TO: NSF Joint Committee on Biosafety Cabinetry

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

DATE: January 16, 2015

SUBJECT: Proposed revision to NSF/ANSI 49 – Biosafety Cabinetry: Design, Construction, Performance and Field Certification (49i40r1)

Draft 1 of NSF/ANSI 49, issue 40 is being forwarded to the Joint Committee on Biosafety Cabinetry for consideration. Please review the changes proposed to this standard and submit your ballot by February 6, 2015 via the NSF Online Workspace (http://standards.nsf.org).

When adding comments, please identify the section number/name for your comment and add all comments under one comment number whenever 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 update the Definitions and Normative References for biosafety cabinets in NSF/ANSI 49.

Background
At the 2008 Joint Committee Face to Face meeting, an issue paper was submitted and discussed regarding the updated biosafety level definitions of the then recently published 5th edition of the Biosafety in Microbiological and Biomedical Laboratories (BMBL). The task group was convened in the months following and updates to Standard 49 were discussed and developed.

These discussions generated the realization for the need to update other area definitions and normative references. The task group then met 3 times in 2012 and once in 2014 with work between to update all areas. This ballot represents the inclusive language developed since the task group convened.

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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1.1 Scope

This Standard applies to Class II (laminar flow) biosafety cabinetry designed to minimize hazards inherent in work with agents assigned to biosafety levels 1, 2, 3, or 4. It also defines the tests that shall be passed by such cabinetry to meet this Standard. This Standard includes basic requirements for the design, construction, and performance of biosafety cabinets (BSC) that are intended to provide personnel, product, and environmental protection; reliable operation; durability and structural stability; cleanability; limitations on noise level; illumination; vibration; and motor/blower performance.

3 Definitions

3.1.1 accessible: Fabricated to be exposed for cleaning and visual inspection using simple tools (screwdriver, pliers, open-end wrench, etc. [Also see definition of “readily accessible.”]).

3.1.2 removable: Capable of being taken away from the main unit using simple tools (screwdriver, pliers, open-end wrench, etc. [also see definition of “readily removable”]).

3.1.3 readily accessible: Fabricated to be exposed for cleaning and visual inspection without using tools.

3.1.4 readily removable: Capable of being taken away from the main unit without using tools.

3.2 airflow: a flow of air

3.2.1 downflow velocity: The velocity of HEPA-filtered air as it flows downward through the work area, providing product and cross contamination protection. The velocity is measured in a plane 4 inches (10 cm) above the bottom edge of the sash, when it is in its normal operating height.

3.2.1 downflow velocity profile: The individual downflow velocities as measured and averaged, on a predetermined grid pattern. Airflow velocities and the average of the airflow through the work area may be calculated as a whole (Uniform) or may be separated into 2 or more adjoining areas (Zoned) with averages calculated for each zone.

3.2.4 unidirectional airflow: Air traveling through an area in a single pass in the same direction at a uniform speed to minimize potential cross contamination from aerosols. Unidirectional airflow may be either vertical or horizontal. Both types of unidirectional airflow rely upon a final filtered air supply and return inlets which are nearly opposite one another in order to maintain the airstream in as straight a flow pattern as possible.
3.2.5 **non-uniform (zoned) downflow**: A downflow velocity profile comprised of several contiguous zones. The average downflow velocities vary from zone to zone [Also see definition of “zone.”]

3.2.6 **uniform downflow**: A downflow velocity profile wherein the individual point velocities are all approximately the same.

3.2.7 **3.2.3 inflow**: The velocity or volume of air that flows from the room into the Front Access Opening, providing an air barrier to prevent the escape of aerosols generated in the cabinet’s workzone.

3.2.8 **inflow velocity**: The average velocity of air moving through the front opening, providing an air barrier to prevent the escape of contaminants.

3.3 **biohazard**: (a contraction of the words biological and hazard): Infectious agent(s), or part thereof, presenting a real or potential risk to the well-being of man, animals, and/or plants, directly through infection or indirectly through disruption of the environment.

3.4 **biosafety cabinet nominal width**: The interior sidewall to sidewall width. The cabinet nominal width is expressed in 1 foot increments for cabinets with an interior sidewall to sidewall width greater than 33 in. Cabinets with an interior sidewall to sidewall width of 33 in or less are classified to the nearest half-foot. This definition is provided for the purpose of determining the required downflow velocity grid spacing requirements and personnel protection slit sampler positioning.

3.5 **biosafety levels**: The essential elements of the four biosafety levels for activities involving infectious microorganisms and laboratory animals are summarized in *Biosafety in Microbiological and Biomedical Laboratories*. The biosafety levels are designated in ascending order, by degree of protection provided to personnel, the environment, and the community. Standard microbiological practices are common to all laboratories. Special microbiological practices enhance worker safety, environmental protection, and address the risk of handling agents requiring increasing levels of containment.

3.5.1 **biosafety level 1 (BSL 1)**: BSL-1 is suitable for work involving well-characterized agents not known to consistently cause disease in immunocompetent adult humans, and present minimal potential hazard to laboratory personnel and the environment. BSL-1 laboratories are not necessarily separated from the general traffic patterns in the building. Work is typically conducted on open bench tops using standard microbiological practices. Special containment equipment or facility design is not required, but may be used as determined by appropriate risk assessment. Laboratory personnel must have specific training in the procedures conducted in the laboratory and must be supervised by a scientist with training in microbiology or a related science.

3.5.2 **biosafety level 2 (BSL2)**: BSL-2 builds upon BSL-1. BSL-2 is suitable for work involving agents that pose moderate hazards to personnel and the environment. It differs from BSL-1 in that:

- laboratory personnel have specific training in handling pathogenic agents and are supervised by scientists competent in handling infectious agents and associated procedures;

- access to the laboratory is restricted when work is being conducted; and

- all procedures in which infectious aerosols or splashes may be created are conducted in biosafety cabinets (BSCs) or other physical containment equipment.

3.5.3 **biosafety level 3 (BSL3)**: BSL-3 is applicable to clinical, diagnostic, teaching, research, or production facilities where work is performed with indigenous or exotic agents that may cause serious or poten-
Physically lethal disease through the inhalation route of exposure. Laboratory personnel must receive specific training in handling pathogenic and potentially lethal agents, and must be supervised by scientists competent in handling infectious agents and associated procedures. All procedures involving the manipulation of infectious materials must be conducted within a biosafety cabinet (BSC), preferably Class II or Class III, or other physical containment devices. Secondary barriers for this level include controlled access to the laboratory and ventilation requirements that minimize the release of infectious aerosols from the laboratory.

3.5.4 biosafety level 4 (BSL4): BSL-4 is required for work with dangerous and exotic agents that pose a high individual risk of aerosol-transmitted laboratory infections and life-threatening disease that is frequently fatal, for which there are no vaccines or treatments, aerosol transmission, or related agent with unknown risk of transmission. Agents with a close or identical antigenic relationship to agents requiring BSL-4 containment must be handled at this level until sufficient data are obtained either to confirm continued work at this level, or re-designate the level. Laboratory staff must have specific and thorough training in handling extremely hazardous infectious agents. Laboratory staff must understand the primary and secondary containment functions of standard and special practices, containment equipment, and laboratory design characteristics. All laboratory staff and supervisors must be competent in handling agents and procedures requiring BSL-4 containment. Access to the laboratory is controlled by the laboratory supervisor in accordance with institutional policies.

There are two models for BSL-4 laboratories:

- a Cabinet Laboratory where all handling of agents must be performed in a Class III BSC.

- a Suit Laboratory where personnel must wear a positive pressure supplied air protective suit.

BSL-4 Cabinet and Suit Laboratories have special engineering and design features to prevent microorganisms from being disseminated into the environment.

3.5.5 risk groups: The principal hazardous characteristics of an agent are: its capability to infect and cause disease in a susceptible human or animal host, its virulence as measured by the severity of disease, and the availability of preventive measures and effective treatments for the disease. The World Health Organization (WHO) has recommended an agent risk group classification for laboratory use that describes four general risk groups based on these principal characteristics and the route of transmission of the natural disease. The four groups address the risk to both the laboratory worker and the community. The NIH Guidelines established a comparable classification and assigned human etiological agents into four risk groups on the basis of hazard. The descriptions of the WHO and NIH risk group classifications are presented in the table below. They correlate with but do not equate to biosafety levels. A risk assessment will determine the degree of correlation between an agent’s risk group classification and biosafety level.
Classification of Infectious Microorganisms by Risk Group table

<table>
<thead>
<tr>
<th>Risk Group Classification</th>
<th>NIH Guidelines for Research involving Recombinant DNA Molecules 20022</th>
<th>World Health Organization Laboratory Biosafety Manual 3rd Edition 20041</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk Group 1</td>
<td>Agents not associated with disease in healthy adult humans.</td>
<td>(No or low individual and community risk) A microorganism unlikely to cause human or animal disease.</td>
</tr>
<tr>
<td>Risk Group 2</td>
<td>Agents associated with human disease that is rarely serious and for which preventive or therapeutic interventions are often available</td>
<td>(Moderate individual risk; low community risk) A pathogen that can cause human or animal disease but is unlikely to be a serious hazard to laboratory workers,</td>
</tr>
<tr>
<td>Risk Group 3</td>
<td>Agents associated with serious or lethal human disease for which preventive or therapeutic interventions may be available (high individual risk but low community risk).</td>
<td>(High individual risk; low community risk) A pathogen that usually causes serious human or animal disease but does not ordinarily spread from one infected individual to another. Effective treatment and preventive measures are available.</td>
</tr>
<tr>
<td>Risk Group 4</td>
<td>Agents likely to cause serious or lethal human disease for which preventive or therapeutic interventions are not usually available (high individual risk and high community risk).</td>
<td>(High individual and community risk) A pathogen that usually causes serious human or animal disease and can be readily transmitted from one individual to another, directly or indirectly. Effective treatment and preventive measures are not usually available.</td>
</tr>
</tbody>
</table>

3.6 cabinet classification: Although this Standard covers only Class II biosafety cabinetry, Class I and Class III cabinets are currently defined and known to be commercially available. Biosafety cabinets can be used for work with biological agents assigned to risk groups biosafety levels 1 through 4, depending on the facility design as described in Biosafety in Microbiological and Biomedical Laboratories. Special note should be taken that risk group 4 BSL-4 agents should only be used in Maximum Containment Laboratories and that Class I and Class II biosafety cabinets are only acceptable in Maximum Containment Laboratories with positive pressure containment suits.

3.6.1 class I: A Class I BSC provides personnel and environmental protection without product protection. Personnel protection is provided as a minimum safe velocity of 75 fpm (0.38 m/s) of unfiltered room air is drawn through the front opening and across the work surface. The air is then passed through a HEPA/ULPA filter in the exhaust plenum, providing environmental protection.

The classical Class I BSC is hard-ducted (i.e., direct connection) to the building exhaust system and the building exhaust fan provides the negative pressure necessary to draw room air into the cabinet. Cabinet air is drawn through a HEPA/ULPA filter as it enters the cabinet exhaust plenum.

Some Class I BSCs are equipped with an integral exhaust fan. If an integral exhaust fan cabinet is vented outside, it requires a canopy exhaust connection, or if a direct connection is used, a blower interlock is required.
Some Class I models used for animal cage changing are designed to allow recirculation of air into the room after HEPA/ULPA filtration and may require more frequent filter replacement due to filter loading and odor from organic materials captured on the filter.


3.6.2 class II Biosafety Cabinet: Class II (Type A1, A2, B1 and B2) BSCs are partial barrier systems that rely on the movement of air to provide personnel, environmental, and product protection. Personnel and product protection is provided by the combination of inward and downward airflow captured by the front grille of the cabinet. Side-to-side cross-contamination of product is minimized by the internal downward flow of HEPA/ULPA-filtered air moving towards the work surface and then drawn into the front and rear intake grilles, and the side gap/grilles. Environmental protection is provided when cabinet exhaust air is passed through a HEPA/ULPA filter. When used as designed, the cabinet exhaust air may be recirculated to the laboratory (Type A1 and A2 BSCs) or discharged from the building via a canopy connection (Type A1 and A2 BSCs). Exhaust air from Types B1 and B2 BSCs must be discharged to the outdoors via a sealed connection.

All Class II cabinets are designed for work involving procedures assigned to biosafety levels 1, 2, and 3, and 4. Class II BSCs may be used with procedures requiring BSL-4 containment if used in a BSL-4 suit laboratory by a worker wearing a positive pressure protective suit.

Class II BSCs provide the microbe-free work environment necessary for cell culture propagation and also may be used for the formulation of nonvolatile antineoplastic or chemotherapeutic hazardous and non-hazardous drugs.

3.6.2.1 class II Type A1 cabinets (formerly designated Type A): cabinets that

– maintain minimum average inflow velocity of 75 ft/min (0.38 m/s) through the work access opening;

– have HEPA/ULPA filtered downflow air that is a portion of the mixed downflow and inflow air from a common plenum (i.e., a plenum from which a portion of the air is exhausted from the cabinet and the remainder supplied to the work area);

– may exhaust HEPA/ULPA filtered air back into the laboratory or to the environment through an external exhaust system connected to the cabinet with a canopy connection; and

– have all biologically contaminated ducts and plenums under negative pressure or surrounded by negative pressure ducts and plenums.

Type A1 cabinets are not suitable for work with volatile chemicals and radionuclides.

Older Type A1 cabinets may not conform with this definition. See Annex E for details on application and installation requirements.

3.6.2.2 Class II, Type A2 cabinets (when exhausted to the environment were formerly designated Type B3): cabinets that

– maintain a minimum average inflow velocity of 100 ft/min (0.51 m/s) through the work access opening;

– have HEPA/ULPA filtered downflow air that is a portion of the mixed downflow and inflow air from a common exhaust plenum;
– may exhaust HEPA/ULPA filtered air back into the laboratory or to the environment through an external exhaust system connected to the cabinet with a canopy connection; and

– have all biologically contaminated ducts and plenums under negative pressure or surrounded by negative pressure ducts and plenums.

Type A2 cabinets used for work with volatile chemicals and radionuclides required as an adjunct to microbiological studies must be exhausted through properly functioning exhaust canopies.

See Annex E for details on application and installation requirements.

### 3.6.2.3 Class II Type B1 cabinets:
cabinets that

– maintain a minimum average inflow velocity of 100 ft/min (0.51 m/s) through the work access opening;

– have HEPA/ULPA filtered downflow air composed largely of uncontaminated recirculated inflow air;

– exhaust some of the contaminated downflow air to an external exhaust system through a dedicated duct connected to the cabinet with a direct connection and exhausted to the atmosphere after passing through the cabinet’s HEPA/ULPA exhaust filter; and

– have all biologically contaminated ducts and plenums under negative pressure or surrounded by negative pressure ducts and plenums.

Type B1 cabinets may be used for work with volatile chemicals and radionuclides required as adjuncts to microbiological studies.

Type B1 cabinets may be used for work treated with volatile chemicals and radionuclides required as adjuncts to microbiological studies if work is done in the direct exhausted portion of the cabinet, or if the chemicals or radionuclides will not interfere with the work when recirculated in the downflow air.

See Annex E for details on application and installation requirements.

### 3.6.2.4 Class II, Type B2 cabinets:
cabinets that

– maintain a minimum average inflow velocity of 100 ft/min (0.51 m/s) through the work access opening;

– have HEPA/ULPA filtered downflow air drawn from the laboratory or the outside air (i.e., downflow air is not recirculated from the cabinet exhaust air);

– exhaust all inflow and downflow air to the atmosphere through an external exhaust system connected to the cabinet with a direct connection after filtration through the cabinet’s HEPA/ULPA exhaust filter without recirculation in the cabinet or return to the laboratory; and

– have all contaminated ducts and plenums under negative pressure or surrounded by directly exhausted (nonrecirculated through the work area) negative pressure ducts and plenums.

Type B2 cabinets may be used for work with volatile chemicals and radionuclides required as adjuncts to microbiological studies.

See Annex E for details on application and installation requirements.

### 3.6.3 Class III:
The Class III BSC was designed for work with highly infectious microbiological agents and for the conduct of hazardous operations and provides maximum protection for the environment and the worker. It is a gas-tight (no leak greater than 1x10^-7 cc/sec with 1% test gas at 3 in pressure Water
Gauge (750 Pascal) enclosure with a non-opening view window. Access for passage of materials into the cabinet is through a dunk tank, that is accessible through the cabinet floor, or double-door pass-through box (e.g., an autoclave) that can be decontaminated between uses. Reversing that process allows materials to be removed from the Class III BSC safely. Both supply and exhaust air are HEPA filtered on a Class III cabinet. Exhaust air must pass through two HEPA filters, or a HEPA filter and an air incinerator, before discharge directly to the outdoors. Class III cabinets are not exhausted through the general laboratory exhaust system. Airflow is maintained by an exhaust system exterior to the cabinet, which keeps the cabinet under negative pressure (minimum of 0.5 in (125 Pascal) of water gauge.)

The Class III BSC was designed for work with highly infectious microbiological agents and other hazardous operations. It provides maximum protection for the environment and the worker. It is a gas-tight (no leak greater than 1x10^-7 cc/sec with 1% test gas at 3 inches pressure water gauge.) enclosure with a viewing window that is secured with locks and/or requires the use of tools to open. Access for passage of materials into the cabinet may be through any of the following: a dunk tank that is accessible through the cabinet floor, a double-door pass-through box that can be decontaminated between uses, integrated double-door autoclaves and portable docking stations with double sealing connecting mechanisms that can be decontaminated between uses. Reversing that process allows materials to be removed from the Class III BSC. Both supply and exhaust air are HEPA/ULPA filtered. Exhaust air must pass through two HEPA/ULPA filters in series, before discharge to the outdoors. Airflow is maintained by an exhaust system exterior to the cabinet, which keeps the cabinet under negative pressure according to manufacturer design pressure criteria. Sometimes because of laboratory conditions an optional exhaust fan may be required. This exhaust fan should generally be kept separate from the exhaust fans of the facility ventilation system. If a cabinet exhaust system is required it should be equipped with an appropriate alarm system which both notifies the cabinet user and shuts down the cabinet exhaust system in the event of a facility exhaust system failure.

Rubber glove/sleeves or equivalent glove material, are sealed to ports in the cabinet and allow direct manipulation of the materials isolated inside. The glove material shall be compatible for use with the materials being used in the cabinet. The exhaust system for the cabinet shall provide inflow to the cabinet arm port in the event of a rubber glove/sleeve breach. The minimum breach velocity shall be measured with a hot wire in the middle of the arm port and shall be no less than 100 ft/min (0.51 m/sec). It is not a requirement for the work area to be free of turbulence or cross-contamination.

3.7 calibration: Comparison of the measurement of a standard or instrument of unknown accuracy with another standard or instrument of known accuracy to detect, correlate, report, or eliminate by adjustment any significant variation in the accuracy of the unknown standard or instrument.

3.8 canopy connection: A BSC exhaust connection where there are one or more openings or gaps in the connection between the BSC and the external exhaust system.

3.9 certification, cabinet design (type testing): Cabinet design certification is formal validation by a qualified design testing organization that a designated cabinet model meets all the requirements of Annex A of this standard.

3.10 certification, cabinet field: Cabinet field certification is formal verification by a qualified field-testing certifier that an installed cabinet meets all the requirements of Annex F of this standard.

3.11 chemical resistance: Capability of materials to maintain their original surface characteristics under prolonged contact with cleaning compounds, and decontaminating agents, and normal conditions of the use environment.

3.12 closed: Fabricated with no openings exceeding 0.031 in (0.079 mm).
3.13 concurrent balance value: This value is determined using the duct traverse measurement method as specified in ASHRAE 111-2008, after establishing cabinet inflow and downflow velocities. This value is determined using the duct traverse measurement method as specified in ASHRAE 111-2008, a minimum of 7.5 duct diameters downstream of a direct connected BSC. Prior to determining the concurrent balance value, it shall be confirmed that the cabinet is operating at its nominal setpoints for inflow and downflow velocity ± 3 fpm. The primary DIM method shall be used for setting the inflow velocity. The accuracy of the DIM shall be better than or equal to ± 3% and ± 7 cfm. The static pressure is also measured approximately two duct diameters from the cabinet exhaust connection. Appropriate filter load and tolerance values shall be added to the base static pressure value to accommodate filter loading: 0.3 in w.g. shall be added for Type B1 cabinets and 0.7 in w.g. shall be added for Type B2 cabinets. The resulting values may be used for design and balance exhaust/supply HVAC requirements.

3.14 decontamination: Inactivation or destruction of infectious agents or neutralization of toxic agents.

3.15 direct connection: A BSC exhaust connection where the connection between the BSC and the external exhaust system is air tight with no designed gaps or openings.

3.16 direct inflow measuring device (DIM): A volumetric airflow measuring device consisting of a capture hood with a sensing component that provides a readout as a single value for volumetric inflow rate and meets the requirements of Annex B.

3.17 high efficiency air filters (for use in class II biosafety cabinets):

3.17.1 high efficiency particulate air (HEPA) filter: A throwaway, extended/pleated medium, dry-type filter with the following characteristics:
- rigid casing enclosing the full depth of the pleats;
- minimum particulate removal of 99.99% for thermally generated monodisperse diocetylphthalate (DOP) smoke particles or equivalent with a diameter of 0.3 µm (Type C);
- minimum particulate removal of 99.99% and determination as the lower efficiency when tested for particle size ranges of 0.1 to 0.2 µm or 0.2 to 0.3 µm in accordance with IEST-RP-CC007 (Type J);
- minimum particulate removal of 99.995% and determination as the lower efficiency when tested for particle size ranges of 0.1 to 0.2 µm or 0.2 to 0.3 µm in accordance with IEST-RP-CC007 (Type K);
- maximum pressure drop of 1.0 in w.g. (250 Pa) when clean and operated at rated airflow capacity; and
- no area showing a penetration exceeding 0.01% when scan tested with a polydisperse aerosol having a light scattering median size of 0.7 µm and a geometric standard deviation of 2.4.

These filters conform to all the performance and construction requirements of a Type C, a Type J, or a Type K filter respectively, contained in IEST-RP-CC001.4. Filter media shall be tested in accordance with the methods of IEST-RP-CC021 with performance levels to meet the minimum efficiency requirements as specified above and the pressure drop requirements as required by the specific application.

3.17.2 ultra-low-penetrating air (ULPA) filter: A throw away, extended/pleated medium, dry-type filter with the following characteristics:
- rigid frame enclosing the full depth of the pleats;
- minimum particle removal of 99.999% and determination as the lower efficiency when tested for particle size ranges of 0.1 to 0.2 µm or 0.2 to 0.3 µm when tested in accordance with IEST-RP-CC007;
– maximum pressure drop of 1.0 in w.g. (250 Pa) when clean and operated at rated airflow capacity. ULPA filters may have higher airflow resistance than HEPA/ULPA filters for the same rated airflow; therefore, care shall be taken to ensure that the pressure drop is compatible with the cabinet motor/blower capability; and

– no area showing a penetration exceeding 0.01% when scan tested with a polydisperse aerosol having a light scattering median size of 0.7 µm and a geometric standard deviation of 2.4.

This filter conforms to all requirements of a Type F filter contained in IEST-RP-CC001.4, HEPA and ULPA filters.

3.18 leak tight: Free of leaks at 2 in w.g. (500 Pa) of air pressure as described in Annex A.

3.19 nominal set point velocities: The cabinet downflow and inflow velocities that the manufacturer designates as the settings at which the cabinet is intended to operate and the settings at which it passed the tests listed in 6.7 and Annex A, section A.7.

3.20 polydisperse aerosol: The aerosol used for filter leak testing according to IEST-RP-CC034 and as specified in Annex A, FAerosol with a light scattering median size of 0.7 µm and a geometric standard deviation of 2.4.

3.214 sash: A fixed or sliding window located at the front of the biosafety cabinet, that forms a partial barrier between the operator and the work area.

3.225 sealed: Fabricated with no openings that will permit entry or leakage of air (leak-tight).

3.236 smooth: A surface free of pits and inclusions, with cleanability equal to or exceeding the following.

3.236.1 interior work surfaces and exposed interior surfaces: Number 3 (100 grit) finish on stainless steel.

3.236.2 other interior surfaces and exterior surfaces: Commercial grade cold-rolled, hot-rolled, or combination cold/hot-rolled steel free of visible scale.

3.247 surfaces: (see Figure 1 - Surfaces)

3.247.1 interior work surfaces: Surfaces used when performing a task, operation, or activity.

3.247.2 exposed interior surfaces: Exposed interior surfaces, other than work surfaces, that are subject to splash, spillage, or airborne contamination during normal use.

3.247.3 other interior surfaces: Interior surfaces not exposed to splash or spillage but exposed to vapor or volatile toxic substances or both.

3.247.4 exterior surfaces: All exposed surfaces not defined as interior.

3.258 toxic: Having an adverse physiological effect on biological systems.

3.269 visible medium: A visible aerosol that is sufficiently neutrally buoyant in air to see observe air disturbances without significantly influencing them. Examples include chemical ventilation tubes and thermally generated aerosol. The delivery velocity of the visual medium should be slow enough to assure that there is no interference to the air flow under test.
3.2730 w.g. (water gauge): Another common name for the inch of water column. The word “gauge” after a pressure reading indicates that the pressure stated is actually the difference between the absolute or total pressure and the air pressure at the time of the reading.

3.2834 work area: The controlled area inside the cabinet directly above the work tray identified by the manufacturer as the location for the user’s activity. This is the horizontal plane inside the cabinet extending from sidewall to sidewall and from back wall to the inside of the sash at a point approximately 2 in (5 cm) above the lower level of the sash.

3.2932 work tray: The solid floor of the work area identified by the manufacturer as the location for the user’s activity. This is differentiated from work area.

3.30 zone: An area distinguished from adjacent parts by dimensional characteristics.