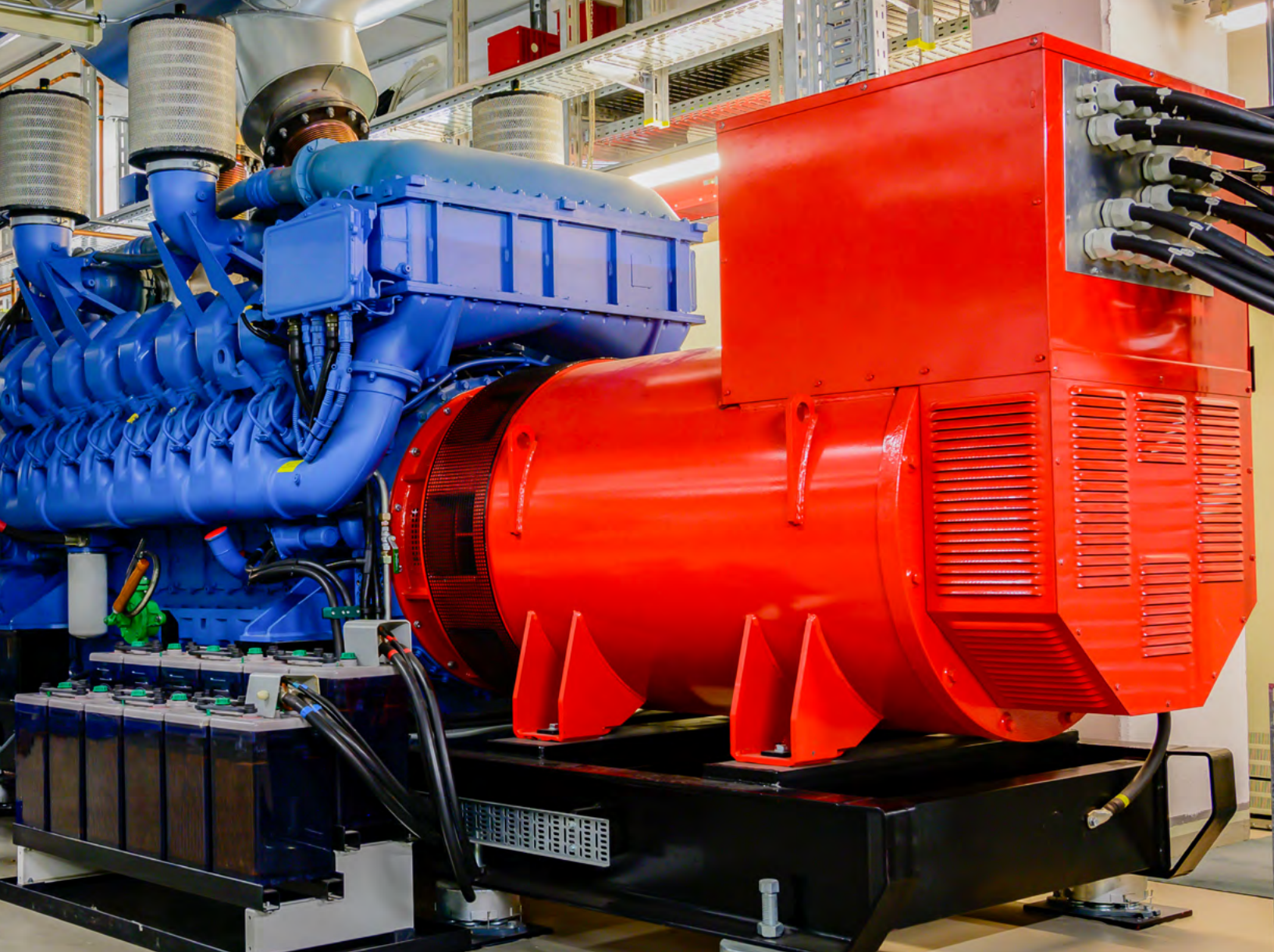




KEY ELEMENTS
to Designing Sound Enclosures

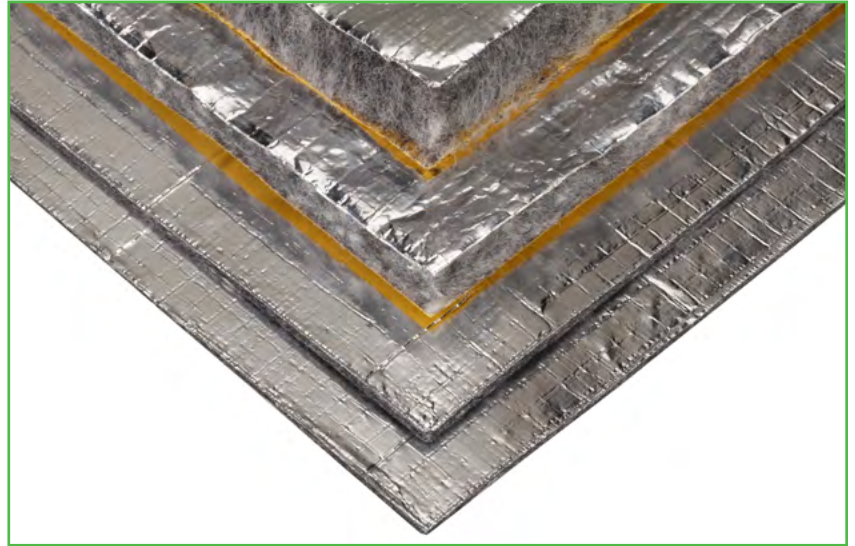


Many industrial and commercial applications require large, robust equipment that can generate excessive noise levels. From power generators to air compressors and many other types of heavy equipment, the overwhelming noise levels can be a nuisance and pose health risks to people working in surrounding areas. Many OEMs use sound enclosures to help counter the disruptive noise created from these machines.

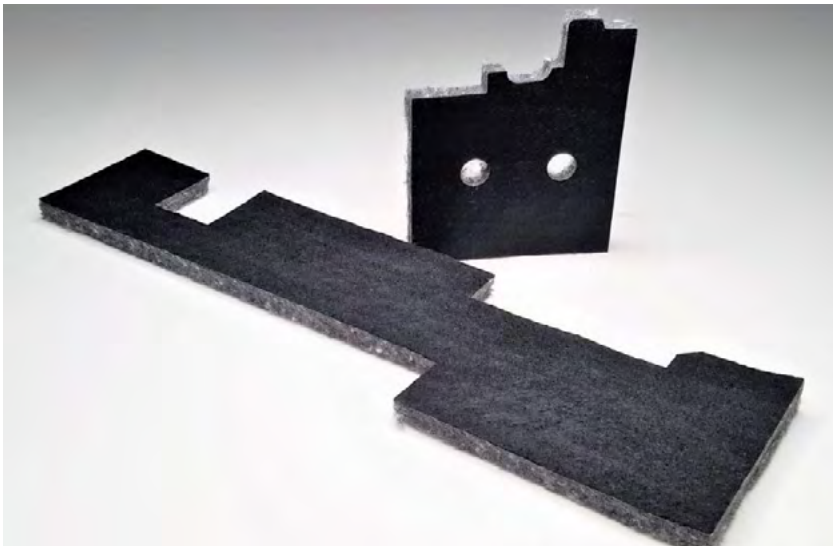
While sound enclosures are designed to trap sound waves to reduce their effect on the ambient environment, many traditional enclosures are less effective than you might think. An effective sound enclosure must include suitable acoustic lining to block unwanted sound waves and prevent unintentional amplification of noise. Understanding the key elements of designing a sound enclosure will help you choose the best option for your needs.

The Importance of Acoustic Material in Sound Enclosures

Not all sound enclosures are made equally. One of the key elements to an effectively designed sound enclosure is the acoustic lining material used. Improperly lined enclosures can induce the opposite of the desired outcome by amplifying the sound waves before reducing the noise or only partially blocking some sound waves. Therefore, choosing the right acoustic material for your sound enclosure is vital to ensure it performs effectively.



What Does An Acoustical Enclosure Do?



Sound waves above 85 decibels can harm individuals who experience consistent exposure to sound at these levels. For example, working around industrial equipment or even living near highways can cause adverse health concerns if the loud noise is not dampened. Acoustic enclosures reduce, minimize, or eliminate sound emanating from a specific source, by using soundproofing materials to absorb or isolate vibrations that create noise.

Decibel Levels of Construction Equipment

Industrial machinery used on construction sites are some of the most common items requiring acoustic enclosures. Construction equipment produces a lot of disruptive noise with levels exceeding 85 decibels, which is harmful to personnel. Below is a list of common industrial equipment and the noise levels they generate:

- **Air compressors:** 40-92 decibels
- **Generators:** 50-95 decibels
- **Bulldozers:** 96-109 decibels
- **Heavy construction equipment:** 80-120 decibels



6 Key Elements to Keep in Mind When Designing a High-Performance Acoustic Enclosure

An optimal acoustic enclosure is made with dense and solid material on the exterior and absorbent material on the inside to prevent noise from escaping. To ensure a proper design for a high-performance sound enclosure that fits your company's sound absorption needs, consider these eight elements when discussing your requirements with an acoustic enclosure manufacturer.

1 Current and Desired Sound Level

Use a sound level meter to determine the current decibel level of the equipment. Ideally, high-performance sound enclosures must reduce sound levels below 85 decibels or more. The desired sound level determines the acoustic enclosure types best suited for your application.

2 Determine the Source of the Noise and Sound Enclosure Dimensions

Determine where the noise is being generated and treat as close to the noise source as possible. Determine the interior and exterior dimensions of your enclosure by establishing whether you will enclose the machinery itself or create an enclosure for personnel.

3 Is Ventilation Required Inside the Noise Enclosure?

When enclosures are built around machines or systems that produce excessive heat, it is necessary to include ventilation to prevent the equipment from overheating.

4 Number and Location of Openings Required

The required equipment openings, such as maintenance access, ventilation, utilities, inlets, and outlets, must be carefully considered during the initial sound enclosure design process. This is because all of the enclosure's openings must be acoustically insulated to prevent unwanted sound from escaping, reducing the enclosure's performance.

5 How Often is the Equipment Accessed?

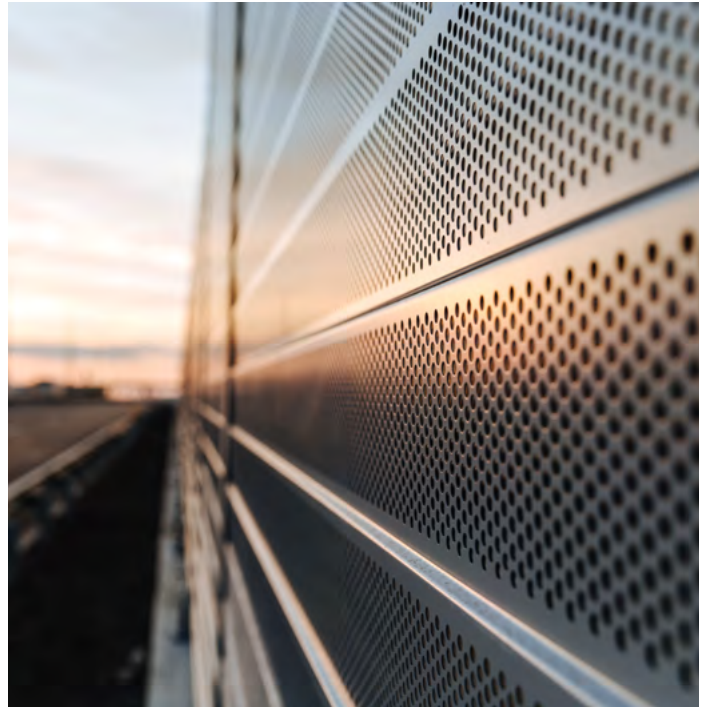
Determine if access to the equipment or parts of the machinery will need to be done daily or only for major maintenance. Sound enclosures can be customized to fit your specific access needs.

6 Other Elements to Which the Enclosure Will Be Exposed

Considering the final environment of the sound enclosure is necessary to ensure a proper design. These considerations allow the enclosure to withstand harmful elements, such as high humidity, intense heat, debris, or chemical exposure that may be present in the area.

Why Sheet-Metal Sound Enclosures Are Not Enough

While most sound enclosures use sheet metal, it often has a limited impact on absorbing sound waves. To demonstrate the effects of acoustic treatments, our engineering team tested a sheet metal acoustic enclosure without any acoustic material. The untreated enclosure had an increase of 28 decibels over the sound generator level. The hard, untreated surface allows the noise to be amplified inside the enclosure before being transferred to the exterior of the enclosure. This finding further supports the importance of paying attention to the material of the physical enclosure and the sound wave concentration inside the sound enclosure. If a sound enclosure is not using internal acoustic absorber material, the enclosure will not reduce noise to its full potential.



Modified Sound Enclosures Reduce Noise

Adding an acoustic-absorber lining material to the enclosure's interior is necessary for effective noise reduction. Using the right absorber material helps to more effectively manage air paths, which helps reduce the device's sound output.

Technicon Acoustics's engineering team tested this by using a sound enclosure with a 24-inch by 36-inch louver and recording the decibel changes. We discovered a 3-4 decibel reduction when adding an absorber foam to the enclosure versus traditional acoustic barriers. Without modifying the sound enclosure, the net volume stayed almost the same on both sides of the enclosure.



Benefits of Using Acoustic Enclosures

One of the major benefits of using acoustic enclosures is reducing sound energy instead of reflecting the sound in another direction. Sound enclosures are made with sound-dampening materials that soak up sound waves by letting noise enter the front surface and exit the opposite side with much less energy. As the reduced sound wave energy exits the sound barrier, it results in a lower noise level for those in the area surrounding the machinery. Acoustic enclosures can be customized for unique situations to work in many industrial applications.

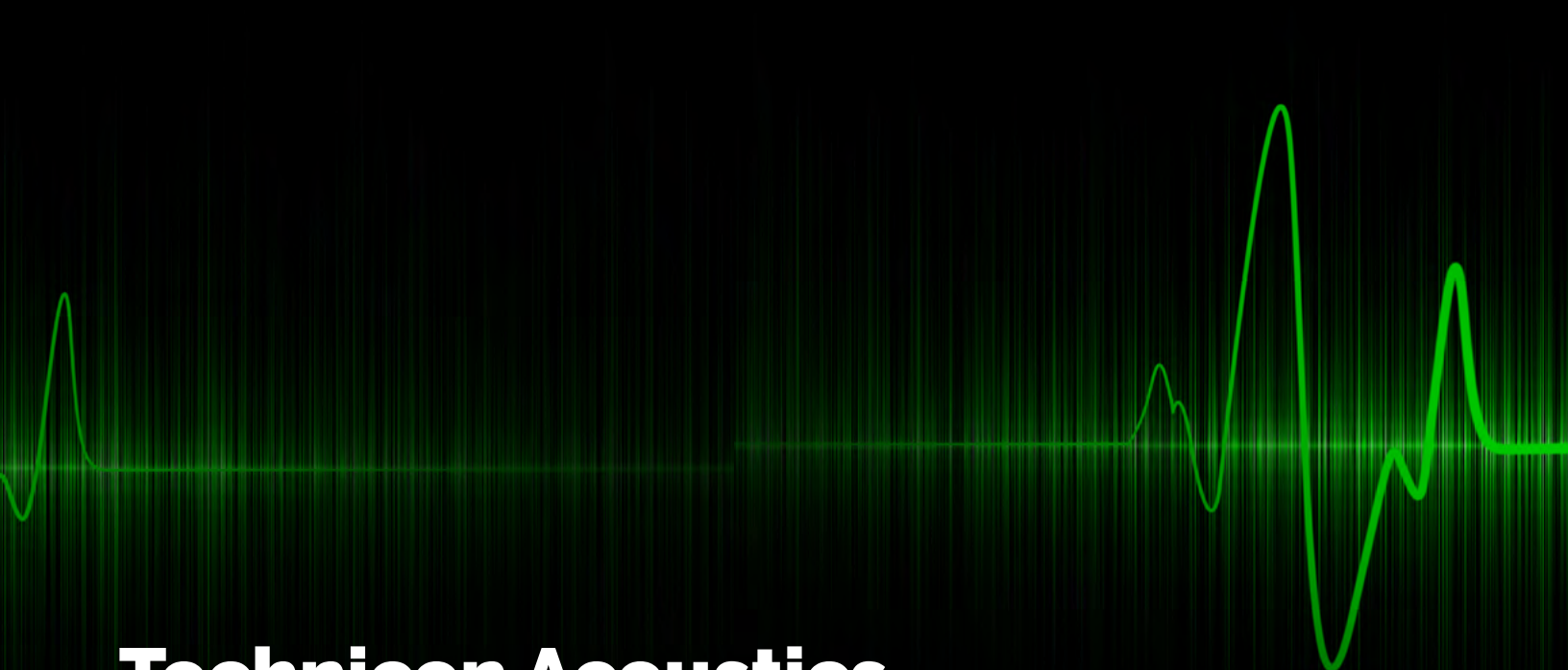


Contact the Technicon Acoustics Team Today to Get Started

Noisy power generators, air compressors, and other industrial equipment are not only annoying, but these high-decibel sound levels are potentially dangerous to those exposed. Therefore, we recommend acoustic absorber foams in sound enclosures to prevent these loud noises and avoid potential health risks to nearby individuals and workers.

Our acoustic absorber foams work in enclosures by blocking and absorbing sound for a net decibel reduction of the equipment's noise. We specially engineer our sound absorber tools to reduce sound levels for power generation equipment, air compressors, and other commercial machinery.

[Request a quote](#) from Technicon Acoustics today for pricing details on customized acoustic absorbers to suit any sound enclosure design.



Technicon Acoustics

We are the leading producer of Acoustic and Thermal Solutions for Original Equipment Manufacturers throughout North America.

We design, develop, manufacture, and deliver parts and materials that absorb, block, and isolate sound and thermal energy. Our dedicated team of Engineering, Manufacturing, and Administrative Professionals utilize the latest systems, processes, and technologies in our state-of-the-art facility to meet and exceed your expectations.

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