TO: Joint Committee on Biosafety Cabinetry

FROM: Robert W. Powitz, Chairperson of the Joint Committee

DATE: October 12, 2023

SUBJECT: Proposed revision to NSF/ANSI 49 – *Biosafety Cabinetry: Design, Construction, Performance and Field Certification* (49i172r1)

Revision 2 of NSF/ANSI 49 issue 172 is being forwarded to the Joint Committee for balloting. Please review the changes proposed to this standard and **submit your ballot by November 2, 2023** via the NSF Online Workspace <www.standards.nsf.org>.

When adding comments, please identify the section number/name for your comment and add all comments under one comment number where possible. If you need additional space, please upload a word or pdf version of your comments online via the browse function.

Purpose

The purpose of this ballot is to confirm revised language regarding the pressure decay test in NSF/ANSI Standard 49.

Background

Issue paper **BSC-2022-02 – Pressure Decay Test** highlighted that since removing the soap bubble leak test, the 10-minute pressure decay test has become a stumbling block for many manufacturers.

The Original Issue Paper was discussed during the June 2022 JC meeting where the issue proponent requested, and the group motioned a new Task Group for discussing this topic for possible revision. The proponent confirmed value in the test but suggested it should be made less burdensome to the BSC Manufacturers.

Since that time, the TG met 3 times first discussing and agreeing upon the value of the test in the first place, and ultimately sorting out revised language for Standard 49. This revised language was sent to the Task Group as a straw ballot which resulted in a Vote of **4 : 1 : 0 (Yes : No : Abstain)** with 3 comments. The comments were minor and using them the issue proponent and TG chair updated the language which is now presented here as Revision 2 for your consideration.

Public Health Impact

The proposed changes have no negative impact on public health.

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 —

Biosafety Cabinetry: Design, Construction, Performance, and Field Certification

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3 Definitions

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3.20 leak tight: Free of leaks at ~~2~~ 0.5 in w.g. (~~500~~125 Pa) of air pressure as described in Annex N-1.

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6.2 Pressure decay / soap bubble / tracer gas leak

The periphery and penetrations of all plenums shall be leak tight when tested by the pressure decay or soap bubble test (see Section N-1.1).

6.2.1 The cabinet shall hold ~~2~~ 0.5 in w.g. (~~500~~125 Pa) ~~within ± 10%~~ for 10 min, with decay not exceeding 10%.

6.2.2 For manufacturer testing only, the soap bubble method may be used when pressure plates fail: all welds, gaskets, penetrations, or seals on exterior surfaces of air plenums shall be free of soap bubbles when at ~~2~~ 0.5 in w.g. (~~500~~125 Pa) ± 10% pressure above atmospheric.

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Normative Annex 1
(formerly Annex A)

Performance tests

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N-1.1 Pressure decay / soap bubble

N-1.1.1 Pressure decay or soap bubble test

N-1.1.1.1 Purpose

This test determines the overall seal integrity of the cabinet outer hull, including exterior surfaces of all plenums, welds, gaskets, plenum penetrations, and seals.

N-1.1.1.2 Apparatus

— manometer, pressure gauge, or pressure transducer system with a minimum range of 0 to 2 in w.g. (0 to 500 Pa) and accurate to ± 2% of reading ± 0.001 in w.g. (0.2 Pa);

— manufacturer-provided pressure plates constructed of steel, aluminum, plastic or other nonpermeable material as needed to seal exhaust, fan inlet, and access openings; and

— liquid leak detector.

N-1.1.1.3 Method (pressure decay)

The pressure decay test may be used during manufacturing to demonstrate compliance with Section N-1.1. It shall always be used during cabinet design certification testing.

a) Prepare the cabinet as a sealed system; i.e., seal the front access opening and exhaust port, if this step has not already been completed by the manufacturer.

b) Remove decorative panels and other access obstructions, where necessary, to allow proper sealing of openings.

c) Attach a manometer, pressure gauge, or pressure transducer system to the test area to indicate the interior pressure.

d) Pressurize the cabinet with air to a reading of ~~2~~ 0.5 in w.g. (~~500~~ 125 Pa), turn off the pressurizing air, and measure the pressure after 10 min.

e) If the cabinet ~~does not hold pressure within~~ loses more than 10% of the initial pressure after 10 min, use the liquid leak detector to check for leaks in the pressure plates used to seal the access opening, exhaust, and fan inlet (where applicable). If leaks are found, make needed repairs if possible and repeat step d.

N-1.1.1.4 Method (soap bubble)

The soap bubble test may be used during manufacturing to demonstrate compliance with Section N-1.1 in place of the pressure decay test. The soap bubble test shall not be used for cabinet design certification testing.

a) Prepare the cabinet as a sealed system; i.e., seal the front sash and exhaust port.

b) Remove decorative panels and other access obstructions, where necessary, to expose plenums to be tested.

c) Attach a manometer, pressure gauge, or pressure transducer system to the test area to indicate the interior pressure.

d) Pressurize the cabinet with air to ensure a continuous reading of ~~2~~ 0.5 in w.g. (~~500~~125 Pa) ± 10%.

e) Spray or brush the liquid leak detector along all welds, gaskets, penetrations, and seals on exterior surfaces of cabinet plenums. Small leaks will be indicated by bubbles. Large leaks will occur that blow the detection fluid from the hole without forming bubbles and may be detected by slight feel of airflow or sound.

N-1.1.1.5 Acceptance

N-1.1.1.5.1 Pressure decay

The cabinet shall not lose more than 10% of the initial pressure after 10 min, when starting at ~~hold 2~~ 0.5 in w.g. (~~500~~125 Pa) ~~± 10% for 10 min~~. This requirement shall be met for all cabinet design certification testing.

N-1.1.1.5.2 Soap bubble

All welds, gaskets, penetrations, and seals on exterior surfaces of air plenums shall be free of soap bubbles when at ~~2~~ 0.5 in w.g. (~~500~~125 Pa) ± 10% pressure above atmospheric. This requirement may be met during manufacturing as an alternative to the pressure decay test.

***Rationale**: revised language to improve the value of the pressure decay test in Standard 49.*