

OSHA[®] FactSheet

Laboratory Safety Noise

This guidance is advisory in nature and informational in content. It is not a standard or a regulation, and it neither creates new legal obligations nor alters existing obligations created by OSHA standards (i.e., the Occupational Noise Exposure standard: 29 CFR 1910.95) or the Occupational Safety and Health Act. In preparing this guidance, OSHA reviewed existing practices and programs as well as available scientific information on noise in laboratories, and reflects comments received from representatives of selected professional associations and laboratories.

Millions of workers are exposed to dangerous levels of noise in their workplaces. Over the past 20 years, government agencies have consistently identified noise-induced hearing loss as one of the top concerns of workers. Noise in laboratories is a growing concern.

Because of concern about noise in clinical laboratories, accrediting agencies are implementing special emphasis programs on noise reduction in these workplaces. As a result of this concern, the College of American Pathologists added laboratory noise evaluation to their General Checklist for Accreditation.

Noise Levels Can Cause Hearing Loss

The Occupational Safety and Health Administration's (OSHA's) Noise standard (29 CFR 1910.95) requires employers to have a hearing conservation program in place if workers are exposed to a time-weighted average (TWA) noise level of 85 decibels (dBA) or higher over an 8-hour work shift.

OSHA's permissible exposure limit (PEL) for noise exposure is 90 dBA for an 8-hour TWA and the standard uses a 5 dBA exchange rate. This means that when the noise level is increased by 5 dBA, the amount of time a person can be exposed is cut in half. For example, a person who is exposed to noise levels of 95 dBA (5 dBA above the OSHA PEL of 90 dBA) can be exposed for only 4 hours in order to be within the daily OSHA PEL.¹

Laboratory Equipment Produces Noise

While the noise levels in most laboratories are below the threshold level that damages hearing, laboratory noise can be fairly loud. The operation of large analyzers (e.g., chemistry analyzer), fume hoods, biosafety cabinets, incubators, cell washers, tissue homogenizers, and stirrer motors, all contribute to the noise level. Other sources of noise in laboratories include fans and compressors for cryostats, refrigerators, refrigerated

centrifuges, and freezers. As an example, a high speed refrigerated centrifuge alone can generate noise levels as high as 65 dBA. To provide some further context, a whisper registers approximately 30 dBA; normal conversation about 50 to 60 dBA; a ringing phone 80 dBA; and a power mower 90 dBA. 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 arms length away.

Measuring Noise Levels

Using a sound level meter, employers should monitor the noise levels generated by various pieces of lab equipment to identify equipment that has excessive noise levels. Most manufacturers have set limits on noise-producing equipment (i.e., less than 85 dBA). When equipment exceeds these limits (i.e., > 85 dBA), personal noise measurement, engineering controls, posting of warning signs, and hearing protection options should be evaluated and implemented. The key is to identify lab equipment that is producing excess noise in the work area and implement controls to keep personal full shift noise levels below the OSHA Permissible Exposure Limits (PELs). Refer to Table G-16, Permissible Noise Exposures, in the Noise standard (29 CFR 1910.95), as a means for determining noise limits for the laboratory environment.

Negative Effects of Noise at Typical Levels in Laboratories

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 the staff to hear what is being said, whether in conversation or on the telephone, there is a danger of misunderstanding instructions or laboratory results. Employers should evaluate improvements in design, engineering controls, and instrumentation that will reduce the noise generated.

Other Negative Effects of Noise on Laboratory Workers

Exposure to high levels of noise can lead to:

- Hearing loss;
- Tinnitus (ringing in the ear);
- Stress;
- Anxiety;
- High blood pressure;
- Gastrointestinal problems; and
- Chronic fatigue.

Reducing Noise in a Laboratory

There are several steps that can be taken to minimize noise in the laboratory:

- Moving noise-producing equipment (e.g., freezers, refrigerators, incubators and centrifuges) from the laboratory to an equipment room;
- Placing compressors for controlled-temperature rooms in a remote location; and
- Providing acoustical treatment on ceilings and walls.

¹ **Note:** It should be noted that other organizations have recommended exposure limits and exchange rates lower than those specified by OSHA. For example, the National Institute for Occupational Safety and Health (NIOSH) has an 8-hour TWA recommended exposure limit (referred to as a REL) of 85 dBA. In addition, NIOSH recommends an exchange rate of 3 dBA rather than 5 dBA. This means that if the noise exposure goes from 90 dBA to 93 dBA, the worker can only be exposed for 4 rather than 8 hours to be within the daily REL. (See:

<http://www.cdc.gov/niosh/docs/2009-136/pdfs/2009-136.pdf>).

This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory-impaired individuals upon request. The voice phone is (202) 693-1999; the teletypewriter (TTY) number is (877) 889-5627.

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