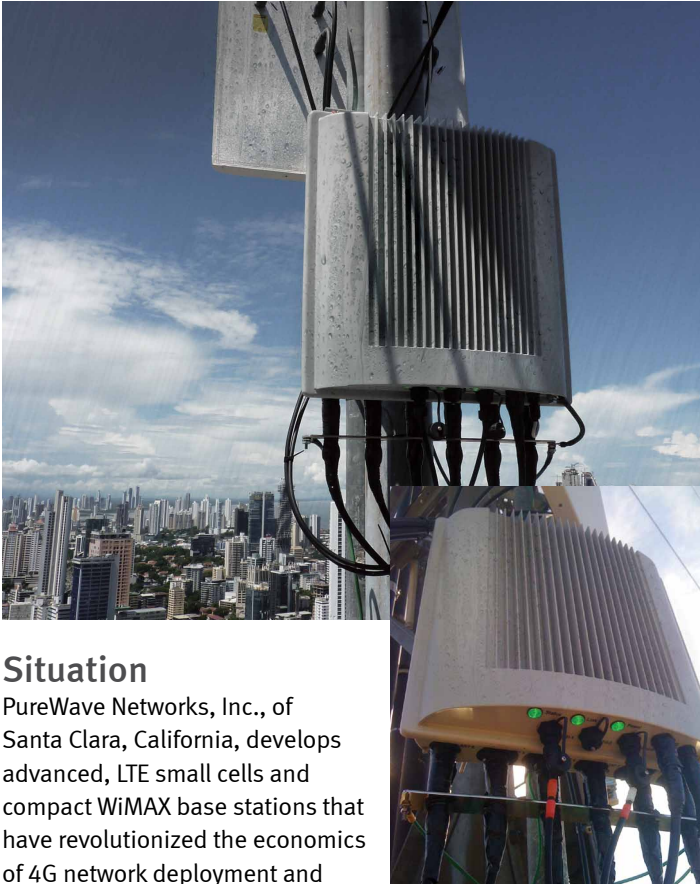




# GORE® Protective Vents

Telecommunications

## Improve Durability of Base Stations By Equalizing Pressure



### Situation

PureWave Networks, Inc., of Santa Clara, California, develops advanced, LTE small cells and compact WiMAX base stations that have revolutionized the economics of 4G network deployment and operations. The PureWave Quantum™ family of base stations offers advanced performance in a rugged unit that can be mounted virtually anywhere outside, eliminating the need for separate remote radio heads. These products deliver the coverage of a macro base station or can be deployed as 4G small cells in a dense urban environment.

### Challenge

Unlike the typical split-unit design, the PureWave Quantum™ contains all of the electronics inside a single cast-aluminum housing with a closed cell gasket. These units were designed for outdoor installations worldwide, so they needed to withstand extreme variability in temperatures and weather conditions. In addition, they needed to meet the IEC standard for full immersion (IP67) required for military and oil/gas applications.

The PureWave Quantum™ engineering team designed a rugged housing with 26 perimeter screws to ensure a solid seal. However, they knew that they needed to account for increased pressure caused by heat buildup during operation of the internal electronics. Leaving a small hole in the housing wall would equalize pressure,

but it would also provide easy access for contaminants such as rain, dirt, dust and even insects. Combining the pressure from heat buildup with pressure caused by sudden changes in external temperatures can result in internal pressure differentials as much as three pounds/inch<sup>2</sup> (3 psi). Over time, these pressure differentials put stress on the housing seals, which can cause the seals to fail and draw in moisture vapor. If the moisture vapor has no path out of the housing, it can condense and corrode the sensitive electronic instrumentation that is being protected. Specifications that result in differentials of 3 psi have a direct effect on total costs because they require tighter tolerances, which in turn increase complexity of product design and manufacturing.

*“Thousands of our systems have been installed in some of the most rugged environments for more than four years, and we have experienced no leakage issues. This level of durable performance is why we continue to turn to Gore when developing all of our products.” — Brett Catterall*

*Director of Operations, PureWave*

### Solution

The PureWave Quantum™ engineering team incorporated a GORE® Protective Vent in the design of the device housing. Based on the size and volume of the housing, the team selected an adhesive vent that they mounted near the top of the side wall to gain maximum airflow. Rated to meet ingress protection up to IP67, this vent equalizes pressure within the housing by allowing air and moisture vapor to pass in and out of the enclosure freely, reducing the potential for condensation. At the same time, the vent serves as a barrier to prevent liquid, dirt, dust, salt and other contaminants from entering.

According to Brett Catterall, Director of Operations at PureWave, “We expect our product to perform reliably for at least ten years, regardless of whether they are installed in the mountains of Northern Canada or the deserts of Asia. With these widely varying environments, we knew we needed to design a housing that provided protection but also could breathe. GORE® Protective Vents have proven that they maintain equalized pressure during rapid thermal/pressure changes. Thousands of our systems have been installed in some of the most rugged environments for more than four years, and we have experienced no leakage issues. This level of durable performance is why we continue to turn to Gore when developing all of our products.”



# GORE® Protective Vents

## Diverse Product Line Engineered for Simple Integration

GORE® Protective Vents are manufactured in many different sizes and shapes, making it easy to choose the right vent for any application. With a diverse product portfolio, these vents are easy to integrate into new or existing designs to meet the needs of a broad range of applications and markets. The versatility of GORE® Protective Vents is apparent in both their range of protection and their ease of installation. For example, these vents:

- tolerate temperatures ranging from -40°C to 125°C
- perform to protection standards up to IP69K\*
- provide maximum protection for applications in harsh environments through molded plastic or metal vents
- install easily by being adhered, threaded, snapped, bolted or heat/ultrasonic-welded to a variety of enclosure materials
- adhere to the device with adhesive backing for applications with insufficient free space to install a vent inside

## The Gore Advantage

Gore is a technology-driven company focused on discovery and product innovation. Well-known for waterproof, breathable GORE-TEX® fabric, the company's portfolio includes everything from high-performance fabrics and implantable medical devices to industrial manufacturing components and aerospace electronics. Founded in 1958 and headquartered in Newark, Delaware, Gore employs approximately 10,000 associates in 30 countries worldwide.

For more than ten years, Gore has delivered protective venting solutions for telecommunication hardware installed throughout the world. When working with Gore, our telecommunications clients are paired with a technical sales associate and an applications engineer to assess the intended application, the product design, and the environment in which it will be used. Gore's team tests various vents to determine the best material, size and placement of the GORE® Protective Vents. This collaborative process has ensured that hardware of some of the largest OEMs and equipment manufacturers meets the challenging environmental demands of today's telecommunication industry.

### INTERNATIONAL CONTACTS

Australia	61.2.9473.6800	Mexico	52.81.8288.1281
Benelux	49.89.4612.2211	Scandinavia	46.31.706.7800
China	86.21.5172.8299	Singapore	65.6733.2882
France	33.1.5695.6565	South Africa	27.11.894.2248
Germany	49.89.4612.2211	South America	55.11.5502.7800
India	91.22.6768.7000	Spain	34.93.480.6900
Italy	39.045.6209.240	Taiwan	886.2.2173.7799
Japan	81.3.6746.2572	United Kingdom	44.1506.460123
Korea	82.2.393.3411	USA	1.410.392.4440

### W. L. GORE & ASSOCIATES, INC.

401 Airport Road • Elkton, MD 21921 USA  
Phone: 1.410.392.4440 • Toll free: 1.800.637.4449  
Fax: 1.410.506.8749 • Email: protectivevents@wlgore.com

[gore.com/protectivevents](http://gore.com/protectivevents)



PureWave Base Station

GORE® Protective Vents Adhesive Vent



\*IP ratings depend on the product housing's design. Please contact a Gore representative for more information.

**FOR INDUSTRIAL USE ONLY. Not for use in food, drug, cosmetic or medical device manufacturing, processing, or packaging operations.**

All technical information and advice given here is based on Gore's previous experiences and/or test results. Gore gives this information to the best of its knowledge, but assumes no legal responsibility. Customers are asked to check the suitability and usability in the specific application, since the performance of the product can only be judged when all necessary operating data are available. The above information is subject to change and is not to be used for specification purposes.

Gore's terms and conditions of sale apply to the sale of the products by Gore.

GORE, GORE-TEX and designs are trademarks of W. L. Gore & Associates.

Quantum PureWave is a trademark of PureWave Networks, Inc.

© 2012 W. L. Gore & Associates, Inc.

