THE BAKER COMPANY

Primary, Under the Work Surface HEPA Filters, Supply HEPA Filter and Direct Exhaust Airflow System Combine to Increase Protection From Particulates, While Preventing Build-Up of Chemical Vapors and Gases.

NCB-D®

HEPA-filtered, particle free supply plenum plus approximately 60% direct exhaust from work area helps prevent build-up of chemical vapors and gases.

Class II, Type B1—Vertical Flow Biological Safety Cabinet

The Baker Company NCB-D® Class II, Type BI Biological Safety Cabinet meets or exceeds specifications for the NCI-I cabinet developed by the National Cancer Institute.

The NCB-D® is designed for biological work, product preparation and experimentation involving agents of low and moderate risk (Biosafety Levels I, 2 or 3).

- The cabinet exceeds design requirements of NCI Specification "General Purpose Clean Air Biological Safety Cabinet" (Class II, Type B Safety Cabinet dated July 6, 1976) and National Sanitation Foundation (NSF) International Standard #49.
- Applications for Class II, Type BI cabinets include microbiological studies, cell culture, pharmaceutical procedures and toxicology.
- According to NCI, this Class II, Type BI cabinet may be used for work with chemical carcinogens in microgram quantities (Laboratory Safety Monograph, NIH, January 1979).

NCB-D® Exceeds Class II, Type B1 Criteria

NCB-D® includes additional, unique design features proven to enhance containment while inhibiting cross contamination and exposure to chemicals, vapors and gases.

- All exhaust air is removed directly from the work area (direct exhaust) into the facility's separate exhaust system.
- Vapors and gases emitted from vessels or work behind the air split (approximately half way back from the cabinet front) are removed and not recirculated.
- HEPA filters located below the work surface assure that all positive pressure areas are free of particulate contamination. Additionally, all positive pressure plenums are completely surrounded by negative pressure. Recirculated air is HEPA-filtered immediately below the work surface before it is passed through a supply downflow filter above the work area.
- All unfiltered air in the cabinet flows under negative pressure in dedicated ducts.

CSA Limited

Meets NSF Standards

Underwriter Laboratories Listed

Features

- A high velocity suction channel prevents gases or particles from migrating behind the viewscreen and entering the work area.
- Sliding 10° ergonomically sloped viewscreen provides easy access to the work area.
- Mass Airflow Monitor automatically activates an audio/visual alarm if exhaust airflow in the duct decreases below the calibrated set point.
- A non-glare satin finish work surface with wide radius corners improves user comfort and simplifies cleaning.
- The HEPA filters located below the work surface provide an added measure of protection by eliminating contamination in the blower/motor area and positive pressure areas of the cabinet.
- Positive pressure plenums are downstream of HEPA filters and are completely surrounded by negative pressure.
- Padded ergonomic arm rest.

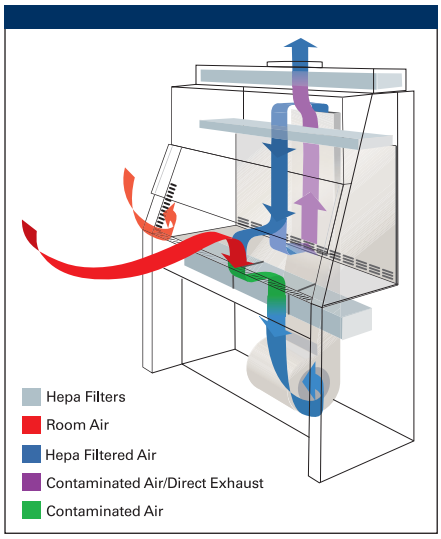
Double HEPA Filters for Added Containment and Internal Protection

The NCB-D® provides personnel, product and environmental protection plus internal contamination control. The NCB-D® design and airflow system protects the product by creating a particulate free work area, while minimizing build-up of chemical vapors and gases which pass through HEPA filters.

Used in accordance with proper technique, NCB-D® provides protection to the environment as well as personnel operating the equipment. In addition, NCB-D® protects the environment from vapors/gases if exhaust air is specially treated (i.e. catalytic conversion, scrubbing, activated charcoal) and exhausted to the outside.

- The high performance airflow system with a circulation-to-exhaust ratio of 40%:60% reduces concentration of chemical vapors and gases inside cabinet.
- Double downflow HEPA filters eliminate blower/motor contamination. HEPA filters are positioned above and below the work area. Only HEPA-filtered air is provided to the positive pressure plenum.
- The HEPA filter above the work area is rarely changed, if ever, because it is exposed only to HEPA-filtered air as it passes through the positive pressure plenum.
- The cabinet is designed for easy HEPA filter replacement and decontamination.
- NCB-D® features a direct exhaust area at the rear of the cabinet. This direct exhaust area provides additional personnel and product protection from gases and vapors by directing this airflow immediately to the exhaust system.

NCB-D® Airflow



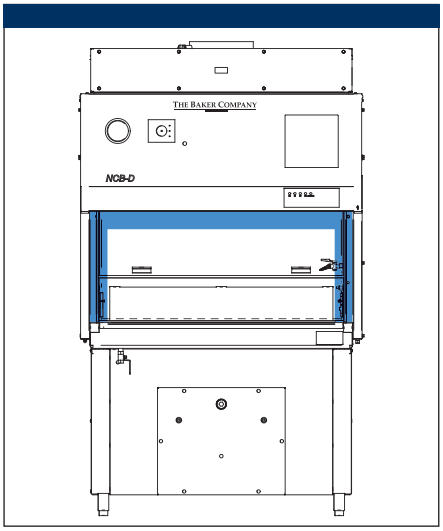
NCB-D® Airflow

- HEPA-filtered air descends through the work zone in a unidirectional (laminar) vertical downflow.
- At the approximate center of the work surface, the air splits. Approximately 40% of the air exits to the base of the cabinet via the front perforated grille. The remaining 60% is pulled through the rear exhaust slot.
- Escape of potentially harmful agents is prevented in part by an air barrier of inward-flowing room air at the front access opening. Room air entering through the front access opening is drawn into the front perforated grille and does not enter the work area.
- In the base of the cabinet, the air drawn through the front perforated grille is pulled by the blower/motor through the primary-downflow HEPA filter and pushed through a plenum to the top of the cabinet.
- Upon reaching the top of the cabinet, the air travels through the secondary-downflow HEPA filter and re-enters the work area as particle-free laminar flowing air.
- Air entering the rear exhaust slot from the work area is drawn directly into the duct at the rear of the cabinet, through the HEPA exhaust filter and into the facility exhaust system.
- Baker's exclusive *momentum air curtain* contains particles within the work area and inhibits migration of room air into the work area.

Direct Exhaust From Work Area Removes Vapors

The direct exhaust feature of the NCB-D® cabinet helps limit the concentration of non-particulate chemical fumes and vapors.

- In the NCB-D® design, approximately 60% of all cabinet air is directly exhausted from the rear of the work area into a facility exhaust system.
- When work that generates a vapor is performed in the rear of the cabinet, the direct exhaust feature makes it possible for a substantial portion of the vapors to be removed from the cabinet and not allowed to recirculate.



High Velocity Suction Slots Capture Unfiltered Air

Containment and cleanliness are accomplished with precise control of airflow volumes and velocities. High velocity suction slots prevent gases or particles from migrating behind the viewscreen and entering the work area.

- Continuous negative pressure or suction is provided above and behind the sliding viewscreen.
- The suction slots also prevent gases, vapors or particulates from migrating up behind the viewscreen and escaping into the operator's environment.

Airflow Monitor

NCB-D® models are equipped with the Baker audio/visual mass airflow alarm system.

- A warning light and buzzer at the front of the unit are activated when exhaust airflow drops below 10% of the set operating rate.
- The alarm warns the user when the exhaust system is inadequate. Work should be discontinued until the problem is corrected.

NCB-D® Design Features

1. Downflow HEPA filters above and below work surface, 99.99% minimum efficiency for 0.3 micrometer particulates.
2. Exclusive contamination-free positive pressure plenum improves internal contamination control and extends secondary downflow filter life.
3. HEPA exhaust filter protects environment from particulate contamination.
4. Airflow monitor warns of insufficient airflow.
5. Sliding10º ergonomically sloped viewscreen for easy access to work area.
6. Recessed, non-glare stainless steel work surface.
7. Independent ground-fault circuit interrupt (GFCI) outlets with self-resetting circuit breaker for user safety; trip light warns circuit has been disconnected because of ground fault error.
8. High velocity suction slots assure unfiltered air does not enter work area.
9. Adjustable levelers aid in installation.
10. StediVOLT® voltage regulator automatically adjusts to low and high voltage situations to maintain proper airflow.
11. By-pass arm rest is padded and reduces noise when viewscreen is closed.

NCB-D4® Model

High Visibility Viewscreen With Sash Alarm

The NCB-D® provides a safe, highly visible work area. 10° slope on viewscreen for enhanced ergonomic comfort.

- The vertical lift viewscreen is constructed of ¼-inch safety plate glass and counterbalanced for easier motion.
- The sash has an 8" working opening with an average calculated air intake velocity of 105 FPM.
- A maximum viewscreen sash opening of 17 ½" simplifies equipment and instrument loading and unloading.
- An integrated viewscreen sash alarm includes an audible indicator to warn of improper sash opening above or below the 8" design set point.
- The high velocity suction slots provide added protection at the viewscreen top and sides.

Downflow and Exhaust Filter Performance

Because filters remove microorganisms and airborne particulates (generally called aerosols) from the air, the quality, performance and useful life of downflow and exhaust filters are critical considerations in the biosafety environment.

- Each filter in each Baker cabinet is scan tested for leaks and tested for overall efficiency by the manufacturer, then individually scan tested by Baker after installation to assure leak-free performance with increased capture efficiency.
- Minimum filter efficiency is 99.99% for particulates 0.3 micrometers, increased efficiency for particulates greater and smaller than 0.3 micrometers.
- Both exhaust and downflow filters can be inserted and removed from the front of the cabinet.
- A closed-cell neoprene gasket provides an airtight seal between the filter assembly and the metal plenum.

Blower/Motor System Helps Extend Filter Life

Baker has selected an optimum blower/motor combination to assure performance and to extend filter life to an average of 7 to 10 years, the longest life in the industry. The Baker blower/motor provides a constant volume of air despite increases in resistance due to filter loading, resulting in extremely long filter life as verified by simulated filter loading tests.

Extended filter life minimizes filter replacement and decontamination costs, and diminishes the hazard to personnel by reducing the frequency of opening the contaminated areas of the cabinet. The more filter resistance the blower/motor system can overcome, the longer between filter changes.

- The Baker blower/motor is a direct drive permanent split capacitor motor designed to deliver the maximum amount of filter life for each cabinet.
- As particulates fill the filter media, resistance to airflow increases.

The blower/motor automatically compensates for loading until the filter is fully loaded and motor capacity is reached.

Motor Loading Capacity

Model	Pressure Drop Increase	Maximum Increase With Manual Blower Speed Control
NCB-D4®, 4-foot	79%	400%
NCB-D6®, 6-foot	100%	400%

NCB-D® is capable of automatically handling a significant increase in pressure drop across the filter without reducing total air delivery more than 10%. With the use of the manual speed controller, the NCB-D® can handle up to a 175% increase in pressure drop across the filter.

- The filter need not be changed until the blower/motor system cannot deliver adequate air volume to maintain the nominal set point, ±5 FPM.

Easier On-Site Certification and Testing

Several NCB-D® design features combine to simplify certification and maintenance for qualified service personnel, thus reducing downtime and improving life cycle costs.

- A manual speed control allows the certifier to increase blower/motor speed to compensate for filter loading.
- Both exhaust and downflow filters can be inserted and removed from the front of the cabinet.
- Filters are clamped directly to the metal plenum to simplify filter replacement.
- HEPA filters located below the work surface are easily accessed and can be bagged out for disposal.

StediVOLT® Motor Speed Controller Maintains Optimum Performance

The Baker exclusive StediVOLT® motor speed controller reduces the risk of performance degradation and possible product loss due to line voltage fluctuations.

- StediVOLT® minimizes changes in cabinet performances due to routine voltage fluctuations, as well as voltage changes caused by high-demand, brownout conditions.
- StediVOLT® "reads" incoming voltage, automatically compensates for low and high voltage, and maintains proper blower speed to prevent periods of unbalanced airflow which may contribute to loss of containment or product protection.

StediVOLT®

Comfortable Lighting Improves Visibility, Reduces Heat

Fluorescent lamps provide better visibility with minimal heat at the face (front) of the cabinet.

- Lamps provide more than 100 foot-candle lighting at the work surface.
- The warm, natural illumination exhibits better color fidelity, minimizes eye strain and improves productivity.

Cabinet Construction Enhances Performance, Minimizes Downtime

Baker cabinet designs represent many years of experience in stainless steel fabrication and craftsmanship. Design considerations such as wide radius corners, aerodynamically shaped surfaces and non-glare satin finish interiors combine to improve comfort, simplify cleaning and maintain proper containment.

Summary Specification

NCB-D® Class II, Type B1 Biological Safety Cabinet, Vertical Flow
See NCB-D® Specification Detail For Cabinet Drawings and Site Preparation Information

NCB-D6® NCB-D4®

Model No.	Size	Opening*	Electrical	Amps/Breaker	Interior Dim.	Exterior Dim.	Net Weight	Ship Weight
NCB-D4®	4'	8"(17½")	115V, AC	12/20	49 5⁄8" x 18 7⁄8" x 26 1⁄8"*	53 5⁄8"W x 34"F-B x 89 1⁄4"H**	845 lbs	1000 lbs
NCB-D6®	6'	8"(17½")	115V, AC	15.5/20	70" x 18 7⁄8" x 26 1⁄8"*	77 5⁄8"W x 34"F-B x 89 1⁄4"H**	1175 lbs	1350 lbs

*Maximum interior height is 26 1⁄16", maximum viewscreen opening is 17 ½".
** Plus 8½" adjustment with levelers.

- NCB-D® includes a corrosion-resistant, Type 304 stainless steel work surface with smooth 3⁄16-inch radius corners to permit easy cleaning. The recessed work area retains spills.
- The satin finish work surface diminishes harsh light reflection.
- Work area side walls and rear wall are one-piece, 16-gauge stainless steel construction with 7⁄16-inch radiused corners for cleaning convenience.
- A stainless steel air diffuser/filter protector located below the second HEPA downflow filter over the work area creates uniform airflow and provides filter protection.
- The 16- and 18-gauge cold-rolled steel exterior cabinet is protected with a white baked enamel finish Perma White.™
- The entire cabinet is airtight. Each component is welded, gasketed or assembled with hermetically sealed joints. Each cabinet is bubble tested under pressure to ensure the integrity of these seals.

Electrical System Offers Safety and Convenience

The NCB-D® electrical system is designed for safety and convenience. GFCI duplex outlets, one on each work area side wall, are provided to accommodate most commonly used laboratory instruments and equipment.

- Each outlet is provided with a drip-proof cover and self-resetting circuit breaker.
- The internal work area outlets are on a separate circuit from the cabinet lights and blower/motor so that an overload caused by research equipment will not affect cabinet function.
- Hermetically sealed bulkhead connectors are used to provide reliable containment protection for electrical connectors which penetrate the cabinet contaminated areas.
- For safety reasons, the NCB-D® cabinet utilizes a single power cord and plug arrangement. This assures that a second power source is not left on if maintenance functions are necessary.
- The NCB-D® is cULus Listed for electrical safety and integrity.

Functional Utilities With Petcocks, Valves and Plumbing Connections

Plumbing and drainage connections are strategically placed for both convenience and proper air management within the airflow plenums.

- One petcock is located in the right work area side wall. In both 4' and 6' models, one plugged penetration is provided to accommodate optional petcock inside the cabinet.
- External plumbing connections are made on bottom of the cabinet rather than through its sides. This arrangement allows installation next to building walls or furniture to the right or left of the cabinet, saving valuable lab space.
- A stainless steel ball valve provides safe and effective drainage of the drain pan.

Options and Accessories

For convenience, most options, accessories and modifications are factory installed and should be specified when ordering. Commonly requested options are listed below.
For detailed information on accessories contact The Baker Company.

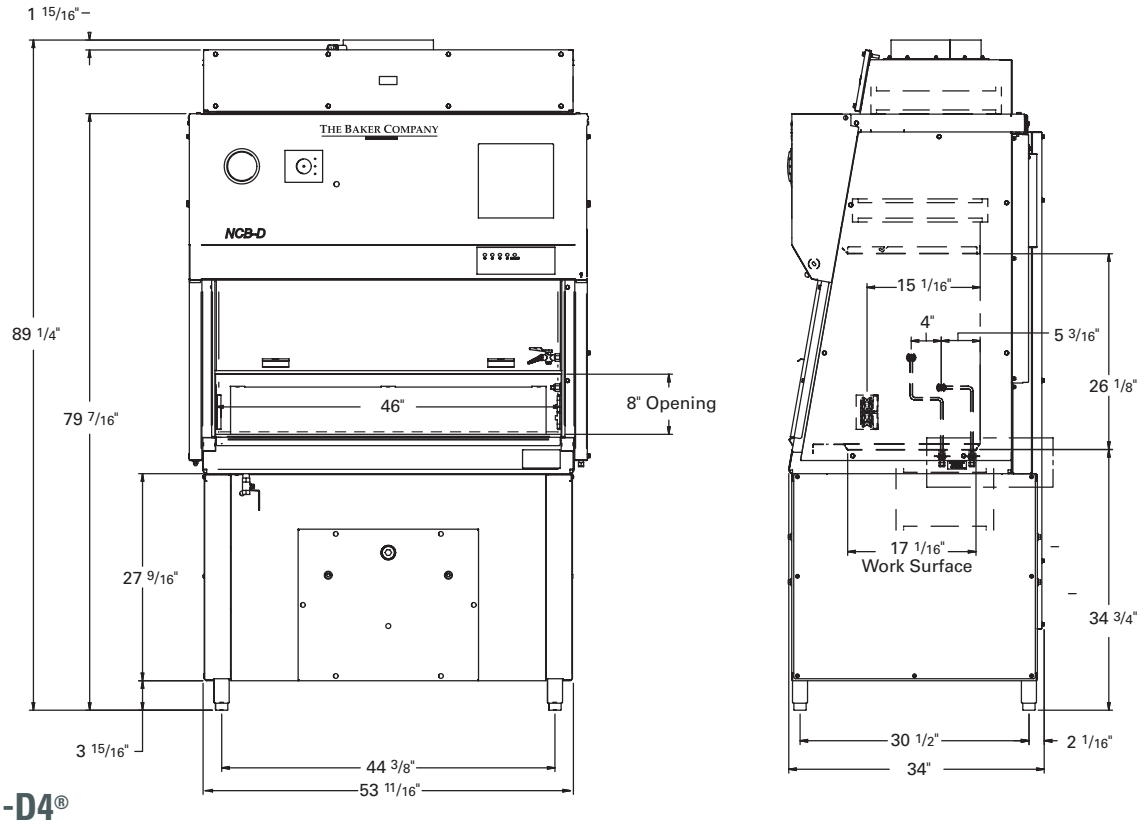
- Stainless steel IV bar
- Additional petcock (specify label)
- Airtight damper assembly
- Seismic restraints
- UV germicidal lamp
- Sidewall cable ports

To Order

For ordering information, terms and conditions of sale, contact The Baker Company or visit the Baker Web site at www.bakerco.com for the name of your authorized Baker Company representative.

Caution: A Class II, Type BI biological safety cabinet is suitable for work with low to moderate risk biological agents (Biosafety Levels I, 2 or 3). They may also be used with biological agents treated with minute quantities of toxic chemicals and trace amounts of radionuclides required as an adjunct to microbiological studies if work is done in the direct exhaust portion of the cabinet, or if the chemicals or radionuclides will not interfere with the work when recirculated in the downflow air (as stated in National Sanitation Foundation International Standard #49).

Note: The adequacy of this containment cabinet for the user's personal safety, as with any containment cabinet, should be determined by an industrial hygienist or safety officer. Site preparation information, architectural drawings, detailed dimensions and purchase specifications are available.



NCB-D4®

NCB-D®

Model Numbers: NCB-D4®, NCB-D6®

NSF Classification:

Class II, Type B1

Cabinet Type: Console

Site Preparation

Electrical System

- 115V, 1-Phase, 60 Hz.
- One 14' power cord with 20-amp, 3-prong grounded plug.
- Unit is cULus Listed as certified for electrical, fire and personal safety.
- Two ground-fault circuit interrupt interior duplex receptacles, controlled by a circuit breaker switch, at NCB-D4 - 5 amps and NCB-D6 - 3 amps.

Electrical Requirements

Model	Total	Electrical Device Required
NCB-D4®	13.5 amps	115 V, 60 Hz, 20 amps
NCB-D6®	16 amps	115 V, 60 Hz, 20 amps

Airflow System Requirements

Model	CFM	Water Column Min. Neg. Static Pressure
NCB-D4®	281 CFM	0.70" wc
NCB-D6®	428 CFM	0.70" wc

Exhaust Requirement NCB-D4®

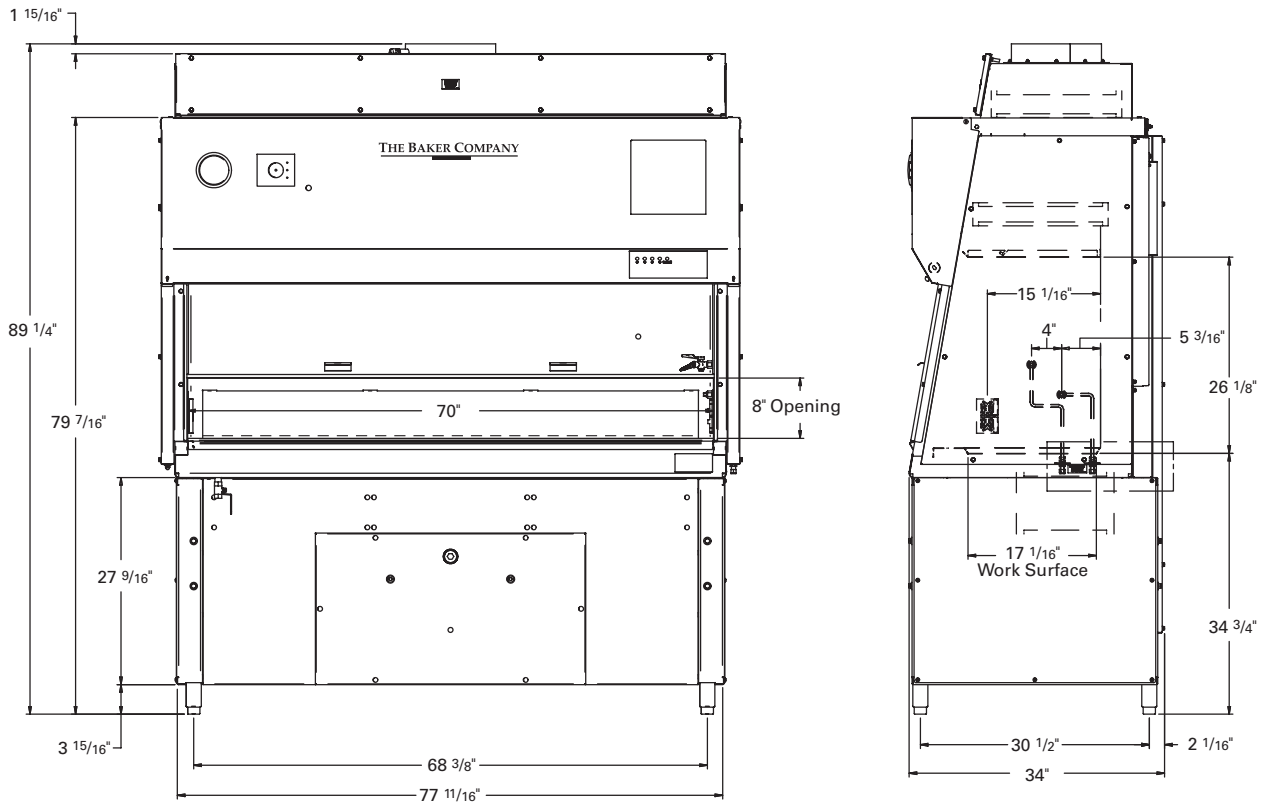
- 281 CFM at .50" water column (wc) minimum negative static pressure. Exhaust system should have the capability to handle at least .70" (wc) suction dependent upon the age and load of the filter.

NCB-D6®

- 428 CFM at .50" water column (wc) minimum negative static pressure. Exhaust system should have the capability to handle at least .70" (wc) suction dependent upon the age and load of the filter.

Filtration System

- Exhaust and downflow filters zero-probed HEPA filter, both 99.99% efficient on all particles 0.3 micrometers by DOP test.



NCB-D6® * Tubular legs with leg levelers shown in full retracted position. Legs Can be Extended 6" and leg levelers 2 ½".

Purchase Specification NCB-D® Class II, Type B1 Biological Safety Cabinet

I. Manufacturer shall provide a certified copy of the personnel, product and cross-contamination (biological) tests, equivalent to or more demanding than as specified in NSF International Standard #49, performed on the unit selected from the corresponding statistical sample. Tests may be witnessed by a representative of the purchaser.

2. Unit shall be designed with primary HEPA filters located directly below the work surface. These filters shall be easily accessed and bagged out.

3. The second HEPA filter is located directly above the work area to provide ultra clean working conditions as originally required by NCI Specification, "General Purpose Clean Air Biological Safety Cabinet" (Class II, Type B Safety Cabinet), dated July 6, 1976.

4. Unit shall be designed to directly exhaust a portion of the total volume of air handled in the unit from the work surface area. Unit must be connected to an in-house exhaust system.

5. High velocity suction slots shall be provided at the top/sides of the viewscreen to help prevent the escape of gases, vapors or particulates from around the edges of the viewscreen to the room environment.

6. Sliding viewscreen shall be counterbalanced on one side with a weight suspended by a stainless steel cable, and be capable of moving to a fully closed position during shutdown periods.

7. A plenum shall direct the downflow air from the recirculation blower to the top of the work area.

8. This positive pressure plenum shall be particle free and be completely surrounded by negative pressure.

9. The 4' and 6' model shall be capable of automatically handling a 79%/100% minimum increase in filter loading and not decrease total air delivery more than 10%. With use of the speed controller, a 400%/400% increase in airflow shall be attainable. Test data to verify these capabilities shall be available upon request.

10. Interior work area shall be 26" high.

11. Supply and exhaust HEPA filters and blower shall be removable from the front without entry into the work space. (Primary, under the worksurface HEPA filters are removed from within the work space).

12. Complete unit shall be listed as certified by Underwriters Laboratory cULus for electrical, fire and personal safety.

13. Audible and visible alarm system shall be provided to indicate low exhaust airflow by monitoring mass airflow.

I4. Unit shall have an audible alarm to indicate when the sliding viewscreen is in an unsafe position.
I5. Intake velocity through the 8" front access opening shall be minimum of I00 FPM.
I6. Cabinet constructed of I6- and I8-gauge cold-rolled steel, with I6-gauge stainless steel work surface. Rear wall corners of work area and drain pan shall be coved with 7/16" radius and continuously welded and ground smooth.
I7. Work area shall be provided with two GFCI work area duplex outlets with drip-proof covers and circuit breakers.
I8. Hermetically sealed, bulkhead electrical connectors shall be provided to assure proper sealing of electrical penetrations into the sealed area of the cabinet.
I9. Aerodynamically designed airfoil entrance shall be provided to minimize turbulence and improve access opening containment capability.
20. Stainless steel air diffuser and filter protector provided in work area.
2I. Unit must be listed by NSF International as meeting Standard #49.
22. Each unit, before shipping, shall have a complete physical test to assure cabinet meets Class II requirements. A copy of this test will be provided with the unit.
23. Speed controller shall automatically compensate for voltage change to maintain constant voltage to motor while allowing for manual adjustments during filter loading.
24. A single power cord and plug are provided for electrical power source.

Warranty

The Baker Company, Inc., expressly represents and warrants all goods (a) to be as specified (and described) in The Baker Company catalogs and literature, and (b) to be free under normal use, service and testing (all as described in The Baker Company catalogs and literature) from defects in material and workmanship for a period of thirty-six months from the invoice date. The exclusive remedy for any breach or violation of this warranty is as follows: The Baker Company, Inc., will F.O.B. Sanford, Maine, furnish without charge repairs to or replacement of the parts or equipment which proved defective in material or workmanship. No claim may be made for any incidental or consequential damages.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE UNLESS OTHERWISE AGREED IN WRITING SIGNED BY THE BAKER COMPANY. (THE BAKER COMPANY SHALL NOT BE RESPONSIBLE FOR ANY IMPROPER USE, INSTALLATION, SERVICE OR TESTING OF THE GOODS.)

25. One petcock shall be provided on the right wall inside the cabinet. One additional capped penetration on the RHS shall be provided for addition of future petcock. The unit shall also be equipped with 2 blanked spots on the LHS for future or optional additional petcocks.
26. All external plumbing connections to the petcocks shall be made through the bottom of the cabinet and not the sides, allowing zero clearance between the unit and the building walls or equipment to its right and left.
27. The unit shall have standard HEPA filters for a protection effectiveness of 99.99% when filtering particles of 0.3 micron size.
28. Units shall be equipped with a padded by-pass arm rest. The by-pass arm rest shall reduce noise when the viewscreen is closed.

THE BAKER COMPANY

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