Noise in the Laboratory

The following is to be a general guide regarding noise and airflow products in laboratories. It will cover different product types and situations. It will discuss products which have standards and others that don't.

Biological Safety Cabinets and NSF 49

NSF 49 is the standard that most Biological Safety Cabinets (BSC) are tested to. It is a set of rules that cabinets by any manufacturer must comply and test to. The noise testing portion of NSF 49 is detailed below.

A.3 Noise level test

A.3.1 Purpose

This test provides a uniform method for measuring the noise level produced by the cabinet. The methods can be performed in most acoustically ordinary rooms, such as a factory, where walls are neither sound absorbing nor completely sound reflecting. The cabinet shall be operated at the nominal set point velocities
within ± 3 ft/min (± 0.015 m/s).

A.3.2 Apparatus

The measuring instrument shall be a type / Class 1 sound level meter with a minimum range of
50 to 100 db and an "A" weighting scale set up in accordance with the manufacturer's instructions.

A.3.3 Method

a) Turn on the cabinet blower and lights.
b) Set the instrument to the "A" weighting mode.
c) Measure the noise level 12 inches (0.30 m) in front of the cabinet leading front edge of the access opening and 15 inches (0.38 m) above the plane of the work surface, in line with the vertical centerline of the cabinet (see Figure 12).
d) To measure the ambient noise level, turn the cabinet blower and lights off, and if applicable, leave the remote exhaust blower on and measure as in step c above.

A.3.4 Acceptance

Overall noise level in front of the cabinet shall not exceed 67 dbA when measured where the maximum ambient sound level is 57 dbA. When the ambient sound level is greater than 57 dbA, the reading obtained
in Section A.4.3.c) shall be corrected in accordance with curves or tables provided in the instrument operator's manual. If this information is not available, use standard correction curves or tables (see A1).

*From NSF/ANSI 49 - 2018

Ambient Noise in the Laboratory

Testing a cabinet to a standard such as NSF 49 is taking into account the sound generated by the cabinet above the ambient sound level in the room. The standard even has a limit as to how loud the room can be. The noise level shall not exceed 67 dBA where the maximum ambient sound level is 57 dBA. It can be that a cabinet seems loud but that can be due to ambient noise levels, other equipment in the room, or the acoustics of the room itself. For example the same cabinet in a small room will be louder than in a large room.

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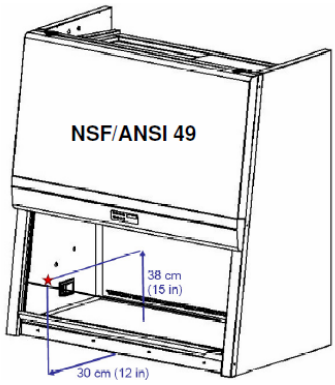
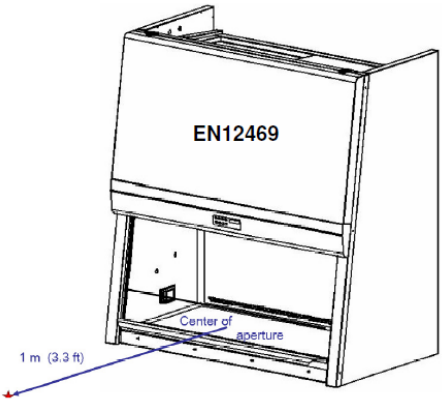
Different Testing Methods

There are two different methods of testing lab equipment one is NSF 49 discussed earlier and the other is EN12469. The two methods have different locations for the microphone as seen in the diagram below. The NSF test location is 15 inches above the worktray and 12 inches from the front of the cabinet. This is where a user's head would be. The test point for EN12469 is lower in the center of the aperture and 1 meter away from the cabinet. In testing the EN method has a value 1+ dB(A) lower than the NSF method. When comparing data one should be aware of what test method is being used to be sure comparisons are accurate.





Laminar Flow Products

Laminar flow products like those pictured above do not have a standard for noise like a Biological Safety Cabinet. These cabinets can seem rather loud when in a laboratory however. These units do have standards for airflow which requires an average of 90 feet per minute airflow ±10 FPM. This is a high velocity of air coming out of a large filter. Most of the noise generated by these units comes from this airflow movement. Over the years the switch to EC or DC motors has eliminated much of the other noise. If one is concerned about noise level and must work in a laminar airforw product a console type where the blower/motor is below the work area is generally quieter than a benchtop model where the blower/motor is above the workzone.

Animal Handling Products

Animal handling products are another type of product where there are frequent questions regarding noise. This subset of products is even more unclear as like laminar airflow products there is no standard for noise level. In the case of many animal handling products like transfer stations or cage dumps there is no standard for airflow either. Manufacturers are free to set the airflows up in any way they please. While some designs may generate lower noise, they may also have poorer performance. Different than NSF listed Biological Safety Cabinets which have standards for performance and noise or laminar airflow products that have standards for performance these types of products have no universal standard for either. There are manufactures that manufacture biological safety cabinets for the animal industry that are NSF listed which would comply with the standard. But others manufacture products that look like or function similar to biological safety cabinets but are not NSF listed that may or may not meet the standard.