



# Portable Electronic Vents

FOR ACOUSTICS

## Glossary of Terms

**Acoustic transducer** — A device that converts sound energy into an electrical signal and vice versa

**Active area** — The total area of the acoustic vent that is exposed to a sound wave; the active area of any vent equals the area inside the adhesive wall; for example, the active area of a circular vent with a 15 mm inner diameter equals 177 mm<sup>2</sup> (Figure 4)

**Amplitude** — The magnitude of sound as generated from a sound wave or sound source; usually measured in dB

**Angle of incidence** — The angle between a sound wave and a perpendicular surface when the sound wave encounters a surface; for example, normally incident means that the progressing sound wave encounters the surface at an angle of exactly 90°

**Attenuation** — The reduction of sound as it travels from a source to a receiving location, usually affected by absorption and reflection in the acoustic system

**Decibel (dB)** — The logarithmic value of any measured physical quantity; commonly used in the measurement of sound; the decibel scale represents a large span of signal levels in a condensed form, with a six dB increase equaling twice the sound level; a human ear requires a ten dB increase to actually hear an increase in sound level

**Distortion** — An undesired change in the waveform of sound that results in a lack of fidelity in reception or reproduction

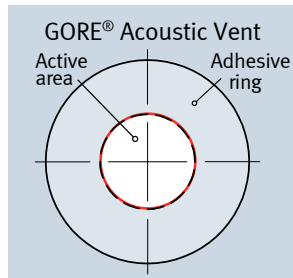
**Dust and splash vent** — A protective barrier made from resistive materials that allow sound waves to pass through but protect against exposure to dust, dirt, and liquid splash

**Frequency** — The number of times per second a sinusoidal wave repeats itself, expressed as cycles per second, or Hertz (Hz)

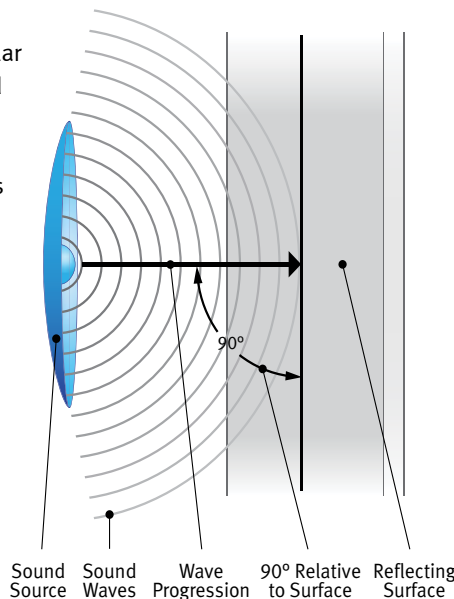
**Frequency response** — The change in amplitude of an acoustic device or system with frequency

**Fundamental** — The lowest frequency that was driven from a sound source

### ACTIVE AREA OF A GORE® ACOUSTIC VENT



### ANGLE OF INCIDENCE



**Harmonics** — Frequency vibrations that are multiples of the fundamentals; for example, a **second-order harmonic** is two times the frequency of the fundamental

**Immersion vent** — A protective barrier made from reactive materials that meet IP67 or other water immersion standards

**Impedance** — The resistance associated with the flow of acoustic energy measured in Rayl (Pascal second/meter); the specific acoustic impedance is independent of part size, however; lower impedance is typically preferred

**Ingress protection rating (IP rating)** — A rating system developed by the International Electrotechnical Commission (IEC) to classify the level of protection from foreign objects, such as dust or water, offered by an enclosure

**Load impedance** — The resistance of a transducer to displacement because of the downstream influences within the acoustic system; load impedance is affected by a combination of the type of material in the vent, the size of the chamber, and the type of acoustic transducer used in the system

**Loudspeaker** — An active acoustic transducer in a portable electronic device that enables a user to communicate in hands-free mode

**Microphone** — A passive acoustic transducer that converts acoustic energy (sound waves) to electrical energy; various types of microphones are available, such as electret condenser microphones (ECM), micro electro-mechanical systems (MEMS), and Piezoelectric

**Noise** — A subjective term for unwanted sound; usually present in portable electronic devices as a buzzing or rattling noise; possibly related to load impedance on an active acoustic transducer or improper design of the vent

**Rayl** — Units of measure of specific acoustic impedance and can be defined as either MKS unit (pa-s/m), or CGS unit (dyne-s/cm<sup>2</sup>)

**Reactance** — The amount of energy lost from a sound wave because of the mechanical vibrations of a material; depending on the acoustic system, optimizing the stiffness, mass and boundary conditions of the material can improve the overall sound quality

**Reactive material** — Materials that predominantly vibrate in response to a sound wave and are used in immersion applications

**Receiver** — An active acoustic transducer that is effective only when a user's ear is near to or pressed firmly to the portable electronic device

**Reflection** — The redirection of sound waves after they encounter a solid surface, resulting in a decrease in sound level or quality; usually affects loudspeakers and receivers

**Resistance** — The amount of energy lost from a sound wave because of interference with material fibers or restrictive holes; depending on the acoustic system, resistance can improve sound quality by dampening resonance within your system; too much resistance can attenuate the overall sound level



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**Resistive material** — Materials that predominately allow sound waves to pass through; often used in vents for dust and splash applications

**Sound pressure level (SPL)** — A logarithmic value that refers to the ratio of the actual sound level to a reference sound level of 20 micropascals (the approximate threshold of human hearing)

**Target ring** — A physical location on a housing or an acoustic transducer used to help apply adhesive vents consistently during manual installation; a target ring is usually either recessed or embossed on the perimeter of the desired location

**Total harmonic distortion (THD)** — The percent of total harmonic energy that a device has in comparison to the level of the fundamental (e.g., if a device drives a fundamental at 1,000 Hz, the THD equals the percent of the total harmonic energy at subsequent frequencies at 2,000 Hz, 3000 Hz, etc.); THD can be a significant design problem in loudspeakers and receivers but not in microphones

**Vent** — A membrane that provides an effective barrier from contaminants (e.g., dust, dirt, and liquids) and still allows the product to breathe with changing environmental conditions

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