



## INCREASE SAFETY AND PERFORMANCE OF LI-ION BATTERIES FOR EVs

Today's EV batteries are facing demands for extended range, shorter charge times and enhanced safety, reliability and longevity. One related challenge is to prevent pressure buildup within the battery pack caused by temperature or altitude changes. GORE® Automotive Vents for batteries reduce pressure differentials with continuous airflow in and out of the enclosure, while blocking contaminants such as water, automotive fluids, salts, dirt and mud. As a qualified automotive partner, Gore delivers advanced venting technologies which are easy to integrate, and support compact and lightweight design of EV battery systems.

### GORE® Automotive Vents for batteries

GORE® Vents are based on ePTFE membrane technology to reliably protect EV battery packs and battery management systems (BMS). Our engineering team can help you identify the optimal venting solution for your application:

- **GORE® PolyVent Super High Airflow Series:** has 3x the minimum airflow of our High Airflow PolyVent AMF300070.
- **GORE® PolyVent High Airflow Series:** has 7x the minimum airflow of our standard series for typical electronics components (e.g. engine control unit).
- **GORE® PolyVent Compact Series:** robust protection in a low-profile design, for extremely small components. Scannable Digital Matrix Code (DMC) for 100% airflow check and enhanced traceability.

### Sustained protection for battery systems, with added benefits:

- **Worry-free venting solution** with total quality control and GORE® PolyVent's integrated design that protects the membrane
- **Easy integration** without additional parts or complicated housing designs in either plastic or metal enclosures
- **Easy installation**, whether for a small series in manual or semi-automated installation or for high-volume automated installation
- **Durable protection** against liquids, dust, dirt, salts and corrosive automotive fluids

|                                                               | PolyVent<br>Super High Airflow Series | PolyVent<br>High Airflow Series | PolyVent<br>Compact Series |
|---------------------------------------------------------------|---------------------------------------|---------------------------------|----------------------------|
| <b>Product Name</b><br>(order number for samples)             | <b>SMPL-AMF310070-50</b>              | <b>AVS 70</b>                   | <b>AVS 200</b>             |
| <b>Product Number</b><br>(order number for series production) | AMF310070                             | AMF300070                       | AMF300200                  |



## Product Performance Characteristics

|                                                                                              |                                                                                                                       |                                                                                                                    |                                                                                                                           |
|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| Minimum Water Entry Pressure (WEP) <sup>1</sup> at standard ambient temperature and pressure | > 30 kPa/3sec                                                                                                         | > 30 kPa/30 sec                                                                                                    | > 80 kPa/60 sec                                                                                                           |
| Minimum airflow<br>Maximum airflow<br>(by conversion to the normalized state 0 °C, 1013 hPa) | Minimum: > 302 l/h at 7 kPa<br>Maximum: < 820 l/h at 7 kPa                                                            | Minimum: > 105 l/h at 7 kPa<br>Maximum: < 260 l/h at 7 kPa                                                         | Minimum: > 15 l/h at 7 kPa<br>Maximum: < 45 l/h at 7 kPa                                                                  |
| Typical airflow<br>(by conversion to the normalized state 0 °C, 1013 hPa)                    | ~430 l/h at 7 kPa                                                                                                     | ~160 l/h at 7 kPa                                                                                                  | ~28 l/h at 7 kPa                                                                                                          |
| Ingress Protection (IP)                                                                      | <ul style="list-style-type: none"> <li>IP67 (1 m for 30 min)</li> <li>Depending on housing geometry: IPX6K</li> </ul> | <ul style="list-style-type: none"> <li>IP68 (1 m for 1 h)</li> <li>Depending on housing geometry: IPX6K</li> </ul> | <ul style="list-style-type: none"> <li>IP68 (1 m for 1 h)</li> <li>Depending on housing geometry: IPX6K, IPX9K</li> </ul> |
| Operating temperatures                                                                       | T <sub>min</sub> = -40 °C<br>T <sub>max</sub> = +125 °C (+130 °C for max 810 hrs)                                     | T <sub>min</sub> = -40 °C<br>T <sub>max</sub> = +125 °C                                                            | T <sub>min</sub> = -40 °C<br>T <sub>max</sub> = +140 °C                                                                   |
| Membrane characteristic                                                                      | Hydrophobic and oleophobic                                                                                            | Hydrophobic and oleophobic                                                                                         | Hydrophobic and oleophobic                                                                                                |
| Housing material                                                                             | PBT-I-GF30 hydrostabilized                                                                                            | PBT-GF30 hydrostabilized                                                                                           | PBT-I-GF30 hydrostabilized                                                                                                |
| O-ring material                                                                              | EPDM 40 IRHD-M                                                                                                        | EPDM 45 IRHD-M                                                                                                     | Silicone 50 Shore A                                                                                                       |
| O-ring color                                                                                 | Black                                                                                                                 | Black                                                                                                              | Red                                                                                                                       |
| Laser marking for increased traceability                                                     | Yes                                                                                                                   | Yes                                                                                                                | Yes                                                                                                                       |

## Design & Dimensions

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## Recommended Installation

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|----------------------------------------------------------------------------------|--|--|--|
| Please contact your Gore representative for more detailed installation drawings. |  |  |  |
|----------------------------------------------------------------------------------|--|--|--|

1. WEP (Water Entry Pressure) Resistance: WEP Resistance measures how much pressurized water a membrane can withstand before it leaks.

## Environmental Performance: GORE® PolyVents

GORE® Automotive Vents for snap-fit installation have been extensively tested according to the following performance standards. Please contact your Gore representative for more detailed information.

### Thermal Shock Resistance Test

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Vent durability under changing temperature conditions

**METHOD:** ISO 16750-4

**TEST CONDITIONS:**

- cycling temperatures between  $T_{min}$  and  $T_{max}$  within 30 seconds
- 30 minutes conditioning at each temperature
- minimum 500 cycles

### Climate Resistance Test

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Vent durability in hot, humid environments

**METHOD:** DIN-EN-60068-2-67

**TEST CONDITIONS:**

- 85 °C temperature
- 85% relative humidity
- 1,000 hours

### Salt Spray Resistance Test

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Vent resistance to salt, water and mist over an extended period

**METHOD:** DIN EN 60068-2-11

**TEST CONDITIONS:**

- Profile Ka

### Temperature Resistance Test

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Vent durability under high and low temperature conditions

**METHOD:** ISO 16750-4

**TEST CONDITIONS:**

- $T_{max}$  for 2,000 hours
- $T_{min}$  for 168 hours

### Ice-Water-Shock Resistance Test

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(not applicable for AMF300070)

Vent resistance to repeated thermal shock by submersion in ice water

**METHOD:** ISO 16750-4

**TEST CONDITIONS:**

- heating to  $T_{max}$  for 60 minutes
- rapid submersion in 5% NaCl ice water for 5 minutes
- 20 cycles

### Fluid Resistance Test

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Vent protection against typical automotive 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.

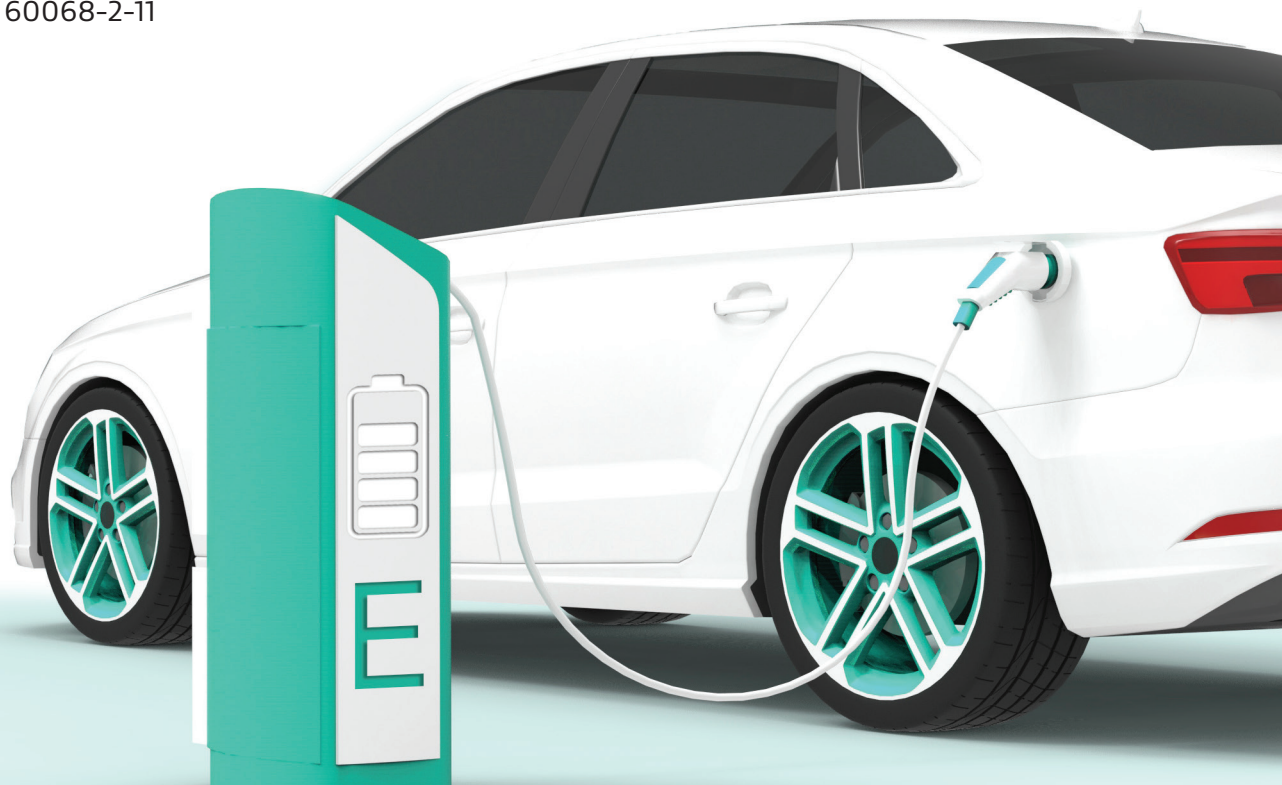
### Vibration and Mechanical Shock Resistance Test

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Vent performance after exposure to mechanical shocks at various temperatures

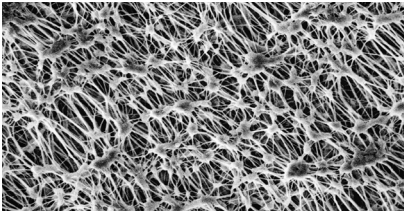
**METHOD:** ISO 16750-3

Product performance depends on sinusoidal and temperature profile, pulse shape and duration, number of shocks and peak acceleration. Compact Series meets the harshest severity levels.



## 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  
magnified 40,000 times

### 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.

Our vents have been engineered with varied properties to fit in any automotive application. With technical support and testing centers in the US, Germany, Japan, Korea and China, 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](https://gore.com/autovents)

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