NOISE CONTROL IS IMPORTANT.

CONSIDER THE ENVIRONMENTS

Noise control within a building is vital to maximizing productivity and well-being. Background sound levels and speech privacy are key aspects of the acoustical environment that must be addressed. As one of the major components of Indoor Environmental Quality (IEQ), good acoustics is critical to achieving occupant comfort.

Noise from building systems equipment such as cooling towers, chillers, emergency generators, and exhaust fans can negatively impact both the indoor and outdoor environments. Outdoor noise control is especially important for complying with municipal property line noise ordinances.

APPLYING NOISE CONTROL IS CHALLENGING.

Applying noise control solutions requires thorough analysis to achieve desirable acoustics. Many variables need to be considered when identifying or engineering a noise control solution: aerodynamics, space, energy, Indoor Air Quality (IAQ), property lines, and the impact on systems and equipment. The best engineering practice to meet noise criteria is an integrated systems approach that incorporates all of these.
CONSIDER ALL NOISE CONTROL PATHS

- Duct-borne Noise
- Environmental Noise
- Seismic & Wind Loading
- Breakout Noise
- Radiated Noise
- Duct-borne Noise
- Vibration Path
- Aerodynamic System Effects & Generated Noise
- Structure-borne Noise

How much noise control do I need?

CONSIDER PROJECT-SPECIFIC LIMITATIONS

According to ASHRAE1, HVAC noise problems occur when noise control is...

1. not considered at the design stage
2. subjected to cost-cutting after the design stage, or
3. not properly integrated in the system

Materials of construction: Project requirements demand non-conventional materials of construction and fabrication methods.

Property Line: Noise from outdoor equipment can be noisy enough to break municipal property line by-laws and result in fines, facility closures and lawsuits.

Time and Cost Control: Each project has a unique duct design. Selecting a silencer with a limited range of sizes will increase time needed to redesign and install duct sections.

Pressure Drop and Energy Consumption: Misapplied or improperly selected silencers can significantly increase energy consumption. Adverse aerodynamic conditions can increase pressure drop from three to ten times more than what was originally accounted for.

Rooftop equipment and ASHRAE: ASHRAE2 recommends noise and vibration control for rooftop applications. Some applications may require an isolated, noise control roof curb.

Space Restrictions: As real estate becomes more expensive, owners need to minimize the size of mechanical rooms in order to optimize usable/rentable space. Designers just don’t have the 15+ diameters of straight duct for a silencer selection to perform as tested and catalogued.

Indoor Air Quality Control: Duct liner can degrade air quality with mold and fibers entering the air stream.

Noise Criteria: Specific noise criteria need to be met depending on project requirements.

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The Lay-in Service

Vibro-Acoustics is dedicated to helping make the built environment a quieter place by offering our complimentary Lay-in Service.

WE ARE NOISE CONTROL EXPERTS. Our acoustic and aerodynamic experts will work as an extension to your design team to help identify noise-related risks and recommend the best solution for the system.

WE CONSIDER ALL PROJECT VARIABLES. We will recommend the optimal solution for your project's unique requirements, such as time, budget and space constraints, indoor air quality, and energy savings.

WE GUARANTEE THE END RESULT. Since our calculations are based on the entire system, we guarantee that our solution will meet the noise criteria in the built environment.

WE ARE COMMITTED TO GREAT BUILDINGS. We will start within 24 hours of receipt of complete information. A full Lay-in will be produced within two to three working days (depending on the size and complexity of the job).

WHY USE THE LAY-IN SERVICE FOR NOISE CONTROL?

Eliminate risk with a guaranteed solution while saving time and money.

- Be proactive and lower costs. Quantify noise-related issues at the design stage and provide solutions that meet project requirements.
- Save time and money. We will focus on designing noise control solutions for your project, provide ready-to-use documents to incorporate into your package, and work through every revision—saving your team an average of 16 billable hours per project.
- Reduce risk and get a guarantee. Don’t absorb the manufacturer’s risk by selecting a product without analysis. We guarantee that our proposed solution will perform under any budget, time, energy, space, and IAQ limitations in the built environment.
- Improve the entire system. There is a solution for every project, system, and/or equipment. Add credibility and value to your projects by achieving a quiet environment.
- Lower operating costs. Do not misapply a standard product and add too much pressure drop. We will provide an applied solution at minimal pressure drop, including system effects.
CONSIDER THE SYSTEM

The Integrated Systems Approach

Sil-Throw air distribution system for quiet spaces with high occupancy.

LEGEND
- Silencers
- Acoustic Barriers, Plenums and Enclosures
- Noise Control Curbs
- Vibration Isolation Restraint Systems
- Architectural Noise Control

Acoustic Barrier

Inlet Silencer c/w Weather Hood

Silencer (EJN2) Flex Connectors Base-mounted PumpFlex Connectors (NP) Neo+ Neoprene Pads (CD) Inlet Circular Silencer (FS) Isolators (CSR) Spring Isolators (PSH) Precompressed Spring Hangers

Conference Room NC-30

Mechanical Equipment Room 65 dBA

File Storage Room NC-45

Open Office NC-40

Lab NC-45

Electrical Room 100 dBA

Classroom NC-25

Corridor NC-40

Library NC-30

Private Office NC-30

Parking Garage 65 dBA

Boiler (CIB) Inertia Base

Inline Pump (SRB) Seismic Restraint Bracket (CIB) Inertia Base

Shaft Transitional silencers save space. Full height baffles minimize pressure drop.

Sli-Throw air distribution system for quiet spaces with high occupancy.
The V-A Way: Applied Engineering for Noise Control

Vibro-Acoustics leverages the Integrated Systems Approach when engineering a noise control solution.

THE INTEGRATED SYSTEMS APPROACH is a design methodology that minimizes noise and vibration problems at the design stage. The entire system is considered, including how each component (fans, duct, silencers, etc.) interacts with the other. In the analysis of the system, both airborne and structure-borne noise are taken into account, as well as project specific requirements such as space, energy (pressure drop with system effects), project cost and time, and IAQ. This enables the user of the Integrated Systems Approach to engineer a solution that not only solves the noise problem but also addresses the specific requirements of the project.

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**3 STEPS IN THE LAY-IN SERVICE**

### 1 Noise Risk Assessment

We will review and perform a complete HVAC system analysis of the acoustics and aerodynamics of the project and determine the level of risk for noise problems.

**Deliverable:** A report that shows the results of the acoustical system analysis and, if needed, how much noise control is required to meet noise level criteria.

### 2 Engineer the Best Solution

Based on system needs, we select or engineer the best solution to meet the project’s sound criteria.

**Deliverable:** A project-specific, optimized solution, complete with schedule, specification, and 3D renderings. We detail the acoustic performance, installed pressure drop at system design velocity, and special construction requirements.

### 3 Ensure Proper Application

We specify where the solution should be located by laying in the solution onto your drawings.

**Deliverable:** Marked-up project drawings illustrating noise control product locations.

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**Get Started**

We make every effort to meet timelines. For a quick start, contact your local Vibro-Acoustics sales representative or email info@vibro-acoustics.com with the following information:

- Equipment sound power levels by octave band (e.g., fans, AHUs, VAV boxes)
- Drawing or sketch of system layout (we welcome CAD drawings)
- Project deadlines
- **Optional:** Desired sound criteria for occupied spaces. Otherwise, we can make recommendations based on ASHRAE Guidelines and/or typical city by-law requirements
- **Optional:** Known project requirements (time, space, energy, budget, IAQ, etc.)

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**Silencer Dimensions:** duct dimension 10 in dia., outside casing dimensions 30 in wide x 30 in high.

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**Vibro-Acoustics Sales Contact**

1. Call 1-800-563-5833
2. Email info@vibro-acoustics.com
3. Visit www.vibro-acoustics.com

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**Noise Risk Assessment**

Based on our analysis there will be noise issues as tabulated below, if effective HVAC noise control measures are not adopted.

Following is a summary of the results of untreated duct-borne noise and breakout calculations:

<table>
<thead>
<tr>
<th>Factor</th>
<th>Unsilenced</th>
<th>Silenced</th>
<th>System</th>
<th>Location</th>
<th>Noise Reduction Impacting</th>
</tr>
</thead>
<tbody>
<tr>
<td>W (in)</td>
<td>H (in)</td>
<td>L (ft)</td>
<td>(CFM)</td>
<td>Fr/Min</td>
<td>in db</td>
</tr>
<tr>
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**Target: W (in) H (in) L (ft) (CFM) Fr/Min in db 63 125 250 500 1000 2000 4000 8000**

**Vibar & Spacer Lining Vibar DS-2 DS-3 10ID 30OD 60 400 -733 0.04 0.04 15 17 36 14 11 17 16 12 CNM-HV-F1**

**DS-1 Film Tag Qty Fan**

**3 STEPS**

**LAY-IN**

**IN THE**

**8**

**1 24 48 60 6,500 +812 0.22 0.29 12 16 17 20 22 21 17 13 REFL-MLV-FJ -**

**Outdoor Criteria (dBA)**

<table>
<thead>
<tr>
<th>Octave Band Center Frequency (Hz)</th>
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<tr>
<td>20</td>
<td>40</td>
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<tr>
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