



Biosafety Cabinet Preventative Maintenance

Background

NSF/ANSI 49 Annex I.1.9 (formerly E.9) states “The current lifespan of a BSC is approximately 15 years.” However, how a Biosafety Cabinet (BSC) is used will impact its lifespan. Does the BSC run 24/7, daily or as needed? What type of facility or laboratory environment is it used in? What procedures or protocols are used within the BSC? What cleaning procedure and materials are used? These all have an impact on BSC lifespan.

Because of the wide variance of answers to the questions above, NuAire recommends periodic Preventative Maintenance (PM) review of BSC mechanical, electrical and safety systems to assure maximum product performance. Since BSC’s are certified at a minimum annually for critical performance per NSF/ANSI 49 Annex N.5 (formerly Annex F) and EN12469 Annex J, PM review can be accomplished during or as a part of the certification process. Just as the certification process monitors and reports HEPA filter loading/life, review of mechanical, electrical and safety systems can reduce the probability of part degradation before any breakdown or failure occurs.

Preventative Maintenance Review

As with the certification process, the key to PM is to develop a record of critical parts and systems during the certification/PM review process. The PM review can start with safety systems or the site installation assessment tests as required per NSF/ANSI 49 Annex N.5.7 (formerly Annex F.7). The site installation assessment tests require the certifier to review and test the safety functions for sash, exhaust/interlock and airflow alarms. The record or reporting function for the site installation assessment tests are a required part of the certification report. The additional PM review record can be part of or an addition to the certification report.

To develop a record of the critical parts and systems, NuAire recommends the first PM review to be performed after 5 years of use, followed by 10 years of use and lastly 15 years of use and every year after that. Being the stated lifespan of a BSC is approximately 15 years, an annual review of older BSC’s is required to monitor part and system degradation to assure the critical nature of biological/chemical containment performance is maintained.

Component/System Review Criteria and Score Rating

Each component and/or system should be visually inspected looking for any degradation or wear in respect to its function. Below is a list of observation/inspection criteria per category.

Electrical: Wear on electrical components is brought on by heat, age and usage. All electrical components should be reviewed for adverse conditions starting with visual discoloration due to heat and age. Inside the BSC control center; wires, connectors, terminal blocks, switches should be reviewed visually for becoming yellow/brown burnt looking. It is highly recommended to use an infrared thermometer, to check the temperature of all the electrical components. All electrical components with the exception of specific components located on the control board (i.e. AC motor Triacs and their associated heatsinks) or an AC motor speed control assembly, should not have a temperature higher than 167°F (75°C). If any component has a temperature higher than 167°F (75°C), it should be immediately replaced. The power cord should be checked to assure the ground pin is present as well as the pins being clean with no corrosion or arc marks. If any of the above adverse conditions are observed during the visual and temperature inspection, it should be noted as to the level or severity and if at risk, immediately replaced or remain at a minimum on a reoccurring inspection plan for future review and replacement.

Mechanical: Wear on mechanical components is typically brought on by usage and age. Sash balance review should be a visual check when the sash is moving reviewing the cord, pulley, spring and housing. If any wear to the cord or excessive housing movement is noted, the sash balances should be replaced¹. Base stands should be checked for stability and fasteners are tight. Auto base stands have a separate PM review and check per NuAire Technical Bulletin PTB0351. The BSC work surface and grills should be reviewed for stability and cleanliness for unimpaired airflow. The paper catch under the work surface and behind the rear divider panel should also be checked and clear of obstructions (i.e. paper, wrappers). Service valves should be checked for operation and leakage. Hardware and fasteners can be visually checked for presence and tightness.

Safety (alarms): Safety alarms should be checked as required part site installation assessment tests as per NSF/ANSI 49 Annex N.5.7 (formerly Annex F.7). Sash or window alarms, low exhaust alarms if a canopy is used, exhaust interlock alarm for type B BSC's and airflow alarms.

¹ Sash balances are highly recommended to be replaced every 10 years regardless of condition.

Score rating:

N/A - Component/system not present or applicable

- 1 – Good: This score indicates that the reviewed item meets minimum requirements and replacement is not expected before the next review.
- 2 – Fair: This score indicates that the reviewed item meets the minimum requirements, however, some degradation is noted and will need to be replaced in one to two years.
- 3 – Poor: This score indicates that the reviewed item doesn't meet the minimum requirements and needs immediate action to prevent component/system failure.

BSC Preventive Maintenance Inspection Report

Customer Information
 Customer: _____
 Address: _____

 City, State, Zip: _____
 Contact: _____
 Phone: _____
 Email: _____

BSC Information
 Manufacturer: _____
 Model: _____
 Serial Number: _____
 Manufacture Date: _____
 BSC Age: _____
 Location: _____
 BSC ID: _____

Inspection Criteria
Electrical

<u>Score</u>	<u>Component/System</u>	<u>Score</u>	<u>Component/System</u>
___	Control Panel Wiring	___	Power Cord
___	Terminal Blocks	___	Main Control Board
___	Connectors/Wire Nuts	___	Fuses/Circuit Breakers
___	Blower Switch	___	FL/LED Tombstones
___	UV Tombstones	___	Outlet Switch
___	Sash Height Switches		

Highest component temperature measured: _____ °F, °C (circle unit of measure)

Motor/Blower
 Facility Line Voltage: _____ AC _____ Hz; Motor Type: _____ AC _____ DC
 Speed Control Voltage: _____ AC/DC; Motor Current: _____
 BSC Total Amperage: _____

Inspection Criteria
Mechanical/Safety (alarms)

<u>Score</u>	<u>Component/System</u>	<u>Score</u>	<u>Component/System</u>
___	Sash Balances	___	Sash Balance connections
___	Base stand (fixed)	___	Base Stand (auto)
___	Work Surface/Grills	___	Paper Catch
___	Service valve	___	Hardware/Fastener
___	Airflow Alarms	___	Exhaust Interlock Alarm
___	Exhaust/Transition Alarm	___	Sash Alarms

Score Rating
 N/A – Component/System Not Applicable; 1 - Good; 2 - Fair; 3 - Poor

Comments: _____

Performed by (Company/Technician): _____ Date: _____