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Joint Committee on Biosafety Cabinetry

July 1, 2024

Proposed revision to NSF/ANSI: 49 – Biosafety Cabinetry: Design, Construction, Performance and Field Certification (49i181r1)

Revision 1 of NSF/ANSI 49, issue 180 is being forwarded to the Joint Committee on Biosafety Cabinetry for consideration. Please review the proposal and **submit your ballot by July 22, 2024** via the NSF Online Workspace.

Please review all ballot materials. When adding comments, please include the section number for your comment and add all comments under one comment number whenever possible. If additional space is needed, you may upload a MS Word or .PDF version of your comments directly to the NSF Online Workspace.

Purpose

The purpose of this ballot is to approve revised language related to motor blower performance procedure in Normative Annex 1 of Standard 49.

Background

Issue paper **BSC-2023-07** highlighted the need to update language related to the motor blower performance procedure in Normative Annex 1.

The issue proponent asserts that since this language was written some time ago, technology has improved and this proposed revised language better serves the process of performance testing.

This issue was presented and discussed during the 2023 JC in-person meeting whereby the group agreed to create the motor blower TG and add this to the discussion. During the most recent meeting on June 3, 2024 two volunteers agreed to draft up additional language and sent directly to JC Approval ballot.

This Revision 1 approval ballot reflects that work and is presented here for your consideration.

If you have any questions about the technical content of the ballot, you may contact me in care of:

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[Note – the recommended changes to the standard which include the current text of the relevant section(s) indicate deletions by use of ~~strikeout~~ and additions by grey highlighting. Rationale Statements are in *red italics* and only used to add clarity; these statements will NOT be in the finished publication.]

NSF/ANSI International Standard for Biosafety Cabinetry —

Normative Annex 1

(formerly Annex A)

Performance tests

N-1.12 Motor / blower performance

N-1.12.1 Purpose

This test demonstrates that the motor / blower will operate at a static pressure sufficient to meet the requirements of Section 6.13.

N-1.12.2 Apparatus

Instrumentation required in Sections N1.8 and N-1.9 ~~and N-1.10~~ shall be used. A manometer with an accuracy of at least ± 2% of reading ± 0.001 in w.g. (0.2 Pa) shall be used.

N-1.12.3 Method

a) Set the cabinet at the manufacturer's recommended nominal set points ± 2 ft/min (0.01 m/s).

b) Measure the total airflow volume rate, ft^3/min (m^3/s). The total airflow volume rate is the flow from all cabinet fans and does not include facility exhaust. The downflow volume rate is always measured for this test. The inflow volume rate is measured only for type A and type C cabinets. Measure inflow volume rate following the procedure in N.1.9, using the direct inflow reading instrument. Measure the downflow velocity following the procedure in N.1.8 and then multiply the overall average downflow velocity by the area of the measurement plane to calculate the downflow volume rate. For type A and type C cabinets, add the inflow and downflow volume measurements together for total airflow volume. ~~and determine that the cabinet blower is delivering at the nominal set point (see Sections N-1.8 and N-1.9). The cabinet supply air volume shall be determined as in Section N-1.9.3.4.4.d.~~

c) Locate the testing organization approved positive and negative pressure taps. The manufacturer shall locate the positive pressure tap (see Figure 25) directly above the downflow HEPA/ULPA filter to allow conversion of velocity pressure to static pressure. The positive pressure tap shall not be located in the face of the blower outlet (see Figure 25). If more than one pressure tap is used, as in a piezometer ring, pressure taps may be connected together for an average reading. The manufacturer shall locate the

negative pressure tap not less than one-half equivalent diameter from the blower inlet. In the case of double inlet blowers, static measurements shall be made in both blower inlets and connected together for an average static pressure (see Figure 26). If it is not possible to mount both static pressure taps due to cabinet design, one tap will be sufficient. For negative pressure tap, use a series pressure tap (see Figure 27). Attach manometers to each pressure tap and record result. The positive pressure reading is the initial static pressure reference point. The sum of the positive and negative readings without reference sign is the total cabinet static pressure.

d) Increase the initial negative pressure reading by 50% or more of the initial positive pressure reading by restricting the cabinet's negative airflow. To accomplish this, monitor the cabinet's initial negative pressure, and load or restrict the cabinet's negative airflow area (i.e., Type A1, A2, or B1-front grill or Type B2-supply air inlet) until the initial negative pressure has increased by 50% of the initial positive pressure reading. In the case where the first loaded HEPA/ULPA filter is under negative pressure (Type B1), the 50% positive pressure value shall be considered 50% of the pressure drop of the first HEPA/ULPA filter.

e) Measure the total volume of airflow (ft^3/min [m^3/s]) the restricted cabinet blower is delivering (see section N-1.12, b)) ~~(see Sections N-1.9 and N-1.9.3.4.4.d).~~

f) Record the initial negative and positive pressures, the final negative pressures, and the initial and final airflow volume rates.

N-1.12.4 Acceptance

The total airflow volume rate, ft^3/min (m^3/s), shall not decrease more than 10% meeting the requirements of Section 6.13.

Rationale: *This issue does not impact public health but will aid NSF for cabinet testing throughput. Currently, NSF/ANSI 49 has a requirement stated for motor blower capacity that is outdated. The technology at the time language was written included the use of a single-phase AC Permanent Spilt Capacitor (PSC) motor using simple non-compensating Triac motor speed control. Technology is vastly improved and this language corrects for this adaptation.*