Portable Electronic Vents

Case Study

Ensure Reliable Protection without Compromising Sound Quality

Situation

Sepura, a global leader in digital radio products, systems and applications for business and critical communications, wanted to expand their line of rugged, two-way, handheld radios. The majority of Sepura radio users operate in physically demanding environments that can expose them to all types of weather as well as hazardous conditions such as chemical spills, toxic gases, or high-pressure water sprays. These users must be able to communicate with one another in any situation, so their radios must provide high-quality sound and continue to function regardless of the challenges they encounter.

Devices that are exposed to challenging environments are thoroughly sealed inside a rugged housing to protect the internal electronics from exposure. However, audio devices include openings to enable sound waves to be transmitted. In addition, rapid changes in temperature – which can be caused by changing weather conditions, extreme heat at a fire scene, or movement from indoors to outdoors during a pursuit – expose the operative's radio to pressure differentials. Over time, the pressure can compromise the housing seals, causing them to fail and create a leak path for contaminants.

Challenge

When developing the first STP8000 Series radio, Sepura's engineering team knew they needed to equalize pressure and protect the audio components from exposure to contaminants. They wanted their device to meet the IEC 60529 Ingress Protection testing protocol, which means that neither dust nor spray could enter the housing. Just as important, the acoustic performance had to meet the European Telecommunications Standards Institute (ETSI) recommendations, ensuring clear and reliable communication between the responders. Thus, Sepura needed a protective material that allowed sound waves to pass through easily while providing a barrier against liquids and particulates.

Solution

Sepura turned to Gore for assistance in determining the best venting solution to maintain both the sound quality and protection level they needed to ensure that the STP8000 radio met the needs of the public safety industry. Gore's application engineers collaborated with Sepura's product team throughout the entire design and development process. After analyzing the environmental conditions in which the radio would be used and the preliminary design of the radio, Gore developed several prototype GORE® Portable Electronic Vents for further testing. Gore then worked with Sepura to optimize the radio design with three GAW325 Series vents to ensure the best acoustic performance and reliable protection of the two microphones and the ear-piece. To address the need for pressure equalization in the main cavity of the radio, Gore also provided a PE8 Series GORE® Pressure Vent that was installed beneath the battery for maximum protection. Since the success of this first project in 2007, Sepura has worked with Gore on several product developments, including the IP67 rated STP9000 series and the intrinsically safe STP8X – the latest addition to the STP Series. Integrating GORE® Portable Electronic Vents in their radios helped Sepura maintain excellent acoustic performance in a long-lasting radio. According to Keith Kenny, Mechanical Engineering Team Leader of Sepura plc, "High-quality sound performance in a radio that lasts has always been our top priority. Emergency responders need a radio they can rely on regardless of what's going on around them. Gore stepped in as a new supplier and understood our needs right away. Because of their experience with venting technology, they have been able to work side-by-side with our engineering team throughout the entire design and development process to create a rugged solution that provides the sound quality our customers demand."

> ***"Gore's engineering team responded quickly and worked closely with us throughout our design process so that we could optimize the performance and durability of the radio. Their expertise in both acoustics and venting technology enabled us to create a rugged solution that delivers both high-quality sound and reliable ingress protection."***
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> *Keith Kenny*
> *Mechanical Engineering Team Leader of Sepura plc*

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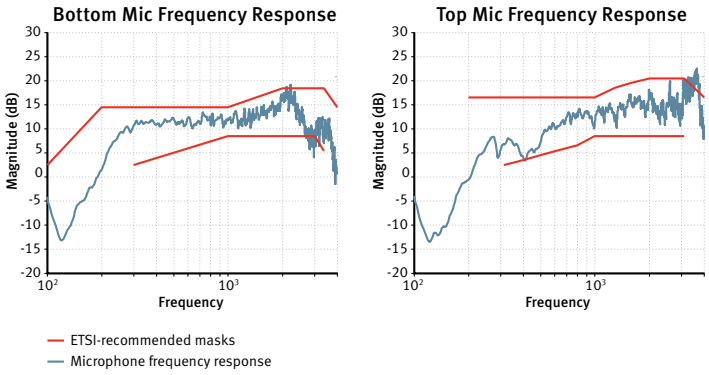
CASE STUDY

The STP9000 Series includes two transducers, which increased the challenge in meeting the frequency recommendations of the European Telecommunications Standards Institute (ETSI). In addition, the radio needed environmental protection that meets IP67. Sepura's engineering team worked with Gore to identify the GAW325 Series of GORE® Acoustic Vents as the best solution to meet both requirements. As shown in the following graphs, Sepura's testing showed that these vents enabled both microphones to maintain frequency response measurements within the ETSI-recommended masks. The measured responses and the mask varies depending on the position of the microphone, location of the vent, and changes in the acoustic system. These acoustic test results met Sepura's specifications, and the transducers remained protected from the environment.



Maintain sound quality and protect sensitive electronics

To function properly, portable acoustic devices require openings that allow sound to enter and exit the acoustic system. Unless these openings are protected, contaminants can enter the enclosure and compromise the acoustic performance. GORE® Acoustic Vents help maintain high-quality sound transmission with

- minimal transmission loss due to low resistance acoustic materials
- excellent dust and liquid barrier for indoor and outdoor applications
- quick recovery after liquid immersion
- robust adhesives that withstand challenging environments
- standard and custom designs available
- easy installation
- dust, splash and immersion protection including IPX8
- patented technology that enables quick and reliable integration into the device as well as long-lasting adhesion on different product surfaces

Learn more at **gore.com/portableelectronics**.

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 diverse portfolio includes high-performance fabrics, implantable medical devices, industrial manufacturing components, and aerospace electronics. Gore products remain at the forefront because they are engineered specifically for durable performance in the most challenging environments.

For almost thirty years, Gore has delivered venting solutions for global applications in industries such as heavy-duty equipment, automotive, solar, lighting, and telecommunications. Gore's vents are backed by years of research and testing to help extend product life and enhance reliable performance – all to ensure that these venting products can meet the demands of today's technology.

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