Steve Williams called the meeting to order. Mindy Costello read the antitrust statement. S. Williams began the meeting by thanking everyone for calling in to participate on this task group.

**Action Items:**

1. Richard Gilpin will email the Canadian and UK documents for reference to post to workspace for group review
2. Bill Peters will send in EN reference definition for workspace as well.
3. B. Peters and Jim Hunter agreed to work on motor blower test requirements
4. Aaron Johnson agreed to review and propose a change to the distortion test using a % of weight of the cabinet.

**Discussion:**

S. Williams opened the discussion with Class I Cabinets, specifically the definition of a class I cabinet from NSF/ANSI 49 which states:

A ventilated cabinet for personnel and environmental protection, having an un-recirculated inward airflow away from the operator that exhausts all air to the atmosphere after filtration through a HEPA filter. Class I cabinets are suitable for work where no product protection is required.

S. Williams posed to the group whether there is a necessity to refine or expand the definition of the Class I cabinet.

Class II has an expansive definition and the preference of the group is to define the class I and III similarly. For example, class II, type, A2, B1, and B2 are not

---

This document is part of the NSF International Standards process and is for NSF Committee uses only. It shall not be reproduced, or circulated, or quoted, in whole or in part, outside of NSF activities, except with the approval of NSF.
allowed to have positive pressure plenums that vent directly to the room. The class I may need this specified in the standard. There is a set definition for class I in the BMBL version five that has a detailed definition as well as the Canadian and UK Health Mastery that may be used as a reference. R. Gilpin will email to M. Costello those documents for reference to post to the workspace for group review. Bill Peters will send in the EN reference definition for the workspace as well.

The discussion moved on to the materials, design and construction requirements for Class I cabinets. It was questioned on whether it is appropriate to require the EPA filter for biological use as opposed to powder containment. The group agreed to maintain the intended use of class I would be biological only. Class II requirements should be adequate for class I with biological use. The verbiage should clearly state in the definition of a class I cabinet that the intended purpose is for biological only. It would behoove to keep minimum levels the same as class II however some allowances would be made due to the smaller enclosure.

Some Class I cabinets can be vented to the room. In the BMBL, these must be ducted to an exhaust. Class II are allowed to vent to the room therefore, class I should be allowed as well. J. Balsamo questioned whether to allow radioactive materials, trace amounts of organics which must be ducted for containment. As long as there is no positive pressure plenums vented to the outside then it would be allowed to have small levels of contaminants for biological research. The group will carry the logic form class II to class I and review from there.

The ambiguity in the standard of the word ‘minute’ was raised. This may be discussed at a future conference call or other forum.

The manufacturers on the call were asked if any of them make a class I cabinet with a positive pressure plenum in direct contact with the room. Both Bill Peters and Jim Hunter replied that they did not.

Class I must meet construction requirements of Class II. All cabinets must have materials and be constructed and tested to the same levels. All present agreed.

Next the discussion turned to the scope of testing class I cabinets. Class II testing is extensive and an expensive process. Class I is designed to do less so theoretically the testing would be less. Field certification may be the discussion of a future call.

Type testing does tie into microbiological testing and personnel protection. Class I may not apply to anything but personnel. In class I there is no downflow air so as to prevent cross contamination or provide for product protection.
The group agreed that a vibration test would be appropriate for Class I cabinets that included an internal blower. They did not come to an agreement on the need for a vibration test on cabinets that rely exclusively on an external exhaust system. The group agreed they do not want cabinets to "dodge" testing requirements.

The group agreed that a Class I cabinet is essentially a fume hood with a HEPA filter in the exhaust, whether it exhausts remotely or into the room. For Class I cabinets with their own internal blower, it may be necessary to specify in the definition the type of connection allowed (hard ducted or canopy). A. Johnson asked for an example of Class I that vented back to the room. The cabinet design is not for volatile use/only biological use. BMBL does reference both types of cabinets.

The group discussed altering the envelope set point to cover a manufacturer specified range if that range was greater than the traditional +/- 10 fpm. S. Williams asked if containment improved as the inflow velocity increases. B. Peters responded that this was thought to be the case until it was discovered that you can actually get reflection off the back wall when the inflow velocity increases too much, resulting in a loss of containment. It would be best to test both high and low end in addition to the nominal set point to verify this. It is up to manufacturers to design the cabinet with these requirements and list the range of inflow as long as they are within the minimum and maximum set by the standard. EN standard specifies the operational mean is within the range 135-235 fpm for class I.

For the motor blower test there may be a necessity to alter the test. The purpose of the test was to demonstrate to the user that the filter would last a reasonable lifetime. Many class I cabinets use a motorized impeller due to space requirements. J. Hunter suggested that no cabinet using a motorized impeller can pass. The filter will be smaller on class I. IEST stated for the motor blower test it measures air flows, then loads the system, turns speed control up and makes sure it is not losing more than 10% of the airflow. Load at 50% would demonstrate life for the filter based on this test. It may be possible to adopt IEST methodology; therefore it will be looked at for reference. The consensus was the tester should look at each cabinet and verify how it is being used to determine motor blower test.

If kept in the standard, the motor blower test must be modified for class I from the class II requirements. All agree this is the task. J. Hunter and B. Peters agreed to work on this.

There was a consensus within the group that the soap bubble leak test was not a field-testing issue for cabinets without positive pressure plenums in direct contact with the room. However it is an issue for decontamination and therefore should
be included in the type testing. This would bring class I requirements in line with class II requirements.

For the HEPA filter test it will be kept with the same methodology as class II with just one less filter.

In the distortion test which is a very stringent test; class I biological cabinets should meet this. This may have to be reviewed to adjust for size. The group pondered what the reasoning for this test was originally: rigors of shipping or opening seams that could leak during decontamination or potentially contaminated positive pressure plenums leaking into the room. The original intent was for larger cabinets to undergo rigors of up to 250 pounds of force. A. Johnson will review and propose a change, possibly using a % of the weight of the cabinet as the force to be applied. The group agrees this is the method to use.

For the overturn testing all present agreed this should have the same requirements as the class II since it will need to be met in order to pass the UL requirements.

A. Johnson will review the balance of stability/resistance to tipping. The group agreed that it may not be appropriate to require small cabinets to be able to support a 250 pound load on the front.

Pertaining to the noise and lighting test it was agreed they should be kept for class I but may only need to be required for cabinets with internal blowers. Most class I cabinets do not produce much noise and would have little trouble meeting the 67dbA requirement. It is possible to do this test on non-powered cabinets and set different requirements. S. Williams prefers to eliminate the noise test on class I cabinets that do have an internal blower.

The inflow velocity test is set at 100 fpm for volatiles and 75 fpm for biologicals. Ventilated safety balance enclosures are included in this and these are not specifically biosafety cabinets. If shifting from biological to chemical to powder then this could be a different standard to attest to.

In the marketplace the group pondered if there are enough volume of class I cabinets to certify to this change. The group agrees to put forth the language for this change. R. Gilpin stated it should be kept simple for requirements and testing. That will help keep it reasonable for those to certify to it.

The question was posed as to whether there is value in the process to developing class I and III in the standard. S. Williams stated he may propose to send a straw ballot.
Possible issues: for class I and III’s
  1. Redefine class I
  2. Baseline testing- possible annex recommended practice
  3. Certification and listing

The next call will be to discuss class III. After the vote on the straw ballot the next conference call will be scheduled.

**Proposed Agenda:**

**Class III Cabinets**

Definition of a class III cabinet from Standard 49:
A totally enclosed, ventilated cabinet of leak-tight construction. Operation in the cabinet are conducted through attached rubber gloves. The cabinet is maintained under negative air pressure of at least 0.50 in w. g. (120 Pa). Downflow air is drawn into the cabinet through HEPA filters. The exhaust air is treated by double HEPA filtration or by HEPA filtration and incineration.
- Discussion of the definition and any need to refine or expand it
- Materials, design and construction requirements
- Scope of testing