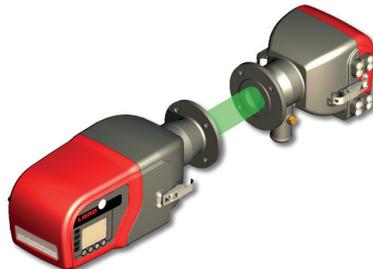


4500MkIII

COMPLIANCE OPACITY
AND DUST MONITORING



● QAL 1 • PS-1 • ASTM D6216 • PROCEDURE 3 • PS-11



LAND
AMETEK[®]
PROCESS & ANALYTICAL INSTRUMENTS



QUALITY CUSTOMER SOLUTIONS

4500MkIII

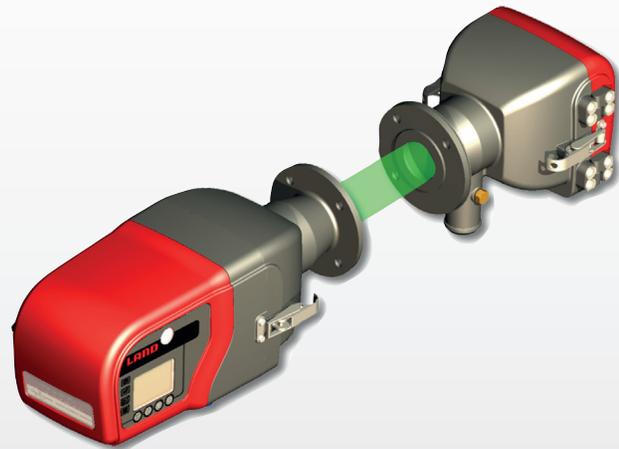
AMETEK LAND HAS BEEN MANUFACTURING PRECISION MEASURING EQUIPMENT SINCE 1947.

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.

THE 4500MkIII IS THE MOST ACCURATE AND RELIABLE OPACITY MONITOR CURRENTLY AVAILABLE.

Combining the unique features of three patented technologies, the 4500MkIII achieves the highest possible specification for the fundamental performance parameters for a compliance opacity monitor, as defined by the internationally-recognized ASTM Standard D6216. Its performance has been independently verified, meeting the QAL 1 requirements for EN 13284-2 and EN 15267-3.



**MEETS ASTM D6216,
EN 15267-3, QAL1, PS-11**

FEATURES ▼

Lifetime warranty on LED light source

3-year warranty on transmissometer

No continuously moving parts

Patented all-glass multi-prism retroreflector

Patented flood LED

Optional fail-safe shutters

Adaptor flanges and spoolpieces

Control Room Unit (option)

Single purge blower

Wide operating temperature range

Auxiliary Function Unit (AFU)

Auxiliary Power Supply (APS)

Dust and Opacity

BENEFITS ▼

No need to replace the light source

Worry-free operation

Highest reliability

Lowest possible drift

Maximum thermal stability

Protects optics if purge air fails, and protects personnel from stack gases during servicing

Allows the 4500 MkIII to fit the existing stack flanges

Allows remote display and diagnostics

One blower provides purge air to transceiver and retro

Operation -40°C to 55°C (-40°F to 131°F) is standard

Easy connections and additional I/O

Universal mains power input and power distribution

Measure both % opacity and dust concentration in mg/m³



RELIABILITY IS BUILT IN

NO CONTINUOUSLY MOVING PARTS
AND A LIFETIME WARRANTY ON THE
LIGHT SOURCE MEAN THE 4500 MkIII
WILL GIVE YEARS OF TROUBLE-FREE
OPERATION.



4500MkIII

SPECIFICATION & DESIGN

HIGH ACCURACY

The Model 4500 MkIII uses a highly homogenous advanced LED light source. A glass multi-prism retro-reflector reduces the effects of misalignment on the measured opacity, thereby achieving the lowest possible detection limit. The flood LED minimizes temperature drift. Collectively these features provide the highest level of stability and lowest level of optical and electronic drift available.

FLEXIBLE CONFIGURATION

This opacity monitor can be configured to meet your needs whether you need a simple low-cost installation or a full featured analyzer.

USER FRIENDLY

The Model 4500 MkIII menu tree is intuitive. The user is guided through the menu with simultaneous text and icon menu prompts. The design feature eliminates the need to carry an operating manual or laptop to the installation location.

INTELLIGENT COMMUNICATIONS

Modbus RTP, 4-20 mA signals and alarm relays are standard. Ethernet is available as an option.



**STACK DIAMETERS
FROM 0.3 M TO 15 M
(1 FT. TO 50 FT.)**

APPLICATIONS

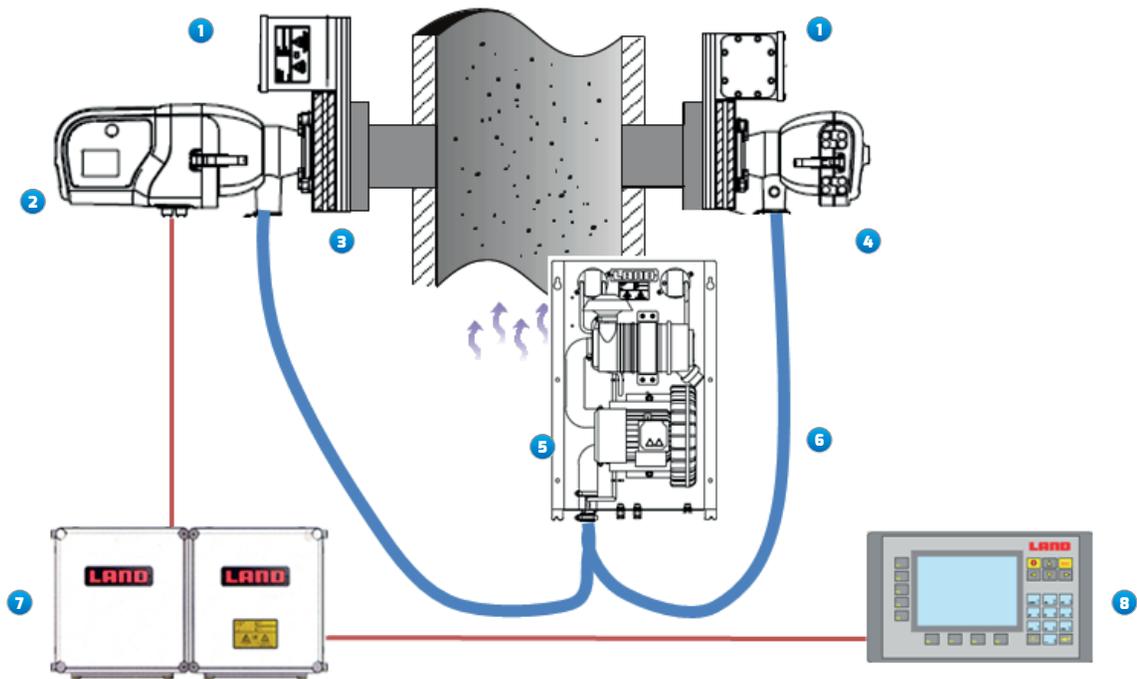
COMPLIANCE MONITORING OF STACK OPACITY AND PARTICULATE MATTER EMISSIONS FROM:

- Electricity Generating Units
- Industrial Boilers
- Process Heaters
- Furnaces
- Kilns

REGULATORY COMPLIANCE

- US EPA 40 CFR 60 Appendix B, Performance Standard 1 and Procedure 3
- ASTM D6216-07 and D6216-12
- EN 15267-3 (QAL1)
- EN 13284-2
- PS-11

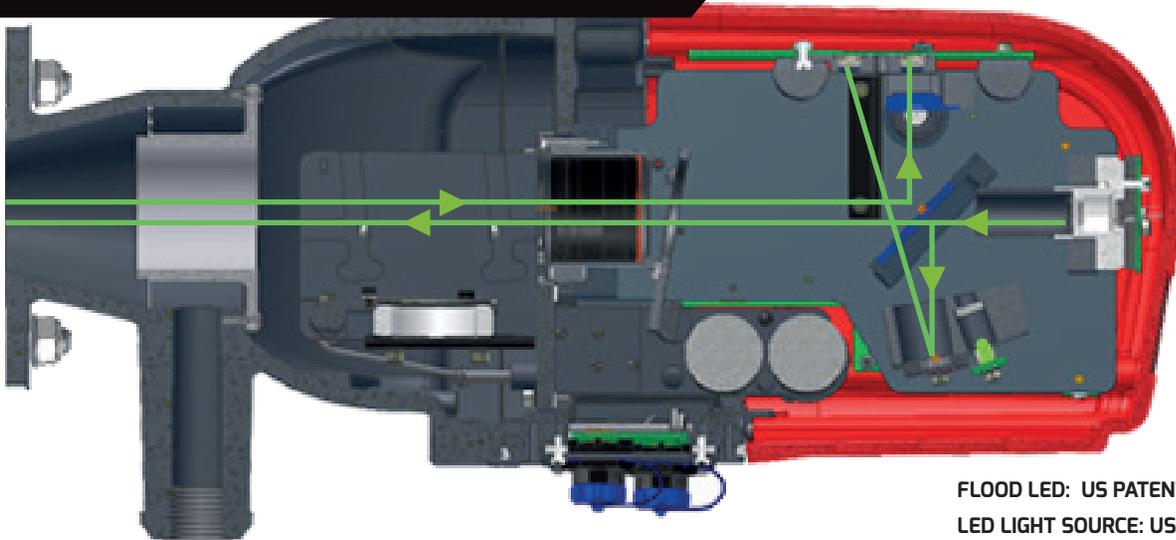
HOW THE 4500MkIII WORKS



KEY

- 1. Shutter
- 2. Transceiver
- 3. Standpipe
- 4. Retroreflector
- 5. Blower
- 6. Air Hose
- 7. AFU & APS (Optional)
- 8. Control Room Unit (Optional)

PATENTED TECHNOLOGY ▼



FLOOD LED: US PATENT 5617212
 LED LIGHT SOURCE: US PATENT 6781695
 RETRO-REFLECTOR: US PATENT 7429112

4500MkIII

OPTIONS FOR THE ANALYSER



Select the inputs and outputs you need for your application.

CONFIGURING THE ANALYSER: I/O SELECTIONS

	4500 MkIII	AFU&APS	CRU
One 4-20 mA output	•		
2-wire RS485 Modbus	•	•	
In Cal relay	•		
Alarm relay	•	•	
System OK relay	•	•	
Screw terminal connections		•	
Mains power input		•	
4-wire RS485 Modbus		•	
Shutter connections		•	
Pressure switch connections		•	
Calibration trigger input		•	
2x 4-20 mA output		•	
Zero and Span cal relays		•	
Fuel Selection (for dust)		•	
Ethernet communications		Option	
Mains power to blowers		•	
-40°C Operation	•	•	
Remote Display			•

MOUNTING OPTIONS

THE 4500 MkIII MOUNTING IS A CORE PART OF THE OPTICAL ALIGNMENT SYSTEM AND THE CORRECT SELECTION IS ESSENTIAL.

Standpipe

The standpipe welds directly to the stack for a simple, rigid mounting.

Spoolpiece

Spoolpieces are available with a wide variety of ANSI Flange sizes which can be bolted onto an existing stack flange.

Transceiver Weather Cover

The transceiver is sealed to IP65 and will resist most weather conditions. The transceiver weather cover attaches to the mounting flange and provides additional protection from driving rain and intense sunlight.

SPOOLPIECES

FLANGE SIZE	HOLE CONFIGURATION
3" 150 lb ANSI	Either straddled or top-dead-center
4" 150 lb ANSI	Either straddled or top-dead-center
5" 150 lb ANSI	Top-dead-center
6" 150 lb ANSI	Top-dead-center



Standpipe

AIR PURGE BLOWERS

A reliable purge air supply is needed to protect the 4500 MkIII from the hot, corrosive, dusty stack gases. The AMETEK Land design uses a side-channel blower and a large-area filter to provide a trouble-free source of purge air that will run for many years with minimal maintenance. The standard blower is weatherproof to IP55 and can be used in a sheltered outdoor location, for example under a canopy.

Blower Weather Cover

The weather cover makes the blower fully weatherproof and is recommended for outdoor locations where the blower will be exposed to wind and rain.

Fail-safe shutters

Electrically-actuated shutters protect the optics from damage if the purge fails, either because of a fault or because of loss of electric power. The shutters close automatically when power is lost or when the AFU receives a purge-fail signal.

Pressure Switch

The pressure switch opens when a positive flow of purge air is detected and closes when flow is lost. The AFU generates an alarm signal if a purge fail condition is detected, and closes the shutters (if fitted).

Prefilter

The prefilter extends the lifetime of the air filter in dusty environments by removing coarse dust from the purge air supply.



Can I use compressed air instead of a blower?

In most cases, the volume of purge air required for effective operation of the Model 4500 MkIII makes it impractical to use compressed air. A minimum flow of 60 m³ / hour (36 cfm) is needed.

CALIBRATION ACCESSORIES

FOR OPTIMUM PERFORMANCE, IT IS NECESSARY TO VERIFY THE CALIBRATION OF YOUR MODEL 4500 MKIII PERIODICALLY. IN MOST CASES, A QUARTERLY CALIBRATION AUDIT IS SUFFICIENT, AND WE CAN PROVIDE THE ACCESSORIES YOU NEED

External Zero Device (EZD)

The EZD allows you to verify the zero opacity point without removing the Model 4500 MkIII from the stack. It can also be used for quarterly calibration error checks, as required by US EPA Procedure 3.

Neutral Density Calibration Filters

Filters are chosen to match your opacity monitor configuration and are calibrated as primary filters in accordance with PS-1.

Calibration Kit

Test stands and mains power supply make it easy to perform a zero alignment (clear-path calibration) off the stack



4500MkIII

COMPLIANCE OPACITY AND DUST MONITORING

SPECIFICATIONS

Measuring Technique:	Double pass transmissometry
Operating Wavelength:	520 ± 20 nm
Light Source:	Pulsed High Intensity LED
Measurement Range:	Opacity 0-10 % to 0-100 % ; Optical Density 0 - 0.1 to 0-3.0 ; Dust Density 0-15 to 0-1000 mg/m ³ (at 5 m pathlength)
Calibration Error:	1.5 % opacity
Drift (long term):	< 0.3 % opacity / month
Thermal Stability:	0.6 % opacity / 22 ° C ambient change
Angle of Projection:	< 2 °
Angle of View:	< 2 °
Response Time:	≤10 s to 95 %
Averaging:	Selectable from 10 s to 24 hr (1 s increment)
Pathlength:	0.5 to 10 m / 20 in to 32 ft (extended pathlengths to 15 m available)
Calibration:	Automatic zero and upscale check (selectable period 1 to 24 hr in 1 hr increments)
Zero Correction:	Automatic correction for zero drift
Control Panel Display:	128 x 64 pixel reflective backlit LCD
Control Panel Keypad:	4 keys for data input
Control Panel Indicators:	Power, System OK, Alarm, Calibration
Operating Temperature:	-40 to 55 ° C / -40 to 131 ° F
Max. Flue Gas Temperature:	600 ° C / 1112 ° F
Max. Flange Temperature:	200 ° C / 392 ° F
Flue Gas Water Content:	Not sensitive to water vapor. Condensed water must not be present in the measurement path.
Electrical Safety:	IEC / EN 61010-2
EMC:	EN 50 081 & EN50 082
Sealing:	IP65 / NEMA4X
Modbus Interface:	RS485; Opacity, Optical Density, Dust Density and Status information available
Analog Outputs:	Isolated 4 to 20 mA Configurable as Opacity, Optical Density, Dust Density
Relay Outputs:	System OK, Calibration, Alarm
Relay Rating:	1 A @ 24 Vdc
Power Supply:	24 Vdc nominal (18 to 30 Vdc), 0.3 A nominal (3 A startup)
Transceiver Dimensions (HxWxD):	191 x 291 x 413 mm / 7.5 x 7.9 x 16.3 in
Retro-reflector Dimensions (HxWxD):	101 x 201 x 237 mm / 7.5 x 7.9 x 9.3 in
Transceiver Weight:	6 kg / 13.2 lbs.
Retro-reflector Weight:	3 kg / 6.6 lbs.
Enclosure:	Cast Aluminum, epoxy coated
Accessories:	Fail-safe Shutters, Blowers, Adapter Flanges, Remote Control Units, Additional Outputs Available
Approvals:	QAL 1, EN 15267, EN 13284-2
Performance Specifications:	ASTM D6216, US EPA PS-1, PS-11, Procedure 3

SEE OUR OTHER PARTICULATE MONITORING AND OPACITY RELATED LITERATURE:



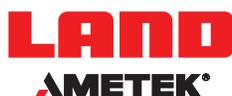
MODEL 4650-PM
PARTICULATE
MONITORING



MODEL 4200+
OPACITY
MONITORING

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

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