communications:	Ethernet/IP, REST API, Modbus TCP/IP, web server				
Processing Functions:	Peak/Valley Picking, Averager, Modemaster, CMD in sampling, CMD out alarms				
Power Req.:	Power over Ethernet or 24 to 30 V DC at the instrument				
Software:	Live configuration and temperature display on any web browser. Optional SPOTViewer software with datalogging, live and historical data trending, plus remote image capture, control of multiple instruments (image capture not available on fiber-optic versions)				
Languages:	Integrated multiple language selections: English, German, French, Italian, Spanish, Portuguese (Brazilian), Japanese, Chinese (simplified Mandarin), Korean, Russian, Polish				
Ambient Temp. Range:	5 - 60 °C specified, 0 - 70 °C operating before cooling required	Optic head up to 200 °C / 392 °F before cooling required	5 - 60 °C specified, 0 - 70 °C operating before cooling required	Optic head up to 200 °C / 392 °F before cooling required	5 - 60 °C specified, 0 - 70 °C operating before cooling required
Warranty:	See our website at www.ametek-land.com for warranty details				

APPLICATION SPECIFIC MODELS

	SPOT+ AL	SPOT+ AL LT	SPOT+ GS	SPOT+ MM
Measurement Range:	200 -900 °C / 392-1652 °F	130 -700 °C / 266 -1292°F 150-700 °C / 302-1292 °F	125 -1200 °C / 257-2192 °F	600 to 1800 °C / 1112 to 3272 °F
Field of View	60:1 to 90%	30 :1	60:1 to 90%	200:1 to 90%
Detector Type:	Application-specific selected range of narrow wavelength bands designed to optimise temperature accuracy measurement of Aluminium	Application-specific selected range of narrow wavelength bands designed to optimise temperature accuracy measurement of Aluminium	Application specific selected range of narrow wavelength bands designed to optimise temperature accuracy for the measurement of Gavannealed and Galvanized Strip	Application specific selected range of NIR wavelength bands designed to optimise temperature accuracy measurement of molten metals.
Display:	Local display with image streaming			
Settings:	Configure locally using the pyrometer interface or remotely (using the Webserver or SPOTPro or IMAGEPro. Emissivity, mode, current output range, alarm logic output and thresholds, network settings, focus and LED, language and user name (focus and LED on standard body only)			
Sighting Image:	Integrated video with local display and remote image capture.			
Focus Range:	300 mm / 11.8 to infinity, locally or remotely adjusted	Nominal target spot diameter 10mm at 300mm focus; 17mm at 500mm focus; 33mm at 1m focus. Twice nominal target area is recommended.	300 mm / 11.8 in to infinity, locally or remotely adjusted	300mm / 11.8in to infinity, locally or remotely adjusted
LED Targeting:	Patented* pulsed green LED focus pattern			
Mounting:	Full range of mountings and accessories available - see Mountings and Accessories Brochure or visit our website			
Uncertainty:	±3 °C at 200 °C, ±1 °C at 300 °C and above (extrusion and quench), ± 5 °C (lubricated strip, forming/ forging and liquid metal)	±3 °C at 150 °C, ±1 °C at 300 °C and above (extrusion and quench), ± 5 °C (lubricated strip, forming/ forging)	±3 °C < 200 °C, ±2 °C or 0.25 % K at 300 °C and above	±5 °C
Resolution:	0.1 °C			
Noise:	5 °C at 200 °C, <0.5 °C at 300 °C and above	5 °C at 150 °C, <0.5 °C at 300 °C and above	5 °C < 200 °C 1.5 °C at 250 °C, <0.5 °C at 300 °C and above	0.5 °C
Sealing:	IP65			
Response Time:	Adjustable 15 ms to 10 s	Adjustable 15 ms to 10 s	Adjustable 15 ms to 10 s	Adjustable 1ms to 10s
Analogue I/O:	Two 4-20 mA outputs, One 4-20 mA input, Contact closure input, Relay output			
Communications:	Ethernet/IP, REST API, Modbus TCP/IP, web server			
Processing Functions:	Peak/Valley Picking, Averager, Modemaster, CMD In sampling or LED control, CMD Out alarms, emissivity output or actuator control			
Power Req.:	Power over Ethernet or 24 to 30 V DC at the instrument			
Software:	Live configuration and temperature display on any web browser. Optional SPOTPro or IMAGEPro software with datalogging, live and historical data trending, plus remote image capture, control of multiple instruments (image capture not available on fiber-optic versions)			
Languages:	Integrated multiple language selections: English, German, French, Italian, Spanish, Portuguese (Brazilian), Japanese, Chinese (simplified Mandarin), Korean, Russian, Polish			
Ambient Temp. Range:	5 - 60 °C / 41 - 140 °F specified, 0 - 70 °C / 32 - 158 °F operating before cooling required	0 - 45 °C / 32 - 113 °F operating before cooling required	5 - 60 °C / 41 - 140 °F specified, 0 - 70 °C / 32 - 158 °F operating before cooling required	5 - 60 °C / 41 - 140°F specified, 0 - 70°C / 32 - 158 °F operating before cooling required
Warranty:	See our website at www.ametek-land.com for warranty details			

SPOT+

SMART HIGH-PRECISION PYROMETERS

AMETEK LAND HAS BEEN MANUFACTURING PRECISION MEASURING EQUIPMENT SINCE 1947.

WE ARE SPECIALISTS IN NON-CONTACT TEMPERATURE MEASUREMENT AND COMBUSTION MONITORING WITH APPLICATIONS ACROSS DIVERSE INDUSTRIES SUCH AS STEEL AND GLASS MAKING, POWER GENERATION AND CEMENT MANUFACTURE.

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



AMETEK Land's AMECare Performance Services ensure peak performance and maximum return on investment over the life of your equipment.

We will deliver this by:

- Proactively maintaining your equipment to maximize availability.
- Optimizing solutions to meet your unique applications.
- Enhancing user skills by providing access to product and application experts.

AMETEK Land's global service network provides unparalleled after-sales services to ensure you get the best performance and value from your AMETEK Land products. Our dedicated service centre teams and on-site engineers are trained to deliver the highest standard of commissioning, maintenance and after-sales support.

SEE OUR OTHER LITERATURE FOR SPOT FAMILY PYROMETERS:

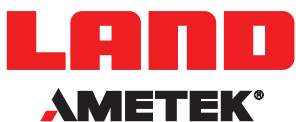


SPOT MOUNTINGS & ACCESSORIES



SPOT ACTUATOR

DISCOVER HOW OUR BROAD RANGE OF NON-CONTACT TEMPERATURE MEASUREMENT AND COMBUSTION & EMISSIONS PRODUCTS OFFER A SOLUTION FOR YOUR PROCESS



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