

W. L. Gore & Associates Venting Business Factsheet

W. L. Gore & Associates is a leading manufacturer of thousands of advanced technology products for the electronics, fabrics, industrial and medical industries. Perhaps best known for its waterproof and breathable fabric GORE-TEX®, the company's portfolio features a diverse array of innovations, including everything from guitar strings to life-saving cardiovascular devices.

Corporate Overview

- W. L. Gore & Associates, Inc., was founded January 1, 1958, in Newark, Delaware, by Wilbert L. (Bill) and Genevieve (Vieve) Gore.
- Gore is a privately held company, headquartered in Newark, Delaware, with manufacturing facilities in the United States, Germany, United Kingdom, Japan and China and sales offices around the world.
- Gore's annual sales total more than \$3.0 billion.
- By using proprietary technologies with the versatile polymer **polytetrafluoroethylene (PTFE)**, Gore has created numerous products for electronic signal transmission, fabric laminates, medical implants, as well as venting membranes, filtration, sealant, and fibers technologies for diverse industries.
- Gore focuses its efforts in four main areas: electronics, fabrics, industrial and medical products:
 - The company's **electronic products division** develops and manufactures high-performance copper and optical signal transmission products.
 - Gore's **fabrics division** provides protection from the elements and enables wearers to remain comfortable across a broad range of activities and conditions.
 - The products made by Gore's **industrial products division** meet diverse filtration and processing challenges throughout industry.
 - Implants from the **medical products division** provide creative healing solutions to complex medical problems.
- Today, Gore employs more than 10,000 employees, called associates.
- Gore has also been named one of the best workplaces in the United Kingdom, Germany, France, Korea, Sweden and Italy for several years in a row.



Gore Venting Overview

GORE® Vents are engineered to equalize pressure, prevent contamination, avoid harmful gas concentrations and reduce condensation in enclosures and packaging of all types.

- Automotive Vents** can extend the reliability and service life of components and reduce design, manufacturing and warranty costs. In automotive lamps, sensors, electronic control units and powertrain components, GORE® Automotive Vents rapidly equalize pressure variations caused by temperature changes while providing a reliable barrier to particulates, debris, water and automotive fluids.
- Packaging Vents** provide a simple, yet technologically advanced solution to manage differential pressure within a container. From maintaining container shape at the point-of-purchase to meeting stringent regulatory guidelines that require ventilation for heavy-duty chemicals, GORE® Packaging Vents deliver consistent and effective container venting results.
- Protective Vents** protect sensitive outdoor electronic equipment from harsh environments that can decrease the performance reliability and lifespan. GORE® Protective Vents offer a full range of venting solutions engineered to improve the performance, reliability and longevity of outdoor electronics such as lighting enclosures, solar energy systems, telecommunication infrastructure, heavy-duty equipment and surveillance and security systems. GORE® Protective Vents rapidly equalize pressure to effectively reduce condensation, reliably protect sensitive electronics against water and other liquids and effectively block contaminants such as dust, dirt or other particulates.
- Portable Electronic Vents** are the choice for leading portable electronic device OEMs. These manufacturers collaborate with Gore on innovative venting solutions for everything from high-volume consumer products, e.g. mobile phones, to ruggedized industrial or mil-spec devices. Gore, the global leader in portable electronic venting, offers custom engineering support and standard products to deliver improved acoustic quality and more reliable environmental protection from liquids, dust, and pressure changes.
- Printers, Inks and Toner Vents** are Gore's breathable and leak-proof venting solution that provides high airflow rates to manage differential pressure in printers and printing components. These durable vents resist inks with low surface tensions and provide a barrier against harmful contaminants entering the printing system. In addition, GORE® Vents continue to vent after repeated exposure to liquids containing additives. Along with providing pressure equalization, the vents can be used to deaerate trapped air in the ink, allowing for continuous ink flow. In toner cartridges, the breathable vent provides the added benefit of humidity control. Typical applications include ink jet printers, wide-format and industrial printers, laser printers and toners.



GORE® Protective Vents – Closer Look

- Gore® Protective Vents have been sold in the following markets for more than
 - 15 years in telecommunication infrastructure equipment
 - 10 years in solar energy systems
 - 15 years in the lighting industry
 - 10 years in heavy-duty equipment
 - 20 years in surveillance and security systems
- **Over 600 million sold vents to over 4,000 customers worldwide**



GORE® Protective Vents come in a variety of product forms, including screw-in vents, snap-in vents and adhesive vents.

GORE® Protective Vents improve product performance and increase the lifetime of sensitive electronics by equalizing pressure and managing condensation in the enclosure. At the same time, these vents protect electronics from contaminants such as dirt, dust, salts, water and other harmful liquids.

Application Fields



Key Lighting Applications:

Industrial/commercial outdoor lighting, outdoor decorative lighting, marine lighting, emergency lighting, entertainment lighting, ballast and transformers



Key Solar Applications:

Junction box, string combiner box, micro/string inverter, CPV modules, tracking equipment, monitoring equipment



Key Telecommunications Applications:

Tower-top electronic enclosures, small cell nodes, coverage systems, base station battery units, antenna tilt motors, tower-mounted sensors



Key Heavy Duty Applications (in Construction, Agricultural and Materials Handling Equipment):

Cameras, lights, displays, electric motors, actuators, sensors, inverters, control units, remote controls, joysticks



Key Surveillance and Security Systems Applications:

CCTV surveillance and security cameras, traffic control systems, outdoor access control systems, fixed-asset tracking equipment

How They Work

Electronic enclosures that are installed outdoors are subject to environmental conditions. When external temperatures change quickly, pressure differentials can occur. These pressure changes put extreme stress on the housing seals, eventually causing them to fail and allowing moisture and other contaminants to enter.

GORE® Protective Vents protect the integrity of the electronics by allowing air and moisture vapor to flow freely into and out of sealed enclosures. At the same time, they serve as a barrier to prevent contaminants such as dirt, dust and sand from entering the enclosure.



Typical Problems Solved

Failed Seals

Extreme changes in temperature (hot sunny day and a sudden thunderstorm), altitude changes (transportation) or the constant heating and cooling cycle of an internal heat source can cause a pressure differential. A quick decrease in temperature can cause a vacuum inside the enclosure. If this pressure differential is not dissipated, the vacuum places continual stress on housing seals which in turn, may cause seals to fail. This allows moisture and contaminants such as dust, dirt and other particulates to be drawn inside.



→ **Solution:** GORE® Protective Vents allow an enclosure to equalize pressure, preventing the occurrence of a vacuum and preserving the seal's integrity.

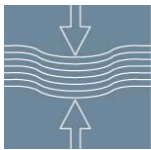
Condensation

If allowed to remain inside sealed enclosures, moisture vapor condenses to liquid water and compromises electronics. In addition to sudden pressure differentials, moisture can get inside enclosures by diffusion — the process by which vapor moves by natural molecular motion through the enclosure walls. When the moisture vapor enters an enclosure and condenses on the inside, it has no way to escape. Therefore, the liquid water remains inside the enclosure, which could lead to corrosion of the electronics, lenses and battery contacts.



→ **Solution:** GORE® Protective Vents enable water vapor to pass freely out of the enclosure, reducing the amount of internal moisture and clearing away condensation on surfaces, such as lenses.

Key Features of GORE® Protective Vents



Equalize Pressure

Rapid temperature changes can cause a vacuum inside a sealed enclosure. GORE® Protective Vents rapidly release the pressure buildup in the housing. In turn, reducing strain on the enclosure's seals.



Integrate Easily

Available in a variety of designs and sizes, GORE® Protective Vents are engineered with a screw-in, snap-in or adhesive membrane construction that integrates easily into any housing design.



Prevent Contamination

GORE® Protective Vents increase reliability of sensitive electronics by providing a durable barrier against contaminants such as liquid, insects, salt, sand and even dust.



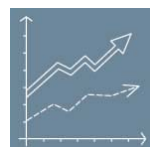
Extend Lifetime

GORE® Protective Vents extend product lifetime by relieving pressure and reducing condensation without requiring stronger seals, additional bolts or other ruggedized solutions.



Reduce Condensation

Condensation can damage sensitive electronics. GORE® Protective Vents minimize condensation by allowing water vapor to diffuse through the microporous membrane.



Meet Customer and Industry Standards

With sophisticated laboratories throughout the world, Gore tests its venting products to meet the most rugged protocols provided by our customers. These include industry standards for enclosure protection, such as Underwriters Laboratory (UL), Technischer Überwachungsverein (TÜV) and International Electrotechnical Commission (IEC).

Further Information: <http://www.gore.com/protectivevents>