3.2 Airflow

3.2.1 Downflow – Pertaining to the velocity or volume of air that flows through the work area from top to bottom.

3.2.2 Downflow velocity profile – The average velocity (or velocities in each nonuniform zone) of the body of air moving down through the work area. The two downflow velocity profile types, non-uniform and uniform, are mutually exclusive.

3.2.3 Inflow – Pertaining to the velocity or volume of air that flows into the work area.

3.2.4 Laminar Airflow – When air flows in parallel layers, with no disruption between the layers.

3.2.5 Non-uniform (zoned) downflow – A downflow velocity profile comprised of several contiguous zones. The average downflow velocities may vary from zone to zone.

3.2.6 Secondary downflow profile – An optional method defined by the manufacturer and verified by NSF International for establishing the downflow velocity profile using fewer test points than required by the non-uniform or uniform downflow velocity profile methodologies.

3.2.7 Uniform downflow – A downflow velocity profile wherein the individual point velocities are all approximately the same.

6.9 Downflow and inflow velocities

6.9.1 The average downflow velocity (uniform downflow) or velocities (non-uniform downflow) and inflow velocity shall be set at the nominal set points for testing unless otherwise noted. Subsequent production models of the test unit may also qualify when the average downflow velocity(ies) operate within +/- 5 ft/min (0.025 m/s) (see Annex A, Section A9) of the unit tested by NSF International.

6.9.2 Downflow velocity - The downflow velocities are measured in a horizontal plane located 4 inches (10 cm) above the bottom edge of the sash in its normal operating position (certified height).

6.9.3 Non-uniform (zoned) downflow – The manufacturer shall designate the test point locations and average downflow velocity in each zone. In each zone, the individual downflow velocities shall not vary more than 20% or 16 FPM (whichever is greater) from the overall average velocity of that particular zone.

6.9.4 Uniform downflow – A downflow velocity profile wherein the individual point velocities vary no more than 20% or 16 FPM (whichever is greater) from the overall average velocity.
A9.3.1 Uniform downflow cabinets
Measure the air velocity at multiple points across the workspace, using equal points in the horizontal plane defined 4 in (10 cm) above the bottom edge of the window frame (certified height) using the following spacing:

- A uniform rectangular grid with spacings as close to but no greater than 6.0 x 6.0 in (15 x 15 cm) and containing a minimum of three rows and seven readings per row.
- Perimeter air velocity readings shall be taken 6.0 in (15 cm) away from the walls and window enclosing the work area (see annex A, figure A17).

Removable equipment nonessential to cabinet operation (acceptable option components) shall be removed prior to the setting of the nominal set point.

The air measurement probe shall be held rigidly in freestanding fixture that permits accurate positioning and does not distort the airflow pattern (ring-stand and clamp). Reported values shall be each of the readings included in the applicable grid and the overall average of these readings. The nominal set point shall be based on this average.

A9.3.2 Non-uniform (zoned) downflow cabinets

Measure the air velocity at multiple points across the workspace in zones defined by the manufacturer in the horizontal plane defined 4 in (10 cm) above the bottom edge of the window frame (height being tested). Manufacturer’s instructions shall include locations of zone boundaries and the number of points within each zone. The requirements for the zones are:

- The grid test points must have equidistant spacing.
- Each zone must have at least 7 test points within it.
- The distance between test points in each contiguous zone shall be not less than 4 inches (10 cm), nor more than 12 (25 cm) inches apart.
- The area defined by the perimeter of the test points must equal at least 30% of the total area of the plane in which the readings are taken.

The removable equipment non-essential to cabinet operation (acceptable option components) shall be removed prior to setting the nominal set points. The air measurement probe shall be held rigidly in freestanding fixture that permits accurate positioning and does not distort the airflow pattern (ring-stand and clamp). Reported values shall be each of the readings taken in each of the zones and the average of each zone. The nominal set point shall be based on the above data in accordance with the manufacturer’s instructions.
A.9.4 Acceptance

The average downward airflow velocity through the cross section of the unobstructed work area (with removable acceptable option components removed) at the level 4 in (10 cm) above the bottom of the window of cabinets meeting the requirements of annex A, section A.7 shall be the values specified by the manufacturer. Subsequent production cabinets of the initial model and size conforming to annex A, section A.7 may also qualify if the measured downflow velocity set points are within ± 5 ft/min (± 0.025 m/s) of the nominal downflow velocity set point and any additional velocity readings agreed to by the testing organization are provided. Individual point readings in cabinets with uniform downflow shall not vary more than ± 20% or ± 16 ft/min (± 0.08 m/s) from the average downflow velocity, whichever is greater, as determined in annex A, section A.9.3. Individual point readings shall not vary more than ± 20% or ± 16 ft/in (± 0.08 m/s) from the average of each zone, whichever is greater, as determined in annex A, section A.9.3, when the downflow is specified as non-uniform downflow (zoned) by the manufacturer.

A.9.5 Secondary downflow profile – If chosen by the manufacturer, they shall designate an alternative downflow velocity profile grid consisting of at least 21 points that meet the requirements outlined in A.9.3.2., and provide results equal to those obtained in A.9.4. This profile, approved by the testing organization, shall be validated and provided by the manufacturer and shall be subject to review by the testing organization. Manufacturer validation procedures shall contain no fewer than ten replicate tests. The testing organization’s approval shall be based on review of the data and successful reproduction of test results.