

Audible Alarm Use and Equipment Integrity Challenges

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You are almost done verifying your equipment design meets all the relevant environmental standards, and then you notice the requirement for the audible alarm. "Wait a second," you think to yourself while starting to get nervous, "how do I get the sound out of the equipment without ruining the integrity of my equipment enclosure?"

There is no reason to panic at this point, as audible alarm manufacturers have a variety of means of dealing with equipment integrity issues. Here are some of the most common:

Bury the Audible Alarm

If the sound level requirement for the audible alarm is moderate (60 to 80 dB @ 2 ft.), then it may be possible to seal the audible alarm inside the equipment and still meet the sound level requirement. An enclosure around an audible alarm will typically dampen the sound level by 15 to 20 dB, but by using an extra loud audible alarm to begin with, the resulting sound outside of the cabinet may still be of sufficient volume. Since every application is different, verification testing on the actual enclosure with the audible alarms inside will have to be done to find out if this method of mounting is an option.

To mount the audible alarm within the equipment, board mount audible alarms can be used if the control circuitry is located on a circuit board, or an L-Bracket can be used with audible alarms that are designed to be panel mounted.

Use a Rubber Gasket

If the equipment must meet a NEMA 4X, IP-65, or similar water proof rating, the audible alarm manufacturer should be able to provide a rubber gasket that will give a water tight seal between the audible alarm and the equipment panel. Before these rubber gaskets were offered, equipment designers used silicone adhesive or glue to make the water-proof seal. Potential problems with using silicon adhesive or glue include the sealing joint failing over time and the difficulty in removing the audible alarm if the equipment is ever refurbished.

The rubber gasket should be placed between the inside of the panel and the audible alarm to prevent water from penetrating through the alarm's threads.



Panel mount audible alarm with screw terminals and a LED in the front grille. Wires are also a popular termination option.

How Do Audible Alarms Work?

The most common type of electronic audible alarm utilizes a piezoelectric transducer. The transducer consists of a metal disc with an attached ceramic material that flexes when voltage is applied. By applying a complex signal to the transducer such as a sine wave, an audible sound is generated. The transducer is mounted to the audible alarm housing using silicone adhesive to provide a complete environmental seal behind the transducer which protects the internal circuitry.

External Mounting

If thinking about punching a 1.25” diameter hole through the enclosure to mount the audible alarm causes too much anxiety, then consideration should be given to externally mounting the audible alarm. Holes still need to be punched through the enclosure for the power wires to pass through, but the wires are much smaller, and standard water proof grommets are available to provide the seal around the wires. A box or an L-Bracket can be used to mount the alarm external to the equipment.



L-Bracket used to mount a panel-mounted audible signal internal or external to the equipment.

Other Considerations

If the audible alarm will be exposed to rain or a water wash down, the nose of the device should be mounted either down (preferably) or horizontally so that all water can easily drain out. If the audible alarm is poorly mounted so that water accumulates in front of the piezoelectric transducer, then its performance may be severely diminished. Additionally, if that accumulated water freezes, the expanding ice can cause permanent damage.

While the front of a piezoelectric audible alarm is sealed against the environment, it is still possible to force water into the device if the strength of the water stream is severe and it is directed straight into the audible alarm’s front opening. In cases where the equipment is strongly washed down, the audible alarm should be mounted so that it is not in the direct line of fire with the water stream. As a last resort, an audible alarm with a sound baffle can be used. Before the equipment is “hosed” down, the baffle on the front of the audible alarm is closed, and afterwards, the baffle must be re-opened. Using a sound baffle to protect against water intrusion is usually not the best option as it relies on the operator to remember to manually open and close it.

Conclusion

With up-front planning, audible alarms can be used in equipment that requires protection against environmental influences. Audible alarm producers have dealt with equipment integrity issues for many years, and should be able to provide recommendations to meet any kind of environmental equipment standard.

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What is a dB?

Sound level is measured in units of decibels (dB’s). 0 dB is equivalent to no sound while 130 dB is the hearing pain threshold. The dB number is always accompanied by a distance value since sound volume degrades over distance. Audible alarms are typically rated as either Soft (55 to 65 dB @ 2 ft), Medium (65 to 80 dB @ 2 ft), or Loud (80 to 95+ dB @ 2 ft).