UMassAmherst | Environmental Health & Safety

Laboratory Noise Fact Sheet

Noise in laboratories is a growing concern, as elevated noise levels can both inhibit communication and lead to irreversible hearing damage. While noise levels in most laboratories are below the threshold that damages hearing (85 dBA or higher over an 8-hour day), laboratory noise can be loud at times, particularly when more than one piece of equipment is in use.

Examples of Laboratory Equipment That Produce Noise

Large analyzers: e.g., chemistry analyzer

Incubators

Probe sonicators

Refrigerators/Freezers

Centrifuges

Vacuum Pumps

Cell washers

Tissue homogenizers

Stirrer motors

Compressors for cryostats

Rock crushers/mills/grinders

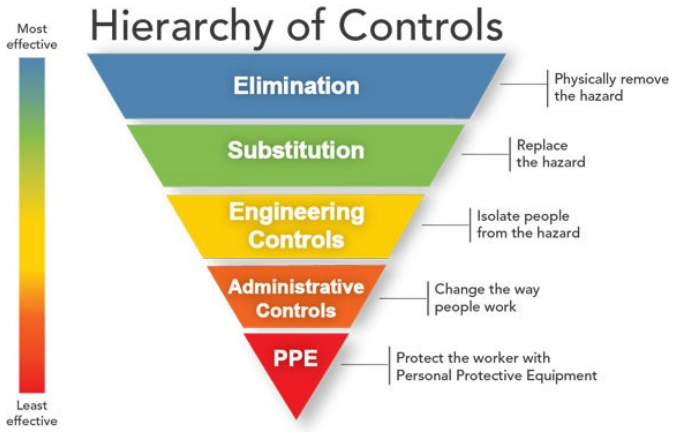
Other essential ventilation system equipment: fume hoods, biosafety cabinets, fans, intake/exhaust vents, etc.

When working in a laboratory, there are usually multiple pieces of equipment operating at the same time. Therefore, the total noise load would be much higher than one piece of equipment alone. In addition to equipment noise, there is also extraneous noise (such as radios, music, and telephones) and external noise (e.g., nearby construction sites, vehicular traffic). If noise levels exceed 80 dBA, people must speak very loudly to be heard, while at noise levels of 85 dBA, people have to shout to communicate with coworkers who are an arm's-length away.

The recommended upper limit for noise for speech to be intelligible is 55 dBA. If the noise level in the laboratory is too high for lab member to hear other people, there is a danger of misunderstanding instructions or laboratory results.

Other negative effects of exposure to high levels of noise include hearing loss, tinnitus (ringing in the ear), stress, anxiety, high blood pressure, gastrointestinal problems, and chronic fatigue.

Mitigation Strategy for Noise in Lab



The hierarchy of controls of excessive noise consists of four layers: elimination/substitution, engineering controls, administrative controls, and personal protective equipment.

Elimination/substitution:

- If possible, purchase or rent newer, quieter equipment to reduce noise exposure.

Engineering controls:

- Install shielding or acoustical sound-deadening enclosures, and/or treatments on walls and ceilings.
- If possible, locate refrigerators, freezers, incubators, centrifuges or other noisy equipment away from the parts of the lab where most researchers work, such as in a hallway or a separate equipment room.
- When possible, use enclosures for noisy equipment that operates for a long period of time. For example, vacuum pumps can be placed inside pump cabinets.

Administrative controls:

- When operating noisy equipment, do not also play music. When the equipment background noise in the lab is already at high level, music or songs are tend to be played at high volume, which may pose adverse effects on hearing and safety.
- Try to stay away from noisy equipment when working in a lab. For every doubling of distance, the sound level reduces by 6 decibels (dB).
- Contact Hearing Conservation Program Administrator to conduct a noise exposure assessment if you are concerned about the noise level in your lab or if you need help with reducing noise exposure.

Personal protective equipment:

- It is required to use hearing protection devices, such as earplugs and earmuffs, when the noise level is over 85 dBA over an 8-hour work shift.
- Noise-cancelling headphones are not considered hearing protection devices. Headphones or earbuds are not allowed when working in a lab. Please check Noise cancelling headphones fact sheet for more information.
- Be aware that wearing hearing protection can also cause safety issues, because you may not be able to hear your lab mates and the alarms clearly.
- If you are not sure whether you need hearing protection devices or if you need help with choosing the device, please contact Hearing Conservation Program Administrator.

Please visit UMass Amherst Hearing Conservation Program for more information.
Please contact Hearing Conservation Program Administrator if you have any questions or concerns.

References and Other Resources:

1. OSHA Fact Sheet, Laboratory Safety Noise: https://www.osha.gov/Publications/laboratory/OSHAfactsheet-laboratory-safety-noise.pdf
2. Peter Froehlich, Noise Pollution in the Laboratory: http://www.parker.com/Literature/Gas%20Separation%20and%20Filtration%20Division/PDF%20Files/Noise%20Pollution%20in%20the%20Laboratory%20White%20Paper.pdf
3. NIOSH, Buy Quiet. https://www.cdc.gov/niosh/topics/buyquiet/default.html
4. OSHA, Occupational Noise Exposure. https://www.osha.gov/SLTC/noisehearingconservation/standards.html