FumeGard Vertical Laminar Flow
Clean Air Wet Process Fume Hood

Model NU-156/E Series
Bench Model

Operation and Maintenance Manual

April, 2021
Revision 16

230VAC Only

Manufactured By:
NuAire, Inc.
2100 Fernbrook Lane
Plymouth, MN 55447
Toll-Free: 1-800-328-3352
In Minnesota: (763)-553-1270
Fax: (763)-553-0459

NOTICE:

This Operation and Maintenance Manual has been prepared to reflect a standard version of NU-156/E FumeGard Vertical Laminar Flow Clean Air Fume Hood.

NuAire offers a wide variety of polypropylene fume hoods to fit individual requirements. The FumeGard series is flexible, designed for selection with the options that meet your specific needs.

Customer or shop drawings prepared for customer approval illustrating variety, plumbing fixtures' locations, work surface configurations and/or other modifications required are appended to this manual.

Errata sheets illustrating any changes to maintenance procedures and/or spare parts are also included.

Any optional equipment that requires instruction, calibration or preventative maintenance is covered by a separate Operation and Maintenance Supplement.

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DRAWINGS

CONGRATULATIONS!

You have just purchased one of the finest all polypropylene FumeGard Vertical Laminar Flow Clean Air Fume Hoods available. With proper care, maintenance and laboratory procedure, this Fume Hood will give you years of product protection from particulate contaminants and personnel protection from particulate, gas and vapors as meeting the containmenmt performance requirements of NSF/ANSI 49 and ASHRAE Standard 110. Please read this manual carefully to familiarize yourself with proper installation, maintenance and operation of the Fume Hood.

FumeGard Vertical Laminar Flow
Clean Air Wet Process Fume Hood
(Total Exhaust)
Model NU-156/E Series
Manufactured By:
Nuaire, Inc. - Plymouth, Minnesota

1.0 General Information

1.1 Description

NuAire's all Polypropylene Model NU-156/E FumeGard Vertical Laminar Flow Wet Process Fume Hood is a bench module Fume Hood which utilizes the latest state-of-the-art technologies in laminar airflow design, materials and manufacturing processes. The modular constructed Fume Hood can be used anywhere space permits where product (work-in-process) and personnel protection are required for chemical research, microelectronics, semi-conductor design/development and/or production assembly processes. Bench Fume Hoods consist of a single piece construction and can be placed on a customer bench or on a special option polypropylene base provided for the Fume Hood. A significant number of design innovations give the NuAire laminar flow equipment superior performance qualities in airflow, lighting, noise levels and vibration. In addition, NuAire's "Narrow Line Design" technique achieves excellent appearance and ruggedness through the use of large modular components, reinforced construction techniques and contrasting color schemes.

The Model NU-156/E FumeGard Vertical Laminar Flow Clean Air Polypropylene Wet Process Fume Hood is a product resulting from the development of the "laminar" flow principle, the application of environmental controls in the fields of biological research or chemical containment and the necessity to provide a chemically inert and resistant work space. The wet process fume hood, when used with proper laboratory technique, is an effective laboratory aid in obtaining optimum control over product quality while reducing the potential for exposure of both product and personnel to airborne particulate chemical agents as well as fumes and vapors generated as a result of work-in-progress operations.

The NU-156/E FumeGard has been designed and tested to the performance criteria as established by the NSF/ANSI 49 for Biosafety Cabinets for personnel, product containment performance. In addition, the NU-156/E meets or exceeds ISO 5 air quality conditions. The NU-156/E has been independently tested by Knutson Ventilation; Minneapolis, MN for its containment properties (i.e. personnel protection) to ASHRAE Standard 110-2016 for Fume Hoods, with a Performance Hood Rating of AM<0.1 (instrument's limit of detection) when operating at a sash height of 10 inches (254mm).

1.2 Safety Instructions

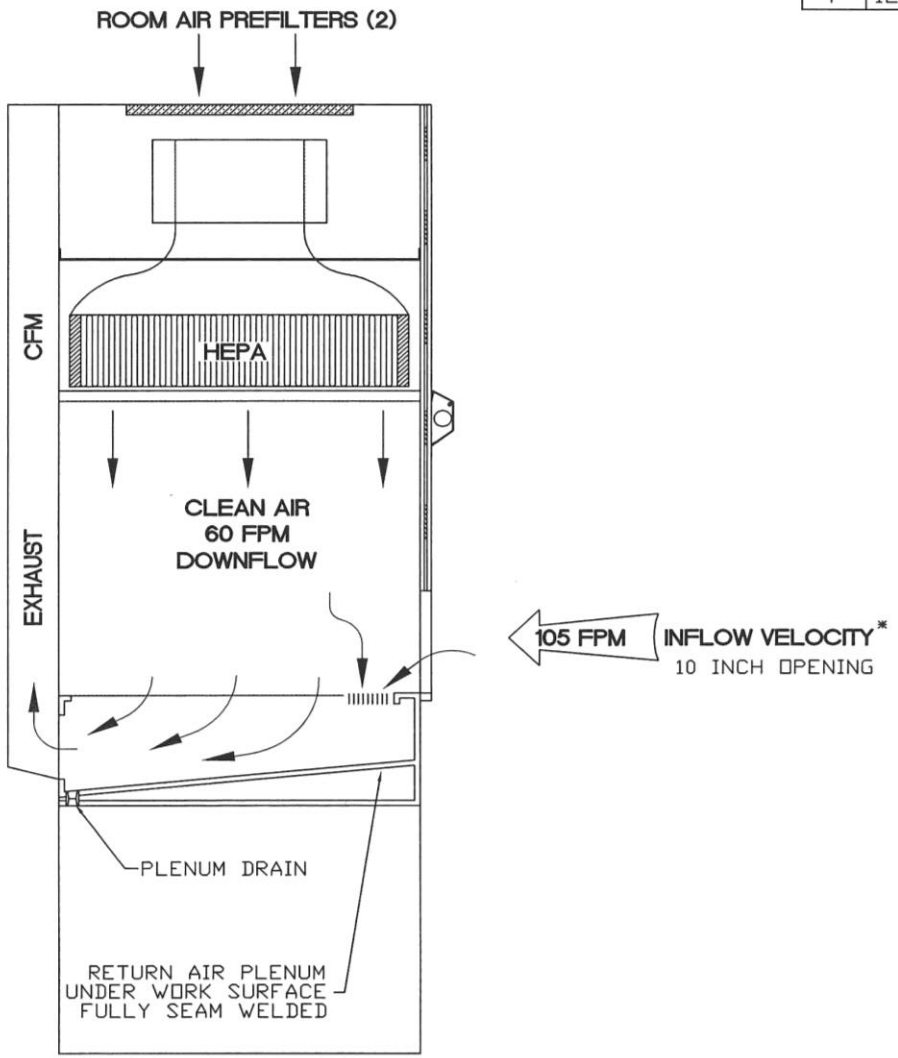
These safety instructions describe the safety features of the FumeGard Model NU-156/E.
The Fume Hood has been manufactured using the latest technological developments and has been thoroughly tested before delivery. **However, the Fume Hood may present potential hazards if it is not installed and used as instructed for its intended purpose or outside of operating parameters.** Therefore, the following procedures must always be observed:

- The Fume Hood must be operated only by trained and authorized personnel.
- For any operation of this Fume Hood, the operator must prepare clear and concise written instructions for operating and cleaning, utilizing applicable safety data sheets, plant hygiene guidelines, and technical regulations, in particular.
    - Which decontamination or deactivation measures are to be applied for the Fume Hood and accessories?
    - Which protective measures apply while specific materials are used?
    - Which measures are to be taken in the case of an accident?
- Repairs to the device must be carried out only by trained and authorized expert personnel.
- Keep these operating instructions close to the Fume Hood so that safety instructions and important information are always accessible.
- Should you encounter problems that are not detailed adequately in the operating instructions, please contact your NuAire Representative of NuAire technical Services.

1.3 Explanation of Symbols

Symbol	Description
	Safety alert symbol indicates a potentially hazardous situation which, if not avoided, could result in death of serious injury.
	Safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
☞	**Note:** Used for important information
	Biohazard
	Hazardous Gases! Personal Protection Equipment Required.
	Chemical Hazard
	Ground, Earth
	Potential electrical hazard, only qualified person to access.
	Flammable Hazard
	Lead Free
CAUTION	CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

REV	ECO	DESCRIPTION	DATE	DRFT	CHKD
F	12865	RELEASED FOR MANUAL	11/20/2015	LS	BP



EXHAUST FLOW (CFM)		
CABINET LENGTH	WORK ZONE DEPTH 25-1/2"	WORK ZONE DEPTH 31-1/2"
4'	689	785
5'	905	1032
6'	1120	1276
8'	1550	1766

* PERSONNEL PROTECTION ALARM
OVER 12 INCHES AND PRODUCT PROTECTION
DETENT AT 8", 10", AND 12" OPENING

ORIGINAL

NU-150 SERIES LAMINAR
AIRFLOW EXHAUST
WORKSTATION

DFTM	PS	5/17/89	CHKD		SHEET 1 OF 1

DRAWING NUMBER ACD-03004 F

2.0 Model and Features

The NU-156/E FumeGard Vertical Laminar Flow Wet Process Fume Hood is manufactured in four standard widths: 4 ft., 5 ft., 6 ft. and 8 ft., with two standard work surface depths: 26" or 32". (See also Specification Drawing BCD-05043.)

Dimensions	NU-156-4 ft.	NU-156-5 ft.	NU-156-6 ft.	NU-156-8 ft.
Overall Dimensions				
Width (W)	48 1/2"(1232mm)	60 1/2"(1536mm)	72 1/2"(1842mm)	96 1/2"(2451mm)
Depth (D) includes duct and light)	35"/41" (889mm)/(1041mm)	35"/41" (889mm)/(1041mm)	35"/41" (889mm)/(1041mm)	35"/41" (889mm)/(1041mm)
Height (H) includes prefilter grill)	66-5/8" (1692mm)	66-5/8" (1692mm)	66-5/8" (1692mm)	66-5/8" (1692mm)
Work Area Dimensions				
Width	38 1/2"(978mm)	50 1/2"(1283mm)	62 1/2"(1588mm)	86 1/2"(2197mm)
Depth	25 1/2"(648mm) OR: 31 1/2"(800mm)	25 1/2"(648mm) OR:31 1/2"(800mm)	25 1/2"(648mm) OR:31 1/2"(800mm)	25 1/2"(648mm) OR: 31 1/2"(800mm)
Height	29"(737mm)	29" (737mm)	29" (737mm)	29" (737mm)

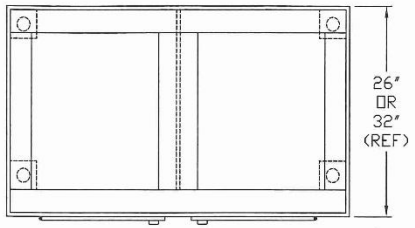
2.1 Standard Features

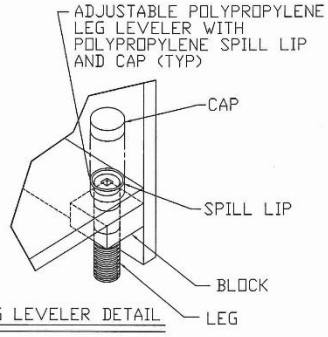
*HEPEX Zero Leak Airflow System
*Standard HEPA Filter: Wood Frame Separatorless 99.99% Efficient on 0.3 Microns
*External LED Lighting
*Front Filter Removal
*Sliding View Screen: Fully Closing to 20" Open
*10-Inch (254mm) Work Access Opening at 100 LFPM (.51 m/s)
*Removable Solid Work Surface with Front and Rear Perforated Grills
*1/2-Inch Stress Relieved Seam Welded Polypropylene
*PVC Diffuser over Supply HEPA Filter
*Spill Trough Plenum under Work Surface
*Flush Mounted Interior and Exterior Plumbing Access Panels
*Plastic Motorized Impeller

2.2 Optional Features

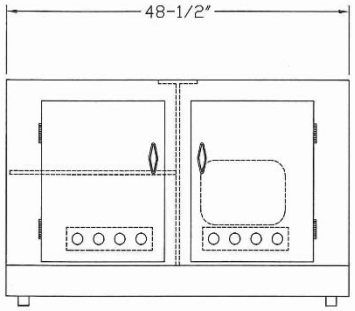
*Magnehelic Gauge: For Supply Pressure
*Remote Controlled Polypropylene/PVDF Service Fixtures
*Duplex Electrical Outlet, Externally or Internally Mounted
*12" X 12" x 5" Polypropylene Sink With Strainer and "P" Trap
*Ground Fault Circuit Interrupter
*Polypropylene or PBF Kynar Hi-Purity Plumbing
*Cascade Rinse Tanks, Single to Triple Tanks with Nitrogen Inlets for Improved Scrubbing Action
*DI, N2 Teflon Spray Guns
*Exhaust Monitor Alarm
*Exhaust Blower Interlock with Alarm
*Exhaust Transition 10" to 14" Round; 1/4-Inch Polypropylene
*99.999% Efficient HEPA Filter on 0.12 Micron (ULPA)
*Fully Perforated (10% Open) Work Surface
*Vented Base Storage Cabinet

REV	ECO	DESCRIPTION	DATE	DRFT	CHKD
C	12865	RELEASED FOR MANUAL	11/20/15	LS	BP





LEG LEVELER DETAIL



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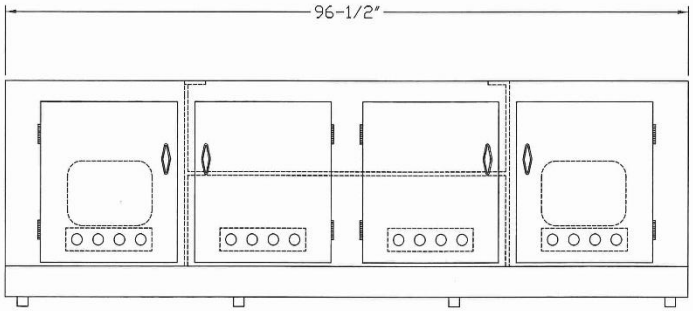
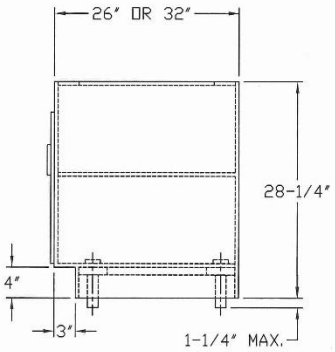
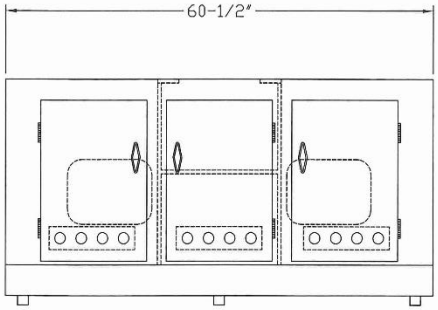
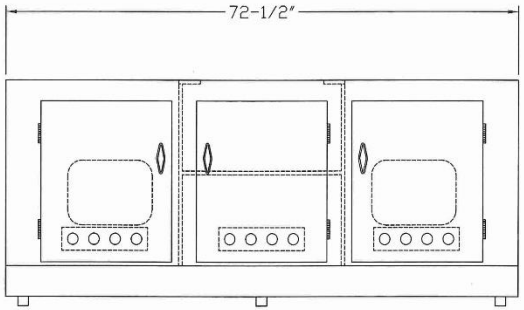


NU-55-824/830





NU-55-524/530



NU-55-624/630

ORIGINAL

NU-55-4,5,6 & 8 FT.
POLYPROPYLENE
FUME HOOD BASE

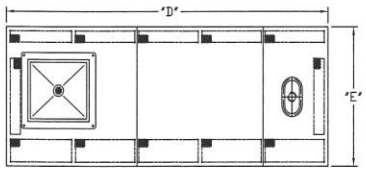
DFTM	MS	12/11/98	CHKD		SHEET 1 OF 1

DRAWING NUMBER BCD-05967 C

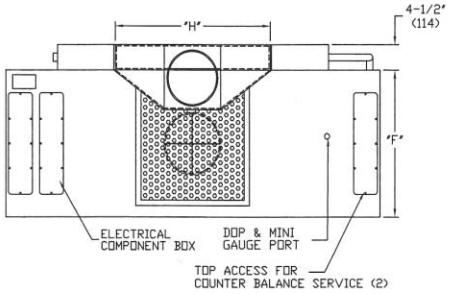
REV	ECO	DESCRIPTION	DATE	DRFT	CHKD
D	12865	RELEASED FOR MANUAL	11/20/15	LS	BP

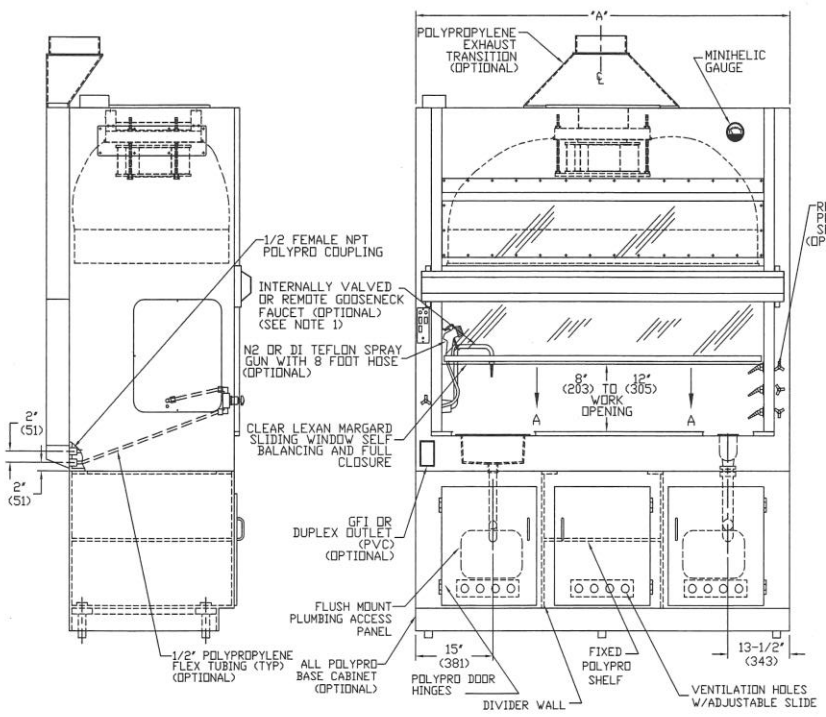
MODEL	DIM "A"	DIM "B"	DIM "D"	DIM "E"	DIM "F"	DIM "G"	DIM "H"	HEPA FILTER SIZE	CERTIF. VALUE	EXHAUST REQ'D	STATIC
NU-156-424	48-1/2"	31-1/2"	38-1/2"	24-3/4"	26"	10"	24"	24" X 36" X 6"	689 CFM	759 CFM	0.8" (20mm) w.g.
	(1232)	(800)	(978)	(629)	(660)	(254)	(609)	(609)x(914)x(152)	(1171 CMH)	(1290 CMH)	
NU-156-430	48-1/2"	37-1/2"	38-1/2"	30-3/4"	32"	10"	24"	30" X 36" X 6"	785 CFM	863 CFM	0.8" (20mm) w.g.
	(1232)	(953)	(978)	(781)	(813)	(254)	(609)	(762)x(914)x(152)	(1334 CMH)	(1466 CMH)	
NU-156-524	60-1/2"	31-1/2"	50-1/2"	24-3/4"	26"	10"	30"	24" X 48" X 6"	905 CFM	995 CFM	0.8" (20mm) w.g.
	(1537)	(800)	(1283)	(629)	(660)	(254)	(762)	(609)x(1219)x(152)	(1538 CMH)	(1690 CMH)	
NU-156-530	60-1/2"	37-1/2"	50-1/2"	30-3/4"	32"	10"	30"	30" X 48" X 6"	1032 CFM	1133 CFM	0.8" (20mm) w.g.
	(1537)	(953)	(1283)	(781)	(813)	(254)	(762)	(762)x(1219)x(152)	(1753 CMH)	(1925 CMH)	
NU-156-624	72-1/2"	31-1/2"	62-1/2"	24-3/4"	26"	12"	30"	24" X 60" X 6"	1120 CFM	1232 CFM	0.8" (20mm) w.g.
	(1842)	(800)	(1588)	(629)	(660)	(305)	(762)	(609)x(1524)x(152)	(1903 CMH)	(2093 CMH)	
NU-156-630	72-1/2"	37-1/2"	62-1/2"	30-3/4"	32"	12"	30"	30" X 60" X 6"	1276 CFM	1402 CFM	0.8" (20mm) w.g.
	(1842)	(953)	(1588)	(781)	(813)	(305)	(762)	(762)x(1524)x(152)	(2168 CMH)	(2382 CMH)	
NU-156-824	96-1/2"	31-1/2"	86-1/2"	24-3/4"	26"	14"	36"	24" X 84" X 6"	1550 CFM	1705 CFM	1.5" (38mm) w.g.
	(2451)	(800)	(2197)	(629)	(660)	(356)	(914)	(609)x(2134)x(152)	(2633 CMH)	(2897 CMH)	
NU-156-830	96-1/2"	37-1/2"	86-1/2"	30-3/4"	32"	14"	36"	30" X 84" X 6"	1766 CFM	1941 CFM	1.5" (38mm) w.g.
	(2451)	(953)	(2197)	(781)	(813)	(356)	(914)	(762)x(2134)x(152)	(3000 CMH)	(3298 CMH)	

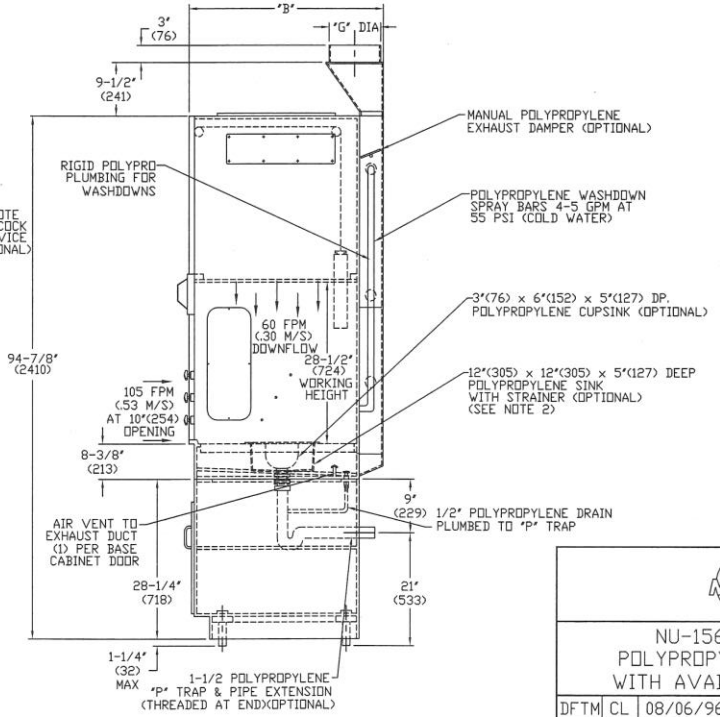
NOTE:
1) ALL SERVICE FIXTURE OPTIONS AVAILABLE EITHER SIDE AND ARE AVAILABLE IN POLYPROPYLENE OR PVDF.
2) POLYPROPYLENE SINKS AVAILABLE IN ANY SIZE. (STANDARD SIZES SHOWN IN DRAWING)
3) ULPA (SEPARATORLESS) HEPA FILTERS ARE OPTIONAL (.12 MICRON).



VIEW A-A
(WORK SURFACE)







ORIGINAL

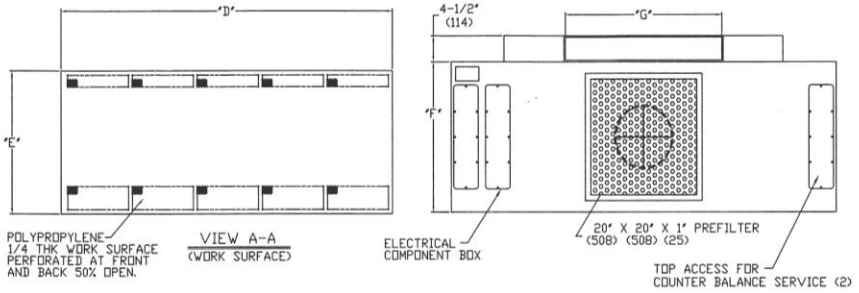
NU-156 STANDARD
POLYPROPYLENE CABINET
WITH AVAILABLE OPTIONS

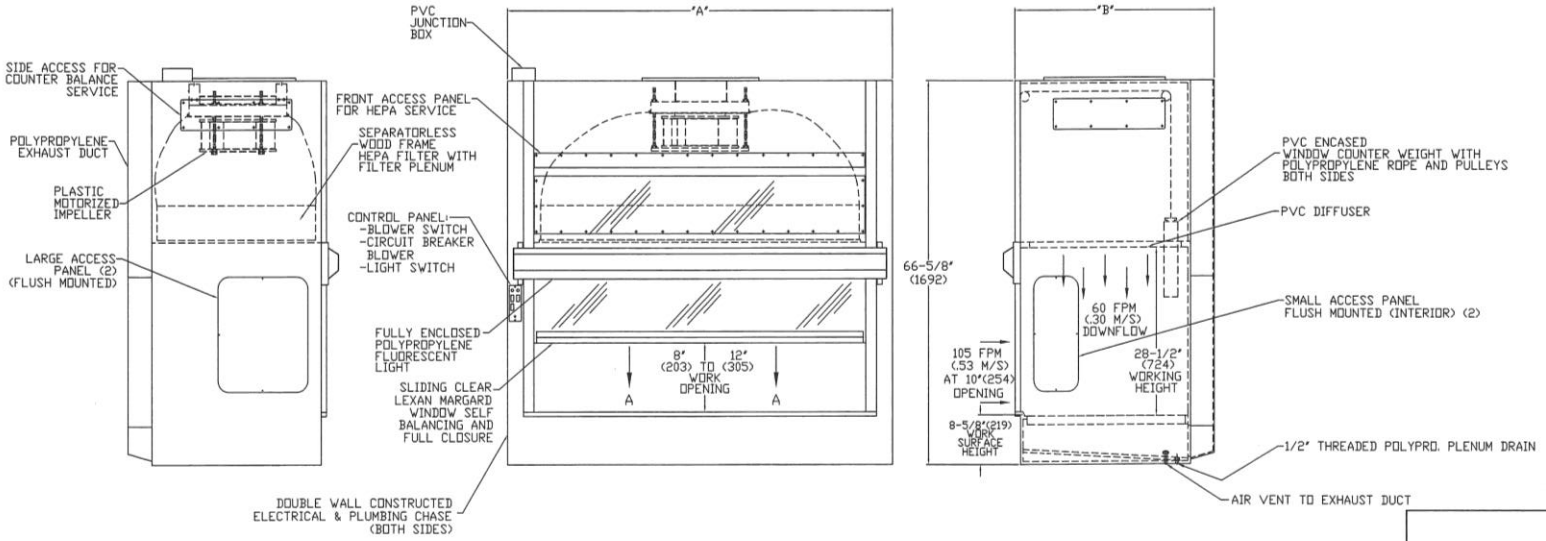
DFTM	CL	08/06/96	CHKD		SHEET 1 OF 1

DRAWING NUMBER BCD-05973 D

REV	ECO	DESCRIPTION	DATE	DRFT	CHKD
E	12865	RELEASED FOR MANUAL	11/20/2015	LS	BP

MODEL	DIM 'A'	DIM 'B'	DIM 'D'	DIM 'E'	DIM 'F'	DIM 'G'	DIM 'H'	HEPA FILTER SIZE	CERTIF. VALUE	EXHAUST REQ'D	STATIC
NU-156-424	48-1/2" (1232)	31-1/2" (800)	38-1/2" (978)	24-3/4" (629)	26" (660)	10" (254)	24" (609)	24" X 36" X 6" (609)x(914)x(152)	689 CFM (1171 CMH)	759 CFM (1290 CMH)	0.8" (20mm) w.g.
NU-156-430	48-1/2" (1232)	37-1/2" (953)	38-1/2" (978)	30-3/4" (781)	32" (813)	10" (254)	24" (609)	30" X 36" X 6" (762)x(914)x(152)	785 CFM (1334 CMH)	863 CFM (1466 CMH)	0.8" (20mm) w.g.
NU-156-524	60-1/2" (1537)	31-1/2" (800)	50-1/2" (1283)	24-3/4" (629)	26" (660)	10" (254)	30" (762)	24" X 48" X 6" (609)x(1219)x(152)	905 CFM (1538 CMH)	995 CFM (1690 CMH)	0.8" (20mm) w.g.
NU-156-530	60-1/2" (1537)	37-1/2" (953)	50-1/2" (1283)	30-3/4" (781)	32" (813)	10" (254)	30" (762)	30" X 48" X 6" (762)x(1219)x(152)	1032 CFM (1753 CMH)	1133 CFM (1925 CMH)	0.8" (20mm) w.g.
NU-156-624	72-1/2" (1842)	31-1/2" (800)	62-1/2" (1588)	24-3/4" (629)	26" (660)	12" (305)	30" (762)	24" X 60" X 6" (609)x(1524)x(152)	1120 CFM (1903 CMH)	1232 CFM (2093 CMH)	0.8" (20mm) w.g.
NU-156-630	72-1/2" (1842)	37-1/2" (953)	62-1/2" (1588)	30-3/4" (781)	32" (813)	12" (305)	30" (762)	30" X 60" X 6" (762)x(1524)x(152)	1276 CFM (2168 CMH)	1402 CFM (2382 CMH)	0.8" (20mm) w.g.
NU-156-824	96-1/2" (2451)	31-1/2" (800)	86-1/2" (2197)	24-3/4" (629)	26" (660)	14" (356)	36" (914)	24" X 84" X 6" (609)x(2134)x(152)	1550 CFM (2633 CMH)	1705 CFM (2897 CMH)	1.5" (38mm) w.g.
NU-156-830	96-1/2" (2451)	37-1/2" (953)	86-1/2" (2197)	30-3/4" (781)	32" (813)	14" (356)	36" (914)	30" X 84" X 6" (762)x(2134)x(152)	1766 CFM (3000 CMH)	1941 CFM (3298 CMH)	1.5" (38mm) w.g.





NOTE:
1) PERSONNEL AND PRODUCT PROTECTION. (CLASS 10,FED. STD. 209D) FULLY AVAILABLE AT 8"-12" OPERATING WORK OPENING.
2) THE WINDOW AND LIGHT ARE REMOVABLE.
3) SUPPLY WOOD FRAME HEPA FILTER 99.99% EFFECTIVE ON .3 MICRON. (SEPARATORLESS)

ORIGINAL

NU-156 STANDARD POLYPROPYLENE CABINET

DFTM	CL	08/06/96	CHKD		SHEET 1 OF 1

DRAWING NUMBER BCD-05378 E

3.0 Warranty

Details regarding product warranties can be found in the published warranty data separate from this manual and included within the data packet sent with the unit.

4.0 Shipments

NuAire takes every reasonable precaution to assure that your FumeGard Fume Hood arrives without damage. Motor carriers are carefully selected and shipping cartons have been specially designed to insure your purchase. However, damage can occur in any shipment and the following outlines the steps you should take on receipt of a NuAire FumeGard Fume Hood to be sure that if damage has occurred, the proper claims and actions are taken immediately.

4.1 Damaged Shipments

4.1.1 Terms are factory, unless stated otherwise. Therefore, it is important to check each shipment before acceptance.

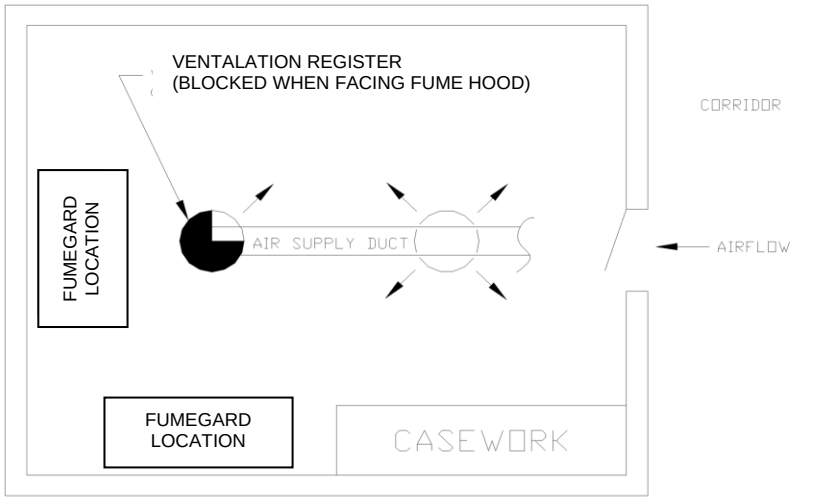
4.1.2 If there is visible damage, the material can be accepted after the driver makes a notation on the consignee's copy of the freight bill. Then an inspection must be made to verify the claim against the carrier. This inspection is the basis of your filing the claim against the carrier.

4.1.3 If concealed damage is found it is absolutely necessary to NOTIFY THE FREIGHT AGENT AT ONCE and request an inspection. Without this inspection, the transportation company may not accept a claim for loss or damage. If the carrier will not perform the inspection, an affidavit must be prepared stating that he was contacted on a certain date and that he failed to comply with the request. This along with other papers in the customer's possession will support the claim.

5.0 Installation Instructions

5.1 Location

Within the laboratory, production process, etc., the ideal location for the Fume Hood is away from personnel traffic lanes, air vents (in or out), doors and/or any other source of disruptive air currents.



If drafts or other disruptive air currents exceed the intake velocity of the Fume Hood through the access opening, the potential exists for contaminated air to exit or enter the work surface area of the Fume Hood. It depends on the severity of the air current. Remember, the FumeGard Fume Hood is no substitute for good laboratory technique. Supply makeup air should be evenly diffused into the room at a rate not to exceed 75 LFPM (.38 m/s), and never "blasted" directly at the floor.

Where space permits, it is recommended to provide a clear 6-inch (152mm) area on each side of the Fume Hood for maintenance purposes.

The electrical outlet into which the Fume Hood is connected should be readily accessible for maintenance purposes. **Do not position the Fume Hood to prevent access to the power cord.** The power cord plug serves as the disconnect and should remain readily accessible. If the outlet is inaccessible, such as a conduit (hardwired) connection, then an appropriate warning label should be applied near the Fume Hoods on/off switch, to indicate the circuit breaker on the power distribution panel to be used.

More than any other type of Fume Hood, the NU-156/E requires careful site planning and preparation, due to the total exhaust nature of the Fume Hood. Proper sizing of the exhaust and supply systems are critical to the successful installation of the Fume Hood. In addition, the Fume Hood provides for the choice of makeup air for the supply (downflow air). The following are airflow requirements:

	Supply Air	**Inflow**	**Exhaust Air ****
NU-156-424/E	409 CFM (695 CMH)	280 CFM (476 CMH)	759 CFM (1291 CMH)*
NU-156-524/E	536 CFM (511 CMH)	369 CFM (627 CMH)	995 CFM (1690 CMH)*
NU-156-624/E	664 CFM (1128 CMH)	456 CFM (775 CMH)	1232 CFM (2093 CMH)*
NU-156-824/E	919 CFM (1561 CMH)	631 CFM (1072 CMH)	1705 CFM (2897 CMH)*
NU-156-430/E	505 CFM (858 CMH)	280 CFM (476 CMH)	863 CFM (1466 CMH)*
NU-156-530/E	663 CFM (1126 CMH)	369 CFM (627 CMH)	1133 CFM (1925 CMH)*
NU-156-630/E	820 CFM (1393 CMH)	456 CFM (775 CMH)	1402 CFM (2382 CMH)*
NU-156-830/E	1135 CFM (1928 CMH)	631 CFM (1072 CMH)	1941 CFM (3298 CMH)*

*CFM exhaust at 0.8 inches (20mm) w.g. negative measured at the rectangular exhaust duct of the Fume Hood for 4, 5 and 6 ft. Fume Hoods. CFM exhaust at 1.5 inches (38mm) w.g. negative measured at the rectangular exhaust duct of the Fume Hood for 8 ft. Fume Hoods.

****Concurrent Balance Value** is determined by a duct traverse measurement method taken a minimum of 7.5 duct diameters downstream of the direct connected LFBSC at its nominal setpoint calibrated using the primary DIM method and capture hood removed. These values shall be used for design and balance exhaust/supply HVAC requirements.

REV	ECO	DESCRIPTION	DATE	DRFT	CHKD
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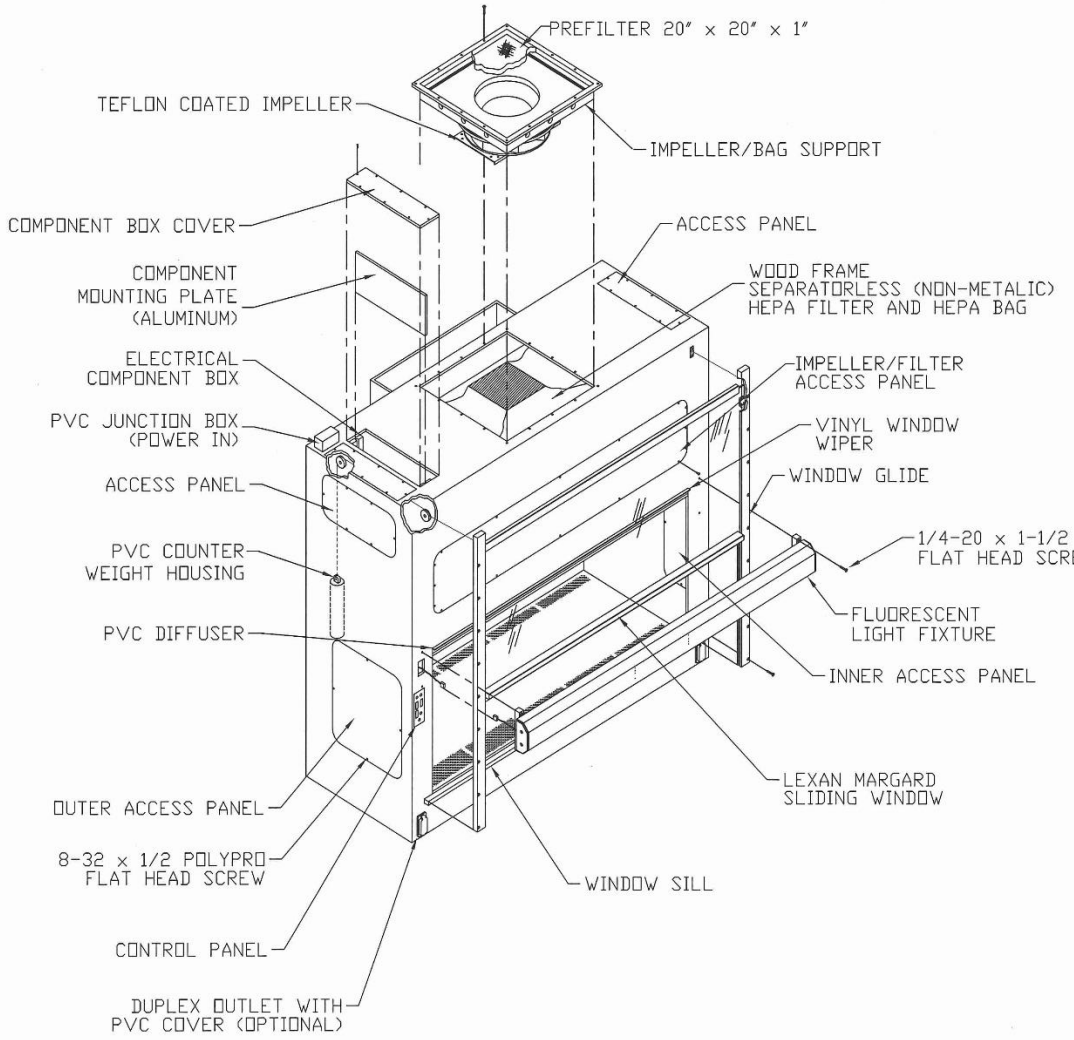

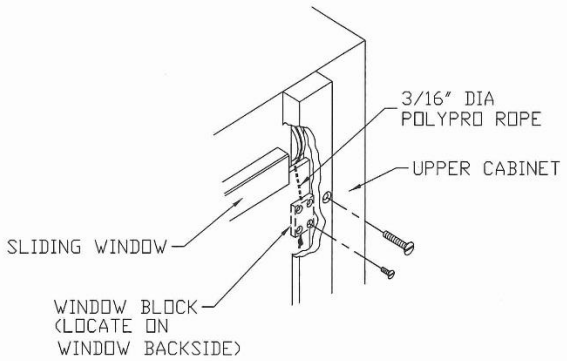

ORIGINAL

NU-156
INSTALLATION ASSY,
(ALL POLYPROPYLENE)

DFTM	JS	02/25/03	CHKD		SHEET 1 OF 1

DRAWING NUMBER BCD-05974 B

REV	ECO	DESCRIPTION	DATE	DRFT	CHKD
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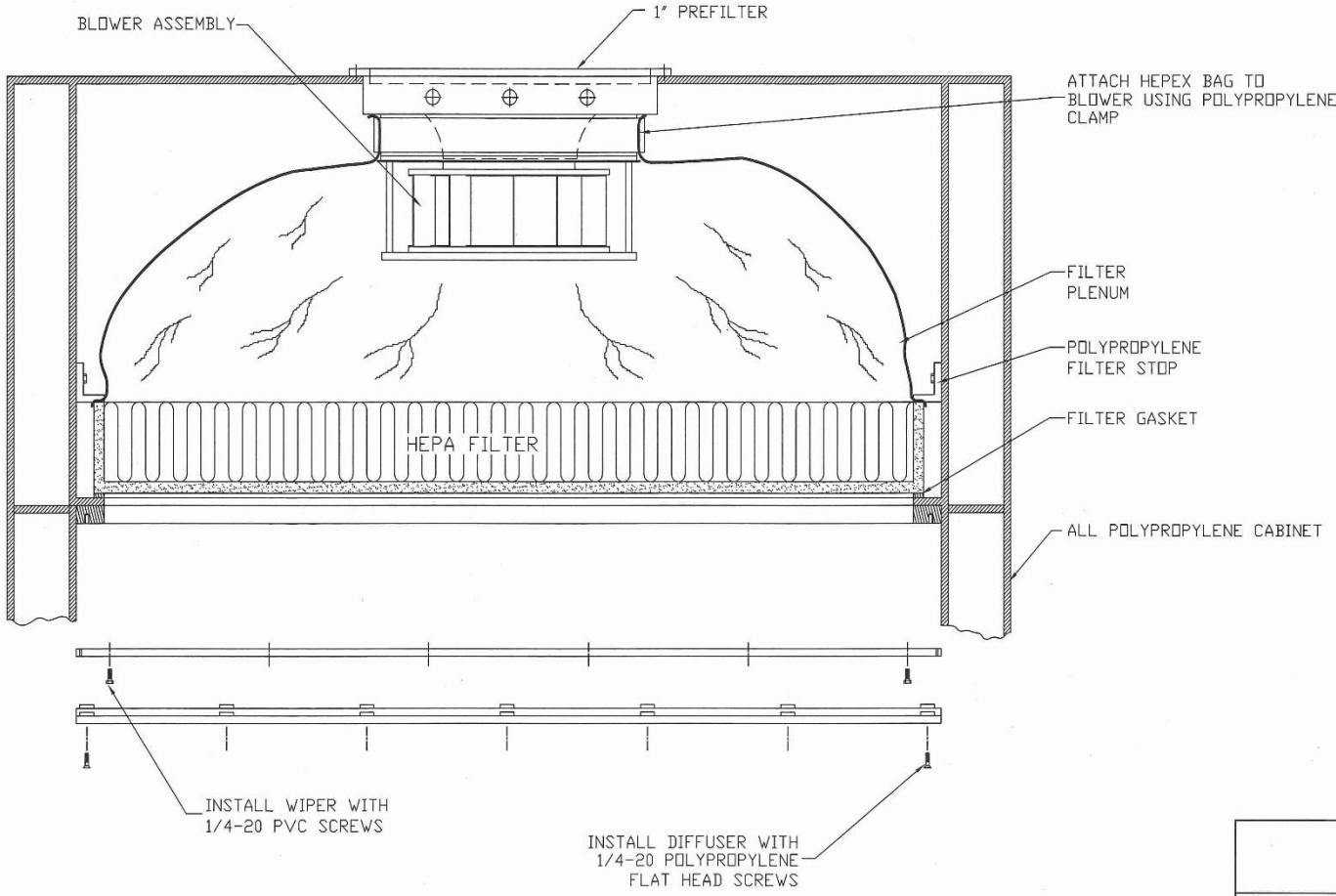


ORIGINAL

NU-153/156 ASSY
PROCEDURE HEPA FILTER
FRONT LOAD

DFTM	CL	08/08/96	CHKD		SHEET 1 OF 1

DRAWING NUMBER BCD-05979 A

5.2 Set-Up Instructions

Remove outer shipping protection (carton or crating). The Fume Hood is banded to the base skid and it is usually the best procedure to leave the skid in place until the Fume Hood is located in its approximate position to facilitate ease in handling. It can then be removed from the skid by removing the banding holding the Fume Hood to the skid.

5.2.1 Base Cabinet Assembly (BCD-05957)

The base cabinet is shipped on a separate skid if accompanied with the Fume Hood. Remove the banding holding the base cabinet to the base skid. Lift the base cabinet from the skid and place on the floor. Now lift the Fume Hood on top of the base cabinet and bolt the base cabinet to the Fume Hood using (4) 1/4-20 x 1-1/2" bolts and washers provided for the attachment process.

5.2.2 Leveling

Using a level placed on the work tray, adjust the leg levelers, first, end-to-end then front to back. The leg levelers located on the floor of the base cabinet are adjusted using a 3/8" drive socket and rotating to raise or lower as necessary.

5.2.3 Bench Installation

Place the Fume Hood on the bench. Using RTV caulk, seal all around the base of the Fume Hood and the bench. This provides a tight seal to prevent bench spills from migrating under the Fume Hood.

5.2.4 Electrical Services

The NU-156/E all Polypropylene Wet Process Fume Hood may be "hardwired" (optional) or plugged into an outlet with protective earthing connection with the standard power cord. The Fume Hood requires 115/230VAC, 50/60Hz single phase (correct rating varies per Fume Hood size, reference Electrical/Environmental Requirements). It is recommended that power to the Fume Hood, whether hardwired or plug connected, be on its own branch circuit, protected with a circuit breaker at the distribution panel near the Fume Hood.

5.2.5 Plumbing Services

Remote controlled polypropylene needle-valve plumbing fixtures are provided within the side walls of the Fume Hood with control handles located external on the face of the Fume Hood. The type of service is specified by the colored-wall petcock (i.e. air, gas, Vacuum, nitrogen, etc.) Service outlets within the interior are designed for hose connections with ten serrations.

All plumbing services are plumbed within the right or left chase with 1/2 inch flexible polypropylene tubing and compression fittings. Water service plumbing lines are rated at a maximum of 60 PSI (4.5 Bars) as tested at NuAire before shipment. Air and gas lines are tested at a 90 PSI (6.75 Bars) maximum.

All plumbing terminates at the rear of the Fume Hood (for customer hook-up) with 1/2 inch female NPT polypropylene couplings.

All sinks are plumbed with 1 1/2 inch Polypropylene "P" trap and piping that exits out the rear of Fume Hood in the storage area. A rear access panel is provided for drain connection.

Connection to plant utilities should be made with proper materials for the individual service and according to national and/or local codes. It is not recommended that flammable gases be used in the Fume Hood unless flame retardant Polypropylene is purchased; however, if flammable gas is used, emergency shutoff valves should be located in an accessible area external to the Fume Hood. Observe all labels pertaining to the type of services and operating pressure.

5.2.6 Exhaust/Supply Duct Installation Guidelines

The exhaust/supply systems must provide conditions similar to that under which the Fume Hood was certified to meet its stated performance. The following guidelines should be observed when installing exhaust/supply air duct work of either existing plant exhaust systems, or a new exhaust system.

1) Adequate room air inflow to replace exhausted air.
   Air diffusion rate not to exceed velocity of 105 LFPM (.53 m/s).

MAKEUP AIR REQUIREMENTS	
	Without Supply Duct
NU-156-424/E	759 CFM (1290 CMH)
NU-156-524/E	995 CFM (1690 CMH)
NU-156-624/E	1232 CFM (2093 CMH)
NU-156-824/E	1705 CFM (2897 CMH)
NU-156-430/E	863 CFM (1466 CMH)
NU-156-530/E	1133 CFM (1925 CMH)
NU-156-630/E	1402 CFM (2382 CMH)
NU-156-830/E	1941 CFM (3298 CMH)

2) Adequate plant exhaust system capability.
   The exhaust system is usually adequate if it can provide the rated exhaust flow at 1.0 inches water gauge negative.

3) Adequate supply air capability (if used).
   The supply air system is usually adequate if it can provide the rated supply air at 0.0 inches water gauge positive.

4) All duct losses must be considered in selecting the exhaust blower, for a new exhaust system.
   (i.e. duct diameter, length and number of elbows)

5) All duct work should be securely anchored to the building construction in a manner to be free from vibration and swaying under all conditions of operation.

6) Sheet metal gauges and seams should be in accordance with the current edition of the ASHRAE guide. A minimum of 24 gauge is required to prevent duct collapse due to high static pressure conditions, required.

7) All duct work should be maintained at a negative pressure within the building.
   (i.e. externally located exhaust blower)

8) The exhaust blower and duct work should be a sealed system, properly vented to the atmosphere to disperse exhausted air.

9) The exhaust duct should be dampered. Dampers should be installed with a locking quadrant with markings to indicate damper position. A Polypropylene damper system is available and is located in the upper duct extension.

5.2.7 Final Assembly and Inspection

Remove any remaining packaging materials, tape. etc. along with the window sash and counter balance blocking with in the right and left side service chase. Inspect all fume hood surfaces, service connections and sash assembly operation, rope and counter balance. Lastly, the exterior surfaces and viewing window are easily cleaned with any mild household detergent using a soft cloth. Harsh chemicals, solvent-type cleansers and abrasive cleaners should not be used. Do not attempt to clean the HEPA filter media. Fume Hood interior walls or work surfaces are easily cleaned with any household detergent using a soft cloth. The work surface is removable for access to the sloped drain plenum area for cleaning. The interior should be thoroughly cleaned prior to use. A solution of 70% isopropyl alcohol is suitable for a final cleaning process.

5.3 Testing Methods and Equipment

After installation and prior to use, NuAire recommends that the Vertical Laminar Flow Clean Air Polypropylene Wet Process Fume Hood be tested or commissioned to factory standards. As part of testing, the certifier should go through the following initial checklist to assure all aspects of the installation are complete and ready for testing.

- Review product installation
  - Exhaust connection
  - Damper valve installed correctly
  - Base cabinet level
- Perform certification
  - At a minimum, the following tests should be performed:
    - HEPA filter leak test
    - Downflow velocity test
    - Inflow velocity test
    - Airflow smoke patterns
    - Site installation assessment tests

The testing methods and equipment required are specified on the factory inspection report included with this manual (see insert in back cover).

☞ **NOTE: IT IS RECOMMENDED THAT THESE TESTS BE PERFORMED BY A QUALIFIED TECHNICIAN WHO IS FAMILIAR WITH THE METHODS AND PROCEDURES FOR TESTING BIOSAFETY CABINETS AND FUME HOODS (SEE INSERT).**

☞ **NOTE: AFTER THE INITIAL CERTIFICATION, NUAIRE RECOMMENDS THAT THE CABINET BE RECERTIFIED AT A MINIMUM OF AN ANNUAL BASIS AND AFTER EVERY FILTER CHANGE, MAINTENANCE ACTION, OR ANY TIME THE OPERATOR FEELS IT IS NECESSARY.**

☞ **NOTE**: The Flowgard Fume Hood, filters and seals provide premium performance. Quality control in both design and manufacturing insure superior reliability; however, protection to both product and operator is so vital that certification to the performance requirements should be accomplished as stated to insure personnel safety as established by the factory standards.

6.0 Operating the NU-156

6.1 Operator Controls and Indicators

The following is a description of the controls and indicators on the instrument control panel.

6.1.1 Blower Switch

The blower switch applies power to the internal blower when in the ON position.

6.1.2 Indicator Light

A green neon indicator light is located above the blower on/off switch and lights when power is applied to the blower. The lamp is rated for 20,000 hours continuous duty.

6.1.3 Circuit Breaker - Blower

The blower is protected with a circuit breaker. The circuit breaker in conjunction with the blower's thermal protector is designed to open under locked rotor or half-wave power conditions. Should the circuit breaker open (pop-out button will appear), merely press to reset. If the circuit breaker continually opens, a failure has occurred in the motor or solid-state speed controller. Consult a qualified repair technician or NuAire, Inc. for replacement.

6.1.4 Light switch

The light switch provides on/off control for the LED light.

6.1.5 Outlet Switch (Optional)

This switch provides on/off control for the line power available in the outlet within the interior of the Fume Hood or located in either outside sidewall of the base cabinet.

6.1.6 Circuit Breaker - Outlets (Optional)

The outlet located on the Fume Hood is protected with a separate circuit breaker. The circuit breaker may trip at 110% of load rating, but will trip at 145% of load rating in less than 2 hours. Should the circuit breaker open (pop-out button will appear), unplug the appliance plugged into the outlet and merely depress the pop-out button to reset.

☞ **NOTE**: If the outlet circuit breaker is not present in your model and the outlet circuit has been specifically wired as a separate circuit, the outlet rating is dependent on the branch circuit, circuit breaker at the power distribution panel.

6.1.7 Airflow Control

The operating downflow within the Fume Hood (i.e. 60 LFPM (.30 m/s) is controlled by a potentiometer located in the instrument control panel. The potentiometer controls the operating voltage applied to the blower. The potentiometer is adjustable over 270 degrees with a slotted screwdriver, which varies the applied voltage. **THIS ADJUSTMENT SHOULD ONLY BE MADE BY A QUALIFIED TECHNICIAN.**

6.1.8 Minihelic Gauge (Optional)

If the unit is equipped with a minihelic gauge, it will display the static pressure within the pressure plenum supplying the downflow HEPA filter. The gauge is calibrated in "inches of water gauge" pressure. As the HEPA filter loads with particulate matter, the amount of static pressure will increase, giving an indication of the "health" of the Fume Hood. From the initial pressure reading each 0.1" w.g. increment, the Fume Hood airflow should be checked by a qualified technician, unless certified on a yearly (or sooner) basis.

The minihelic gauge is optionally available and is mounted on the upper right front of the Fume Hood. The minihelic gauge is connected with PVC tubing to the filter plenum.

6.1.9 Exhaust Digital Monitor

General

The exhaust digital monitor uses an integrated digital pressure transducer to monitor negative pressure. The monitor indicates through both a segment display and LED's. The segment display is green and operates to ± 0.01"w.g. sensitivity. The LED's indicate acceptable pressure (green), caution or near alarm points to within 0.005"w.g. (yellow) or alarm condition (red).

The monitor starts when the blower to the NU-156 is switched on. Upon start up, all segments displays, and LED's will light and a short audible alarm will sound to indicate a properly functioning monitor. During the next 4 minutes, the segment display will indicate dashes and green LED will blink during the warm-up period. Once the 4-minute warm-up period is complete, the monitor will measure and display the current exhaust system. If the monitor is not functioning properly, the green, yellow and red LED's will blink to indicate an error.

The monitor is powered by a 115V outlet within the NU-156. The monitor also has alarm contacts, COM, and NC that will disable the NU-156 supply blower if the exhaust static pressure falls within the alarm conditions of the digital monitor. All users' interaction is accomplished through the arrow and reset keys. It is recommended that the monitor be calibrated during the certification process.

Nominal Pressure Calibration

The exhaust digital monitor is factory calibrated to the nominal exhaust system static pressure. This is accomplished through an offset calibration procedure. To accomplish, perform the following once the Isolator has been certified to its proper airflow and the monitor is through the warm-up period.

- Press and hold [↑] and [↓] arrow key simultaneously for 3 seconds until the red LED blinks and the display alternates "In" and a pressure value.

  Use [↑] and [↓] arrow keys to adjust the display value to match the pressure in the exhaust duct.

- Press [RESET' key to enter the nominal pressure value (red LED will stop blinking and display will indicate pressure value).

High/Low Alarm Setpoint Calibration

The exhaust digital monitor is factory calibrated to a high/low alarm setpoint of +.2" w.g. / -.50" w.g. from the nominal exhaust system static pressure setpoint. To verify or to change the alarm setpoints, perform the following procedure.

- Press and hold either [↑] key for high alarm or [↓] key for low alarm for 3 seconds until the red LED blinks and the display alternates either "Hi" or "Lo" and a pressure value.
- Use [↑] and [↓] arrow keys to adjust the display value desired.
- Press [RESET] key to enter the alarm setpoint value.

Audible alarm

The audible alarm should be activated whenever the pressure reaches the high or low alarm setpoint. However, once the alarm pressure is reached, it must stay on the alarm limit for 5 seconds consistently or it will not recognize it as an alarm. If at any time, the pressure returns to acceptable limits, the alarm would be reset and silenced. Once the 5 second period of constant alarm is present, the audible should sound for 30 seconds, then ring back 1 second every 10 seconds. If the [RESET] key is pressed, the alarm should be silenced for 5 minutes, then continue to ring back for 1 second every 10.

6.2 Operating Guidelines

The intent herein is to present general operational guidelines that will aid in the use of the Laminar Flow Wet Process Fume Hood to control airborne contaminants of low to moderate risk as stated in Technical Report No. FPS 56500000001 prepared by Dow Chemical U.S.A. for the National Cancer Institute.

6.2.1 Procedure protocols defined in terms of the barrier or control concepts unique to the NU-156 must be developed in order to obtain the maximum potential for safety and protection. The preplanning necessary to develop these protocols is based on several fundamental considerations, each of which will contribute to optimum benefits from the equipment:

a. Minimize disruption of "air curtain"
b. Minimize room activity
c. Utilize unidirectional air flow
d. Adequately diffused makeup air
e. Minimize blockage of front/rear inlet grills
f. Minimize overcrowding of work surface

6.2.2 Minimize Penetration of "Air Curtain"

The minimum number of items necessary should be placed into the Fume Hood to prevent overloading, but the work should also be planned to minimize the number of times an operator's hands and arms must enter and leave the air curtain at the open face. The ideal situation is to have everything needed for the complete procedure placed in the hood before starting, so that nothing need pass in or out through the air barrier at the face until the procedure is completed. This is especially important in working with moderate risk agents.

Unnecessary raising of the hands inside the Fume Hood above the level of the work opening should be avoided. This presents an inclined plane from hands to elbows along which the downflow of air may run, to and possibly out, the open face. When withdrawing hands from the Fume Hood, **never** use horizontal sweeping movements. Always use motions parallel to the inflow velocity - straight in, straight out.

☞ **NOTE:** When working with agents of lower risk, it is not as important for all materials to be placed in the Fume Hood before starting, or for the procedure to be completely finished before materials are removed. Also, the time period for a unit of work may be continued over a more extended period during which entries and withdrawals from the Fume Hood may be made.

6.2.3 Minimize Room Activity

Activity in the room itself should be held to a minimum. Unnecessary activity may create disruptive air currents as well as interfere with the work of the operator. A person walking past the front of a Fume Hood can cause draft velocities up to 175 FPM (.89 m/s), which are sufficient to disrupt the air balance of the laminar flow unit.

6.2.4 Utilize Unidirectional Air Flow

The operator must keep two important facts in mind:

(1) The air, as supplied to the work area through filters from the top, is contaminant free and
(2) Airborne contamination generated in the work area is controlled by the unidirectional flow of parallel air streams in a top-to-bottom direction.

A solid object placed in a laminar air stream will disrupt the parallel flow and consequently, the capability of controlling lateral movement of airborne particulates. A cone of turbulence extends below the object and laminarity of the air stream is not regained until a point is reached downstream, approximately equal to three to six times the diameter of the object. Within the parameters of this cone, particles may be carried laterally by multidirectional eddy currents.

6.2.5 Adequately Diffused Makeup Air must be employed in order to avoid disruptive air currents that will penetrate the work access opening, causing contaminated interior downflow air to escape or inflow air to penetrate the work surface, contaminating work in process. Makeup air must be diffused at no greater than 100 LFPM (.51 m/s) as measured 6 inches (152mm) below the diffuser. If this cannot be achieved, then makeup air must be supplied near the inlet air to the blower above the Fume Hood. Smoke flow tests, see Section 4.6, must result in all smoke being contained, with no refluxing or drift within the interior. On units with sinks, some drift of the interior downflow will be experienced near the sink, toward the center of the Fume Hood. These flow characteristics must be kept in mind when locating "clean" and "dirty" work in process.

6.2.6 Minimize Blockage of Front/Rear Inlet Grills

The personnel and product protection afforded by the NU-156 demands that the front and rear grills be kept free of all materials. The tests per NSF/ANSI 49 and ASHRAE110-2016 to determine the level of personnel and product protection are conducted with the grills unblocked.

Blocking the inlet grill will most assuredly result in a loss of personnel protection. Arms should be kept above the inlet grill (i.e. this is the reason for the one-inch airfoil lip). Lab coats should be tight fitting and not permit blocking of the suction inlet grill.

Blocking of the rear grill will alter the airflow pattern which could affect cross contamination of work in process. Excessive blocking of the rear grill will force more air toward the front grill which will lower the personnel protection afforded by the Fume Hood, permitting potentially contaminated downflow air to escape the work access opening.

☞ **NOTE**: With a fully perforated work surface it is not as important to concern oneself with blocking airflow patterns created by the rear grill. Overcrowding the work surface should be avoided, however, since the perforated work surface does not have a defined rear grill.

6.3 Ergonomics

Ergonomics, the study or accommodation of work practices is extremely important for proper cabinet usage and user health and safety. An evaluation of normal work practices should be performed with each user when working in a cabinet. Evaluation criteria should be at a minimum:

a. Proper user posture
b. Effective work zone layout for work practice
c. Vision or sightlines

For each of the above evaluation criterion, several work aids may be supplied to accommodate the user.

- Ergonomic chair - A six-way articulating seat and back control for personalized adjustment to assure proper user posture. Be sure feet are resting on the floor, chair foot support or foot rest. Also be sure back is fully supported with proper chair adjustments.
- Forearm/elbow support - The cabinet is provided with a non-metallic forearm support on the work access opening. Periodic mini-breaks during work practice should be taken resting forearm to avoid stress and fatigue. Elbow rests that can provide support for particular work practices, such as pipetting are optional. Also available as an option, closed cell foam disposable forearm pads to reduce pressure points and add comfort.
- Effective workzone layout - Always prepare your work procedure to minimize reach to avoid neck and shoulder stress and fatigue. Rotating tables used to maximum workzone and minimize reach are optional.
- Vision and sightline - Always prepare your work procedure to eliminate glare and bright reflections on the window. Keep your window clean and sightlines clear to your effective workzone.

7.0 General Maintenance

CAUTION

All maintenance actions on this equipment must be performed by a qualified technician who is familiar with the proper maintenance procedures required for this equipment. This includes certification, inspection as well as repair.

The prefilter replacement internal depends on the contaminant (large particles or lint) in the room - a typical period is every three months. NuAire does, however, recommend that the FumeGard have the integrity of the HEPA filters verified by a qualified technician after the unit has been initially installed. Thereafter, certification should be performed on an annual basis, or whenever the operator has reason to believe it necessary, especially if the Fume Hood has been moved to a new location, or the magnehelic gauge has increased by 0.1" w.g. (2.5mm w.g.).

7.1 LED Lamp Replacement

Two LED lamps are sealed external to the Fume Hood to aid maintenance and minimize heat buildup within the Fume Hood. The life rating of the lamp is 9000 hours based on three-hour burning cycles.

To replace a lamp it is necessary to remove the lamp fixture assembly.

1. Switch Fume Hood light switch off and remove the four front flat head screws.
2. With the help of another person to support the fixture, disconnect the fixture connector on the left end so the entire fixture can be laid on a bench. The lamps are sealed behind a 1/8 inch (3mm) thick Lexan cover. Remove the 1/4-20 screws that secure the cover to the fixture.
3. After the lamps are replaced reverse the procedure for assembly.
4. When replacing the light fixture, be sure to tuck the electrical wiring back into the holes (i.e. Fume Hood interior), preventing unsightly wires from being exposed.

7.2 Supply Filter/Motor Replacement

The supply HEPA filter under normal usage and barring an accident (a puncture) do not need replacement until the supply volume cannot be maintained. This may permit the supply average velocity to be as low as 55 LFPM (.28 m/s), as long as no point falls below 20 percent of the average.

The supply filter for the FumeGard employs NuAire's HEPEX system.

7.2.1 Supply Filter Replacement (Drawing BCD-05979)

CAUTION

Disconnect electrical power from the unit before attempting any maintenance action.

Step 1: Remove the front access panel on upper Fume Hood to gain access to the HEPA filter and blower plenum connection.

Step 2: Remove the Polypropylene band clamp holding the flexible plenum to the blower assembly.

☞ **NOTE**: The blower assembly has been gasketed with double sticky back gasket which must be replaced when installing a new filter.

Step 3: For ease of filter removal, remove the diffuser from inside the work zone. Remove the Polypropylene 1/4 - 20 flat head screws holding the diffuser in place. The diffuser also houses the vinyl wiper for the window, which does not require removal.

Step 4: Before removing the HEPA filter, remove filter stops holding down the filter. It is the best procedure to use two people to remove and replace the HEPA filter. Note that the filter is cradled in sponge rubber and may require gentle tugging to gain release.

Step 5: To install the supply HEPA filter, simply reverse the procedure outlines in the steps above.

7.2.2 Blower Removal

Step 1: Disconnect electrical connections to the blower. A four-pin quick disconnect connector has been provided for this purpose. It is recommended that the blower be removed as a single unit mounted on the subassembly plate. Remove the (4) 1/4-20 x 1/2 bolts under the subassembly plate that connects with the Teflon coated support posts. The plate and blower can be removed through the front access panel.

Step 2: Replace the blower exactly as originally installed, paying particular attention to the correct electrical connections, see electrical schematic.

The following color coding has been established by NuAire:

Wire #	Definition	Color Code
1	Neutral	White
2	Hot (To Triac)	Black
5	Capacitor	Brown

7.3 Airflow Adjustments

The NU-156 airflow calibration consists of internal and external adjustments to balance the airflow within the Fume Hood and the calibration of the airflow monitor probes. **THIS WORK SHOULD BE DONE ONLY BY A QUALIFIED TECHNICIAN WHO CAN MEASURE THE AIRFLOW FROM THE FILTERS WITH A SUITABLE VELOMETER.** NuAire provides one internal adjustment to balance the supply airflow within the Fume Hood. This is: Blower speed adjustment via control system.

The blower speed control system adjusts the Fume Hood's supply volume of airflow while the customer supplied exhaust system controls the exhaust volume of airflow.

The Fume Hood is considered to be certifiable if the following airflow measurements are present:

a. Downflow average: 60 LFPM $\pm$5 LFPM (.30 m/s $\pm$.025 m/s).
b. Inflow average: 105 LFPM $\pm$5 LFPM (.53 m/s $\pm$.025 m/s) using the direct inflow measurement method.

The following procedure should be used to measure the Fume Hood flow, in the order specified in the subsequent sections.

7.3.1 Total Flow Reference

The first step is to determine the total flow as a reference available to the Fume Hood, in order to evaluate the proper installation (capability of the exhaust system.) The exhaust system is adequate if it can provide the required static pressure at the Fume Hood's rated maximum flow.

The total flow measurement procedure can be found in Table 7.1. If necessary, adjust the exhaust system to achieve the correct exhaust volume. Use Table 7.0 to relate downflow and inflow volumes and corresponding average airflow velocities. Note the internal motor/blower is turned off during the total flow measurement.

7.3.2 Determine Downflow Average

The procedure for determining the downflow average velocity is shown in Table 7.1. NuAire provides one adjustment to balance the downflow within the Fume Hood, the motor speed adjustment. The downflow is considered to be certifiable if the following measurements are present.

☞ **NOTE**: NuAire employs a permanent split capacitor motorized blower which, due to its physical properties, will automatically increase RPM as the applied load to the blower increases (i.e. the static pressure increases due to HEPA filter loading.) This results in the capacity to automatically handle a 60 percent increase in static pressure across the HEPA filter with no more than 10% drop in total flow (CFM). Therefore only a moderate motor speed adjustment may be required on an annual certification basis.

7.3.3 Determine Work Access Inflow Velocity Average

The procedure to determine average inflow velocity is shown in Table 7.1. Once the average downflow velocity is set, average inflow velocity is measured using a Direct Inflow Reading Instrument (DIM) and adjusting the exhaust volume until the target value is achieved.

7.4 Filter Integrity Checks

In order to check filter and filter seal integrity, the HEPA filter media and seals must be directly accessible by measuring instrument. The challenge material (i.e. PAO) should be supplied over the supply inlet for the supply filter and in the rear center of the workzone over the intake slots for the exhaust filter. The upstream challenge port is located on top of the Fume Hood.

A PVC diffuser plate, placed below the supply HEPA to protect the filter during normal usage as well as diffuse (even out) the downflow, may be removed as follows.

The PVC diffuser is secured to the Fume Hood top by 1/4 - 20 Polypropylene screws located immediately behind the front viewing window and along the rear and sidewalls. After removing the screws, lower the diffuser and remove from work zone. Note that the diffuser has fixed spacers to allow clean air to feed down along side walls, back and front window to force any stagnant particles through the perforated grills and out the exhaust duct. Also note the front of the diffuser sandwiches a vinyl window wiper to contain air leakage above the diffuser.

Once the HEPA filter media and seals are exposed, the media and seals are scanned with a photometer at a traverse rate no greater than 10 ft. per minute for leaks not to exceed 0.01% of upstream (challenged) concentration.

7.5 Airflow Smoke Pattern Test

The airflow smoke pattern test is performed using a smoke source (i.e. smoke tubes) in and around the cabinet workzone and access opening to determine a visual representation of the cabinet's containment performance. To perform the test, the smoke source should be passed through the following areas:

A smoke source shall be passed:

1. From one end of the cabinet to the other, along the center line of the work surface, at a height of 4 inches (102mm) above the top of the access opening.
2. From one end of the cabinet to the other, 1 inch (25mm) just inside the view screen, at a height 6 inches (152mm) above the top of the access opening.
3. Along the edges of the entire perimeter of the work opening approximately 1.5 inches (38mm) outside the cabinet, with particular attention paid to corners and vertical edges.
4. 2 inches (51mm) from the sides up inside of the window at the side channel seals, and along inside of the cabinet along the top of the work area or immediately below the wiper gasket.

The criteria used to evaluate the smoke patterns is the following:

1. The smoke inside the cabinet shall show smooth downward flow with no dead spots or reflux.
2. No smoke shall escape from inside the cabinet.
3. No smoke refluxes out of the cabinet once drawn in, nor does smoke billow over the worksurface or penetrate onto it.
4. No smoke shall escape from the cabinet.

7.6 Preventative Maintenance

The Fume Hood preventative maintenance inspection procedures should be performed annually during the certification and consist of a physical examination of the work zone interior condition and cleanliness. Sash operation and condition, rope, counter balance, light operation and service fixture ware and function. Inspection results should be recorded with the certification results.

TABLE 7.0
CERTIFICATION VALUES

The following are recommended minimum/maximum Fume Hood airflow setpoints in order to maintain the Hood Performance rating for personnel protection. NuAire recommends, however, operation at the stated average flow for ease of maintenance and annual certification.

Model	Parameter	Minimum Acceptable Flow	Stated Average Flow	Maximum Acceptable Flow
NU-156-424	1. Inflow Avg. Velocity	100 FPM (.51 m/s)	105 FPM (.53 m/s)	110 FPM (.56 m/s)
	2. Inflow Volume	270 CFM (459 CMH)	280 CFM (476 CMH)	294 CFM (500 CMH)
	3. Down Avg. Velocity	55 FPM (.28 m/s)	60 FPM (.30 m/s)	65 FPM (.33 m/s)
	4. Down Volume	375 CFM (637 CMH)	409 CFM (695 CMH)	443 CFM (753 CMH)
	5. Total Volume	645 CFM (1095 CMH)	689 CFM (1171 CMH)	737 CFM (1252 CMH)
NU-156-524	1. Inflow Avg. Velocity	100 FPM (.51 m/s)	105 FPM (1.53 m/s)	110 FPM (.56 m/s)
	2. Inflow Volume	355 CFM (603 CMH)	369 CFM (627 CMH)	386 CFM (656 CMH)
	3. Down Avg. Velocity	55 FPM (.28 m/s)	60 FPM (.30 m/s)	65 FPM (.33 m/s)
	4. Down Volume	491 CFM (834 CMH)	536 CFM (911 CMH)	581 CFM (987 CMH)
	5. Total Volume	846 CFM (1437 CMH)	905 CFM (1538 CMH)	967 CFM (1643 CMH)
NU-156-624	1. Inflow Avg. Velocity	100 FPM (.51 m/s)	105 FPM (.53 m/s)	110 FPM (.56 m/s)
	2. Inflow Volume	435 CFM (739 CMH)	456 CFM (775 CMH)	477 CFM (810 CMH)
	3. Down Avg. Velocity	55 FPM (.28 m/s)	60 FPM (.30 m/s)	65 FPM (.33 m/s)
	4. Down Volume	609 CFM (1035 CMH)	664 CFM (1128 CMH)	720 CFM (1223 CMH)
	5. Total Volume	1044 CFM (1774 CMH)	1120 CFM (1903 CMH)	1197 CFM (2034 CMH)
NU-156-824	1. Inflow Avg. Velocity	100 FPM (.51 m/s)	105 FPM (.53 m/s)	110 FPM (.56 m/s)
	2. Inflow Volume	605 CFM (1028 CMH)	631 CFM(1072 CMH)	661 CFM (1123 CMH)
	3. Down Avg. Velocity	55 FPM (.28 m/s)	60 FPM (.30 m/s)	65 FPM (.33 m/s)
	4. Down Volume	843 CFM (1432 CMH)	919 CFM (1561 CMH)	996 CFM (1692 CMH)
	5. Total Volume	1448 CFM (2460 CMH)	1550 CFM (2633 CMH)	1657 CFM (2815 CMH)
NU-156-430	1. Inflow Avg. Velocity	100 FPM (.51 m/s)	105 FPM (.53 m/s)	110 FPM (.56 m/s)
	2. Inflow Volume	270 CFM (459 CMH)	280 CFM (476 CMH)	294 CFM (500 CMH)
	3. Down Avg. Velocity	55 FPM (.28 m/s)	60 FPM (.30 m/s)	65 FPM (.33 m/s)
	4. Down Volume	463 CFM (787 CMH)	505 CFM (858 CMH)	547 CFM (929 CMH)
	5. Total Volume	733 CFM (1245 CMH)	785 CFM (1334 CMH)	841 CFM (1429 CMH)
NU-156-530	1. Inflow Avg. Velocity	100 FPM (.51 m/s)	105 FPM (1.53 m/s)	110 FPM (.56 m/s)
	2. Inflow Volume	355 CFM (603 CMH)	369 CFM (627 CMH)	386 CFM (656 CMH)
	3. Down Avg. Velocity	55 FPM (.28 m/s)	60 FPM (.30 m/s)	65 FPM (.33 m/s)
	4. Down Volume	608 CFM (1033 CMH)	663 CFM (1126 CMH)	718 CFM (1220 CMH)
	5. Total Volume	959 CFM (1629 CMH)	1032 CFM (1753 CMH)	1104 CFM (1876 CMH)
NU-156-630	1. Inflow Avg. Velocity	100 FPM (.51 m/s)	105 FPM (.53 m/s)	110 FPM (.56 m/s)
	2. Inflow Volume	435 CFM (739 CMH)	456 CFM (775 CMH)	477 CFM (810 CMH)
	3. Down Avg. Velocity	55 FPM (.28 m/s)	60 FPM (.30 m/s)	65 FPM (.33 m/s)
	4. Down Volume	752 CFM (1278 CMH)	820 CFM (1393 CMH)	889 CFM (1510 CMH)
	5. Total Volume	1187 CFM (2017 CMH)	1276 CFM (2168 CMH)	1366 CFM (2321 CMH)
NU-156-830	1. Inflow Avg. Velocity	100 FPM (.51 m/s)	105 FPM (.53 m/s)	110 FPM (.56 m/s)
	2. Inflow Volume	605 CFM (1028 CMH)	631 CFM(1072 CMH)	661 CFM (1123 CMH)
	3. Down Avg. Velocity	55 FPM (.28 m/s)	60 FPM (.30 m/s)	65 FPM (.33 m/s)
	4. Down Volume	1041 CFM (1769 CMH)	1135 CFM (1928 CMH)	1230 CFM (2090 CMH)
	5. Total Volume	1646 CFM (2797 CMH)	1766 CFM (3000 CMH)	1891 CFM (3213 CMH)

TABLE 7.1

Recommended Measurement Methods for Fume Hood Downflow & Inflow.

Downflow Measurement

The downflow velocity is measured on a grid scale in a horizontal plane 4 inches (102mm) above the bottom edge of the viewing window. Readings taken at least six inches (152mm) from perimeter walls.

<u>Downflow Velocity Profile (applicable on all units)</u>

A. Instruments: TSI 8355 Thermo anemometer or equivalent

B. Procedure:

Supply filter efflux is measured on a grid, in a horizontal plane 4 inches (102mm) above the bottom edge of the window.

No reading should be taken closer than 6 inches (152mm) from the inside perimeter.

C. Test Data - Inches (mm):

400/E	6 (152)	11.300 (287)	16.60 (422)	21.90 (556)	27.200 (691)	32.500 (826)								
500/E	6 (152)	11.500 (292)	17.000 (432)	22.500 (572)	28.000 (711)	33.500 (851)	39.000 (991)	44.500 (1130)						
600/E	6 (152)	11.610 (295)	17.220 (437)	22.830 (580)	28.440 (722)	34.060 (865)	39.670 (1008)	45.280 (1150)	50.890 (1293)	56.500 (1435)				
800/E	6 (152)	11.731 (298)	17.461 (443)	23.192 (589)	28.923 (735)	34.653 (880)	40.385 (1025)	46.115 (1171)	51.846 (1317)	57.577 (1462)	63.307 (1608)	69.038 (1754)	74.769 (1899)	80.500 (2045)
6 (152)														
11 (279)														
16 (406)														
21 (533)														
26 (660)														

Number of Readings:	Average Velocity ft./min. (m/s)

D. Acceptance Criteria: Average downflow velocity = 55 to 65 fpm (.30 to .33 m/s)

E. Meets Acceptance Criteria: Yes _____ No_____

Inflow/Exhaust Volume Measurement

A. Instrument: Shortridge Flowhood ADM-870 or TSI 8355 Thermo anemometer.

B. Procedure: The exhaust airflow (customer supplied) shall draw air from the cabinet. Any one of a number of airflow controlling and measuring means may be used to establish inflow/exhaust volume. The inflow/exhaust volume is established for the cabinet having the workzone downflow average velocity at its nominal value. To measure the inflow volume, the internal blower should be turned on, thus, the inflow volume balanced with the downflow volume can be measured to set the desired average inflow velocity.

The inflow/exhaust volume is measured by using a Direct Inflow Measurement (DIM) instrument (i.e. Shortridge Flowhood). The DIM instrument can be used directly on the cabinet with NO CORRECTION FACTORS REQUIRED. The DIM instrument should also be duct taped to the cabinet's front work access opening to prevent any sneak air paths from occurring. The DIM instrument will read inflow volume (i.e. CFM). Use the area table to calculate the inflow velocity and referenced exhaust volume based upon the DIM measurement.

Inflow	÷ Work Access	= Inflow Velocity	ft./min (m/s)

Volume	ft.^{3}/min. (m^3/s)	Opening Area	ft.^{2} (m^2)	

Alternate Procedure:

The alternate procedure to determine inflow velocity is as follows. The inflow velocity is measured on a grid scale with the internal blower on and with in a 12" (30mm) cardboard tunnel extension taped too and the same size as the work access opening. Readings taken at least 4 inches (102mm) from sides of window access opening and in to rows at 25% and 75% in a center plane of the cardboard tunnel of the access opening height.

400/E	4 (102)	7.812 (198)	11.625 (295)	15.438 (392)	19.250 (489)	23.062 (586)	26.875 (683)	30.688 (779)	34.5 (876)			
500/E	4 (102	7.863 (200)	11.725 (298)	15.589 (396)	19.450 (494)	23.312 (592)	27.175 (690)	31.038 (788)	34.901 (886)	38.764 (985)	42.625 (1083)	46.500 (1181)
600/E	4 (102)	7.893 (200)	11.786 (299)	15.679 (398)	19.572 (497)	23.465 (596)	27.358 (695)	31.250 (794)	35.144 (893)	39.037 (992)	42.930 (1090)	46.823 (1189)
800/E	4 (102)	7.925 (201)	11.850 (301)	15.775 (401)	19.700 (500)	23.625 (600)	27.550 (700)	31.475 (800)	35.400 (900)	39.325 (998)	43.250 (1098)	47.175 (1198)
2.5												
7.5												

600/E (CONT)	50.716 (1288)	54.609 (1387)	58.500 (1486)						
800/E (CONT)	51.100 (1298)	55.025 (1398)	58.950 (1497)	62.875 (1597)	66.800 (1697)	70.725 (1796)	74.650 (1896)	78.575 (1996)	82.5 (2096)
2.5 (CONT)									
7.5 (CONT)									

Inflow Volume	ft.^{3}/min.(m^3/s)
Inflow Area	ft.^{2}(m^2)
Inflow Velocity	ft./min.(m/s)

C. Acceptance Criteria: Access Opening inflow velocity = **100** to 110 ft. /min.

D. Meets Acceptance Criteria: Yes _____ No _____
Cabinet Test (First Method): Yes _____ No _____
Cabinet Test (Second Method): Yes _____ No _____

Pertinent Areas for Calculation

	Work Zone Cross-Sectional Area	Work Access Opening Area (10-Inch)
NU-156-424/E	6.82 sq. ft (.633 m^2)	2.67 sq. ft (.248 m^2)
NU-156-524/E	8.94 sq. ft (.830 m^2)	3.51 sq. ft (.326 m^2)
NU-156-624/E	11.07 sq. ft (1.028 m^2)	4.34 sq. ft (.403 m^2)
NU-156-824/E	15.32 sq. ft (1.423 m^2)	6.01 sq. ft (.558 m^2)
NU-156-430/E	8.42 sq. ft (.782 m^2)	2.67 sq. ft (.248 m^2)
NU-156-530/E	11.05 sq. ft (1.026 m^2)	3.51 sq. ft (.326 m^2)
NU-156-630/E	13.67 sq. ft (1.269 m^2)	4.34 sq. ft (.403 m^2)
NU-156-830/E	18.92 sq. ft (1.757 m^2)	6.01 sq. ft (.558 m^2)

8.0 Electrical/Environmental Requirements

8.1 Electrical (Supply Voltage Fluctuations not to Exceed +/- 10%)

NU-156-424/430	115 VAC,	60 Hz,	1 Phase,	4 Amps
NU-156-524/530	115 VAC,	60 Hz,	1 Phase,	6 Amps
NU-156-624/630	115 VAC,	60 Hz,	1 Phase,	6 Amps
NU-156-824/830	115 VAC,	60 Hz,	1 Phase,	12 Amps
*NU-156-424E/430E	230 VAC,	50 Hz,	1 Phase,	5 Amps
*NU-156-524E/530E	230 VAC,	50 Hz,	1 Phase,	5 Amps
*NU-156-624E/630E	230 VAC,	50 Hz,	1 Phase,	5 Amps
*NU-156-824E/830E	230 VAC,	50 Hz,	1 Phase,	6 Amps

* CE Certified

8.2 Operational Performance (for indoor use only)

Environment Temperature Range: 60°F - 90°F (15.6°C - 32.2°C)
Environment Humidity: Maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C
Environment Altitude: 6562 Feet (2000 Meters) maximum

8.3 Light Exposure

Standard LED Lighting @ 150 ft. candles (1614 LUX) maximum intensity.

8.4 Installation Category: 2.0

Installation category (overvoltage category) defines the level of transient overvoltage, which the instrument is designed to withstand safely. It depends on the nature of the electricity supply and its overvoltage protection means. For example, in CAT II, which is the category used for instruments in installations supplied from a supply comparable to public mains such as hospital and research laboratories and most industrial laboratories, the expected transient overvoltage is 2500 V for a 230 V supply and 1500 V for a 120 V supply.

8.5 Pollution Degree: 2.0

Pollution degree describes the amount of conductive pollution present in the operating environment. Pollution degree 2 assumes that normally only non-conductive pollution such as dust occurs with the exception of occasional conductivity caused by condensation.

8.6 EMC Performance (classified for light industrial)

Emissions: EN61326
Immunity: EN61326

Class A equipment is intended for use in an industrial environment.
In the documentation for the user, a statement shall be included drawing attention to the fact that there may be potential difficulties in ensuring electromagnetic compatibility in other environments, due to conducted as well as radiated disturbances.

9.0 Optional Equipment

9.1 Ground Fault Interrupter

The duplex outlet may be wired with a Ground Fault Interrupting circuit (GFI). The GFI sensor detects a "leakage" of five milliamperes or greater between power and ground and interrupts current flow in 1/40 of a second; fast enough to prevent injury to personnel.

The GFI duplex contains a "reset" button that pops out, showing a red line which indicates that power to the protected circuit has been discontinued. The GFI circuit should be tested at least once a month for maximum protection against electrical shock hazard.

To Test:

1. Push "test" button.
   The "reset" button should pop up, showing a red line which indicates that power to the protected circuit has been discontinued. The GFI circuit should be tested at least once a month for maximum protection against electrical shock hazard.

2. If the "reset" button does not pop up when the test button is pushed, a loss of ground fault protection is indicated. Do not use, call a qualified electrician.

3. To restore power, push the "reset" button.

The GFI is so dependable that the FumeGard can be used to verify the integrity of electrical circuitry in any appliance simply by plugging it into a FumeGard electrical outlet.

Each GFI is thoroughly tested prior to shipment.

10.0 Disposal and Recycle

Cabinets that are no longer in use and are ready for disposal contain reusable materials. ALL components with the exception of the HEPA filters may be disposed and/or recycled after they are known to be properly disinfected.

☞ **NOTE**: Follow all local, state and federal guidelines for disposal of HEPA filter solid waste.

BIOHAZARD

Chemical Hazard

Prior to any disassembly for disposal, the cabinet must be decontaminated.

RECYCLE

LEAD FREE

Component	Material
Base Cabinet	Polypropylene
Front Grill	Polypropylene
Work Surface	Polypropylene
Window Faring	Polypropylene
Window Glides	Polypropylene
Window	Polycarbonate
Window Frame	Polycarbonate
Supply Diffuser	PVC
HEPA Filter Frames	Wood
Hepex Bag	PVC
Blower Wheel & Housing	PVC
Motor	Various Steel/Copper
Printed Wiring Assembly	Lead Free Electronic
Wire	PVC Coated Copper
Ballasts	Various Steel, Electronic
Connectors	Nylon
Hardware	Polypropylene/Teflon Coated Steel

☞ **NOTE**: Material type can be verified with use of a magnet with stainless and aluminum being non-magnetic.

11.0 Polypropylene Care and Use

NuAire products manufactured from Polypropylene materials require special consideration for the care and use to assure maximum customer satisfaction. Polypropylene materials have many favorable characteristics, such as being resistant to many chemicals, rigid, durable, and available in many thicknesses. NuAire fabricates the Polypropylene materials in many different ways to produce a variety of products for the laboratory. Understanding about the care and use of the Polypropylene material is important.

11.1 Cleaning

Regular cleaning can be done with gentle household or neutral cleaner. Don't use sharp and/or scouring cleaning agents as they could easily damage the surface. This also includes all liquid cleaning agents which contain abrasive whiting (powdered chalk) or similar ingredients. Only use cleaning cloths, wipes or natural or synthetic sponges. A soft brush can be used for crevices.

If an external surface static charge develops, spraying an anti-static solution on the affected area will eliminate the problem.

NOTE: NuAire does not offer any product warranty with respect to cleaning material compatibility. **USE AT YOUR OWN RISK!** The information provided above is from raw material suppliers and known general source documents for use to develop application cleaning SOP's.

11.2 Material Compatibility

High concentrations of some acids may cause staining if in the constant contact with Polypropylene. Once it has penetrated the surface of the material, only option would be to replace the surface, if at all possible.

See chemical resistance guide on following page for Polypropylene and other various types of plastics.

CHEMICAL RESISTANCE GUIDE

PLEASE NOTE: This guide is intended as general information only. Since each pair of ratings listed is for *ideal* conditions, consider all factors when evaluating chemical resistance.

MATERIALS KEY:
LDPE – Low Density Polyethylene
HDPE – High Density Polyethylene
PP/PA – Polypropylene/Polypropylene Copolymer
PMP – Polymethylpentene
PC – Polycarbonate
PVC – Polyvinyl Chloride
PSF – Polysulfone
FEP – Teflon® FEP
TFE – Teflon® TFE
PFA – Teflon® PFA

RATINGS KEY: **E** – Excellent **G** – Good **F** – Fair **N** – Not Recommended
First letter of each pair applies to conditions at 20°C; the second to those at 50°C.

▼ CHEMICAL / MATERIAL ▶	LDPE	HDPE	PP/ PPCO	PMP	FEP/ TFE/ PFA	PC	RIGID PVC	PSF
Acetaldehyde	GN	GF	GN	GN	EE	FN	GN	NN
Acetamide (saturated)	EE	EE	EE	EE	EE	NN	NN	NN
Acetic Acid (5%)	EE	EE	EE	EE	EE	EG	EE	EE
Acetic Acid (50%)	EE	EE	EE	EE	EE	EG	EG	GG
Acetone	NN	NN	EE	EE	EE	NN	NN	NN
Acetonitrile	EE	EE	FN	FN	EE	NN	NN	NN
Acrylonitrile	EE	EE	FN	FN	EE	NN	NN	NN
Adipic Acid	EG	EE	EE	EE	EE	EE	EG	GG
Alanine	EE	EE	EE	EE	EE	NN	NN	NN
Allyl Alcohol	EE	EE	EE	EG	EE	GF	GF	GF
Aluminum Hydroxide	EG	EE	EG	EG	EE	FN	EG	GG
Aluminum Salts	EE	EE	EE	EE	EE	EG	EE	EE
Amino Acids	EE	EE	EE	EE	EE	EE	EE	EE
Ammonia	EE	EE	EE	EE	EE	NN	EG	GF
Ammonium Acetate (saturated)	EE	EE	EE	EE	EE	EE	EE	EE
Ammonium Glycolate	EG	EE	EG	EG	EE	GF	EE	GG
Ammonium Hydroxide (5%)	EE	EE	EE	EE	EE	FN	EE	GG
Ammonuim Hydroxide (30%)	EG	EE	EG	EG	EE	NN	EG	GG
Ammonium Oxalate	EG	EE	EG	EG	EE	EE	EE	EE
Ammonium Salts	EE	EE	EE	EE	EE	EG	EG	EE
n-Amyl Acetate	GF	EG	GF	GF	EE	NN	NN	NN
Amyl Chloride	NN	FN	NN	NN	EE	NN	NN	NN
Aniline	EG	EG	GF	GF	EE	FN	NN	NN
Benzaldehyde	EG	EE	EG	EG	EE	FN	NN	FF
Benzene	NN	NN	NN	GF	EE	NN	NN	NN
Benzoic Acid (saturated)	EE	EE	EG	EG	EE	EG	EG	FF
Benzyl Acetate	EG	EE	EG	EG	EE	FN	NN	NN
Benzyl Alcohol	NN	FN	NN	NN	EE	NN	GF	NN
Bromine	NN	FN	NN	NN	EE	FN	GN	NN
Bromobenzene	NN	FN	NN	NN	EE	NN	NN	NN
Bromoform	NN	NN	NN	NN	EE	NN	NN	NN
Butadiene	NN	FN	NN	NN	EE	NN	FN	NN
n-Butyl Acetate	GF	EG	GF	GF	EE	NN	NN	NN
n-Butyl Alcohol	EE	EE	EE	EG	EE	GF	GF	GF
sec-Butyl Alcohol	EG	EE	EG	EG	EE	GF	GG	GF
tert-Butyl Alcohol	EG	EE	EG	EG	EE	GF	EG	GF
Butyric Acid	NN	FN	NN	NN	EE	FN	GN	GG

▼ CHEMICAL / MATERIAL ▶	LDPE	HDPE	PP/ PPCO	PMP	FEP/ TFE/ PFA	PC	RIGID PVC	PSF
Calcium Hydroxide (concentrated)	EE	EE	EE	EE	EE	NN	EE	GG
Calcium Hypochlorite (saturated)	EE	EE	EE	EG	EE	FN	GF	EE
Carbazole	EE	EE	EE	EE	EE	NN	NN	NN
Carbon Disulfide	NN	NN	NN	NN	EE	NN	NN	NN
Carbon Tetrachloride	FN	GF	GF	NN	EE	NN	GF	NN
Cedarwood Oil	NN	FN	NN	NN	EE	GF	FN	FF
Cellosolve Acetate	EG	EE	EG	EG	EE	FN	FN	NN
Chlorine (10% in air)	GN	EF	GN	GN	EE	EG	EE	NN
Chlorine (10% (moist))	GN	GF	FN	GN	EE	GF	EG	NN
Chloroacetic Acid	EE	EE	EG	EG	EE	FN	FN	NN
p-Chloroacetophenone	EE	EE	EE	EE	EE	NN	NN	NN
Chloroform	FN	NN	NN	NN	EE	NN	NN	NN
Chromic Acid (10%)	EE	EE	EE	EE	EE	GF	EG	NN
Chromic Acid (50%)	EE	EE	GF	GF	EE	FN	EF	NN
Cinnamon Oil	NN	FN	NN	NN	EE	GF	NN	FF
Citric Acid (10%)	EE	EE	EE	EE	EE	EG	GG	EE
Cresol	NN	FN	GF	NN	EE	NN	NN	NN
Cyclohexane	FN	FN	FN	NN	EE	EG	GF	NN
Decalin	GF	EG	GF	FN	EE	NN	EG	NN
o-Dichlorobenzene	FN	FF	FN	FN	EE	NN	NN	NN
p-Dichlorobenzene	FN	GF	GF	GF	EE	NN	NN	NN
Diethyl Benzene	NN	FN	NN	NN	EE	FN	NN	NN
Diethyl Ether	NN	FN	NN	NN	EE	NN	FN	NN
Diethyl Ketone	NN	NN	GG	GF	EE	NN	NN	NN
Diethyl Malonate	EE	EE	EE	EG	EE	FN	GN	FF
Diethylene Glycol	EE	EE	EE	EE	EE	GF	FN	GG
Diethylene Glycol Ethyl Ether	EE	EE	EE	EE	EE	FN	FN	FF
Dimethylformamide	EE	EE	EE	EE	EE	NN	FN	NN
Dimethyl Sulfoxide	EE	EE	EE	EE	EE	NN	NN	NN
1, 4-Dioxane	GF	GG	GF	GF	EE	GF	FN	GF
Dipropylene Glycol	EE	EE	EE	EE	EE	GF	GF	GG
Ether	NN	FN	NN	NN	EE	NN	FN	NN
Ethyl Acetate	EE	EE	EE	FN	EE	NN	NN	NN
Ethyl Alcohol (Absolute)	EG	EE	EG	EG	EE	EG	EG	EG
Ethyl Alcohol (40%)	EG	EE	EG	EG	EE	EG	EE	EG
Ethyl Benzene	NN	NN	NN	NN	EE	NN	NN	NN
Ethyl Benzoate	FF	GG	GF	GF	EE	NN	NN	NN
Ethyl Butyrate	GN	GF	GN	FN	EE	NN	NN	NN
Ethyl Chloride (liquid)	FN	FF	FN	FN	EE	NN	NN	NN
Ethyl Cyanoacetate	EE	EE	EE	EE	EE	FN	FN	FF
Ethyl Lactate	EE	EE	EE	EE	EE	FN	FN	FF
Ethylene Chloride	GN	GF	FN	NN	EE	NN	NN	NN
Ethylene Glycol	EE	EE	EE	EE	EE	GF	EF	EE
Ethylene Glycol Methyl Ether	EE	EE	EE	EE	EE	FN	FN	FF
Ethylene Oxide	FF	GF	FF	FN	EE	FN	FN	EE
Fluorides	EE	EE	EE	EE	EE	EE	EE	EE
Fluorine	FN	GN	FN	FN	EG	GF	EG	NN
Formaldehyde (10%)	EE	EE	EE	EG	EE	EG	GF	GF

▼ CHEMICAL / MATERIAL ▶	LDPE	HDPE	PP/ PPCO	PMP	FEP/ TFE/ PFA	PC	RIGID PVC	PSF
Formaldehyde (40%)	EG	EE	EG	EG	EE	EG	GF	GF
Formic Acid (3%)	EG	EE	EG	EG	EE	EG	GF	GG
Formic Acid (50%)	EG	EE	EG	EG	EE	EG	GF	GG
Formic Acid (98-100%)	EG	EE	EG	EF	EE	EF	FN	FF
Fuel Oil	FN	GF	EG	GF	EE	EG	EE	EG
Gasoline	FN	GG	GF	GF	EE	FF	GN	FF
Glacial Acetic Acid	EG	EE	EG	EG	EE	NN	EG	FN
Glycerin	EE	EE	EE	EE	EE	EE	EE	EE
n-Heptane	FN	GF	FF	FF	EE	EG	GF	EG
Hexane	NN	GF	GF	FN	EE	FN	GN	EG
Hydrochloric Acid (1-5%)	EE	EE	EE	EG	EE	EE	EE	EE
Hydrochloric Acid (20%)	EE	EE	EE	EG	EE	GF	EG	EE
Hydrochloric Acid (35%)	EE	EE	EG	EG	EE	NN	GF	EE
Hydrofluoric Acid (4%)	EG	EE	EG	EG	EE	GF	GF	GF
Hydrofluoric Acid (48%)	EE	EE	EE	EE	EE	NN	GF	FN
Hydrogen Peroxide (3%)	EE	EE	EE	EE	EE	EE	EE	EE
Hydrogen Peroxide (30%)	EG	EE	EG	EG	EE	EE	EE	EE
Hydrogen Peroxide (90%)	EG	EE	EG	EG	EE	EE	EG	EE
Isobutyl Alcohol	EE	EE	EE	EG	EE	EG	EG	EG
Isopropyl Acetate	GF	EG	GF	GF	EE	NN	NN	NN
Isopropyl Alcohol	EE	EE	EE	EE	EE	EE	EG	EE
Isopropyl Benzene	FN	GF	FN	NN	EE	NN	NN	NN
Kerosene	FN	GG	GF	GF	EE	EE	EE	GF
Lactic Acid (3%)	EG	EE	EG	EG	EE	EG	GF	EE
Lactic Acid (85%)	EE	EE	EG	EG	EE	EG	GF	EE
Methoxyethyl Oleate	EG	EE	EG	EG	EE	FN	NN	NN
Methyl Alcohol	EE	EE	EE	EE	EE	GF	EF	GF
Methyl Ethyl Ketone	NN	NN	EG	NN	EE	NN	NN	NN
Methyl Isobutyl Ketone	NN	NN	GF	FF	EE	NN	NN	NN
Methyl Propyl Ketone	GF	EG	GF	FF	EE	NN	NN	NN
Methylene Chloride	FN	FN	FN	FN	EE	NN	NN	NN
Mineral Oil	GN	EE	EE	E&	EE	EG	EG	EE
Nitric Acid (1-10%)	EE	EE	EE	EE	EE	EG	EG	EF
Nitric Acid (50%)	GN	GN	FN	GN	EE	GF	GF	GF
Nitric Acid (70%)	FN	GN	NN	GF	EE	NN	FN	NN
Nitrobenzene	NN	FN	NN	NN	EE	NN	NN	NN
n-Octane	EE	EE	EE	EE	EE	GF	FN	GF
Orange Oil	FN	GF	GF	FF	EE	FF	FN	FF
Ozone	EG	EE	EG	EE	EE	EG	EG	EE
Perchloric Acid	GN	GN	GN	GN	GF	NN	GN	NN
Perchloroethylene	NN	NN	NN	NN	EE	NN	NN	NN
Phenol, Crystals	GN	GF	GN	FG	EE	EN	FN	FF
Phosphoric Acid (1-5%)	EE	EE	EE	EE	EE	EE	EE	EE
Phosphoric Acid (85%)	EE	EE	EG	EG	EE	EG	EG	EE
Pine Oil	GN	EG	EG	GF	EE	GF	FN	FF
Potassium Hydroxide (1%)	EE	EE	EE	EE	EE	FN	EE	EE
Potassium Hydroxide (conc.)	EE	EE	EE	EE	EE	NN	EG	EE
Propane Gas	NN	FN	NN	NN	EE	FN	EG	FF
Propylene Glycol	EE	EE	EE	EE	EE	GF	FN	GG
Propylene Oxide	EG	EE	EG	EG	EE	GF	FN	GG
Resorcinol (saturated)	EE	EE	EE	EE	EE	GF	FN	NN
Resorcinol (5%)	EE	EE	EE	EE	EE	GF	GN	NN

12.0 REPLACEMENT PARTS LIST

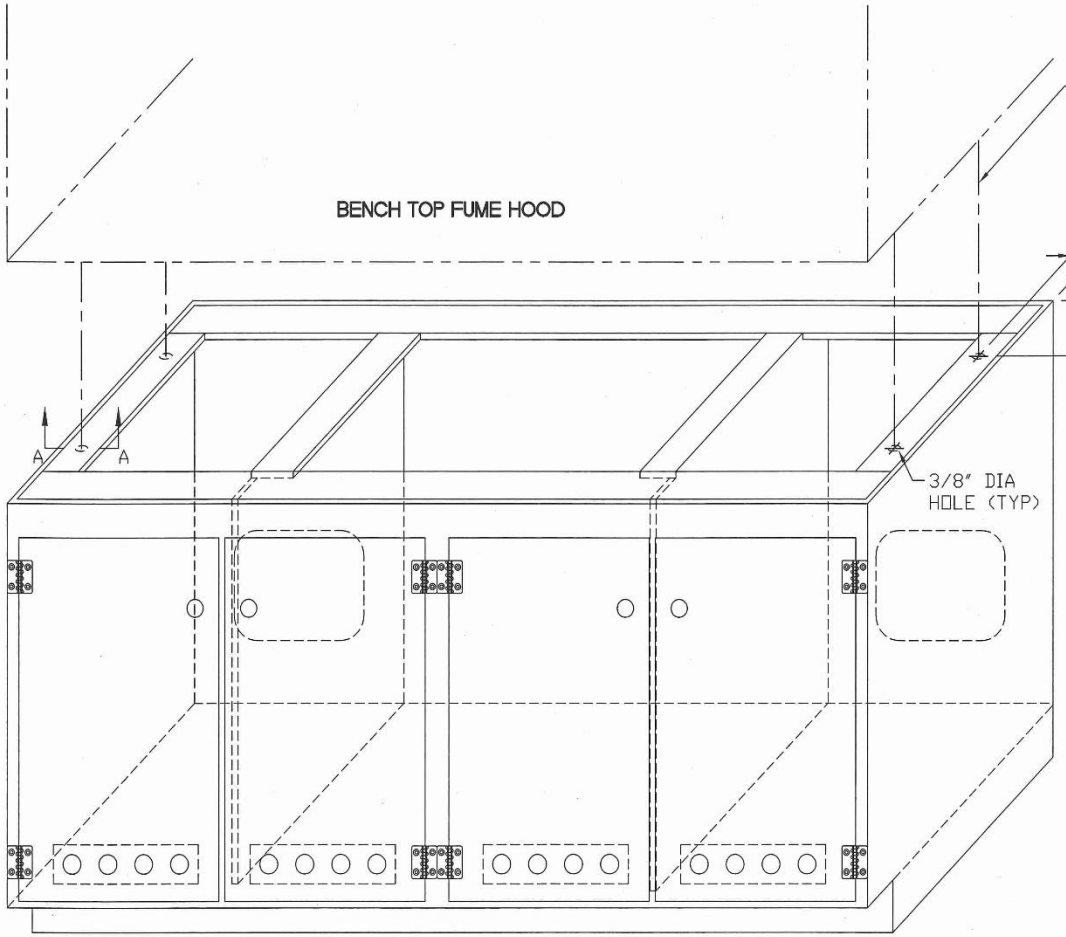
The following is a list of replacement parts. For replacement of electrical parts, refer to the electrical schematic. Please consult NuAire, Inc. for parts not listed. To order, specify: model no., serial no. and part no.

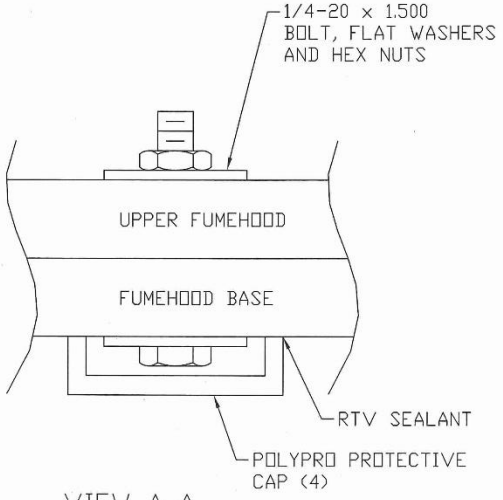
Replacement Parts List

Model No.	HEPA Filter	HEPEX Plenum	Diffuser	Window
NU-156-424	24 x 36 x 6 A-980944-01	B-155-2129-01	B-151-1826-01	B-156-2099-01
NU-156-430	30 x 36 x 6 A-980944-04	B-155-2129-02	B-151-1826-05	B-156-2099-01
NU-156-524	24 x 48 x 6 A-980944-02	B-155-2129-03	B-151-1826-02	B-156-2099-02
NU-156-530	30 x 48 x 6 A-980944-05	B-155-2129-04	B-151-1826-06	B-156-2099-02
NU-156-624	24 x 60 x 6 A-980944-03	B-155-2129-05	B-151-1826-03	B-156-2099-03
NU-156-630	30 x 60 X 6 A-980944-06	B-155-2129-06	B-151-1826-07	B-156-2099-03
NU-156-824	24 x 84 x 6 A-156-2709-01	B-155-2129-07	B-151-1826-04	B-156-2099-04
NU-156-830	30 x 84 x 6 A-156-2709-02	B-155-2129-08	B-151-1826-08	B-156-2099-04

***Standard HEPA filter initial resistance is rated at 0.5" w.g. (12mm w.g.) at 100 LFPM (.51 m/s) (separatorless) ULPA filter initial resistance is rated at 0.65" w.g. (16mm w.g.) at 100 LFPM (.51 m/s).**

REV	ECO	DESCRIPTION	DATE	DRFT	CHKD
A	12865	RELEASED FOR MANUAL	11/20/15	LS	BP





VIEW A-A

ORIGINAL

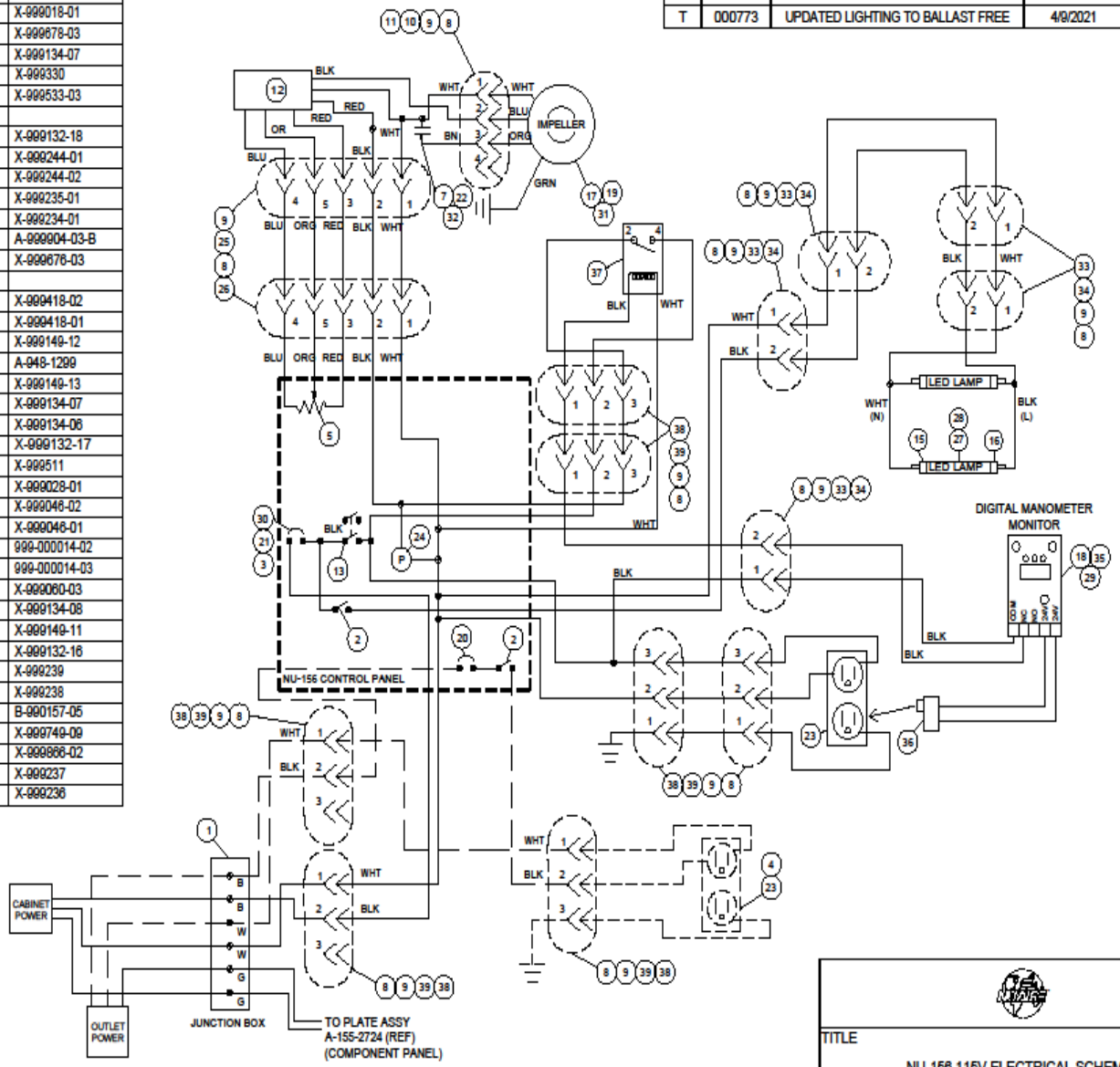
FUME HOOD - BASE
CABINET CONNECTION
INSTALLATION

DFTM	CL	07/31/96	CHKD		SHEET 1 OF 1

DRAWING NUMBER BCD-05957 C

ITEM	QTY	DESCRIPTION	NUAIRE P/N
1	1	JUNCTION BOX - PVC 2 X 4	X-999018-01
2	2	ROCKER SWITCH SPST	X-999678-03
3	1	CIRCUIT BREAKER 15 AMP (8 FT. UNIT)	X-999134-07
4	1	GFI OUTLET 15A 115V	X-999330
5	1	POTENTIOMETER 500K OHMS 1/4W	X-999533-03
6			
7	1	CAPACITOR 50 MFD. (8 FT. UNIT)	X-999132-18
8	A/R	PIN CONTACT	X-999244-01
9	A/R	SOCKET CONTACT	X-999244-02
10	A/R	CONNECTOR PLUG 4 PIN MATE-N-LOC	X-999235-01
11	A/R	CONNECTOR RECEPTACLE 4 PIN MATE-N-LOC	X-999234-01
12	1	MOTOR SPEED CONTROL	A-999904-03-B
13	1	ROCKER SWITCH DPST	X-999676-03
14			
15	2	LAMP SOCKET SOLID BASE BI-PIN	X-999418-02
16	2	LAMP SOCKET SPRING BASE BI-PIN	X-999418-01
17	1	IMPELLER TMK 355-4-12 (5, 6 FT UNITS)	X-999149-12
18	1	PCBD MONITOR (DIGITAL MANOMETER)	A-948-1299
19	1	IMPELLER TMK 400-4 (8 FT UNIT)	X-999149-13
20	1	CIRCUIT BREAKER 15 AMP (OUTLETS)	X-999134-07
21	1	CIRCUIT BREAKER 8 AMP (5,6, FT. UNITS)	X-999134-06
22	1	CAPACITOR 40 MFD (5-6 FT. UNIT)	X-999132-17
23	A/R	DUPLEX OUTLET (OPTIONAL TO QTY 4) 15A	X-999511
24	1	GREEN NEON PILOT LIGHT	X-999028-01
25	2	5 PIN CONNECTOR	X-999046-02
26	2	5 PIN RECEPTACLE	X-999046-01
27	2	LED LAMP 36" (4 FT. UNITS)	999-000014-02
28	2	LED LAMP 48" (5/6/8 FT. UNITS)	999-000014-03
29	1	PRESSURE SENSOR FOR DIGITAL MANOMETER	X-999060-03
30	1	CIRCUIT BREAKER 6 AMPS (4 FT UNIT)	X-999134-08
31	1	IMPELLER TMK 315-4-12 (4 FT UNIT)	X-999149-11
32	1	CAPACITOR 16 MFD (4 FT. UNIT)	X-999132-16
33	5	CONNECTOR PLUG 2 PIN	X-999239
34	5	CONNECTOR RECEPTACLE 2 PIN	X-999238
35	1	LABEL	B-990157-05
36	1	24V TRANSFORMER	X-999749-09
37	1	RELAY (DPDT)	X-999866-02
38	10	CONNECTOR PLUG 3 PIN	X-999237
39	10	CONNECTOR RECEPTACLE 3 PIN	X-999236

REV	CO	DESCRIPTION	DATE	DFTR	CHKD
T	000773	UPDATED LIGHTING TO BALLAST FREE	4/9/2021	TH	DSH



POWER SPECIFICATIONS:
115 VAC 60 Hz SINGLE PHASE OUTLETS NOT TO EXCEED 15 AMP TOTAL CIRCUIT.

( ) INDICATES ITEM NUMBER

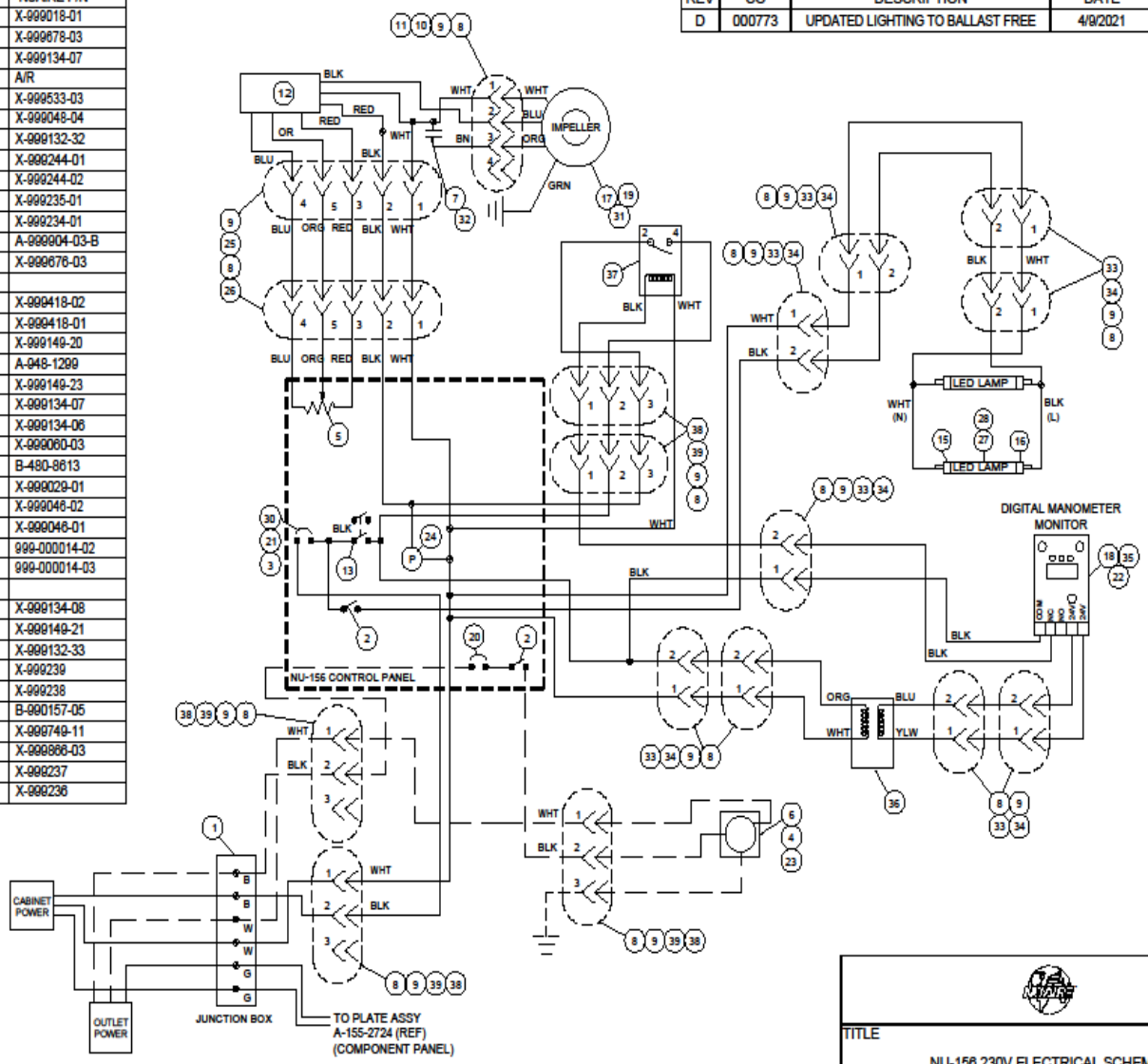
– – – INDICATES OPTIONAL ITEM

TITLE
NU-156 115V ELECTRICAL SCHEMATIC WITH OPTIONS

DFTR	BR	DATE	4/19/1996	CHKD	BR	SHEET 1 OF 1
DRAWING NUMBER	BCD-05831					T

ITEM	QTY	DESCRIPTION	NUAIRE P/N
1	1	JUNCTION BOX - PVC 2 X 4	X-999018-01
2	2	ROCKER SWITCH SPST	X-999678-03
3	1	CIRCUIT BREAKER 15 AMP (8 FT. UNIT)	X-999134-07
4	1	OUTLET	A/R
5	1	POTENTIOMETER 500K OHMS 1/4W	X-999533-03
6	1	OUTLET COVER	X-999048-04
7	1	CAPACITOR 10 MFD. (5-6, 8 FT. UNITS)	X-999132-32
8	A/R	PIN CONTACT	X-999244-01
9	A/R	SOCKET CONTACT	X-999244-02
10	A/R	CONNECTOR PLUG 4 PIN MATE-N-LOC	X-999235-01
11	A/R	CONNECTOR RECEPTACLE 4 PIN MATE-N-LOC	X-999234-01
12	1	MOTOR SPEED CONTROL	A-999904-03-B
13	1	ROCKER SWITCH DPST	X-999676-03
14			
15	2	LAMP SOCKET SOLID BASE BI-PIN	X-999418-02
16	2	LAMP SOCKET SPRING BASE BI-PIN	X-999418-01
17	1	IMPELLER TMK 355-4-12 (5, 6 FT UNITS)	X-999149-20
18	1	PCBD MONITOR (DIGITAL MANOMETER)	A-948-1299
19	1	IMPELLER TMK 400-4 (8 FT UNIT) 230V	X-999149-23
20	1	CIRCUIT BREAKER 15 AMP (OUTLETS)	X-999134-07
21	1	CIRCUIT BREAKER 8 AMP (5,6, FT. UNITS)	X-999134-06
22	1	PRESSURE SENSOR FOR DIGITAL MANOMETER	X-999060-03
23	1	OUTLET BEZEL	B-480-8613
24	1	GREEN NEON PILOT LIGHT	X-999029-01
25	2	5 PIN CONNECTOR	X-999046-02
26	2	5 PIN RECEPTACLE	X-999046-01
27	2	LED LAMP 36" (4 FT. UNITS)	999-000014-02
28	2	LED LAMP 48" (5/6/8 FT. UNITS)	999-000014-03
29			
30	1	CIRCUIT BREAKER 6 AMPS (4 FT UNIT)	X-999134-08
31	1	IMPELLER TMK 315-4-12 (4 FT UNIT)	X-999149-21
32	1	CAPACITOR 4 MFD (4 FT. UNIT)	X-999132-33
33	9	CONNECTOR PLUG 2 PIN	X-999239
34	9	CONNECTOR RECEPTACLE 2 PIN	X-999238
35	1	LABEL	B-990157-05
36	1	24V TRANSFORMER	X-999749-11
37	1	RELAY (DPDT) 230V	X-999866-03
38	8	CONNECTOR PLUG 3 PIN	X-999237
39	8	CONNECTOR RECEPTACLE 3 PIN	X-999236

REV	CO	DESCRIPTION	DATE	DFTR	CHKD
D	000773	UPDATED LIGHTING TO BALLAST FREE	4/9/2021	TH	DSH



POWER SPECIFICATIONS: 230 VAC 50/60 Hz SINGLE PHASE

(○) INDICATES ITEM NUMBER

– – – INDICATES OPTIONAL ITEM

TITLE

NU-156 230V ELECTRICAL SCHEMATIC WITH OPTIONS

DFTR	TH	DATE	6/22/17	CHKD	DSH	SHEET	1	OF	1

DRAWING NUMBER	BCD-19188	D