

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 Standard Series:** withstands typical automotive fluids and continuous temperatures up to 125 °C, with short-term spikes up to 140 °C.
- **GORE® PolyVent High Airflow Series:** has 5x the typical airflow of our Standard Series, for Li-Ion batteries.
- **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 Standard Series	PolyVent High Airflow Series	PolyVent Compact Series
Product Name (order number for samples)	AVS 14	AVS 70	AVS 200
Product Number (order number for series production)	AMF300114	AMF300070	AMF300200



Product Performance Characteristics

Minimum Water Entry Pressure (WEP) ¹ at standard ambient temperature and pressure	> 60 kPa/30 sec	> 30 kPa/30 sec	> 80 kPa/60 sec
Minimum airflow Maximum airflow (by conversion to the normalized state 0 °C, 1013 hPa)	Minimum: > 15 l/h at 7 kPa Maximum: < 60 l/h at 7 kPa	Minimum: > 105 l/h at 7 kPa Maximum: < 200 l/h at 7 kPa	Minimum: > 15 l/h at 7 kPa Maximum: < 45 l/h at 7 kPa
Typical airflow (by conversion to the normalized state 0 °C, 1013 hPa)	~35 l/h at 7 kPa	~140 l/h at 7 kPa	~28 l/h at 7 kPa
Ingress Protection (IP)	- IP68 (1 m for 1 h) - Depending on housing geometry: IPX6K, IPX9K	- IP68 (1 m for 1 h) - Depending on housing geometry: IPX6K	- IP68 (1 m for 1 h) - Depending on housing geometry: IPX6K, IPX9K
Operating temperatures	$T_{min} = -40\text{ °C}$ $T_{max} = +125\text{ °C}$ (+140 °C for max 168 hrs)	$T_{min} = -40\text{ °C}$ $T_{max} = +125\text{ °C}$	$T_{min} = -40\text{ °C}$ $T_{max} = +140\text{ °C}$
Membrane characteristic	Hydrophobic and oleophobic	Hydrophobic and oleophobic	Hydrophobic and oleophobic
Housing material	PBT-I-GF30 hydrostabilized	PBT-I-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

Please contact your Gore representative for more detailed installation drawings.			
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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

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

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

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

METHOD: DIN EN 60068-2-11

TEST CONDITIONS:

- Profile Ka

Temperature Resistance Test

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

(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

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

Vent performance after exposure to mechanical shocks at various temperatures

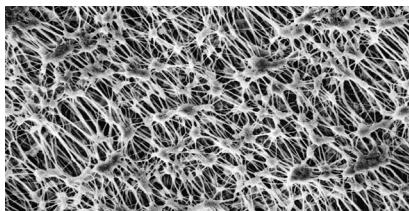
METHOD: ISO 16750-3

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

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INTERNATIONAL CONTACTS

Australia +61 2 9473 6800
China +86 21 5172 8299
EMEA +49 89 4612 2211
India +91 22 6768 7000

Japan +81 3 6746 2570
Korea +82 2 393 3411
Mexico +52 81 8288 1281
Singapore +65 6733 2882

South America +55 11 5502 7800
Taiwan +886 2 2173 7799
USA +1 410 506 7812

W. L. Gore & Associates, GmbH
Hermann-Oberth-Str. 26, 85640 Putzbrunn, Germany
T +49 89 4612 2211 **F** +49 89 4612 2302 **E** ipd-deutschland@wlgore.com
gore.com/autovents

