Speciation

<table>
<thead>
<tr>
<th>Conditioner</th>
<th>Compressor</th>
<th>Flow rate of diluted gas</th>
<th>Required signal for gas sampling</th>
<th>Control modes for dilution</th>
<th>Sampling method</th>
<th>PM mass calculation</th>
</tr>
</thead>
</table>
| Dilution-tunnel unit | Dilution-tunnel unit | 35 to 80 L/min*1 | Input the amount of PM collected on filter to calculate PM mass. It is necessary to input engine output (kW) to calculate the PM mass engine output (g/kWh). | PM mass (in g/test, g/h or g/kWh) can be calculated and saved, based on integrated values of flow rate and dilution ratio. | Partial flow dilution method | PM mass calculation* 2

*1, with back-up filter*

*2, Input the amount of PM collected on filter to calculate PM mass. It is necessary to input engine output (kW) to calculate the PM mass engine output (g/kWh).

*3, Please contact HORIBA, when you ordering.

Please read the operation manual before using this product to assure safe and proper handling of the product.
The Micro Dilution Tunnel (MDLT-ONE) is designed to sample particulate emissions using the partial flow dilution method. A small portion of the total exhaust is diluted with filtered air to create a constant flow rate through particulate filters, collecting particulate matter (PM) in compliance with the latest regulations. Due to its unique dilution concept, MDLT-ONE provides levels of accuracy and reliability comparable to those of full flow dilution systems, but in a more compact and cost-effective way.

**Customer Benefits**

**Test & Trust**
- Best correlation to full flow dilution tunnels
- Accurate dilution via two venturi flow meters
  - Intercalibration
  - Temperature-stabilized sensors
- Unprecedented speed
  - Online flow control within 150 ms
  - Fast-response piezo-actuated valve
  - Thermoelectric dilution air conditioning directly at tunnel inlet

**Productive**
- Up to 30% time savings*
- Based on easy-to-use HORIBA ONE platform
- Full integration into automation systems
- Automatic filter changer available

**Flexible**
- Mobile single rack
- Installation in less than 15 minutes
- 360° fully flexible tunnel mounting
- Particle number counter can be added

*compared to other products on the market
The Micro Dilution Tunnel (MDLT-ONE) is designed to sample particulate emissions using the partial flow dilution method. A small portion of the total exhaust is diluted with filtered air to create a constant flow rate through particulate filters, collecting particulate matter (PM) in compliance with the latest regulations. Due to its unique dilution concept, MDLT-ONE provides levels of accuracy and reliability comparable to those of full flow dilution systems, but in a more compact and cost-effective way.

**Customer Benefits**

**Test & Trust**
- Best correlation to full flow dilution tunnels
- Accurate dilution via two venturi flow meters
  - Intercalibration
  - Temperature-stabilized sensors
- Unprecedented speed
  - Online flow control within 150 ms
  - Fast-response piezo-actuated valve
  - Thermoelectric dilution air conditioning directly at tunnel inlet

**Productive**
- Up to 30% time savings*
- Based on easy-to-use HORIBA ONE platform
- Full integration into automation systems
- Automatic filter changer available

**Flexible**
- Mobile single rack
- Installation in less than 15 minutes
- 360° fully flexible tunnel mounting
- Particle number counter can be added

*compared to other products on the market

**Applications**

**PM Emission Measurement of All Engines**

**R&D Support of Engine and After Treatment System**

**Complies with worldwide emissions regulations**

- ISO-16183
- EU: Euro VI (HDV)
- EU: Stage IV / V (NRMM)
- US: 40 CFR Part 1065/1066

Japan: Post Post New Long-Term
EU: Stage IV / V (NRMM)
**Specification**

<table>
<thead>
<tr>
<th>Feature/Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM sampling method</td>
<td>Partial flow dilution method</td>
</tr>
<tr>
<td>Control modes for dilution</td>
<td>Proportional sampling mode (Control, split ratio) / Fixed dilution rate mode (Control, dilution ratio) / Fixed flow rate mode (Manual control)</td>
</tr>
<tr>
<td>Power supply voltage and frequency</td>
<td>[0.1 \text{VA} \times \text{1000} \text{rpm} \times 0.005]/\text{rpm} \text{, single phase}</td>
</tr>
<tr>
<td>Dimensions</td>
<td>\text{Max. unit : 1027 (W) x 1700 (D) x 510 (H) mm} \text{Space for operation unit : 900 (W) x 500 (D) mm}</td>
</tr>
<tr>
<td>Number of filter lines</td>
<td>\text{Max. 6 lines (5 for sample, 1 for bypass)}</td>
</tr>
<tr>
<td>Mass</td>
<td>\text{Max. unit : Approx. 350 kg (excluding isolation equipment and} \text{Space for operation unit : 430 x 500 (D) mm (table is not included)}</td>
</tr>
<tr>
<td>Power requirements</td>
<td>\text{Max. 3 kW (Operating unit : 1.6 kW) }</td>
</tr>
<tr>
<td>Filter auto-changer*3</td>
<td>\text{Changer for automatic replacement of PM filter (φ 47 mm), both single-filter method and multi-filter method are available.}</td>
</tr>
<tr>
<td>Sampling Pressure</td>
<td>\text{Between atmospheric pressure and up to 450 kPa}</td>
</tr>
<tr>
<td>Control methods for dilution</td>
<td>Control based on learned pattern of exhaust rate / Real-time control based on analog input of exhaust flow rate (under the condition of 20 ℃ and 101.3 kPa)</td>
</tr>
<tr>
<td>PM mass calculation*2</td>
<td>\text{PM mass (in g/test, g/h or g/kWh) can be calculated and saved, based on integrated values of flow rate and dilution ratio.}</td>
</tr>
</tbody>
</table>

*1: For the filter face velocity in the regulation (less than 100 cdm3), the flow rate for the φ47 mm filter must be 8.5 standard L/min.*

*2: Input the amount of PM collected on filter to calculate PM mass. It is necessary to input engine output (kW) to calculate the PM mass engine output (g/kWh).*

*3: Please contact HORIBA, when you ordering.*

---

**Micro Dilution Tunnel (MDLT-ONE)**

Partial Flow Dilution Sampling System

---

**Please read the operation manual before using this product to ensure safe and proper handling of the product.**

---

**HORIBA**

**Japan**

Head Office
2 Miyashita-kita, Koganei-shi, Kanto-ken, Japan
Phone: 042 (232) 61-3121 / Fax: 042 (232) 61-3529

HORIBA (China) Trading Co., Ltd.
China

Unit 10, Beijing Art Space, Xianfengpark, Fucheng Rd., Shangdi, Haidian District, Beijing, 100830, China
Phone: 010-8884-6969 / Fax: 010-8884-6968

HORIBA Instruments (Singapore) Pte. Ltd.
Singapore

201A Bukit Timah Rd, #07-01/02, Moonboard House, Singapore 669051
Phone: 65 (652) 8950 / Fax: 65 (6) 6521-1652

HORIBA Vietnam Co., Ltd.
Vietnam

17, 395, Tran Van Khong St., Phu My Hung District, Ho Chi Minh City, Vietnam
Phone: 84 (28) 3760-6000 / Fax: 84 (28) 3760-6155

HORIBA KOREA Ltd.
Korea

2102-1 Yongsan-daero, Seocho-gu, Seoul, 06076, Korea
Phone: 82 (2) 3837-0000 / Fax: 82 (2) 3837-0003

HORIBA India Private Limited
India

311, 3/5, A/B, BTM 2nd Stage, Bommasandra, Bengaluru, 560044, Karnataka, India
Phone: 91 (80) 2870-7000 / Fax: 91 (80) 2870-7003

HORIBA Instruments Incorporated
USA

3780 Research Dr., Irvine, CA 92618, USA
Phone: 1 (949) 582-9211 / Fax: 1 (949) 582-9204

HORIBA Test Automation Limited UK

MDLT-ONE

Partial Flow Dilution Sampling System