Labgard ES Energy Saver Class II, Type A2 Laminar Flow Biological Safety Cabinet

Models
NU-425-300/400/500/600
Bench/Console

Operation & Maintenance Manual

December, 2010
Revision 3
(Series 60 & Higher)

NU-425-400/500/600 Only
Sliding Window Only

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ABOUT THIS OPERATION & MAINTENANCE MANUAL

The information contained in this manual is intended to reflect our current production standard configuration model along with the more frequently purchased options. Any unique additions/modifications/shop drawings are appended in the back flap of this manual, along with any modifications and/or additions to procedures as outlined in this manual. A copy of the original factory test report is also appended to this manual. In case this manual and/or test report is lost or misplaced, NuAire retains a copy in our files. A replacement copy can be obtained by calling or writing NuAire, Inc. stating the model number and serial number and a brief description of the information desired.

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Laminar Flow Biological Safety Cabinet

Models NU-425-300/400/500/600

Operation & Maintenance Manual

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Models

NU-425-300/400/500/600

MANUFACTURED BY:

NuAire, Inc. - Plymouth, Minnesota, U.S.A.

1.0 General Information

1.1 Description

The LABGARD ES Model NU-425 Laminar Flow Biological Safety Cabinet (LFBSC) is a bench/table top model, optionally available with a base support stand, for operation as a console model. The LABGARD ES model NU-425 utilizes an Energy Saver DC ECM motor optimally determined forward curved fan for each model size/width to maximize both energy efficiency and filter loading capacity. The Energy Saver ECM motor is controlled via a solid-state DC motor controller that provides automatic compensation (constant volume control) for both filter loading and line voltage variances.

The Laminar Flow Biological Safety Cabinet, (LFBSC) is a product resulting from the development of the "laminar flow" principle and the application of environmental controls as required in the field of biological research or chemical containment. The LFBSC, when used with proper technique, is an effective laboratory aid in obtaining the optimum control over product quality while reducing the potential for exposure of both product and personnel to airborne biological or particulate chemical agents in low to moderate risk-hazard research and drug preparation or product operations, as prescribed by the Center for Disease Control (CDC) Atlanta, Georgia.

The NU-425 bench LFBSC is known as a Class II, Type A2 Biological Safety Cabinet. This is possible since NuAire's cabinet conforms to the following requirements:

1. Maintains inflow velocity of 100 LFPM (.51m/s) through the work access opening.

2. Has HEPA filtered downflow air that is mixed with the inflow air from a common exhaust plenum.

3. Exhaust airflow can either be room re-circulated or exhausted outside using a canopy exhaust transition.

4. Has all biologically contaminated ducts and plenums under negative pressure or surrounded by negative pressure. (Type A1 permits positive pressure contaminated ducts and plenums).

   Cabinets used for work with minute quantities of volatile toxic chemicals and traces amounts of radionuclides required as an adjunct to microbiological studies must be exhausted through properly functioning exhaust canopies.

1.2 Safety Instructions

These safety instructions describe the safety features of the LABGARD ES Model NU-425 LFBSC.
The safety cabinet has been manufactured using the latest technological developments and has been thoroughly tested before delivery. It may, however, present potential hazards if it is not used according to the intended purpose or outside of operating parameters. Therefore, the following procedures must always be observed:

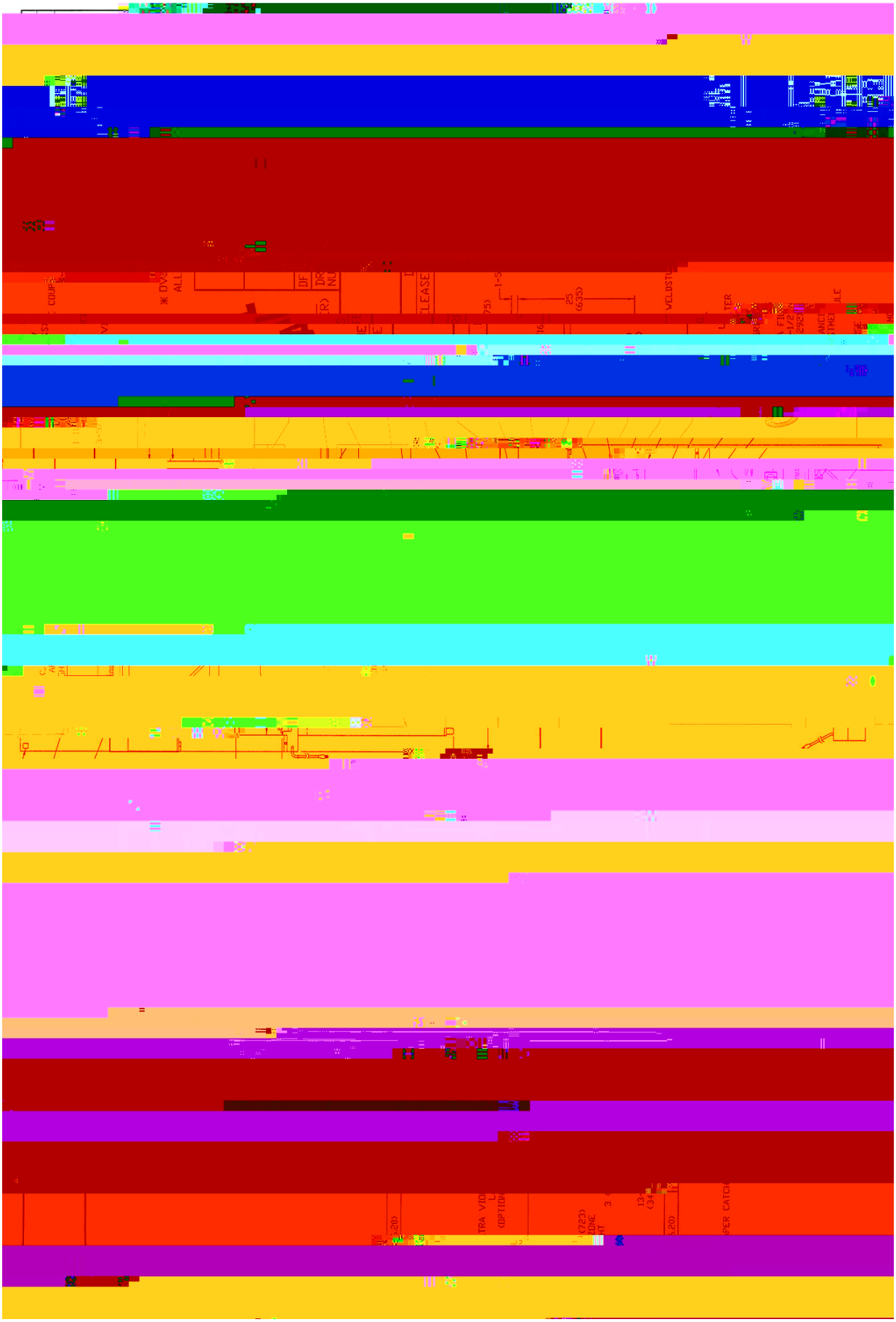
- The safety cabinet must be operated only by trained and authorized personnel.
- For any operation of this unit, the operator must prepare clear and concise written instructions for operating and cleaning, utilizing applicable safety data sheets, plant hygiene guidelines, and technical regulations, in particular.
    - which decontamination measures are to be applied for the cabinet and accessories,
    - which protective measures apply while specific agents 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 unit 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.

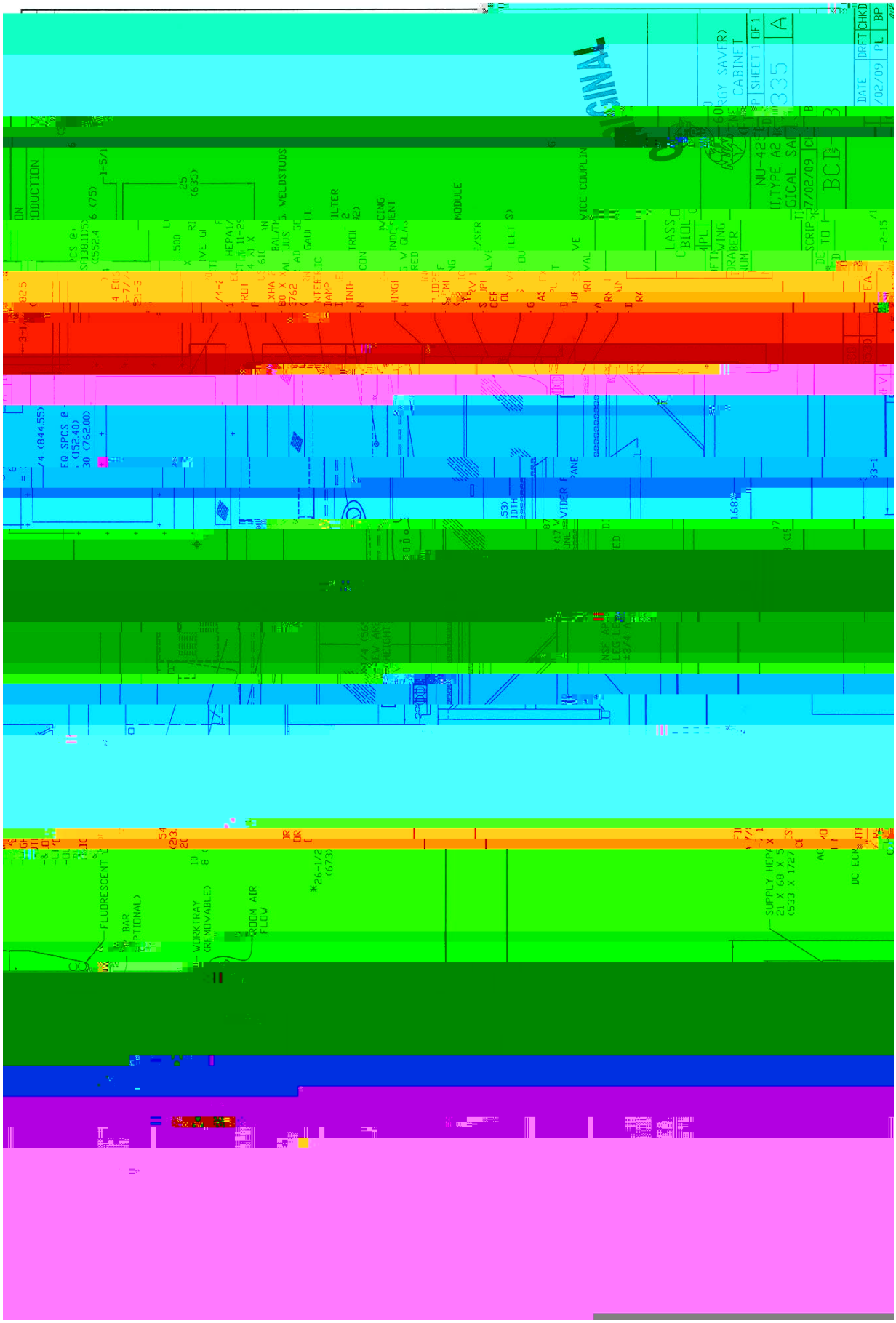
1.3 Explanation of Symbols

NOTE:

2.0 Models & Features

The model NU-425, Class II, Type A2 Laminar Flow Biological Safety Cabinet is manufactured in four sizes: 3 ft., 4 ft., 5 ft., and 6 ft.





3.0

5.2.1 Base Stand Assembly

The base stand is shipped knocked down in a separate carton and is assembled per drawing BCD-05147 if accompanied with the unit. Remove the banding holding the cabinet to the base skid. Lift the cabinet from the base skid and place on the floor. Now lift the cabinet on top of the base and bolt the base stand to the cabinet using two 3/8" - 16 x 3/4" bolts and washers provided for the front base stand tabs and two 1/4" acorn nuts for the rear weld studs. Place the cabinet in its desired location.

The base stand storage cabinets w"

5.2.5 Plumbing Services

Service ball valves with the type of service specified by the removable button on the handle are located in the work zone. The service ball valves are not recommended for pressure over 75 p.s.i. (5.2 BAR). Reducing valves should be installed external to the cabinet if necessary. Service ball valves should never be used for flammable gasses or oxygen service. A special needle valve for oxygen service or certified valve is required and available upon request.

External connection is to 3/8 inch NPT coupling in the inner sidewalls. Connection to plant utilities should be made with proper materials for the individual service and according to National and/or Local codes. Observe all labels pertaining to the type of service and operating pressure.
Remote controlled needle-valve plumbing fixtures can be optionally provided within the interior sidewalls. Control handles are located externally on the vertical airfoil. Service outlets within the interior have serrated tapered fittings designed for hose connections with the remote controlled needle valve plumbing fixtures. NuAire provides for rear, bottom, or top connections of plumbing services to plant utilities. Connection from the needle valve assembly to the welded exit coupling is accomplished

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5.2.6 Electrical Services

The NU-425 series Biological Safety Cabinets may be "hardwired" (optional) or connected via an electrical power cord which is standard. The unit requires 115 VAC, 60 Hz, single phase (current rating varies per cabinet size, reference Electrical/Environmental Requirements). It is recommended that power to the unit be on its own branch circuit, protected with a circuit breaker or fuse at the distribution panel.

PLEASE NOTE, THIS UNIT CONTAINS ELECTRONIC BALLASTS FOR THE FLUORESCENT LIGHTING. ELECTRONIC BALLASTS OPERATE WITH HIGH INRUSH CURRENT. IT IS NOT RECOMMENDED TO USE THIS PRODUCT WITH GROUND FAULT CIRCUIT INTERRUPTERS (GFCI'S) BECAUSE THE BALLASTS MAY CAUSE THE GFCI TO TRIP.

5.2.7 Final Assembly

NOTE: REMOVE THE PROTECTIVE CARDBOARD COVER OVER THE EXHAUST HEPA FILTER.

The exterior surface and viewing glass are easily cleaned with any mild household detergent cleaner using a soft cloth. Harsh chemicals, solvent-type cleaners and abrasive cleaners should not be used.

Do not attempt to clean the HEPA filter media. Cabinet interior walls or work surface are easily cleaned with any mild household detergent cleaner using a soft cloth. Turn the cabinet on and let it operate for 60 minutes before using it as a LFBSC.

5.3 Certification Testing Methods and Equipment

After installation and prior to use, NuAire recommends that the cabinet be certified or commissioned to factory standards. At a minimum, the following tests should be performed.

1. HEPA filter leak test
2. Downflow velocity test
3. Inflow velocity test
4. Airflow smoke patterns
5. 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).

IT IS RECOMMENDED THAT THESE TESTS BE PERFORMED BY A QUALIFIED TECHNICIAN WHO IS FAMILIAR WITH THE METHODS AND PROCEDURES FOR CERTIFYING BIOLOGICAL SAFETY CABINETS (SEE INSERT).

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

Note that the LABGARD ES cabinets, filter

6.0 Operating the NU-425

6.1 Operator Controls & Indicators

The following is a description of the controls and indicators found on both the front panel (see Drawing BCD-11816) and cabinet.

6.1.1 Circuit Breaker-Blower (Top of Control Center)

The motor/blower is protected with a circuit breaker. The circuit breaker in conjunction with the motor'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 depress 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.

6.1.2 Circuit Breaker-Outlets (Top of Control Center)

The duplex outlet located in the sidewall of the work area is protected with a 3 amp circuit breaker. The circuit breaker may trip at 110% of load rating but will trip at 145% of load rating in less than 2 seconds. 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.

6.1.3 Fluorescent/U.V. Light Switch

This switch provides on/off control for the fluorescent light and/or the ultraviolet (U.V.) light if present (optional). With the U.V. light option, the switch provides for on-center off-on operation so that both the fluorescent light and the U.V. light cannot be energized at the same time. The UV light is also interlocked, so it will only operate if the sliding window is closed. Proper care should be exercised when the U.V. light is on.

6.1.4 Outlet Switch

This switch provides on/off control for the 115 VAC power available in the outlet(s) within the cabinet workzone.

6.1.5 Blower Switch

The blower switch applies power to the internal motor/blower when in the ON position. The blower switch also has a second set of poles, which are available for use as a contact closu(on)11(n)Eitactso8(act)-n(i)-7(

6.1.8 Airflow Calibration Potentiometer

The operating airflows within the cabinet (i.e. 60 LFPM (.30 m/s) downflow and 105 LFPM (.53 m /s) air inflow barriers) are controlled by the DC motor speed control and an exhaust damper. The DC motor speed control controls the ECM motor by providing a Pulsed Width Modulation (PWM) signal of 2.5 to 8.0 Vdc that is sent to the ECM motor. The ECM motor also sends back a Revolution Per Minute (RPM) signal to the DC motor speed control. The RPM signal is monitored for changes in comparison to a reference stored motor loading curve of RPM versus PWM and adjusts as needed to maintain a constant volume of air.

The airflow calibration potentiometer provides a means of adjusting the stored curve starting point, if necessary, at any point of the filter loading process. The airflow calibration potentiometer was manufactured in (2) versions. The first version, once adjusted with a small screwdriver, causes the speed control to go into calibration mode. The second version provides more feedback to the Service Technician in that there is a calibration mode push button next to the potentiometer that when pushed activates the calibration mode. There is also an LED to indicate you are in calibration mode. In either case, it will then remain in calibration mode until no potentiometer adjustment is made for 1 minute or the LED indicator is off. At that point the current RPM and PWM values will be stored as the starting point and the calibration mode will be exited.

THIS ADJUSTMENT SHOULD ONLY BE MADE BY A QUALIFIED TECHNICIAN EMPLOYING THE PROPER INSTRUMENTS IN ORDER TO INSURE AIRFLOWS PER NSF/ANSI 49.

6.1.9 Minihelic Gauge

The unit is equipped with a minihelic gauge. The minihelic gauge displays the static pressure within the pressure plenum supplying the downflow and exhaust filters. The gauge is calibrated in "inches of water gauge" pressure. As the HEPA filters load w. ped-2(e)-2(du)2(n)2(e)-2(c g)13(a(r)-2(e.l1(t)-3(i)-3(c i)-3(n)s)]TJ

6.2 Operating Guidelines

The intent herein is to present general operational guidelines that will aid in the use of the Laminar Flow Biological Safety Cabinet (LFBSC) 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, May 1, 1972.

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

6.3.6 Terminal Purging & Wipedown

Following completion of work, allow the cabinet to run for 2-3 minute period without personnel activity to purge the unit. The decontamination of the interior surfaces should be repeated after removal of all materials, cultures, apparatus, etc. A careful check of grills and diffuser grids should be made for spilled or splashed nutrients which may support fungus growth and resulting spore liberation that contaminates the protected work environment.

6.3.7 Paper Catch/Prefilter

A permanent paper catch is installed behind the rear divider panel of the work zone. This area forms the return air path to the motor/blower; and if the airflow is blocked, it could seriously affect the performance of the cabinet. Therefore, **THE PAPER CATCH SHOULD BE CHECKED AND CLEANED NO LESS THAN ON A WEEKLY BASIS; DAILY** basis if procedures dictate the use of paper products. Any paper removed must be properly disposed of as *Contaminated Hazardous Waste.* The above procedures also apply to all units configured with a prefilter.

6.3.8 Shut Down

Turn off blowers and lights. Do not use cabinet as a depository for excess lab equipment during periods

CATUION: DISINFECTANTS THAT USE CHLORIDES AND HALOGENS WILL CAUSE DAMAGE TO THE STAINLESS STEEL SURFACES IF LEFT ON FOR LONG PERIODS OF TIME.

d. After the specified contact time, wipe up excess disinfectant. **IF THE DISINFECTANT USED CONTAINS CHLORIDES OR HALOGENS, RE-WIPE ALL SURFACES WITH 70% ALCOHOL OR SIMILAR NON-CORROSIVE ANTI-MICROBIAL AGENT TO PREVENT DAMAGE TO STAINLESS STEEL SURFACES.**

7.0 General Maintenance

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 both certification as well as repair.

7.1 Decontamination

No maintenance should be performed on the interior of the Labgard cabinet (area behind access panels) unless the cabinet has been microbiologically decontaminated, is known to biologically clean, or known to be chemically inert. Surface disinfection is performed as specified in the cleaning procedures.

Hazardous Gases! Personal Protection Equipment Required.

A disinfection using formaldehyde must be performed in accordance with the specifications of NSF 49/1992, Annex G.

This procedure presents considerable risks and must be performed only by specially trained and authorized service personnel in accordance with applicable safety regulations.

The formaldehyde is vaporized within the tightly sealed sample chamber. The quantity of the applied formaldehyde depends on the volume of the sample chamber in the safety cabinet that is to be disinfected. The formaldehyde evaporates immediately after reaching its boiling point; the minimum reaction time is 6 hours. Therefore, the formaldehyde should be neutralized after the specified reaction time by vaporizing ammonia.

Flammable Hazard!

Formalin is flammable. The auto-ignition temperature of formalin is 430° C (820° F).

With a volume percentage of 7.75% in dry air, formaldehyde vapor may explode.

For vaporization, do not use heating devices reaching temperatures above 250° C (477° F).

Chemical Hazard!

Cabinet Size	300

7.3 HEPA Filter/Motor Replacement (Drawing BCD-11819)

The HEPA Filters under normal usage and barring an accident (a puncture), do not need replacement until the efflux velocity cannot be maintained or the access inflow velocity cannot be maintained at 100 LFPM (.51 m/s) (min.). This may permit the average downflow velocity to be as low as 55 LFPM (.28 m/s) as long as no point falls below 20% or +/-16fpm of the average downflow velocity, which ever is greater.

The HEPA Filters should not be replaced until the entire cabinet has been decontaminated or known to be biologically "clean".

7.3.1 Procedure (see Drawing BCD-11819)

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

Step 1: Remove screws at each upper side of the control center and allow the control center to rotate down, resting on the safety straps. Second, remove the front decorative panel which is held into position by (3) knurled nuts on the top edge and (6) knurled screws on the front.

Step 2: Place sliding window into lowest position and remove front filter panel, which is held into position by Phillip pan head screws. Once the screws are removed, the panel is held into position by smooth weldstuds located on the top corner of the front filter panel. Use the window stop brackets as handles to remove the panel.

CAUTION: Screws are used in lieu of acorn nuts, and lockwashers. The screws have O-rings and should be replaced if damaged or badly deformed.

The interior of the cabinet is now fully exposed for replacement of the filters and/or motor/blower.

Step 3: Filter Removal

It is not always necessary to replace both the supply and exhaust filters at the same time. If during the course of certifications, the downflow falls off while the exhaust increases (i.e. greater than 110 LFPM) (.56 m/s), the supply filter is "loading" faster than the exhaust filter, and only the supply filter may need replacement. The opposite might also happen depending upon many factors.

a. To remove the supply filter:

1. First, remove the HEPEX/choke tray band clamp between the supply HEPEX and the

Dispose of spent HEPA filters properly. Avoid direct contact to "dirty side" of the filters. Label all waste containers/cartons based on the type of hazard.

b. To remove the Exhaust HEPA:

1. Relax the exhaust filter seal loading mechanism by turning the four threaded bolts counterclockwise until one can see a definite release of the loading springs.

2. Pull the exhaust choke tray free and remove the filter. It is not necessary to remove the tray, although it is free to move forward several inches, if necessary, to free the HEPA filter.

Step 4: Filter Installation

WHEN INSTALLING NEW FILTERS, USE ONLY FILTERS OF THE SAME RATED FLOW AND SIZE AS ORIGINALLY INSTALLED. It is recommended that a new HEPEX/Supply filter be installed since the HEPEX is factory installed to the filter. However, field installation kits are available separately from the filter.

a. To install the supply filter, simply reverse the procedure outlines in Step 3a, above.

Note: Be sure to open the choke plate fully before inserting the filter into the tray. This will assist in adjusting the airflow.

b. To install the exhaust filter, apply a thin layer of silicone grease to the top and bottom gaskets of the filter and carefully insert into the exhaust choke tray.

Position the filter fra

7.5 Airflow Calibration

The NU-425 Airflow Calibration Consists of adjustments to balance the airflow within the cabinet. **THIS WORK SHOULD BE DONE ONLY BY A QUALIFIED TECHNICIAN WHO CAN MEASURE THE AIRFLOW FROM THE FILTERS WITH A SUITABLE VELOMETER.** NuAire provides two adjustments to balance the airflow within the cabinet. These are:

a. PWM signal adjustment via DC motor speed control
b. Exhaust filter choke

The PWM signal adjustment establishes the motor speed controls curve starting point of the programmed internal

7.5.2 Inflow Calibration

Step 1:

- Measure the inflow velocity using the recommended procedure found in Table 7.0. If necessary, adjust the exhaust filter choke, located under the front decorative panel, to achieve the correct average inflow velocity within the stated range of 105 ± 5 LFPM (.53 ± .025 m/s).

- Less than 100 LFPM (.51 m/s);

  First, open the choke plate or make sure it is open. If this is insufficient, then increase the motor speed control.

- Greater than 110 LFPM (.56 m/s);

  First, adjust the motor speed control to achieve 1/2 the exhaust excess, and then close the choke plate to achieve the balance. In this fashion, the downflow should remain nearly constant (i.e. what the reduced speed took away, the choke plate restores).

Note: The choke plate adjustment requires a standard blade screwdriver. To adjust, loosen the liquid-tight fitting around the choke adjustment shaft. While monitoring the exhaust flow to check position, turning the choke adjustment shaft clockwise will open the choke while turning counter clockwise closes the choke.

Step 2:

- Once exhaust adjustment is complete, return the downflow calibration and then check average downflow velocity. If the downflow average remains within the correct range, the calibration is complete. If not, readjust as necessary to obtain the correct calibration range. Once entire cabinet has been balanced, tighten liquid-tight fastener around choke adjustment shaft.

Step 3:

7.6 HEPA Filter Leak Test

In order to check filter and filter seal integrity, the HEPA filter media and seals must be directly accessible, by the measuring instrument. The challenge material (i.e. PAO) should be supplied in the rear center of the workzone

7.8 Site Installation Assessment Tests

These tests are performed to verify the sash position, airflow or pressure setpoint where an audible and/or visual alarm will activate to signify unfavorable operating conditions within the biological safety cabinet and/or the remote exhaust blower, and canopy connection performance.

7.8.1 Sash Alarm

Step 1: With sash alarm switch enabled, raise the sliding sash 1" (2.5cm) above the manufacturer's designated sash height for normal operation. Verify that the audible/visual alarm activates/sounds.

Step 2: Return the sash to its normal operating height.

7.8.2 Airflow or Pressure Alarm (when installed)

Step 1: Measure and reco

7.9 Cleanliness Classification Test for Pharmacy Application

If this cabinet is going to be used within pharmacy, per USP797[1], the cabinet must be tested to assure compliance to ISO 14644-1:1999, Cleanrooms and Associated Controlled Environments, Part 1: Classification of Air Cleanliness[2]. The cleanliness classification test is performed using a particle counter to measure particle counts within the cabinet workzone. Turn on cabinet and let warm up for several minutes. Turn on particle counter and flush out sample tub.(O)5(M)35osure

Table 7.0

Recommended Measurement Methods for Cabinet Downflow & Inflow

A. Downflow Measurement

a. Recommended Instruments: TSI 8355 Thermoanemometer

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 readings should be taken closer than 6 inches (152mm) from the inside perimeter.

c. Test Data - Inches (mm):

300	6 (152)	11.594 (295)	17.188 (437)	22.782 (597)	28.375 (721)				
[redacted]	6 (152)	11.729 (298)	17.458 (443)	23.187 (589)	28.916 (735)	34.645 (880)	40.375 (1026)		
[redacted]	6 (152)	11.797 (300)	[redacted]	23.391 (594)	29.188 (741)	34.985 (889)	40.782 (1036)	46.579 (1183)	52.375 (1330)

8.0 Error Indicators & Troubleshooting

Audible alarms and error indicators occur for a variety of reasons. Whenever an alarm condition is present, the audible alarm and error indicator will be presented and stay on until the error is cleared. When presented with an error indicator, please perform the following:

Step 1: NOTE ALL ERROR INDICATORS. When the cabinet is running, any and all red indicators display an error.

Step 2: VERIFY ERROR INDICATORS. Error indicators can be verified by turning the errored function on/off.

Step 3: MONITOR RE-OCCURRENCE OF ERROR INDICATORS. If re-occurrence of the error indicator is

Error Indicator	Indicator	Correction
Cabinet outlets won't turn on.		Check outlet circuit breaker on top of control center. Check voltage to outlets.
Cabinet ultraviolet light won't turn on.		Check blower/light circuit breaker on top of control center. Check ultraviolet lamp. Check voltage to ultraviolet ballasts. Check ballast. Check light switch.

10.0 Optional Equipment

10.1 Ultraviolet Light

Ultraviolet light will injure your eyes. Avoid direct viewing at all times. Personnel should not be present when ultraviolet lamp is on

10.1.1 Overview

The germicidal ultraviolet is primarily intended for the destruction of bacteria and other microorganisms in the air or on directly exposed surfaces. Approximately 95% of the ultraviolet radiations from germicidal tubes are in the 253.7 nanometer region. This is a region in the ultraviolet spectrum which is near the peak of germicidal effectiveness. The exposure necessary to kill bacteria is the product of time and intensity. High intensities for a short period of time, or low intensities for a longer period are fundamentally equal in lethal dosage on bacteria (disregarding the life cycle of bacteria). The intensity of

Energies Required Destroying Some Microorganisms By Ultraviolet Radiations(e)

Mold Spores	Microwatt seconds per cm/2	Protozoa	Microwatt seconds per cm/2
Penicillum roqueforti	26,400	Paramecium	200,000(a)
Penicillium expansum	22,000		
Penicillium digitiatum	88,000	**Nematode Eggs**	40,000(b)
Aspergillus glaucus	88,000		
Aspergillus flavus	99,000	**Algae**	22,000(c)
Aspergillus niger	330,000		
Rhizopus nigricans	220,000	**Virus**	
Mucor racemosus A	35,200	Baceriophage (E. Coli)	6,600
Mucor racemosus B	35,200	Tobacco Masaic	440,000
Oospora lactis	11,000	Influenze	3,400(d)
Yeasts			
Saccharomyces	13,200		
Ellipsoideus	17,600		
Saccharomyces cerevisiae	13,200		
Brewers' yeast	6,600		
Baker's yeast	8,800		
Common yeast cake	13,200		

11.0 Electrical/Environmental Requirements

11.1 Electrical (Supply voltage fluctuations not to exceed +/- 10%)

***NU-425-300	115V,	60Hz,	1 Phase,	12 Amps
*NU-425-400	115V,	60Hz,	1 Phase,	12 Amps
*NU-425-500	115V,	60Hz,	1 Phase,	14 Amps
*NU-425-600	115V,	60Hz,	1 Phase,	14 Amps

*UL/UL-C Listed

11.2 Operational Performance (for indoor use only)

Environment Temperature Range:	60°F-85°F (15°C - 30°C)
Environment Humidity:	20% - 60% Relative Humidity
Environment Altitude:	6562 Feet (2000 meters) maximum

11.3 Light Exposure

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

11.4 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

12.0 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

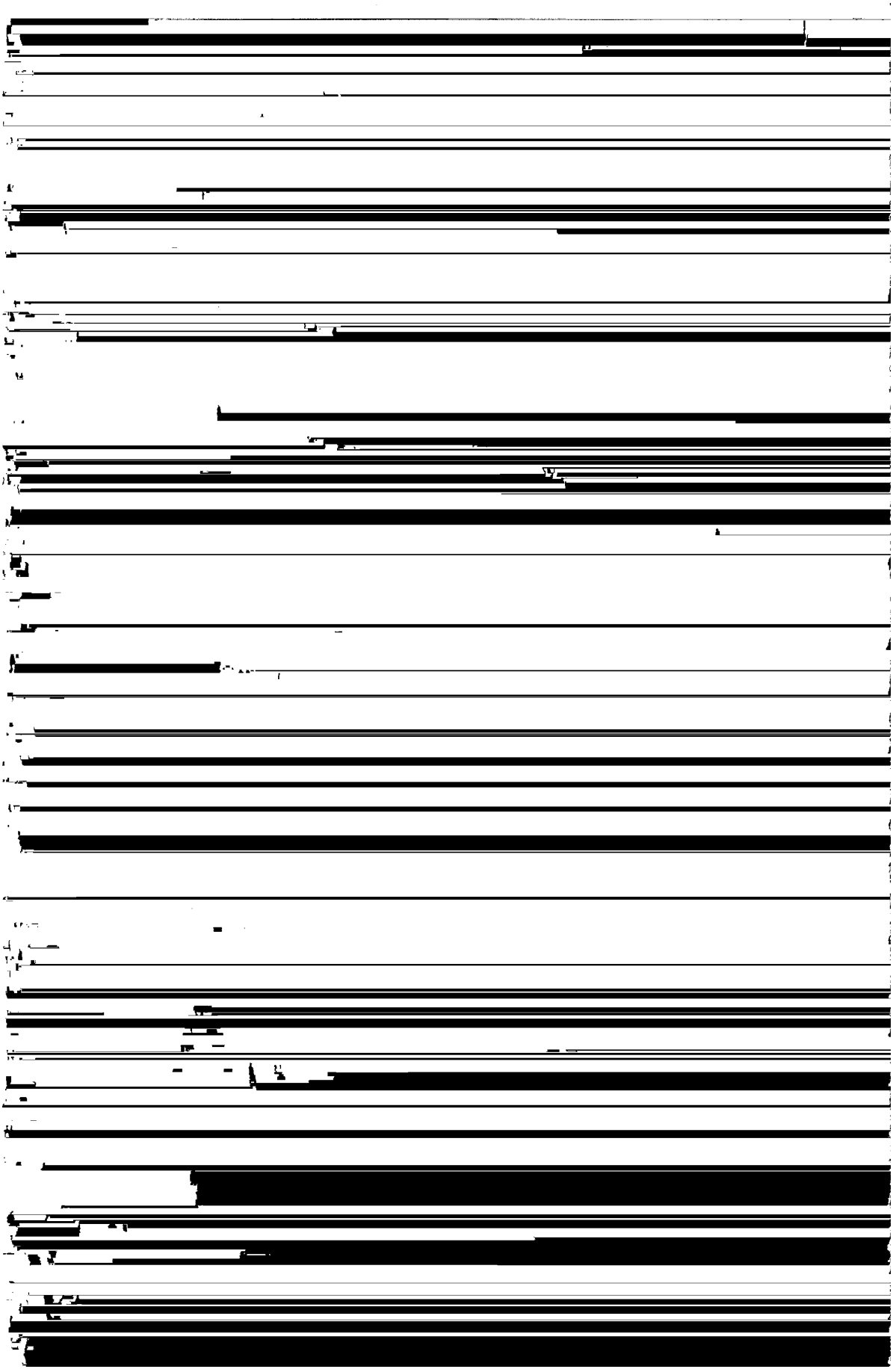
Prior to any disassembly for disposal the cabinet must be decontaminated

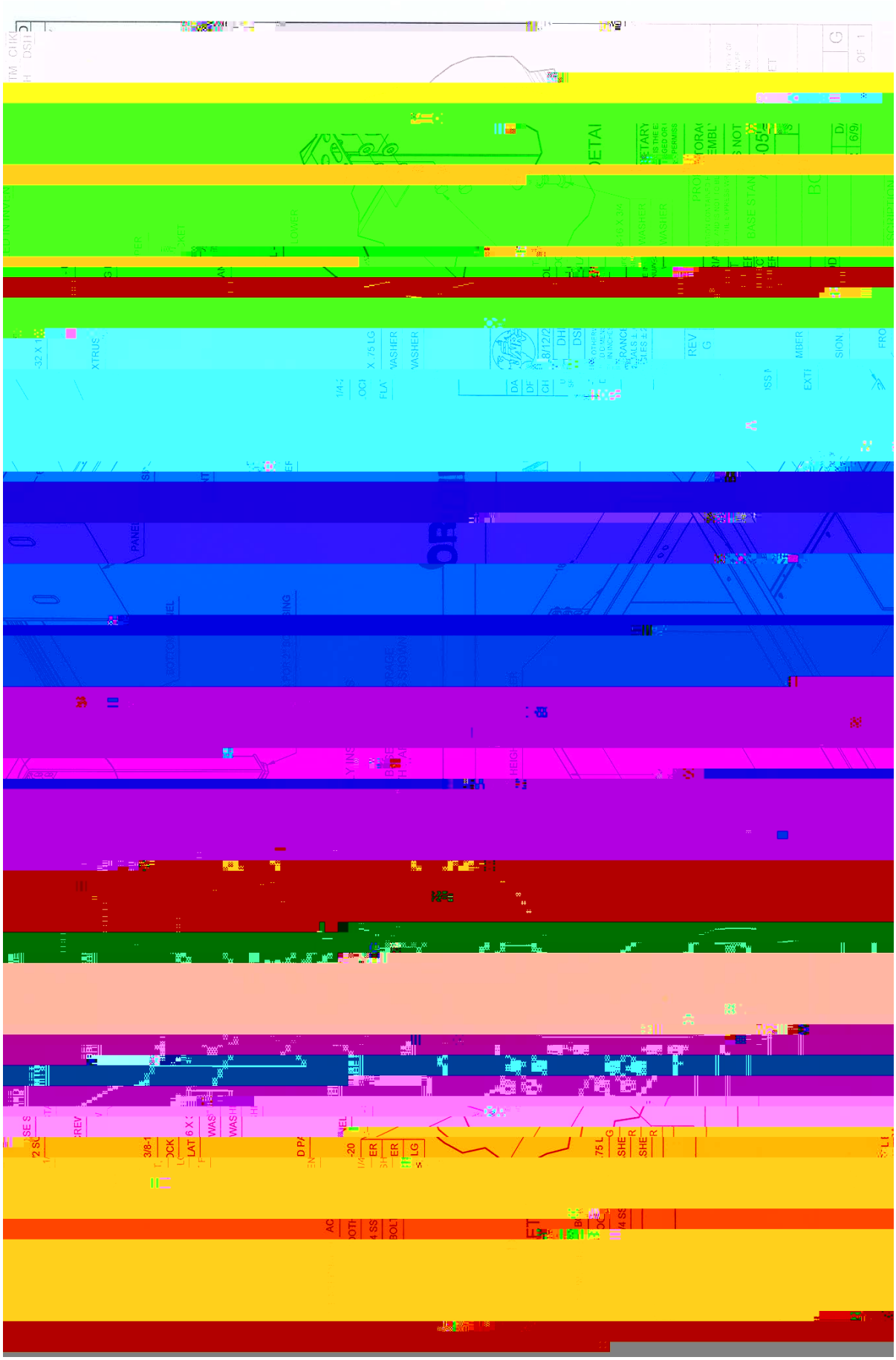
RECYCLE

LEAD FREE

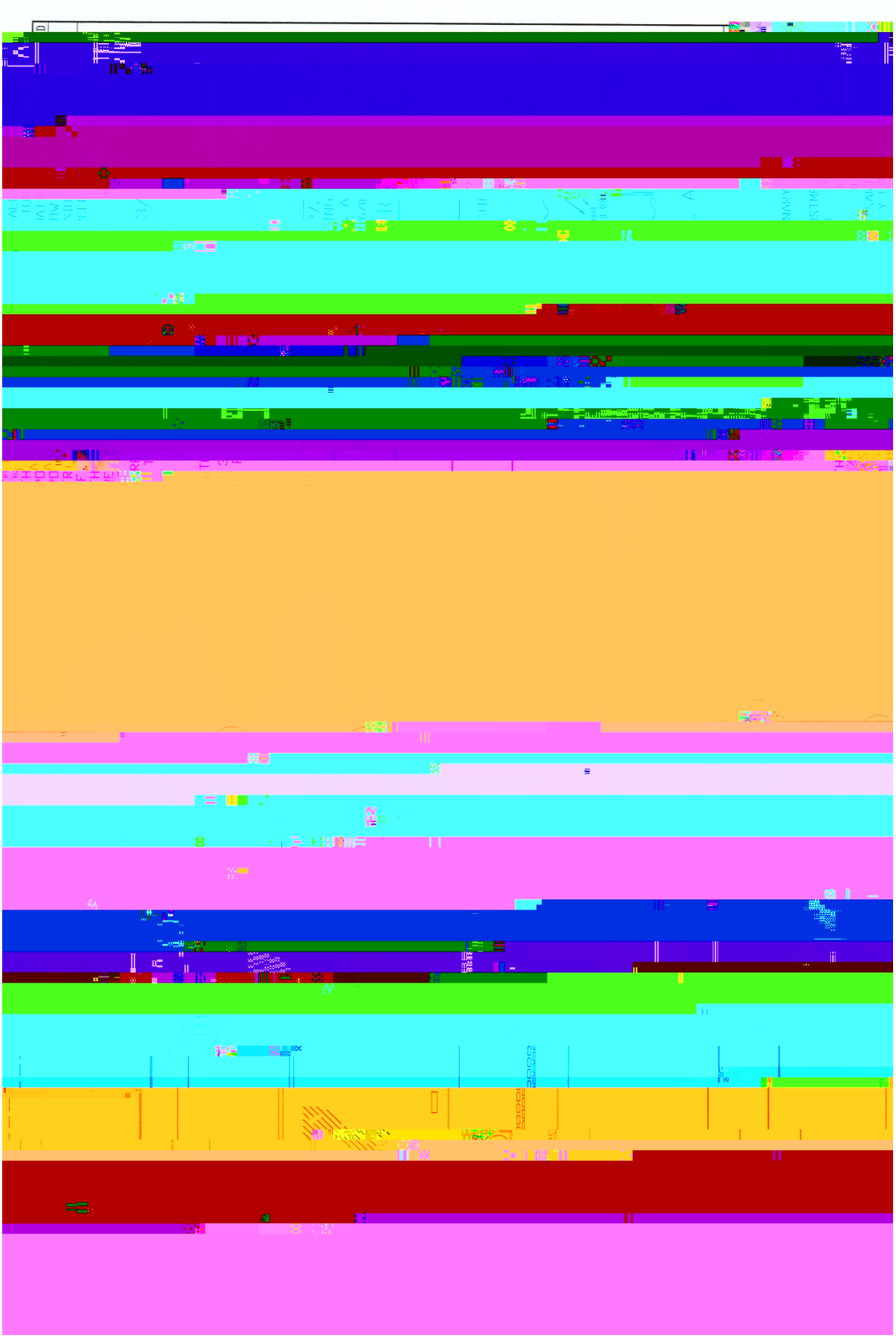
Component	**Material**
Base Cabinet	Stainless Steel
Front Grill	Stainless Steel
Worksurface	Stainless Steel
Window Faring	Stainless Steel
Window Glides	HDPE
Window	Safety Glass
Window Frame	Stainless Steel
Front Service Panel	Painted Steel
Front Decorative Panel	Painted Steel
Control Center	Painted Steel
Supply Diffuser	Aluminum
Exhaust Filter	Aluminum
HEPA Filter Frames	Painted Steel
Hepex Bag	PVC
Blower Wheel & Housing	Steel
Motor	Various Steel/Copper
Printed Wiring Assembly	Lead Free Electronic
Wire	PVC Coated Copper
Ballasts	Various Steel, Electronic
Armrest	PVC
Connectors	Nylon
Hardware	Stainless Steel and Steel

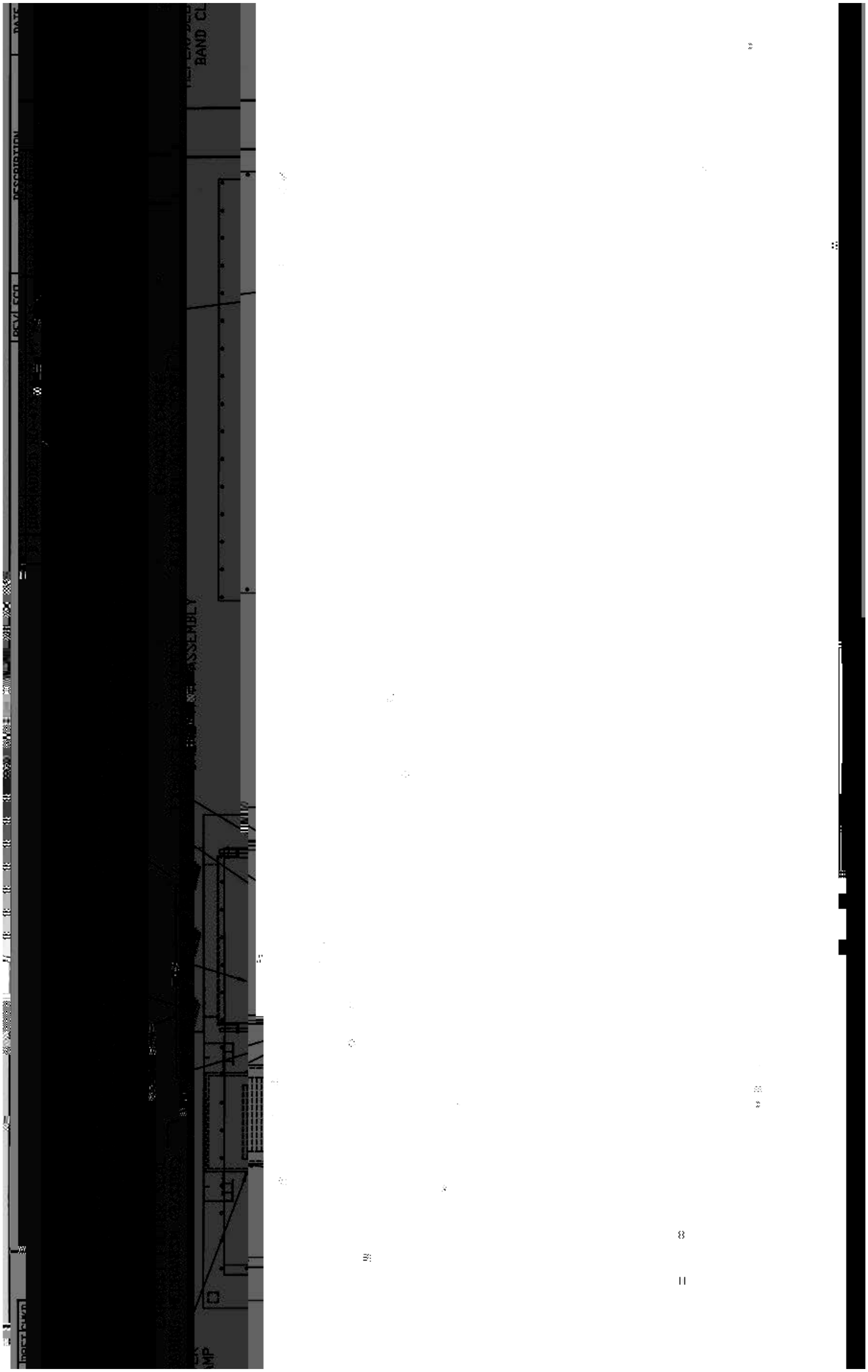
NOTE: Material type can be verified with use of a magnet with stainless and aluminum being non-magnetic.

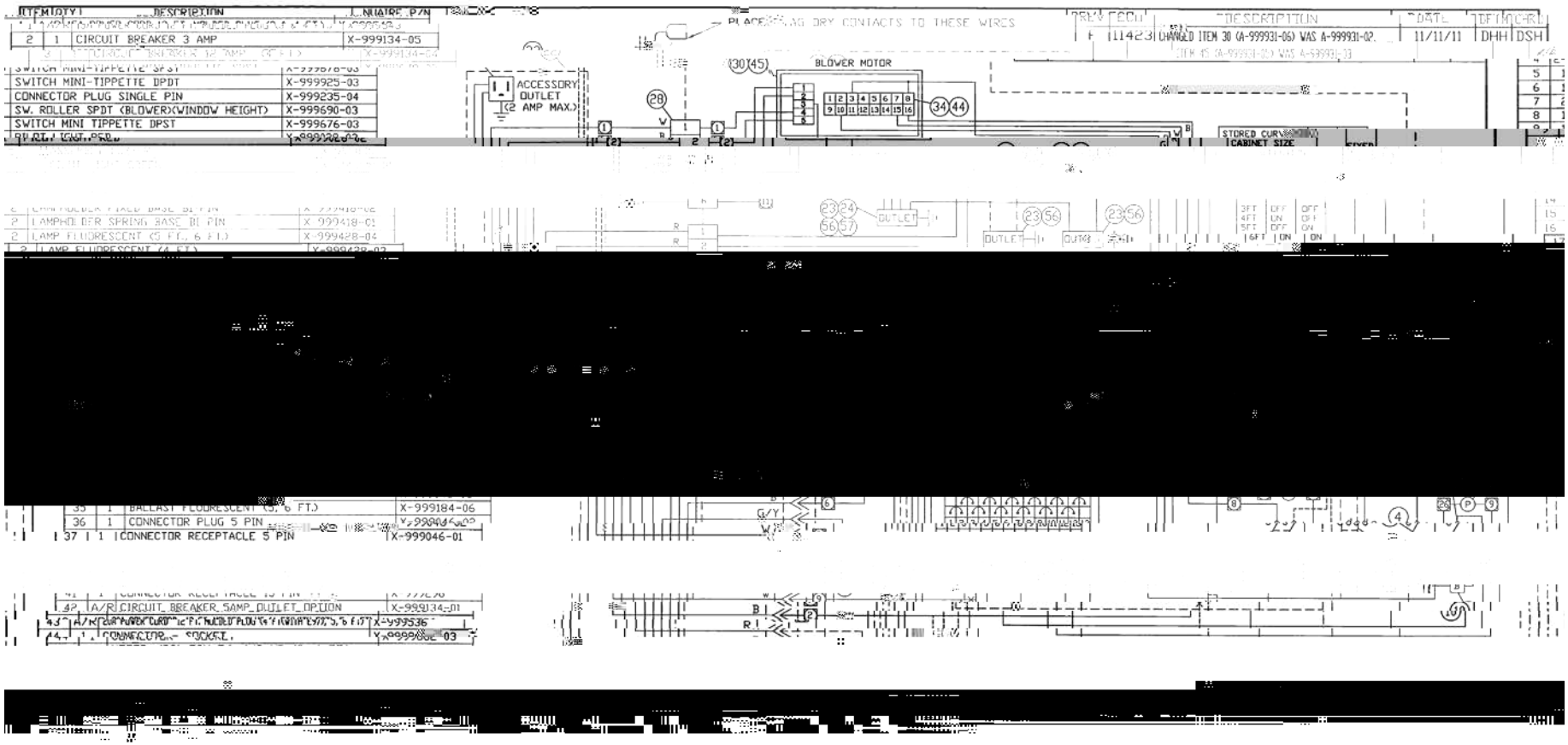




NU-425/427/430/435/437/440/475/477/480/629
DECORATIVE PANEL






ITEM QTY DESCRIPTION MANUFACTURER P/N
2 1 CIRCUIT BREAKER 3 AMP X-999134-05
SWITCH MINI-TIPPETTE DPDT X-999925-03
CONNECTOR PLUG SINGLE PIN X-999235-04
SW. ROLLER SPDT (BLOWER)(WINDOW HEIGHT) X-999690-03
SWITCH MINI TIPPETTE DPST X-999676-03
2 LAMPHOLDER SPRING BASE BI PIN X-999418-01
2 LAMP FLUORESCENT (3 FT., 6 F.I.) X-999428-04
35 1 BALLAST FLUORESCENT (3, 6 FT.) X-999184-06
36 1 CONNECTOR PLUG 5 PIN
37 1 CONNECTOR RECEPTACLE 5 PIN X-999046-01
42 A/R CIRCUIT BREAKER 5AMP OUTLET OPTION X-999134-01
ACCESSORY OUTLET (2 AMP MAX.)
BLOWER MOTOR
PLACE PLUG DRY CONTACTS TO THESE WIRES
REV ECO DESCRIPTION DATE DFT CHK'D
11423 CHANGED ITEM 30 (A-999931-06) WAS A-999931-02. 11/11/11 DHH DSH
STORED CURVE
CABINET SIZE
OUTLET
3FT OFF OFF
4FT ON OFF
5FT OFF ON
6FT ON ON