Venting to Enhance Reliability

Harsh under-hood and under-carriage conditions can threaten the reliability of high-value electronic components like control units, sensors, actuators and motors. GORE® Automotive Vents improve component reliability and longevity. They allow continuous flow of air and gases, to equalize pressures and protect enclosure seals. They also protect electronics by blocking entry of contaminants like water, automotive fluids, salts, dirt and mud. As a qualified automotive partner, Gore delivers advanced venting technologies in weldable, snap-fit and adhesive constructions, to fit any application.

A Portfolio of Adhesive Vent Solutions

Low-profile, lightweight GORE® Adhesive Vents are the perfect fit for small, densely-configured electronics. They install easily, bond securely, provide lasting hydrophobic and oleophobic protection, and have excellent roll-off to maintain airflow. Choose from multiple sizes and configurations, or ask our engineering team to help you identify which is optimal for your application:

- **The High WEP Series**: These 100% ePTFE all-membrane vents provide our highest level of protection and durability in the harshest conditions. For small enclosures.

- **The High Airflow Series**: These laminate vents provide our highest airflow, for faster pressure equalization. For medium enclosures.

- **The High WEP/High Airflow Series**: With a smaller (5 mm) footprint, these 100% ePTFE all-membrane vents offer proven durability, the right balance of high WEP and high airflow, and defined lower-and-upper-limit airflow specs for predictable performance. For small enclosures.

Realize the Benefits of GORE® Automotive Vents for Adhesive Installation

- **Streamline inventory** with this versatile portfolio: Varied sizes, airflow levels and WEP resistance levels meet multiple demands and applications.

- **Simplify component design**: these lightweight, low-profile vents fit in the tightest spaces.

- **Durable silicone adhesive bonds securely** and facilitates high-volume automated installation.

- **Sustained venting performance** with a high roll-off, thermally-stable and chemically-resistant membrane.
## Product Series

<table>
<thead>
<tr>
<th>Product Series</th>
<th>High WEP Series</th>
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<tbody>
<tr>
<td>Product Name (order number for samples)</td>
<td>AVS 44 (S)</td>
</tr>
<tr>
<td>Product Number (order number for series production)</td>
<td>AVE20307</td>
</tr>
<tr>
<td>Product Quantity / Form</td>
<td>10,000 pcs. / roll</td>
</tr>
</tbody>
</table>

## Product Performance and Characteristics

### Main vent functionality

Our highest level of protection and durability in the harshest conditions

### Minimum Water Entry Pressure

> ≥ 60 kPa / 30 sec (> 600 mbar / 30 sec)

### Minimum airflow

- **for GORE™ Membrane material**
- **for properly-installed part – ref**
  - 7.8 l/h/cm² @ 70 mbar
  - 0.5 l/h @ 7 kPa
  - 1.8 l/h @ 7 kPa

### Typical airflow

- **for GORE™ Membrane material**
- **for properly-installed part**
  - 12 l/h/cm² @ 70 mbar
  - 0.8 l/h @ 7 kPa
  - 2.8 l/h @ 7 kPa

### Operating temperature

- Tmin = −40 °C
- Tmax = +150 °C

### Membrane characteristic

Hydrophobic and oleophobic

### Membrane type

- 100% ePTFE (AM2XE)

### Membrane construction

- All-membrane, without backing material

### Pressure-sensitive adhesive

- AD104E Silicone

### Housing size

- Small to Medium

### Housing material

- All typical metal and plastic housing materials

### Vent installation and mounting recommendations

- Designed for automated Installation
- Use of a target frame is recommended

### Vent Design and Dimensions

<table>
<thead>
<tr>
<th>Vent Design and Dimensions</th>
<th>AVS 44 (S)</th>
<th>AVS 98 (S)</th>
<th>AVS 99</th>
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<td>ID = 5.50 mm</td>
<td>ID = 6.50 mm</td>
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<td>OD = 7.00 mm</td>
<td>OD = 10.00 mm</td>
<td>OD = 12.00 mm</td>
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</tr>
</tbody>
</table>

### Vent Thickness

- 0.30 mm

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**WEP (Water Entry Pressure) Resistance:**

WEP Resistance measures how much pressurized water a membrane can withstand before it leaks.

**Environmental Performance**

GORE® Automotive Vents have been extensively tested according to the following performance standards.

* Please contact your Gore representative for more detailed information.

**Temperature Resistance Test**

Vent durability under low and high temperature conditions

- Method: • ISO 16750-4
- Test conditions: • Tmin and Tmax within 30 seconds
  - Tmin for 500 hours

**Thermal Shock Resistance Test**

Vent durability under changing temperature conditions

- Method: • ISO 16750-4
- Test conditions:
  - cycling temperatures between Tmin and Tmax within 30 seconds
  - 30 minutes conditioning at each temperature
  - minimum 200 cycles
<table>
<thead>
<tr>
<th>Product Series</th>
<th>High WEP Series</th>
<th>High Airflow Series</th>
<th>High WEP/High Airflow Series</th>
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</thead>
<tbody>
<tr>
<td><strong>Product Name</strong></td>
<td>AVS 44 (S)</td>
<td>AVS 98 (S)</td>
<td>AVS 99</td>
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</table>

**Product Performance and Characteristics**

- **Main vent functionality**
  - Our highest level of protection and durability in the harshest conditions

- **Faster pressure equalization from our highest airflow**
  - \( \geq 34.5 \text{kPa} / 60 \text{sec} (\geq 345 \text{mbar} / 60 \text{sec}) \)

- **Minimum Water Entry Pressure***
  - for properly-installed part
  - \( \geq 60 \text{kPa} / 30 \text{sec} (\geq 600 \text{mbar} / 30 \text{sec}) \)
  - \( \geq 34.5 \text{kPa} / 60 \text{sec} (\geq 345 \text{mbar} / 60 \text{sec}) \)
  - \( \geq 50 \text{kPa} / 30 \text{sec} (\geq 500 \text{mbar} / 30 \text{sec}) \)

- **Minimum airflow**
  - for GORE™ Membrane material
  - for properly-installed part – ref
  - \( \text{7.8 l/h/cm}^2 @ 70 \text{mbar} \)
  - \( \text{0.5 l/h} @ 7 \text{kPa} \)
  - \( \text{7.8 l/h/cm}^2 @ 70 \text{mbar} \)
  - \( \text{1.8 l/h} @ 7 \text{kPa} \)
  - \( \text{7.8 l/h/cm}^2 @ 70 \text{mbar} \)
  - \( \text{2.6 l/h} @ 7 \text{kPa} \)
  - \( \text{7.8 l/h/cm}^2 @ 70 \text{mbar} \)
  - \( \text{4.8 l/h} @ 7 \text{kPa} \)

- **Typical airflow**
  - for GORE™ Membrane material
  - for properly-installed part
  - \( \text{12 l/h/cm}^2 @ 70 \text{mbar} \)
  - \( \text{0.8 l/h} @ 7 \text{kPa} \)
  - \( \text{12 l/h/cm}^2 @ 70 \text{mbar} \)
  - \( \text{2.8 l/h} @ 7 \text{kPa} \)
  - \( \text{12 l/h/cm}^2 @ 70 \text{mbar} \)
  - \( \text{4.0 l/h} @ 7 \text{kPa} \)

- **Operating temperature**
  - \( \text{Tmin} = -40 \degree \text{C} \quad \text{Tmax} = +150 \degree \text{C} \)

- **Membrane characteristic**
  - Hydrophobic and Oleophobic

- **Membrane type**
  - 100% ePTFE (AM2XE)
  - ePTFE / PET (LM9XE)
  - 100% ePTFE (AM6XJ)

- **Membrane construction**
  - All-membrane, without backing material
  - Laminate, with backing material

- **Pressure-sensitive adhesive**
  - AD104E Silicone
  - AD103E Silicone

- **Housing size**
  - Small to Medium
  - Medium Small

- **Housing material**
  - All typical metal and plastic housing materials

**Vent Design and Dimensions**

<table>
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<tr>
<th>AVS 107 (S)</th>
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<tr>
<td>OD = 19.05 mm</td>
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<td>OD = 5.00 mm</td>
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</tbody>
</table>

- **Vent Thickness**
  - 0.30 mm
  - 0.34 mm

**Ice-Water-Shock Test**

- Vent resistance against repeated thermal shock by submersion in ice water
- **Method:**
  - ISO 16750-4
  - **Test conditions:**
    - Heating to +125 °C for 60 minutes
    - Rapid submersion in 5% NaCl ice water for 5 minutes
    - 20 cycles (AVS 110 for external mount only)

**Climate Resistance Test**

- Vent durability in hot, humid environments
- **Method:**
  - ISO 16750-4
  - **Test conditions:**
    - 85 °C temperature
    - 85% relative humidity
    - 1,000 hours

**Salt Spray Resistance Test**

- Vent resistance to salt, water and mist over an extended period
- **Method:**
  - ISO 16750-4
  - **Test conditions:**
    - According to IEC 60068-2-52
    - Severity level 5 equals a test period of four weeks

**Liquid Contamination Test**

- Vent protection against chemical loads
- **Method:**
  - ISO 16750-5
  - Product performance depends on application method (i.e., cotton cloth, brush, spray, immersion, pouring) and the specific contaminant applied.
Why the GORE™ Membrane Matters

Only GORE® Automotive Vents incorporate the performance benefits of the GORE™ Membrane. Made of expanded polytetrafluoroethylene (ePTFE), it’s engineered with billions of pores. These pores are 700x larger than an air molecule, to ensure reliable airflow and pressure equalization. Yet at 20,000x smaller than a drop of water, these pores effectively block entry of liquids, dirt and debris.

The GORE™ Membrane is:
• chemically inert
• non-shedding
• UV-resistant
• temperature-resistant
• hydrophobic and oleophobic

What GORE® Automotive Vents Can Offer You

GORE® Automotive Vents deliver innovative technology, backed by decades of research and testing. Our product portfolio has proven itself in the harshest environments: literally billions of our vents have been installed in automotive applications worldwide. Today, virtually every global OEM trusts GORE® Automotive Vents to extend the reliability and longevity of their exterior lighting, electronics and powertrain products and assemblies.

GORE® Automotive Vents have been engineered with varied properties to fit in any automotive application. We have technical support and testing centers in the US, Germany, Japan, Korea and China, so our application engineers are easily accessible – and ready to work in close partnership with your design team, from product concept through manufacturing integration.

Contact Us to discuss options and solutions for your newest application. Call your local Gore representative or send your inquiry from our website: gore.com/autovents

About W. L. Gore & Associates

W. L. Gore & Associates is a global materials science company dedicated to transforming industries and improving lives. Since 1958, Gore has solved complex technical challenges in demanding environments — from outer space to the world’s highest peaks to the inner workings of the human body. With approximately 10,000 Associates and a strong, team-oriented culture, Gore generates annual revenues that exceed $3 billion. www.gore.com.

International Contacts

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<tr>
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<tbody>
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<td>USA</td>
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