BIOSAFETY CABINET CERTIFICATION (EXPERIENCE SHARING)

UNIVERSITI TEKNOLOGI MALAYSIA

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DORSETT PUTRAJAYA HOTEL

FIELD TESTING OF FIELD CERTIFICATION

- Duration for BSC Certification
- Type of standard use
- Type of field test
- Instrument use for field test certification
- Method use for field test certification
- Report writing for field test certification

22 January 2024

When BSC Should be Field Certified?

- At the time of installation
- At least annually thereafter
- After HEPA/ULPA filter are changed or maintenance repairs are made to internal part
- BSC is relocated or shifted
- If heavy use, recertification should be considered more frequent.

Type of Standards for BSCs Field Certification

- EN 12469 or NSF/ANSI 49 or
- Others such as BS 5726, AS 2252, YY0569

Type of Field Testing

Primary Test	Secondary Test (Optional)
Inflow Velocity	Vibration Test
Downflow Velocity	Light Intensity Test
HEPA/ULPA Filter Leak Test	Sound Test
Smoke Pattern Test	UV Intensity Test
Site Installation Assessment Test	

Downflow Velocity Test: Standards

- NSF 49: Average downflow velocity within ±0.025m/s of manufacturer's setpoint.
- For EN/12469: Average downflow velocity ≥0.25m/s.
- NSF 49 Acceptance indvidual:
  i. Variation ≤20% or 0.08m/s whichever is greater (Annex A)
  ii. Variation ≤25% or 0.08m/s whichever is greater (Annex F)
- EN 12469 Acceptance individual:
  i. Variation ≤20% from average
- For BSC ≥3 ft, minimum of reading is 7 per row
- For BSC ≤3 ft, minimum of reading is 4 per row
- Minimum of 3 rows or as defined by zone(s)

Downflow and Inflow Velocity Test: Test Instrument

Test instrument used:

- Thermal anemometer-accuracy ±0.015m/s or 3% indicated velocity (whichever is higher)
- Calibration interval : 12 month

Downflow Velocity Test: Report Writing

Elements should have in report:

i. Individual velocity readings in applicable grid
ii. Overall average velocity reading
iii. Minimum velocity reading
iv. Maximum velocity reading
v. Acceptance range for average velocity
vi. Acceptance criteria for airflow velocity uniformity

Inflow Velocity Test

Secondary Method (Constricted Access Opening)

- Used restricted opening method as specified on data plate
- Normally the grid is mentioned in the data plate.
- The average velocity will multiply with the correction factor.
- The acceptance normally state in data plate, if not (min: 0.381 m/s)

Inflow Velocity Test: Correction Factor

- Inflow velocity (V1) = average of actual inflow velocity * K factor * 0.3 for 10" window opening work position, 0.375 for 8" window opening work position

K factor = 1.0219 for 3 ft w/ 10" opening, 0.9935 for 3 ft w/ 8" opening.

K factor = 0.9918 for 4 ft w/ 10" opening, 1.047 for 4 ft w/ 8" opening.

K factor = 0.9942 for 5 ft w/ 10" opening, 1.0012 for 5 ft w/ 8" opening.

K factor = 0.9918 for 6 ft w/ 10" opening, 1.100 for 6 ft w/ 8" opening.

Example for calculation formula & K factor for BSC Thermofischer 1300 Series A2

Inflow Velocity Test: Report Writing

Elements should have in report:

i. Individual constricted velocity readings
ii. Overall average of constricted velocity readings
iii. Calculated exhaust volume
iv. Calculated inflow velocity
v. Constricted opening dimension and area
vi. Work access opening area and dimension
vii. Acceptance range calculated inflow velocity
viii. Inflow velocity test method
ix. Name of test (inflow velocity test)

HEPA/ULPA Filter Leak Test

Standards

Scan HEPA filter: media & gasket with PAO

NSF 49:

-Leak≤ 0.01% (HEPA is 99.99% efficient)

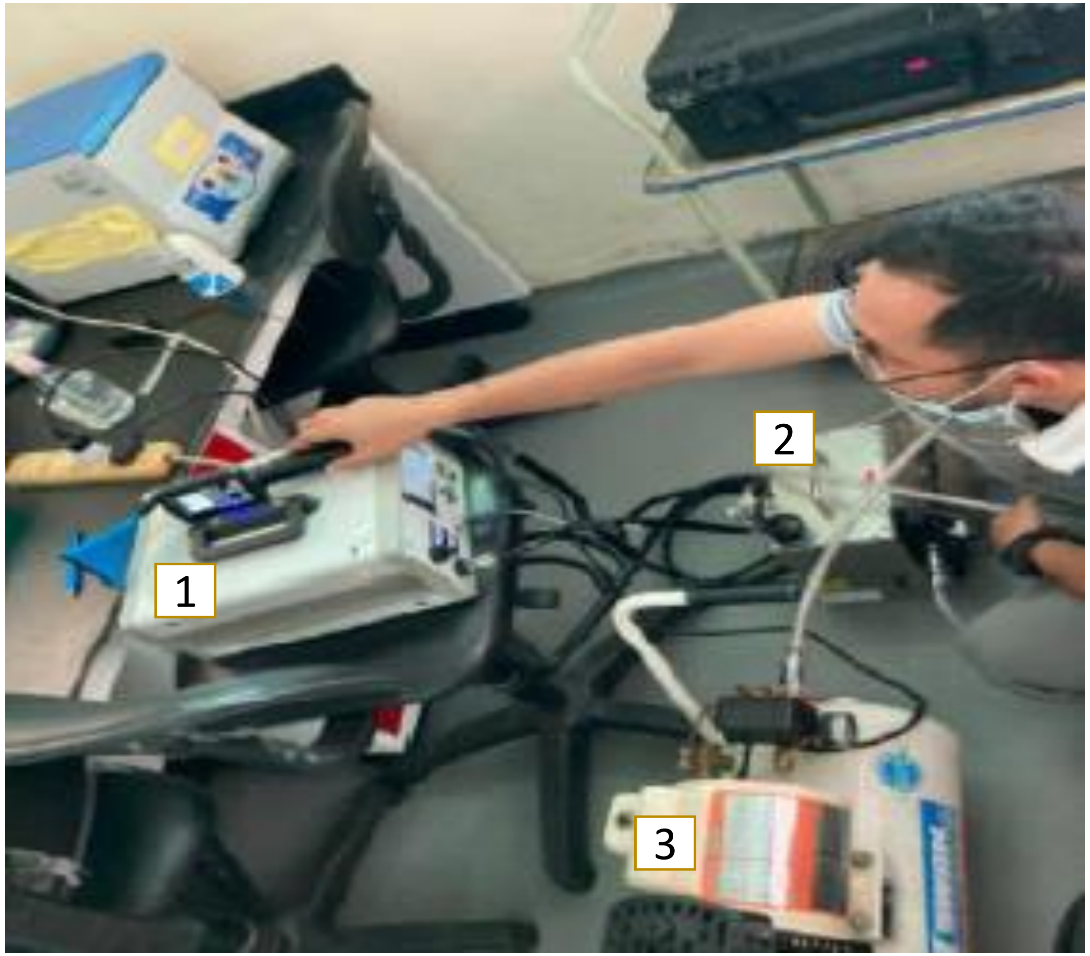
-For filters that can’t be surface scanned ≤0.005%

HEPA/ULPA Filter Leak Test: Test Instrument

Aerosol Photometer
Calibration interval: 12 months

Aerosol Generator
Calibration Interval: 12 months

HEPA/ULPA Filter Leak Test: The Set-up



1. Aerosol photometer
2. Aerosol generator
3. Air compressor


ATI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iProbe
0.022%

HEPA/ULPA Filter Leak Test: Report Writing

- Upstream aerosol challenge concentration
- Method use to report concentration (measured or calculated)
- Maximum leak penetration in percent
- Method used (scanned or probe test)
- Name of test (HEPA/ULPA filter leak test)

Smoke Pattern Test: Test Instrument

Smoke tube

Smoke nebulizer

Smoke Pattern Test: View Screen Retention

Method:
2.5 cm (1”) behind sash, 15 cm (6”) above lower edge, Left to Right

Acceptance Criteria:
The smoke flow shall smooth downward with no dead spots or reflux. No smoke shall escape from the BSC.

Smoke Pattern Test: Downflow

Method:
Centerline, Legt to Right,10 cm (4”) above sash lower edge

Acceptance Criteria:
The smoke shall show smooth downward flow with no dead spots or reflux (upward flow)

Smoke Pattern Test: Work Opening Edge Retention

Method:
Aperture perimeter, 4 cm (1.5”) outside opening

Acceptance Criteria:
No smoke reflux out of the cabinetonce drawn in, nor shall smoke billow over the work surface.

Smoke Pattern Test: Sash Seal Test

Method:
5 cm (2”) along side and top sash perimeter

Acceptance Criteria:
There shall be no escape of smoke from cabinet

Site Installation Assessment Test

Sash Alarm Functions:

- On cabinets equipped with sliding sash, it shall be raised 1 inch (25mm) above and lowered 1 inch (25mm) below the sash operating height.
- The signaling of an audible and visual alarm shall be verified for both conditions.

Sash is raised 1 inch from operating sash height

Sash is lowered 1 inch from operating sash height

Sash alarm should audible and visible

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