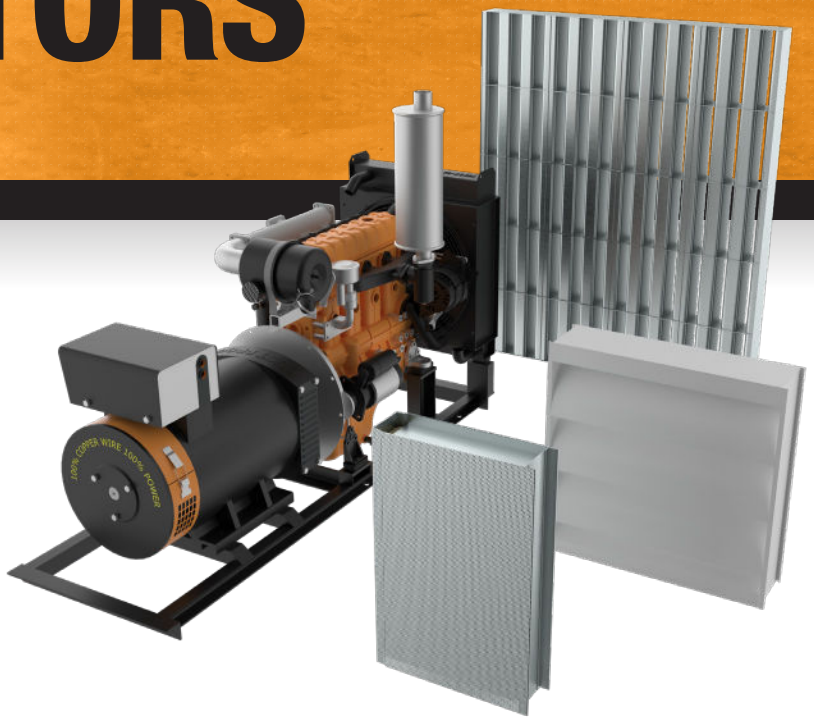
Solutions for

EMERGENCY GENERATORS



price | NOISE CONTROL

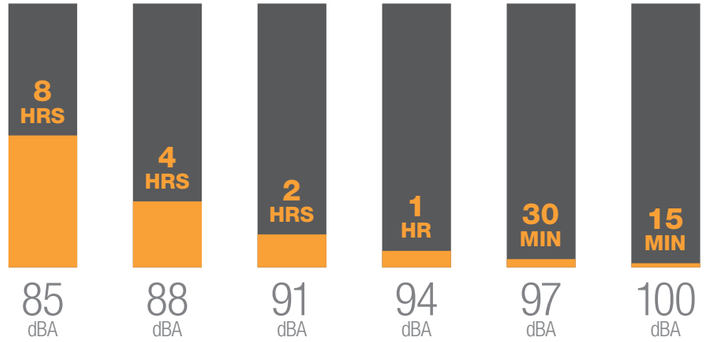
Why Generator Noise Control MATTERS

Emergency and standby generators are often legally required as they are vital to facilities that require a source of power throughout any circumstances — from hospitals, laboratories and data centers to universities, commercial towers, and residential infrastructure. They provide reliable backup to ensure continuity during power outages.

THE ISSUE

Emergency generators are often overlooked in the noise control efforts because they are meant to only run in emergency situations. However, they are meant to be operational for the entire lifetime of a building, which means they are typically tested twice a week for a few hours at a time. The typical sound power level of a 1500kW diesel generator is above the human ear threshold of pain [120dBC]. If left untreated, it can cause hearing loss in seconds.

NIOSH RECOMMENDS **NO MORE** THAN THIS LEVEL OF EXPOSURE



Reference: https://www.cdc.gov/niosh/noise/about/noise.html

Noise Propagates Easily

Without treatment, generator noise propagates through intake and exhaust openings, building walls, and duct systems. Emergency generator rooms within a building are reverberant, effectively amplifying noise as it leaves through openings. Noise could get amplified up to 10dB in a reverberant room.

The Impact Is Widespread

Excessive noise affects occupants, neighboring properties, and sensitive equipment. State and local codes restrict allowable noise levels at property lines, creating compliance risks.

Reliable backup power should not come at the cost of comfort, safety, or compliance.

Code Compliance

Although there is no specific bylaw directed to emergency generators, regulations for maximum sound pressure levels exist at the jurisdictional level.

NFPA 110 can be referenced to understand the types of emergency generator systems as it addresses performance requirements for emergencies and standby power systems. As it relates to noise however, the Noise Control Act ; 42 U.S.C. §4901 et seq. (1972) stablishes a national policy to protect the public's health and welfare from excessive noise levels. In many jurisdictions, nighttime limits in residential areas prohibit mechanical or electrical equipment from raising the ambient sound level by more than 5 dBC.

PRICE SOLUTIONS

Radiator Exhaust Cooling Fan Noise Silencer

Targets

Targets the noise created by the fan removing heat from the generator, as well as the noise that transfers from the engine block directed towards the fan.

Acoustic Principle

Reduce broadband frequency noise by forcing air through lined passages (silencers) that absorb and impede sound energy.

Design Guidelines

- Face velocity into the silencers **below 1000 fpm** to minimize pressure drop (0.2 to 0.25 in.wg).
- Minimum silencer length of **5 ft** if the line of sight is 50 ft away or further.
- Minimum silencer length of 10 ft or longer if the line of sight is within 40 ft.
- Generator room openings should not face occupied spaces closer than 30 ft if possible.
- Double wall (Acoustic panels 2” Thick) duct connecting the radiator exhaust to the silencer with an acoustic access door.
- A 2ft or 3 ft long 2” thick acoustic panel transition from the silencer exit to the louver to slow down air before it enters the radiator exhaust louvers.
- High Transmission Loss casing **16 gauge** to prevent breakout/in noise into the end of the silencer, bypassing internal acoustic baffles.
- RH silencers are recommended as they lead to the lowest pressure drop when used close coupled to a fan.

Intake Air Silencer Banks & Acoustic Panels

Targets

Noise from the engine block transferring through the intake air louvers.

Acoustic Principle

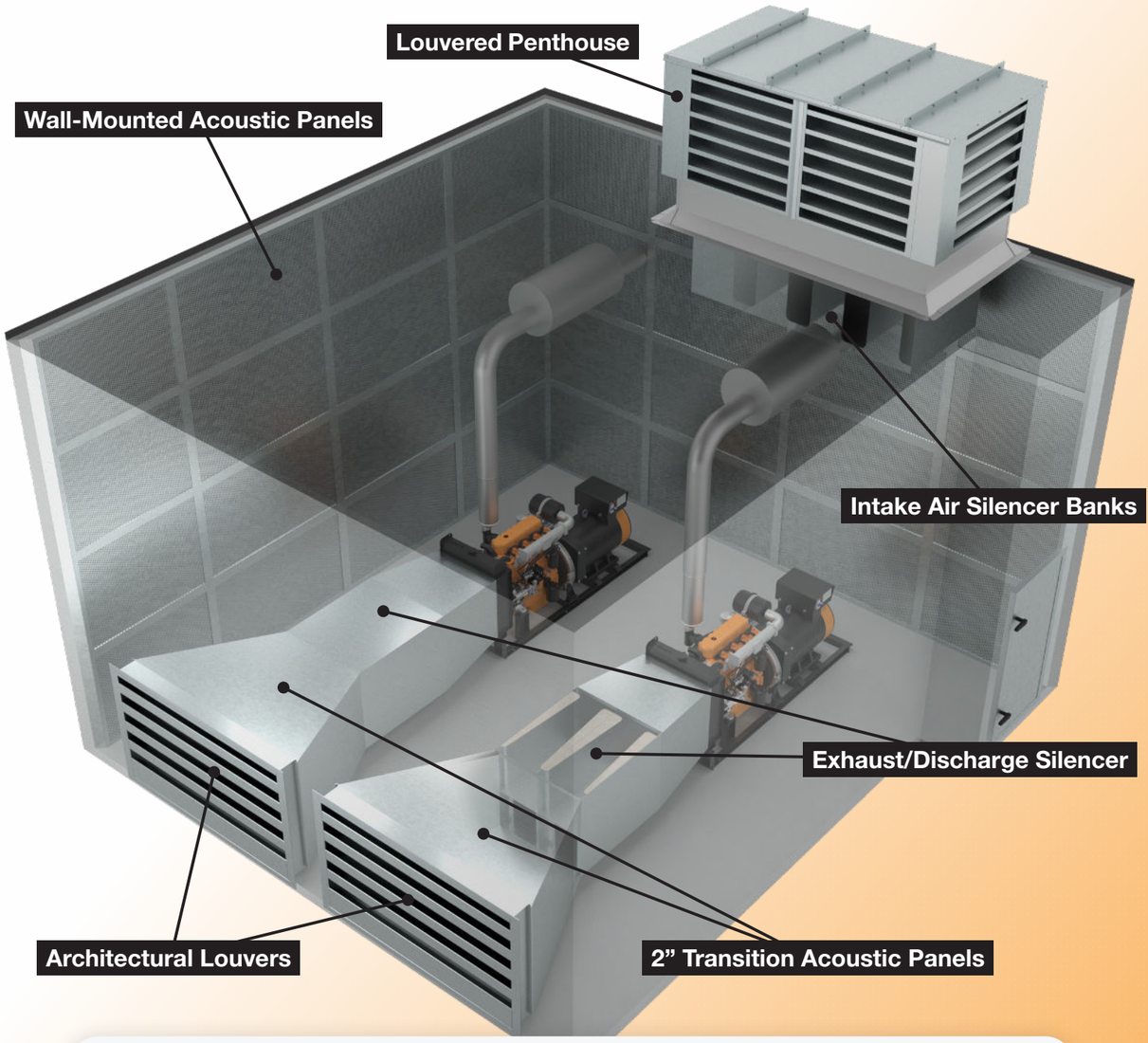
Reduce broadband frequency noise by forcing air through lined passages (silencers) as well as absorbing sound within the room by lining walls and ceiling within the emergency generator room.

Design Guidelines

- **Architectural Louver** with built in drain pan.
- **3 to 4 ft long RL silencer bank with face velocity below 350 fpm (leading to 0.02 to 0.05 in.w.g)**. Most of the available pressure drop will be used on the radiator exhaust so low face velocity is required at the intake silencer to get enough insertion loss from the silencer.
- **6” Sleeve at each silencer component with integrated damper**
- Price 4” Wall mount Acoustical panels lining 70% of the room, ideally walls and ceiling, with the floor being the only reverberant surface.

BENEFIT TO OWNERS

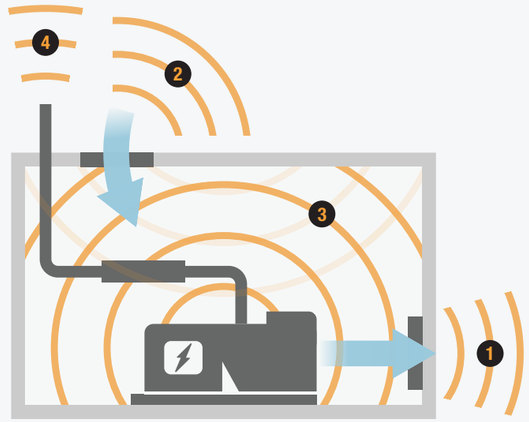
+ Code-compliant noise reduction
+ Reduced risk of hearing damage
+ Minimize legal risk

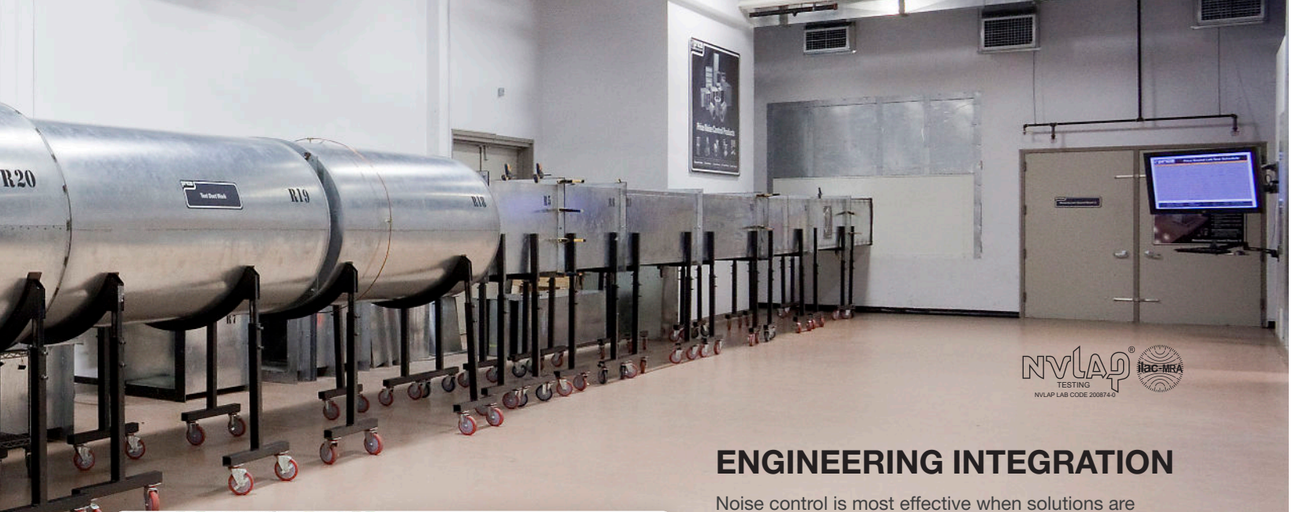


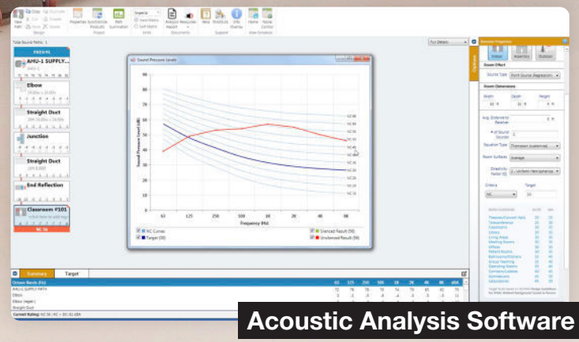
UNDERSTANDING GENERATOR NOISE

Generator noise is complex and controlling it requires a full-system approach. The four main sources are:

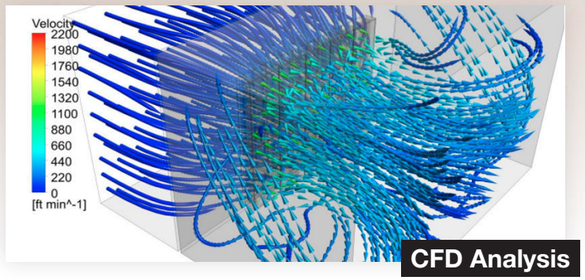
1. **Radiator Exhaust Noise** (cooling fan noise)
2. **Air Intake Noise** (casing radiated)
3. **Room Acoustics** (concrete rooms amplify sound)
4. **Combustion Exhaust Noise** (typically addressed by generator manufacturer with exhaust factory mufflers)







Acoustic Analysis Software



CFD Analysis

ENGINEERING INTEGRATION

Noise control is most effective when solutions are designed as a system – Price offers a variety of science-backed solutions that ensure our work is accurate.

+ **Acoustic Analysis Software – Silencer Selection:** Advanced software ensures precise silencer selection by analyzing insertion loss, pressure drop, and system performance.
+ **NVLAP-Accredited Laboratory:** Our state-of-the-art lab provides certified testing to verify silencer performance and ensure compliance with strict noise control standards.
+ **CFD Analysis – Predict Team:** Detailed airflow and noise simulations optimize silencer design, reduce turbulence, and improve system efficiency. For more info, visit: **predictcfd.com**
+ **Structural Analysis:** PE-reviewed calculations and drawings confirm silencer integrity and include custom stand or support designs as needed.

This system-level approach ensures acoustic performance, regulatory compliance, and mechanical reliability.

BALANCING PERFORMANCE & PRACTICALITY

A Noise control design must balance:

Acoustic Targets
Meeting community noise bylaws, ASHRAE guidelines, and owner comfort expectations.

Mechanical Performance
Ensuring cool airflow is maintained, and pressure drop is minimized. An emergency generator emergency generator typically cannot withstand a back pressure value of 0.5in.w.g. total.

Space Constraints
Many generator rooms have space-constrained conditions that require silencer banks, duct transitions and panels to fit into limited areas, and panels must fit into limited areas.

Cost & Durability
Solutions must be cost-effective without compromising longevity, though most solutions for this equipment need to be robust and large to have an impact on sound.

The Price Noise Control team considers all these factors to ensure that designs proven in calculation deliver the same performance in real-world applications.

WHY PARTNER WITH PRICE?

HOLISTIC APPROACH

Silencers and panels manufactured to project-specific geometries, finishes, and performance needs.

PROVEN EXPERTISE & ENGINEERING SUPPORT

Our team collaborates with acousticians, consultants, and contractors to provide site-specific designs.

COMPLIANCE CONFIDENCE

Price products have tested laboratory data, leading to better chances to meet local codes and environmental standards.*

**Our silencers are tested up to the latest version of ASTM-E477-(2020) while our Acoustic panels are tested under ASTM-E90 & ASCT-C423.*

QUIET, RELIABLE OPERATION.

Download the Case Study Brochure to explore our acoustic projects.

For support with your next project, contact:

1.204.654.5613 (Option 6)

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Access the Price All-In-One Acoustic Analysis Software **www.priceindustries.com/software/all-in-one**

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