## SPECIFICATIONS

### Measuring

<table>
<thead>
<tr>
<th>Technique:</th>
<th>Double pass transmissometry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Wavelength:</td>
<td>520 +/- 20 nm</td>
</tr>
<tr>
<td>Light Source:</td>
<td>Pulsed High Intensity LED</td>
</tr>
<tr>
<td>Range:</td>
<td>Opacity 0-10 % to 0-100 %</td>
</tr>
<tr>
<td></td>
<td>Optical Density 0-0.1 to 0-3.0</td>
</tr>
<tr>
<td></td>
<td>Dust Density 0-10 to 0-10000 mg/m³</td>
</tr>
</tbody>
</table>

### Control Panel

| Display:       | 128 x 64 pixel reflective backlit LCD |
| Keypad:        | 4 keys for data input |
| Indicators:    | Power, System OK, Alarm, Calibration |

### Environmental

| Operating temperature: | -40 to 55° C / -40 to 131° F |
| Max. Flue gas temp:    | 600° C / 1112° F |
| Max. Flange temp:      | 200° C / 392° F |
| Compliance:            | EN 61010-2 |
| EMC:                   | EN50 081 & EN50 082 |
| Sealing:               | IP65 / NEMA4X |

### Outputs

#### 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

### Electrical

| Power Supply:         | 24 Vdc nominal (18 to 30 Vdc) |
| Current Consumption:  | 0.3 A nominal (3 A startup) |

### Mechanical Data

| Dimensions (HxWxD):  | Transceiver: 191 x 201 x 413 mm / 7.5 x 7.9 x 16.3 in |
| Retro-reflector:      | 191 x 201 x 237 mm / 7.5 x 7.9 x 9.3 in |
| Weight:               | Transceiver: 6 kg / 13.2 lbs |
|                       | Retro-reflector: 3 kg / 6.6 lbs |

### Accessories

Available:
- Fail-safe Shutters
- Blowers
- Adapter Flanges
- Remote Control Units
- Additional Outputs Available

### Approvals

Complies with:
- EN15267-1, EN15267-2
- EN15267-3, EN13284-2

### Measuring Technique:
Double pass transmissometry

### Operating Wavelength:
520 +/- 20 nm

### Light Source:
Pulsed High Intensity LED

### Measuring Range:
- Opacity: 0-10 % to 0-100 %
- Optical Density: 0-0.1 to 0-3.0
- Dust Density: 0-10 to 0-10000 mg/m³

### Angle of Projection:
3°

### Angle of View:
3°

### Response Time:
≤10 s to 95 % Selectable from 10 s to 24 hr (1 s increment)

### Averaging:
0.5 to 10 m / 20 in to 32 ft

### Calibration:
Automatic zero and upscale check (Selecteable 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

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4 keys for data input

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### Enclosure

Transceiver / Retro-reflector: Cast Aluminum, epoxy coated

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### Compliance Monitoring

Model 4500 MkIII

Complies with QAL-1 and PS-1
The Land Model 4500 MkIII has reset the industry standard on compliance opacity and dust concentration measurement. Combining the unique features of three patented technologies, the 4500 MkIII achieves the highest available specification for the principal performance parameters, as defined by the internationally recognized ASTM Standard D62161. Its performance has been independently verified, meeting the QAL 1 requirements for EN:13284-2 and EN 15267-3. These industry-leading features make the MkIII the most accurate opacity monitor available today. Its excellent sensitivity makes it ideal for all current or future requirements in opacity and dust concentration measurement.

### Industry Best Specifications

<table>
<thead>
<tr>
<th>ASTM Standard</th>
<th>4500 MkIII Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calibration Error</td>
<td>&lt;1.5% Opacity</td>
</tr>
<tr>
<td>24 Hour Drift</td>
<td>&lt;0.3% Opacity</td>
</tr>
<tr>
<td>Long Term Drift</td>
<td>&lt;0.3% Opacity per Month</td>
</tr>
<tr>
<td>Voltage Variation</td>
<td>&lt;0.2% Opacity</td>
</tr>
<tr>
<td>Thermal Stability</td>
<td>&lt;0.6% Opacity every 22°C</td>
</tr>
<tr>
<td>Ambient Light Sensitivity</td>
<td>&lt;0.2% Opacity</td>
</tr>
<tr>
<td>Insensitivity to Misalignment</td>
<td>&lt;1% Opacity for +0.25° misalignment</td>
</tr>
</tbody>
</table>


### Benefits

**The Best Warranty**

- **Ultimate Reliability**
- **3 Year System Warranty**
- **Lifetime Light Source Warranty**

**Ultimate Performance**

- **Flood LED**
  - US Patent #5617212
- **LED Light Source**
  - US Patent #6781695
- **Retro-reflector**
  - US Patent #7429112

**User-Friendly**

- **Single Hand Operation**
- **Simple Installation**
- **Dual Function Menus**
- **Text and Icons**
- **Easy to Read Display**

**Easy Auditing**

- **Built in Audit Jig**
- **Local Keypad**
  - Initiate Audit
- **Local Display**
  - View Results

**Easily Upgrade Existing Installation**

- **Adapter Flanges**
- **Air Purging Accessories**

### Industrial Applications

- Boilers
- Heaters
- Furnaces
- Kilns
- FCC Stacks
- Incinerators
- Dust Collectors
- Precipitator Control
- Baghouse Monitoring

### Features

- **Flood LED**
- **LED Light Source**
- **Retro-reflector**

The Model 4500 MkIII uses a highly homogenous advanced **LED light source** and a glass multi-prism **retro-reflector** to reduce the effects of misalignment on the measured opacity, thereby achieving the lowest possible detection limit. The **Flood LED** technique eliminates the requirement for continuous moving parts (chopper motors etc). Collectively these features provide the highest level of stability and lowest level of optical and electronic drift available.

**The Model 4500 MkIII menu tree is intuitive and language independent.** 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. Standard features include analog, digital and modbus outputs.

**Designed with the field auditor/service engineer in mind,** the periodic performance audit verification could not be simpler. The built-in audit jig accepts standard optical filters, and the zero alignment can be confirmed without removing the instrument from the stack.

**The 4500 MkIII Installation includes options for adapter flanges, air purging and other accessories that make upgrading your existing opacity monitoring system quick and hassle free.**