ANALYSIS OF CAMPUS FUME HOODS

for

VARIOUS CLASSROOM BUILDINGS

at

NEW MEXICO STATE UNIVERSITY

LAS CRUCES, NEW MEXICO

HZ PROJECT NUMBER 14.0294.06

Final Submittal

March 05, 2014

HUITT-ZOLLARS
6501 Americas Parkway NE, Suite 550
Albuquerque, New Mexico 87110-8154
(505) 883-8114 ph ~ (505) 883-5022 fax

HUITT-ZOLLARS

HUITT-ZOLLARS, INC. • 500 W. 7th St. • Suite 300 • Mail Unit 23 • Fort Worth, TX 76102-4773 • 817.335.3000 phone • 817.335.1025 fax • huitt-zollars.com

March 05, 2014

James C. Nuñez
New Mexico State University
Las Cruces, New Mexico

Dear Mr. Nuñez,

Please see attached report concerning the Analysis of Campus Fume Hoods at New Mexico State University prepared by the undersigned.

Please contact us if you have any questions or concerns regarding this report.

Regards,

Huitt-Zollars Inc.
New Mexico Architectural License #1658

John L. Jarrard AIA LEED AP

Sergey Aleksanyan P.E. LEED AP

Lucas Stockburger EIT

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SECTION ONE

Executive Summary

SECTION ONE: EXECUTIVE SUMMARY

Huitt-Zollars was contracted by New Mexico State University (NMSU) to assess the general condition of a select number of laboratory fume hoods and their associated HVAC systems. Huitt-Zollars was to provide recommendations for improvement of these systems. The fume hoods to be surveyed were reported to not be meeting the average velocity range set by existing codes and standards (listed and described in section three of this report). For a full list of hoods included in this study, reference Appendix B.

Section two lists and describes the existing conditions observed during the assessment. A total of thirty seven laboratory fume hoods were examined across six buildings, Foster Hall, Gerald Thomas Hall, Skeen Hall, Wooten Hall, New Mexico Department of Agriculture (NMDA) and Engineering Complex 1.The fume hood's condition, function and performance were evaluated. Where available, mechanical prints were overviewed to develop a general idea of how the exhaust and makeup air system functions in each building surveyed. NMSU has implemented a policy to inspect each laboratory fume hood on campus every six months. This policy was reviewed to determine if the policy is complete and compliant with current codes.

Section three presents and describes the specific codes applicable to fume hood installation and operation.

Section four provides a summary of recommendations for improving fume hood performance, meeting codes and standards and suggestions for hood replacement. Below is a short list of those recommendations and the associated cost. The cost summary for these repairs can be seen in section five, and a detailed cost analysis is included in appendix D.

Recommendation	Quantity	Cost/Recommendation	Total
Install Sash Stops on Hoods	35	$218	$7,630
Install Fume Hood Monitor	24	$4,802	$115,248
Repair or Replace Exhaust Fan	5	$3,694	$18,470
Rebalance Fume Hood	13	$1,416	$18,410
Relocate Supply or Return Diffuser	3	$647	$1,942
Calibrate Fume Hood Monitor	6	$1,089	$6,533
Replace Existing Fume Hood	13	$21,463	$279,019
Retro Commission Exhaust and Makeup Systems	1	$54,000	$54,000
		Total:	**$501,252**

SECTION TWO

Existing Conditions

SECTION TWO: EXISTING CONDITIONS

Huitt-Zollars performed a study assessing the general condition of select laboratory fume hoods, the associated HVAC systems and the NMSU hood policies to provide recommendations improvement. Concerns specific to each building and its hoods within the scope of the survey were identified as well as general observations of all the fume hoods. The laboratory fume hoods investigated are located in the following buildings: Foster Hall, Gerald Thomas Hall, Skeen Hall, New Mexico Department of Agriculture (NMDA), Wooten Hall and Engineering Complex 1 (Algae Lab).

Individual hood data collected during site visit is located in Appendix B.

2.1 General

The recorded hood data (similar to the inspection points in the NMSU EH&S database) are as follows:

- Average air velocity at face of hood at operational height.
- Average air velocity at face of hood as measured by in hood airflow monitoring station
- Average air velocity at face of hood documented at last NMSU inspection
- Date of last inspection.
- Did the hood pass the last NMSU inspection?
- Laboratory Fume Hood Manufacturer
- Is there operational or warning signage in place to instruct user?
- Is there a sash?
- Operational height and opening dimension of sash.
- Direction of sash motion
- Is hood equipped with sash stops to limit maximum sash height?
- Is hood adjoined to another hood(s)?
- Is hood equipped with start/stop local control?
- Is hood equipped with modulating flow damper?
- Brand and model of airflow monitoring station if exists.
- Is hood equipped with fume hood monitor?
- If in place, does the monitor provide low or high air flow alarms?
- Is make up air supplied to space? How?
- Overall condition of hood, rated as red, yellow or green (red=poor, yellow=moderate, green=good).

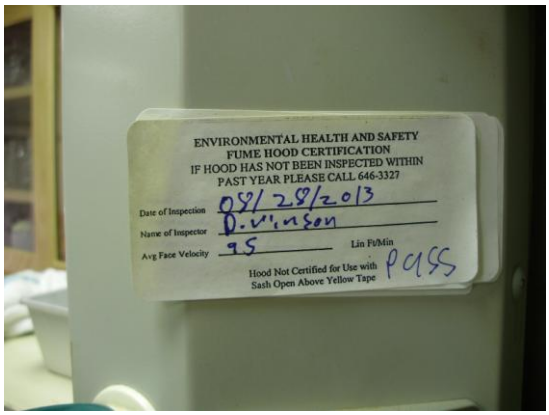
New Mexico State University policy is to inspect laboratory fume hoods every six months. During the inspection, the following information is recorded.

- Sash opening size
- Is there a sash?
- Direction of sash motion
- Is there a damper to modulate flow at the face of the hood?
- Is there a switch to start and stop exhaust air flow of hood?
- Average velocity at face of hood
- Did the hood pass or fail velocity test?
- Usage of hood (active, inactive, storage, etc)
- Type of use for hood (research, teaching, radiation, etc)
- Internal dimensions of hood
- Is there damage, rust, or any obvious problems with hood system?
- What is the material composition of hood (steal, transite, other)?
- Name of evaluator

The average air velocity at the face of the hood is determined by averaging six points across the sash opening. The target air velocity for the hoods is 100 fpm, with an acceptable range from 80 fpm to 150 fpm. In the event the average velocity is outside of this range the hood will fail inspection, be placed temporarily out of service and a work order will be submitted.

2.2 General Observations

Upon completion of the NMSU inspection the hood is marked with a sticker (Figure 1) listing the date of the inspection, the measured average air velocity, the name of the inspector and whether the unit passed inspection. The height of the sash for the listed velocity on these tags is not indicated, however, newer tags do have the following disclaimer “Hood Not Certified for Use with Sash Open above Yellow Tape.” (Figure 2)



Inspection Tag (Figure 1)

Each fume hood should have documented a maximum sash height, as well as a preferred range of operating heights, where the lowest height in the range is the most preferred. Yellow tape (sometimes orange) was put on place on 80% of the hoods observed to indicate the maximum certified operating height. It would be preferable to use sash stops to set the maximum sash height. There is no documentation on how this maximum height is determined, nor is the height consistent from hood to hood.

Maximum Sash Height Tape (Figure 2)

2.3 Foster Hall:

Three hoods were surveyed in foster Hall. The building consists of laboratory and teaching spaces. The laboratory spaces are spread over the original building and the recent addition.

The first hood is located in room 220. The hood is constant air volume, with an on/off switch tied to the fan. It appears the hood may be used to exhaust corrosive fumes, due to the perchloric acids stored nearby. There are specific NFPA requirements for hoods used to exhaust perchloric acid; these are presented in Section Three “Code Requirements.”

The second hood is located in room 120 (Figure 3). The air velocity measured at the time of the survey was 200 fpm with a sash height of 9.5”. The hood, however, had been removed from service with a failing average air velocity of 56 fpm during its last NMSU inspection (May 2013). In general the hood was in poor condition, replacement is recommended. If the existing hood is to be re-commissioned into service, it is recommended that a fume hood monitor and alarm be added.

Room 120 Fume Hood (Figure 3)

The third hood observed in Foster is a constant air volume hood located in room 441, and makes use of an airflow monitoring station, alarm and fume hood monitor. With the sash height set to 12 inches (the height of the orange tape on side of hood), an air velocity of 171 fpm was measured. This airflow velocity exceeds the maximum recommended velocity by 21 fpm. The inspection sticker, dated May 2013, showed an air velocity of 115 fpm.

Per the International Mechanical Code, the makeup air and exhaust air quantities must be equal. The lower level of Foster Hall provides makeup air through the supply air system. It was not determined if the volume of air provided is adequate. Makeup air for floors 2 through 4 in Foster Hall is currently being provided directly to the hallway, lab doors are left open to allow for airflow to the room. This method of providing makeup air has potential to cause issues with air balance in the laboratories and with proper fume hood operation.

2.4 Skeen

Six hoods were surveyed in Skeen Hall. The building is fairly new, with most of the laboratories being used for teaching. Based on the prints, the makeup air system in the building seems to be adequate in meeting the air requirements of the fume hood labs.

Two fume hoods are located on the first floor in rooms W122 and W138. Both hoods were constant volume with no start/stop switch. As a result, both hoods were running at the time of the survey. Both the measured air velocity and the air velocity recorded during the previous NMSU inspection were within acceptable range. The fume hood monitor for the hood located in room W122 was not providing face velocity information and may require calibration or repair. Both hoods are being used for flammable vapor exhaust. If more than 1 gallon of the flammable or perchloric chemicals are being used guidelines set by NFPA should be followed.

Two fume hoods are located in room W330, and another in W342A. The three have similar performance. Each hood had face velocities that measured within the acceptable range. The fume hood monitors showed face velocities that were at least 20% in error when compared to the measured air velocity. Overall, the hoods were in excellent condition but each hood's associated monitors require calibration.

Fume Hood Monitor (Figure 4)

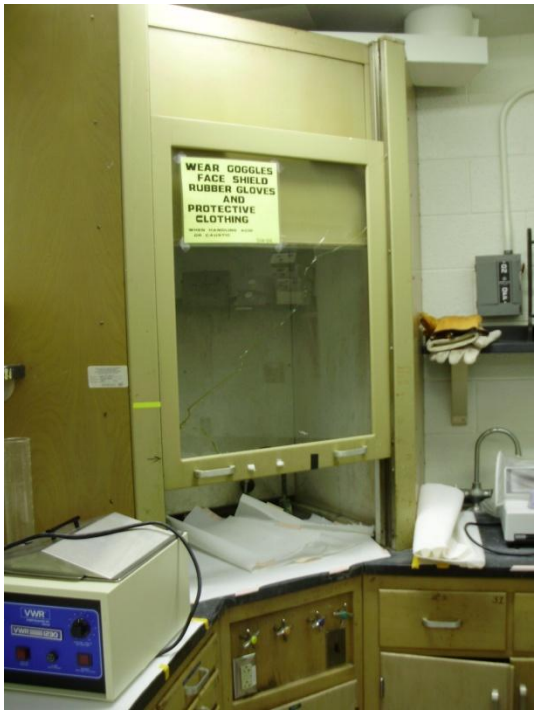
The fifth hood is located in room W356 on the third floor. A flow of 128 fpm was measured, but the fume hood monitor was reading a low flow alarm (figure 4). This hood had no sticker indicating a documented inspection. The hood should be inspected, and the monitor calibrated.

2.5 Gerald Thomas Hall

Eighteen fume hoods were surveyed in Gerald Thomas Hall. Of these eighteen hoods, twelve were in poor condition, and six were in acceptable condition. Makeup air to the fume hoods is provided through a return chase in the center of the building. The labs bring in makeup air through transfer grilles to this chase. It was not determined if this method of providing makeup air is adequate for each laboratory. For specific information regarding each hood, see appendix B.

In room W206 there are two older constant volume fume hoods. The hoods are served by a single exhaust system, balancing damper are located in the duct run-out to each hood. One hood measured average velocity of 218 fpm and failed its last inspection; the other measured 108 fpm and passed its last inspection. Joining the exhaust for these hoods is only acceptable if the hoods are used for like purposes. The fume hood units should be rebalanced or replaced, and would benefit from the use of fume hood monitors as no alarms were present to notify low flow hazards.

Rooms 250, 262 and 268 contained older model fume hoods, none of which make use of airflow stations or fume hood monitors. The hoods in each of these rooms failed inspection due to reading low flow; however, during the survey the hoods read average face velocities exceeding the recommended maximum. The height used during the survey was equal to the height marked with tape by the inspection team, indicated by the inspection tag to be the maximum certified operating height.



Room 272 Hood (Figure 5)

The hood in room 272 (figure 5) passed its last inspection in July 2013 with a velocity of 150 fpm, during the survey a face velocity of 275 fpm was measured (at the certified height marked on the hood). The hood is in poor condition, and the glass in the sash in cracked, the unit should be repaired or replaced. The exhaust ductwork leaving the hood is shaped such that uniform flow and exhaust rates will be difficult to achieve. No alarm system present to notify user of low flow.

Three hoods were located in room 273; two had passed the previous inspection. The failing hood in the center of the room is equipped with two sashes, this hood was out of service for reading low flow during the last inspection. At the time of the survey, the hood and its associated monitors were not operational. When fully staffed, egress into and out of the room may be hindered by current hood locations. Makeup air to the hoods might experience excessive turbulence or cross contamination due to the hood layout.

The lab hoods located in rooms 356, 160W and 160E are older model hoods lacking fume hood monitors and flow stations. These hoods passed inspection in July, 2013, but during the survey measured average face velocities above the recommended maximum 150 fpm. The exhaust fans and balancing dampers may require adjustment to reduce the air velocity

Room 159 contains two newer style hoods located adjacent to one another (Figure 6). A supply diffuser is located directly above the fume hoods operating areas. The location of this diffuser will cause turbulence at the face of the hoods, preventing safe and effective operation. Both hoods passed inspection with adequate air flow, but would still benefit from the use of an airflow monitor and alarm.

Room 159 Hoods (Figure 5)

The fume hood in room 326 is marked as “Out of Order and Extremely Dangerous.” The hood is used to vent corrosive fumes but was not able to meet the targeted airflow. The last inspection for this unit was in 2012, consider removal or replacement.

Two fume hoods, one located in room W300 and the other in room 155 read low, but passing face velocities at the NMSU inspection in July (84 fpm). At the time of the survey the hoods read velocities below the minimum requirements (65 fpm and 75 fpm). Adjustments to the exhaust fan and air balance dampers are needed to ensure necessary air velocity is achieved at the face of the hood when the sash is placed at its maximum certified operation height.

2.6 Wooten Hall

Three hoods were surveyed in Wooten Hall. According to information provided by one of the lab operators, the hoods located on the second floor are to be removed and the space is to be repurposed. The hood located in room 259 had been marked “Out of Service” for reading low airflow, but the hood monitor was in “HI” flow alarm. The two other hoods observed in Wooten Hall, located on the first floor, were in excellent condition. Each hood was equipped with a fume hood monitor and airflow station. The hood monitors were not displaying the air velocities. The monitor for hood A in room 159 was marked as “Not Calibrated.” These hoods will be ready for use when the monitors are properly calibrated. More information for the hoods surveyed can be found in Appendix B.

2.7 New Mexico Department of Agriculture (NMDA)

Five hoods were surveyed in the NMDA building, two located in the petroleum lab, two located in the chemistry lab and the fifth in room 123.The method of makeup air provision to the labs was not determined.

Two hoods were surveyed in the chemistry lab, room 126. Hood A passed it’s most recent inspection with an average face velocity of 119 fpm, during survey a failing velocity of 162 fpm was measured. Hood B showed a similar issue, passing the most recent NMSU inspection with an average velocity of 119 fpm, but during the survey read a failing velocity of 210 fpm. Neither hood was equipped with a fume hood monitor, or alarm. Directly above the user operating space is a supply air diffuser. The location of this diffuser has the potential to create unwanted turbulence at the face of the hood.

Two hoods were surveyed in the petroleum lab, rooms A101 and A102. Each hood is used to exhaust flammable or explosive fumes. Both hoods passed inspection and are equipped with a start/stop switch for the exhaust fan. Fume hoods exhausting corrosive or flammable gas in quantities greater than 1 gallon require the entire exhaust run to be under negative pressure. This necessitates the use of exterior exhaust fan located on the roof or an exterior wall. The existence of local start/stop switch at each hood indicates the fan may be located within the hood, resulting in positive pressure exhaust ductwork. The location of the fans should be verified to ensure the lab is in accordance with the NFPA 45 code (see section three). Each hood would benefit from a fume hood monitor and flow alarm. Additionally, the room exhaust

grille for room A102 is located above the fume hood. The location of this room exhaust has the potential to interfere with the hood's ability to operate properly.

Room 123 contains a fume hood being used for general storage and table space. The hood is in good condition but is no longer needed in the lab and should be removed/relocated. The hood is not equipped with a start/stop switch, resulting in the hood needlessly exhausting air and wasting energy.

2.8 Engineering Complex 1

Two hoods were surveyed in the Engineering Complex 1 Building, the first is located in the environmental laboratory (218), and the second in the algae lab (118). Both hoods had passed their most recent inspection and are being used for perchloric acids per the signage in place. The hood located in the algae lab is not equipped with a fume hood monitor or alarm. The means of makeup air introduction to the lab could not be determined. The hood located in the environmental lab was equipped with a fume hood alarm (Figure 7), but no airflow station. The hood was equipped with a fan start/stop switch, and makeup air is provided via a dual duct supply terminal unit.

Fume Hood Alarm (Figure 6)

SECTION THREE

Code Requirements

SECTION THREE: CODE REQUIREMENTS

The following are codes and criteria for laboratory fume hoods design.

- ASHRAE 62.1 2007 Ventilation for Acceptable Indoor Air Quality
- ASHRAE 90.1 2007 Energy Standard for Buildings
- ASHRAE 100-2006 Energy Efficiency in Existing Buildings
- National Fire Protection Association Standard on Fire Protection for Laboratories Using Chemicals, NFPA 45
- Occupational exposure to hazardous chemicals in laboratories, OSHA Standard 1910.1450
- Uniform Mechanical Code (UMC)

3.1 Uniform Mechanical Code

The International Mechanical Code (section 505) requires that makeup air for a fume hood lab to be supplied in a volume that equals the volume of exhaust air being removed from the space and to be located so as to avoid the recirculation of contaminated air within the hood enclosure. The volume of the air provided must be sufficient enough to dilute any explosive or flammable vapors, fumes, or dusts to below twenty-five percent of their lower explosive/flammable limit. Exhaust air ducts from fume hoods should not be unified with other exhaust air duct runs unless they are from the same lab and the hoods are being used for similar purposes.

3.2 ASHRAE

ASHRAE 110-1995 outlines a recommended hood testing procedure to certify and verify new hoods installed. It is recommended that the test be performed for each hood. The test only needs to be repeated if the configuration of the room changes, the hood's airflow changes, or if the hood is relocated.

3.3 NFPA

The National Fire Protection Association code section 45 details the requirements for fume hoods which are used to exhaust corrosive or flammable vapors. NFPA 45 should only be applied if the hood contains 1 gallon or more of flammable or corrosive material (such as gasoline or perchloric acid). The major guidelines are as follows:

- There should be continuous ventilation at hood under normal operating conditions.
- Perchloric ducts must be acid resistant and spark resistant.
- Fan motor cannot be located in the exhaust stream, and there shall be no manifolding of ductwork.
- The entire exhaust run must remain negative relative to the building pressure.

- The hood must have an identification or sign that lists the following:
    1. The last inspection date
    2. Logged interior inspection
    3. The name of the inspector
    4. The average face velocity of the hood at operating height
    5. The location of the fan serving the unit
- Chemical hoods should be kept closed whenever possible
- A permanently installed measurement device for hood airflow shall be provided on each chemical hood.
- Chemical fume hoods shall be located in areas of minimized air turbulence

3.4 OSHA

The Occupational Safety and Health Administration provide federal regulations in volume 29 part 1910.1450 for the use of fume hoods.

OSHA recommends a fume hood face velocity of 80 to 150 feet per minute. It is also recommended that fume hoods have a continuous monitoring device to allow convenient confirmation of adequate hood performance.

SECTION FOUR

Recommendations

SECTION FOUR: RECOMMENDATIONS

4.1 Older Hood Replacement

A majority of the hoods investigated during the survey performed by Huitt-Zollars showed signs of age and wear, primarily those located in Gerald Thomas Hall and Foster Hall. The older hood can be less effective in containing contaminants and may be reaching the end of useful life and should be considered for replacement (see Appendix B). Newer hoods are equipped with an airfoil at the leading edge of the workbench and baffles along the back of the hood to aid in creating a laminar airflow into the hood.

4.2 Exhaust Fan Repair

Fume hoods showing low flow may be served by an exhaust fan that is in need of repair or replacement. Exhaust fans serving fume hoods with average face velocities less than 85 fpm should be evaluated for repair or replacement. For hoods with low average face velocities see Appendix B.

4.3 Evaluate Makeup Air Systems

Adequate makeup air is imperative for efficient fume hood operation. The building air system in Foster Hall provides make up air directly to the hallways. The makeup air is then indirectly transferred into the lab space through open doors. This is an inappropriate method for providing makeup air, as doors could be closed to minimize contaminants. The HVAC system for Foster Hall should be retro-commissioned to determine if adequate volumes of outside air and makeup air are being supplied to the appropriate spaces. The majority of labs in Gerald Thomas Hall are located in the center of the building along a return air plenum/chase. The chase transfers the plenum air to the lab via transfer grilles. Cooling to the room is supplied via dual duct boxes serving each lab. It was not determined if the return air chase feeds back to the air handlers supplying the building. If the AHUs pull return air from this plenum it is possible contaminants could be brought back to the unit. It was not determined if this set up provides adequate makeup air to the laboratories, the system could benefit from an airflow balance.
According to the prints, the laboratories both in Skeen Hall and Engineering complex 1 provide, adequate makeup air to the space. Not enough information was available on the system at the NMDA to determine if the HVAC system is adequate to serve the laboratory systems.

4.4 Hood Locations in Room

A laboratory hood should be located away from any return, supply or exhaust vents in the room in which it resides. Airflow from these distribution devices causes turbulence at the face of the hood which can cause contaminants to “wash out” into the room. It is recommended that existing vents and grilles located near or above a laboratory hood be moved, or the fume hood

relocated. If relocated, the hood should be located in an area with minimal foot traffic passed the hood. Additionally a means of safe egress should be provided that does not require an occupant to pass directly in front of a hood.

4.5 Follow NFPA Requirements for Hoods Exhausting Corrosive and Flammable Material

A number of hoods that were surveyed are approved to be used for perchloric acid and/or flammable vapors (gasoline, ethanol, etc). NFPA 45 has specific labeling requirements for these hoods. It is recommended that the labeling requirement from NFPA be implemented. It is also recommended that the exhaust system for these hood types be verified ensure the entire run is under negative pressure per the NFPA.

4.6 Testing Procedures

The current hood testing procedures are partially successful in determining the viability of each hood. It is recommended that the sash upper and lower limit at time of testing be recorded and indicated at each hood. The minimum and maximum height corresponding to the average velocities at both extremes of the testing range (80 fpm to 150 fpm).

4.7 Labeling

Among the hoods surveyed, there was no consistent labeling or instruction set posted, apart from the inspection sticker. The use of some of a labeling standard would help constitute consistent and safe operation practices, and assist with repair issues. It is the following information be available at the hood.

- Hood identification number or barcode
- Inspection Date
- Name of Inspector
- Operation height of sash/Average face velocity at that height
- Maximum heights of sash/Average face velocity at that height.
- Location of Exhaust Fan
- Pass or Fail inspection?
- For use with corrosive or flammable fumes (yes/no)?

The hood identification used in Appendix B is an example of possible nomenclature, not a report of actual tagging on site.

4.8 Hood Operation

Depending on the use, some hoods require constant exhaust at all times, while others require exhaust during use. A number of hoods in place are equipped with a local enable/disable switch

tied to the exhaust fan, while the remaining hoods pull a constant exhaust. There are potential energy savings in scheduling on/off periods for non-corrosive fume hoods.

Mechanical “stops” are available to install to prevent the sash from being raised beyond its maximum recommended height. Equipping existing lab hoods with sash stoppers will help prevent low flow issues that can occur if the hood is misused.

For all existing fume hoods, it is recommended that no equipment in the hood be located closer than 6” from the face of the hood.

4.9 Fume Hood Monitors and Alarms

Fume hood monitors inform the user of the current air velocity at the face of the hood. When integrated with an alarm the system can protect the user from potentially dangerous fumes. It is recommended that these be available and permanently installed at each hood station, and at minimum include an alarming function. Certain hoods with fume hood monitors already installed were not reading accurate fpm, and require calibration, see Appendix B.

SECTION FIVE

Cost Analysis

SECTION FIVE: COST ANALYSIS

The cost associated with incorporating each of the recommendation described in section four can be addressed per building, per recommendation or per hood. Appendix D contains a full detailed cost analysis for addressing each issue on the hoods that were surveyed. The costs can be extended to hoods outside the scope of this survey where applicable.

The following page is a brief summary of the repair and upgrade costs.

NMSU CAMPUS FUME HOOD COST SUMMARY			
Recommendation	Cost/Hood	Number of Hoods	Total Cost
Building: FOSTER HALL			
Install hood stops	$218	3	$653
Install Fume Hood Monitor	$4,802	2	$9,604
Fix Exhaust Fan or Install New	$3,694	1	$3,694
Replace Fume Hood	$21,463	1	$21,463
Retro Commission Building	$54,000	1	$54,000
	Total Cost for Inspected Items:		**$89,413**
Building: SKEEN HALL			
Install hood stops	$218	6	$1,305
Calibrate Fume Hood Monitors	$1,089	4	$4,355
	Total Cost for Inspected Items:		**$5,660**
Building: GERALD THOMAS HALL			
Install hood stops	$218	18	$3,915
Install Fume Hood Monitor	$4,802	17	$81,631
Fix Exhaust Fan or Install New	$3,694	2	$7,388
Replace Fume Hood	$21,463	12	$257,553
Rebalance Fume Hood	$1,416	10	$14,162
Relocate Diffuser	$647	1	$647
	Total Cost for Inspected Items:		**$365,297**
Building: WOOTEN HALL			
Install hood stops	$218	2	$435
Calibrate Fume Hood Monitors	$1,089	2	$2,178
	Total Cost for Inspected Items:		**$2,613**
Building: New Mexico Department of Agriculture			
Install hood stops	$218	4	$870
Install Fume Hood Monitor	$4,802	4	$19,207
Fix Exhaust Fan or Install New	$3,694	2	$7,388
Rebalance Fume Hood	$1,416	3	$4,249
Relocate Diffuser	$647	2	$1,295
	Total Cost for Inspected Items:		**$33,009**
Building: ENGINEERING COMPLEX 1			
Install hood stops	$218	2	$435
Install Fume Hood Monitor	$4,802	1	$4,802
	Total Cost for Inspected Items:		**$5,237**
Gross Cost for ALL Inspection Items	**$501,228**		

APPENDIX A

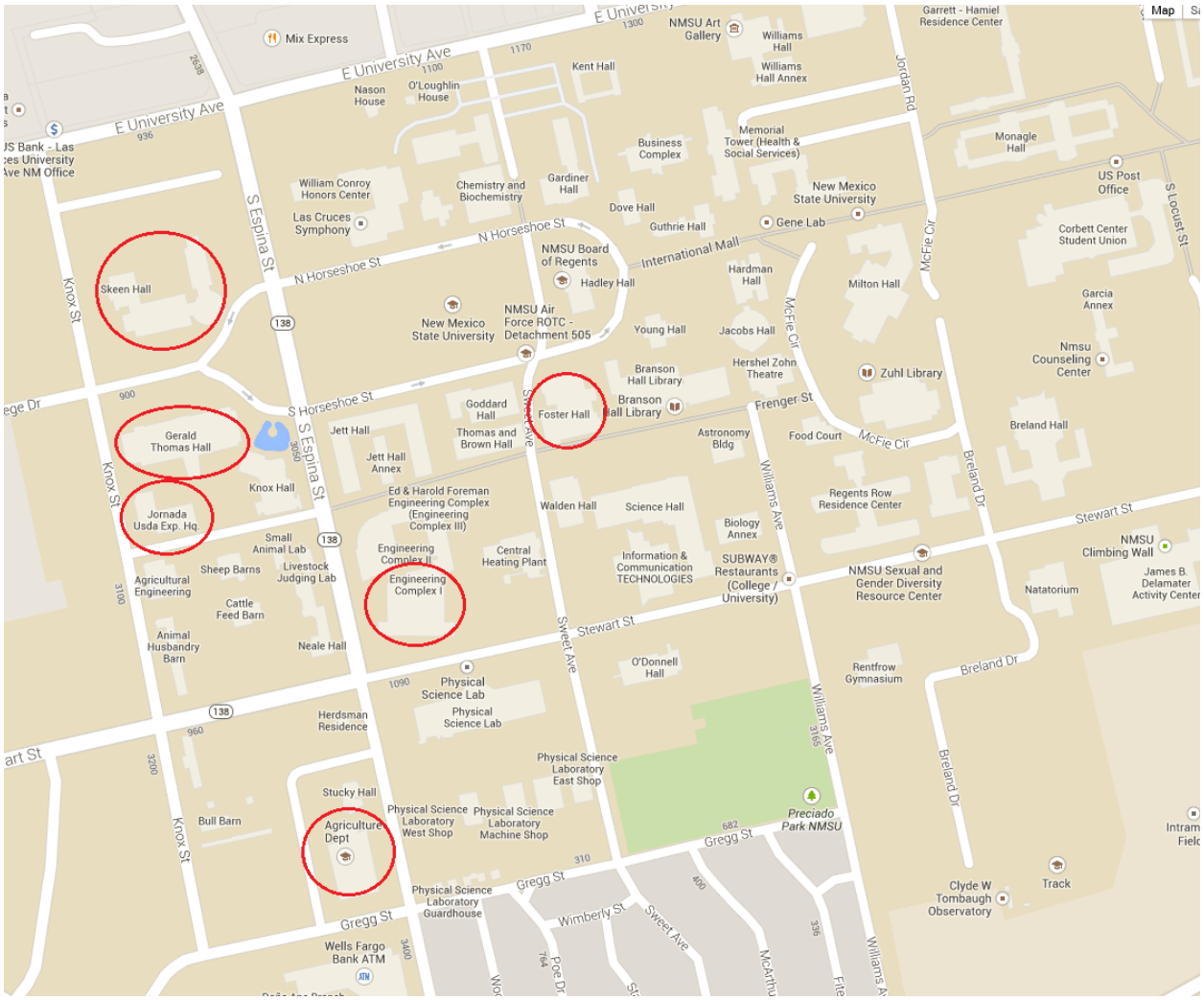
Campus Map

HUITT-ZOLLARS

New Mexico State University
Las Cruces, New Mexico
Analysis of Campus Fume Hoods

Project Number: R140294.06

DATE: 03/05/2014

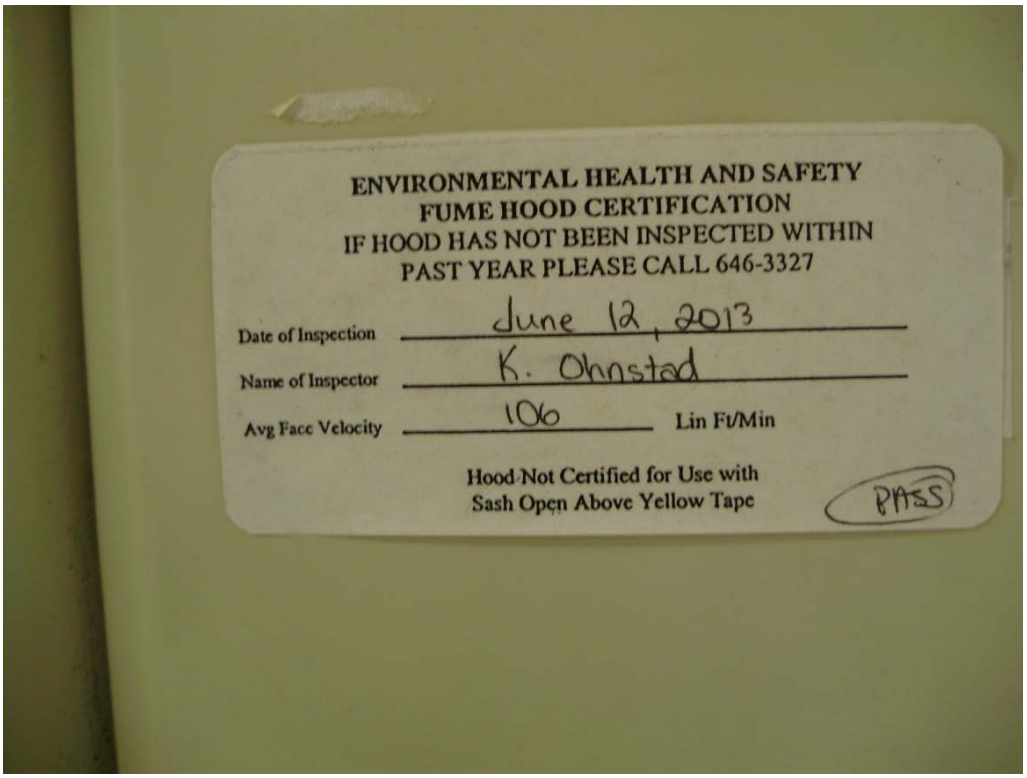


APPENDIX B

Exhaust Hood Summary Sheets

Exhaust Hood Summary Sheet	
Building Name:	Foster Hall
Building Room ID:	220
Equipment Identification	FH.220
Date of Survey	12/19/2013
Measured Average Flow	115 fpm
Flow Station Measured Flow	No Flow Station
Flow at Last Inspection	106 fpm
Last Inspection Date:	6/12/2013
Pass Inspection (Y/N):	Yes
Equipment Type:	Lab Fume Hood
Equipment Manufacturer	Not Listed
Signage in Place:	Yes
Sash (Y/N):	Yes
Sash Opening Distance:	11" x 60"
Sash Motion:	Vertical
Sash Stops (Y/N)	No
Connected to Other Hoods (Y/N):	No
Hood Fan Switch (Y/N):	No
Damper (Y/N):	Not Visible
Caustic Chemicals Used (type)	Yes (Various Acids including Hydrochloric)
Hood Monitor:	No Monitor
Air Flow Station:	No Airflow Station Visible
Volume Control:	Constant Volume at Hood
Alarms:	None
Make-Up Air (Y/N)	No Dedicated Makeup-Air
Condition Rating (Green, Yellow, Red)	Yellow
Comment	Lab would benefit from adding appropriate fume hood monitor and alarm.


Wear Your Safety Glasses
Wear Your GLOVES
NOTICE


ENVIRONMENTAL HEALTH AND SAFETY
FUME HOOD CERTIFICATION
IF HOOD HAS NOT BEEN INSPECTED WITHIN
PAST YEAR PLEASE CALL 646-3327
Date of Inspection June 12, 2013
Name of Inspector K. Ohnstad
Avg Face Velocity 106 Lin Ft/Min
Hood Not Certified for Use with
Sash Open Above Yellow Tape
PASS

Exhaust Hood Summary Sheet	
Building Name:	Foster Hall
Building Room ID:	120
Equipment Identification	FH.120
Date of Survey	12/19/2013
Measured Average Flow	200 fpm
Flow Station Measured Flow	No Flow Station
Flow at Last Inspection	56 fpm
Last Inspection Date:	5/29/2013
Pass Inspection (Y/N):	No
Equipment Type:	Lab Fume Hood
Equipment Manufacturer	Hemco
Signage in Place:	Yes
Sash (Y/N):	Yes
Sash Opening Distance:	9.5" x 50"
Sash Motion:	Vertical
Sash Stops (Y/N)	No
Connected to Other Hoods (Y/N):	No
Hood Fan Switch (Y/N):	Yes
Damper (Y/N):	No
Caustic Chemicals Used (type)	Unknown
Hood Monitor	No Monitor
Air Flow Station:	No Airflow Station
Volume Control:	Constant Volume at Hood
Alarms:	None
Make-Up Air (Y/N)	Through Supply
Condition Rating (Green, Yellow, Red)	Red
Comment	Lab would benefit from adding appropriate fume hood monitor and alarm. Failed Inspection, hood in poor condition. Consider replacing.


THIS EQUIPMENT HAS
LIMITED SERVICE
REASON: Failed OSHA Standard
Standard: 80-150 FPM
Actual: 61 FPM
A Hank: 54 FPM
DATE OF INSPECTION: 6/1/2013
* A work order will be submitted * 5/29/13
Questions: To EH&S, 646-3327
Reference: Equipment, Room, Building

Exhaust Hood Summary Sheet	
Building Name:	Foster Hall
Building Room ID:	441
Equipment Identification	FH.441
Date of Survey	12/19/2013
Measured Average Flow	173 fpm
Flow Station Measured Flow	171 fpm
Flow at Last Inspection	115 fpm
Last Inspection Date:	5/29/2013
Pass Inspection (Y/N):	Yes
Equipment Type:	Lab Fume Hood
Equipment Manufacturer	Mott
Signage in Place:	Yes
Sash (Y/N):	Yes
Sash Opening Distance:	12" x 16"
Sash Motion:	Vertical
Sash Stops (Y/N)	No
Connected to Other Hoods (Y/N):	Yes
Hood Fan Switch (Y/N):	No
Damper (Y/N):	Yes
Caustic Chemicals Used (type)	Unknown
Hood Monitor:	Yes, TEL AFA 1000
Air Flow Station:	Phoenix Airflow Monitor, Model 805
Volume Control:	Constant Volume at Hood
Alarms:	Yes
Make-Up Air (Y/N)	From Corridor
Condition Rating (Green, Yellow, Red)	Green
Comment	Hood in excellent condition, however, make-up air to hood is coming from the corridor.


AIR FLOW

Exhaust Hood Summary Sheet	
Building Name:	Skeen
Building Room ID:	W122
Equipment Identification	SKH.W122
Date of Survey	12/20/2013
Measured Average Flow	113 fpm
Flow Station Measured Flow	No Flow Displayed
Flow at Last Inspection	126 fpm
Last Inspection Date:	5/17/2013
Pass Inspection (Y/N):	Yes
Equipment Type:	Lab Fume Hood
Equipment Manufacturer	Fisher Hamilton
Signage in Place:	No
Sash (Y/N):	Yes
Sash Opening Distance:	10" x 62"
Sash Motion:	Vertical
Sash Stops (Y/N)	No
Connected to Other Hoods (Y/N):	Yes
Hood Fan Switch (Y/N):	No
Damper (Y/N):	Yes
Caustic Chemicals Used (type)	May be used for corrosive chemicals
Hood Monitor:	Safeaire by Fisher Scientific Model 54L048
Air Flow Station:	Yes, Not Visible
Volume Control:	Constant Volume at Hood
Alarms:	Yes
Make-Up Air (Y/N)	Through Supply
Condition Rating (Green, Yellow, Red)	Green
Comment	Hood needs Sash Stops. Hood monitor non operational. No NFPA Labeling.


FLAMMABLE
KEEP FIRE AWAY
CORROSIVES


WHEN FLASHING
Test
Reset
TEMPORARY SILENCE - PRESS UNTIL SILENT
PERMANENT SILENCE - PRESS UNTIL SIL
RE-ENABLE AUDIBLE - PRESS UNTIL AUDIBLE
TEST SYSTEM - PRESS UNTIL FLASHING
SAFEAIRE
FUME HOOD MONITOR
54L0480
Fisher Scientific

Exhaust Hood Summary Sheet	
Building Name:	Skeen
Building Room ID:	W138
Equipment Identification	SKH.W138.B
Date of Survey	12/20/2013
Measured Average Flow	147 fpm
Flow Station Measured Flow	133 fpm
Flow at Last Inspection	105 fpm
Last Inspection Date:	7/11/2013
Pass Inspection (Y/N):	Yes
Equipment Type:	Lab Fume Hood
Equipment Manufacturer	Fisher Hamilton
Signage in Place:	No
Sash (Y/N):	Yes
Sash Opening Distance:	12" x 62"
Sash Motion:	Vertical
Sash Stops (Y/N)	No
Connected to Other Hoods (Y/N):	No
Hood Fan Switch (Y/N):	No
Damper (Y/N):	Yes
Caustic Chemicals Used (type)	May be used for corrosive chemicals
Hood Monitor:	Safeaire by Fisher Scientific Model 54L048
Air Flow Station:	Not Visible
Volume Control:	Constant Volume at Hood
Alarms:	Yes
Make-Up Air (Y/N)	Through Supply
Condition Rating (Green, Yellow, Red)	Green
Comment	Hood needs Sash Stops. No NFPA Labeling


FLAMMABLE
KEEP FIRE AWAY
CORROSIVES


WHEN FLASHING
Test
Reset
TEMPORARY SILENCE - PRESS UNTIL SILENT
PERMANENT SILENCE - PRESS UNTIL SIL
RE-ENABLE AUDIBLE - PRESS UNTIL AUDIBLE
TEST SYSTEM - PRESS UNTIL FLASHING
SAFEAIRE
FUME HOOD MONITOR
54L0480
Fisher Scientific

Exhaust Hood Summary Sheet	
Building Name:	Skeen
Building Room ID:	W330
Equipment Identification	SKH.W330.A
Date of Survey	12/20/2013
Measured Average Flow	100 fpm
Flow Station Measured Flow	158 fpm
Flow at Last Inspection	93 fpm
Last Inspection Date:	9/17/2013
Pass Inspection (Y/N):	Yes
Equipment Type:	Lab Fume Hood
Equipment Manufacturer	Fisher Hamilton
Signage in Place:	Yes
Sash (Y/N):	Yes
Sash Opening Distance:	11" x 62"
Sash Motion:	Vertical
Sash Stops (Y/N)	No
Connected to Other Hoods (Y/N):	Yes
Hood Fan Switch (Y/N):	No
Damper (Y/N):	Yes
Caustic Chemicals Used (type)	May be used for corrosive chemicals
Hood Monitor:	Safeaire by Fisher Scientific Model 54L048
Air Flow Station:	Yes, Not Visible
Volume Control:	Constant Volume at Hood
Alarms:	Yes
Make-Up Air (Y/N)	Through Supply
Condition Rating (Green, Yellow, Red)	Green
Comment	Hood needs Sash Stops. Hood monitor may need calibration. No NFPA Labeling


WASTE
ACCUMULATION
POINT


Test
Reset
SAFEAIRE
FUME HOOD MONITOR
54L0480
Fisher Scientific

Exhaust Hood Summary Sheet	
Building Name:	Skeen
Building Room ID:	W330
Equipment Identification	SKH.W330.B
Date of Survey	12/20/2013
Measured Average Flow	120 fpm
Flow Station Measured Flow	95 fpm
Flow at Last Inspection	95.5 fpm
Last Inspection Date:	8/21/2013
Pass Inspection (Y/N):	Yes
Equipment Type:	Lab Fume Hood
Equipment Manufacturer	Fisher Hamilton
Signage in Place:	No
Sash (Y/N):	Yes
Sash Opening Distance:	11" x 62"
Sash Motion:	Vertical
Sash Stops (Y/N)	No
Connected to Other Hoods (Y/N):	Yes
Hood Fan Switch (Y/N):	No
Damper (Y/N):	Yes
Caustic Chemicals Used (type)	May be used for corrosive chemicals
Hood Monitor:	Safeaire by Fisher Scientific Model 54L048
Air Flow Station:	Yes, Not Visible
Volume Control:	Constant Volume at Hood
Alarms:	Yes
Make-Up Air (Y/N)	Through Supply
Condition Rating (Green, Yellow, Red)	Green
Comment	Hood needs Sash Stops. Hood monitor may need calibration. No NFPA Labeling


FLAMMABLE
KEEP FIRE AWAY
DANGER


Test
Reset
SAFEAIRE
FUME HOOD MONITOR
54L0480
Fisher Scientific

Exhaust Hood Summary Sheet	
Building Name:	Skeen
Building Room ID:	W342A
Equipment Identification	SKH.W342A.A
Date of Survey	12/20/2013
Measured Average Flow	173 fpm
Flow Station Measured Flow	116 fpm
Flow at Last Inspection	118 fpm
Last Inspection Date:	5/31/2013
Pass Inspection (Y/N):	Yes
Equipment Type:	Lab Fume Hood
Equipment Manufacturer	Fisher Hamilton
Signage in Place:	Yes
Sash (Y/N):	Yes
Sash Opening Distance:	11" x 62"
Sash Motion:	Vertical
Sash Stops (Y/N)	No
Connected to Other Hoods (Y/N):	Yes
Hood Fan Switch (Y/N):	No
Damper (Y/N):	Yes
Caustic Chemicals Used (type)	May be used for caustic chemicals
Hood Monitor:	Safeaire by Fisher Scientific Model 54L048
Air Flow Station:	Not Visible
Volume Control:	Variable Volume at Hood
Alarms:	Yes
Make-Up Air (Y/N)	Through Supply
Condition Rating (Green, Yellow, Red)	Green
Comment	Hood needs Sash Stops. Hood monitor reading much different than field measurement. May need calibration. No NFPA Labeling


CAUTION
HAZARDOUS
WASTE


SAFEAIRE
EMERG
PURGE
Fisher
Hamilton
54L0335
TEST
RESET
ALARM BEEPS
CALL OLGA

Exhaust Hood Summary Sheet	
Building Name:	Skeen
Building Room ID:	W356
Equipment Identification	SKH.W356
Date of Survey	12/20/2013
Measured Average Flow	128 fpm
Flow Station Measured Flow	"Low"
Flow at Last Inspection	None
Last Inspection Date:	5/31/2013
Pass Inspection (Y/N):	Yes
Equipment Type:	Lab Fume Hood
Equipment Manufacturer	Fisher Hamilton
Signage in Place:	Yes
Sash (Y/N):	Yes
Sash Opening Distance:	11" x 62"
Sash Motion:	Vertical
Sash Stops (Y/N)	No
Connected to Other Hoods (Y/N):	Yes
Hood Fan Switch (Y/N):	No
Damper (Y/N):	Yes
Caustic Chemicals Used (type)	May be used for caustic chemicals
Hood Monitor:	Safeaire by Fisher Scientific Model 54L048
Air Flow Station:	Not Visible
Volume Control:	Variable Volume at Hood
Alarms:	Yes, In Alarm During Survey
Make-Up Air (Y/N)	Through Supply
Condition Rating (Green, Yellow, Red)	Yellow
Comment	Hood needs Sash Stops. Hood in silent low flow alarm at time of survey. Hood monitor and flow station may need calibration. No NFPA Labeling

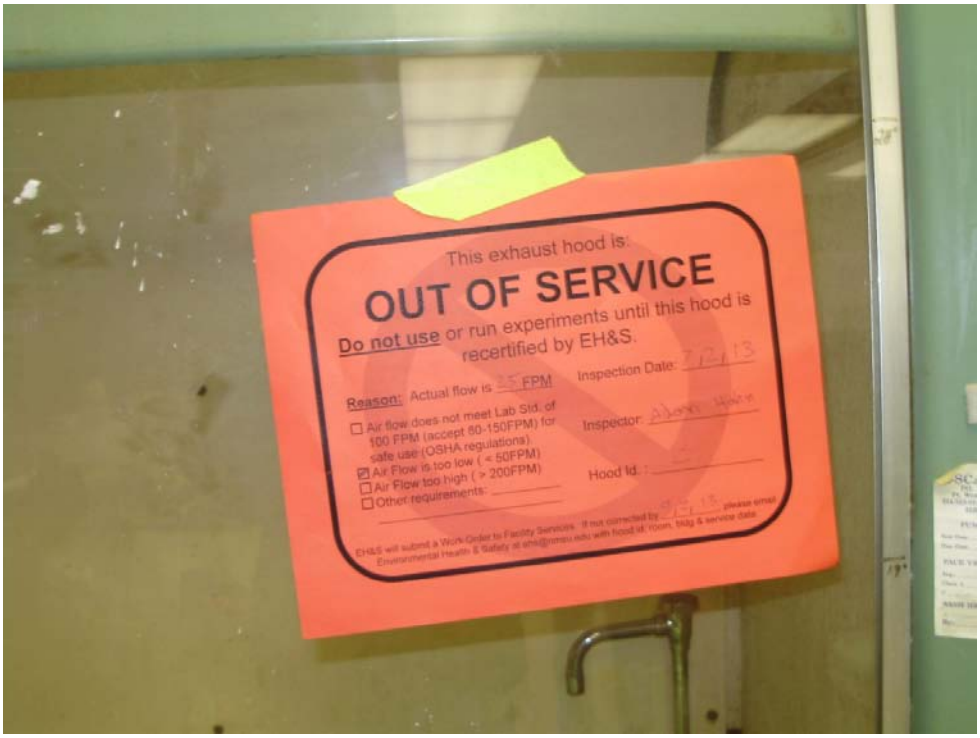

Test
Reset
WHEN FLASHING
TEMPORARY SILENCE - PRESS UNTIL SILENT
PERMANENT SILENCE - PRESS UNTIL SIL
RE-ENABLE AUDIBLE - PRESS UNTIL AUDIBLE
TEST SYSTEM - PRESS UNTIL FLASHING
SAFEAIRE
FUME HOOD MONITOR
54L0480
Fisher Scientific

Exhaust Hood Summary Sheet	
Building Name:	Gerald Thomas
Building Room ID:	W206
Equipment Identification	GT.W206.A
Date of Survey	12/20/2013
Measured Average Flow	108 fpm
Flow Station Measured Flow	N/A
Flow at Last Inspection	83 fpm
Last Inspection Date:	7/2/2013
Pass Inspection (Y/N):	Yes
Equipment Type:	Lab Fume Hood
Equipment Manufacturer	No Tag
Signage in Place:	No
Sash (Y/N):	Yes
Sash Opening Distance:	10" x 64"
Sash Motion:	Vertical
Sash Stops (Y/N)	No
Connected to Other Hoods (Y/N):	Yes
Hood Fan Switch (Y/N):	Yes
Damper (Y/N):	Manual
Caustic Chemicals Used (type)	No
Hood Monitor:	None
Air Flow Station:	None
Volume Control:	Constant Volume
Alarms:	None
Make-Up Air (Y/N)	Through Return
Condition Rating (Green, Yellow, Red)	Red
Comment	No hood monitor, unit is old and should be replaced. Rebalance Dampers

Exhaust Hood Summary Sheet	
Building Name:	Gerald Thomas
Building Room ID:	W206
Equipment Identification	GW.W206.B
Date of Survey	12/20/2013
Measured Average Flow	218 fpm
Flow Station Measured Flow	N/A
Flow at Last Inspection	289 fpm
Last Inspection Date:	7/2/2013
Pass Inspection (Y/N):	No
Equipment Type:	Lab Fume Hood
Equipment Manufacturer	Labconco
Signage in Place:	Yes
Sash (Y/N):	Yes
Sash Opening Distance:	16" x 41"
Sash Motion:	Vertical
Sash Stops (Y/N)	No
Connected to Other Hoods (Y/N):	Yes
Hood Fan Switch (Y/N):	Yes
Damper (Y/N):	Manual
Caustic Chemicals Used (type)	No
Hood Monitor:	None
Air Flow Station:	None
Volume Control:	Constant Volume
Alarms:	None
Make-Up Air (Y/N)	Through Return
Condition Rating (Green, Yellow, Red)	Red
Comment	No hood monitor, unit B sold and marked as having "limited service", consider replacing. Rebalance Dampers


LABCONCO
LIMITED SERVICE

Exhaust Hood Summary Sheet	
Building Name:	Gerald Thomas
Building Room ID:	W200
Equipment Identification	GT.W200
Date of Survey	12/20/2013
Measured Average Flow	0 fpm
Flow Station Measured Flow	N/A
Flow at Last Inspection	26 fpm
Last Inspection Date:	7/2/2013
Pass Inspection (Y/N):	No
Equipment Type:	Lab Fume Hood
Equipment Manufacturer	No ID
Signage in Place:	Yes
Sash (Y/N):	Yes
Sash Opening Distance:	12" x 39"
Sash Motion:	Vertical
Sash Stops (Y/N)	No
Connected to Other Hoods (Y/N):	No
Hood Fan Switch (Y/N):	Yes
Damper (Y/N):	N/A
Caustic Chemicals Used (type)	No Caustics Observed
Hood Monitor:	None
Air Flow Station:	None
Volume Control:	Constant Volume
Alarms:	None
Make-Up Air (Y/N)	Through Return
Condition Rating (Green, Yellow, Red)	Red
Comment	Marked as "Out of Service", no flow. Consider replacing unit.


This exhaust hood is:
OUT OF SERVICE
Do not use or run experiments until this hood is recertified by EH&S.
Reason: Actual flow is 25 FPM
Inspection Date: 7/2/13
☐ Air flow does not meet Lab Std. of 100 FPM (accept 80-150FPM) for safe use (OSHA regulations)
☑ Air Flow is too low (< 50FPM)
☐ Air Flow too high (> 200FPM)
☐ Other requirements:
Inspector:
Hood Id.:

Exhaust Hood Summary Sheet	
Building Name:	Gerald Thomas
Building Room ID:	250
Equipment Identification	GT.250
Date of Survey	12/20/2013
Measured Average Flow	190 fpm
Flow Station Measured Flow	N/A
Flow at Last Inspection	84 fpm
Last Inspection Date:	7/2/2013
Pass Inspection (Y/N):	Yes
Equipment Type:	Lab Fume Hood
Equipment Manufacturer	No ID
Signage in Place:	No
Sash (Y/N):	Yes
Sash Opening Distance:	6" x 43"
Sash Motion:	Vertical
Sash Stops (Y/N)	No
Connected to Other Hoods (Y/N):	No
Hood Fan Switch (Y/N):	Yes
Damper (Y/N):	No
Caustic Chemicals Used (type)	Corrosive Chemicals
Hood Monitor:	None
Air Flow Station:	No
Volume Control:	Constant Volume
Alarms:	No
Make-Up Air (Y/N)	Through Return Chase
Condition Rating (Green, Yellow, Red)	Red
Comment	Exhaust Shut Off, Hood old and in poor condition, consider replacing.

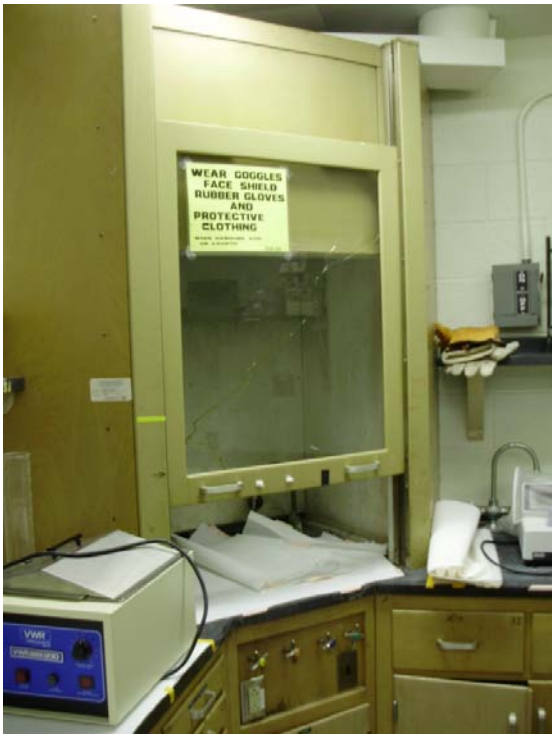

Waste
Accumulation
Point

Exhaust Hood Summary Sheet	
Building Name:	Gerald Thomas
Building Room ID:	262
Equipment Identification	GT.262
Date of Survey	12/20/2013
Measured Average Flow	155 fpm
Flow Station Measured Flow	N/A
Flow at Last Inspection	None
Last Inspection Date:	7/3/2103
Pass Inspection (Y/N):	Yes
Equipment Type:	Lab Fume Hood
Equipment Manufacturer	No ID
Signage in Place:	No
Sash (Y/N):	Yes
Sash Opening Distance:	16" x 41"
Sash Motion:	Vertical
Sash Stops (Y/N)	No
Connected to Other Hoods (Y/N):	No
Hood Fan Switch (Y/N):	Yes
Damper (Y/N):	No
Caustic Chemicals Used (type)	No
Hood Monitor:	None
Air Flow Station:	No
Volume Control:	Constant Volume
Alarms:	No
Make-Up Air (Y/N)	Through Return Chase
Condition Rating (Green, Yellow, Red)	Red
Comment	No monitor, Old, consider replacing.

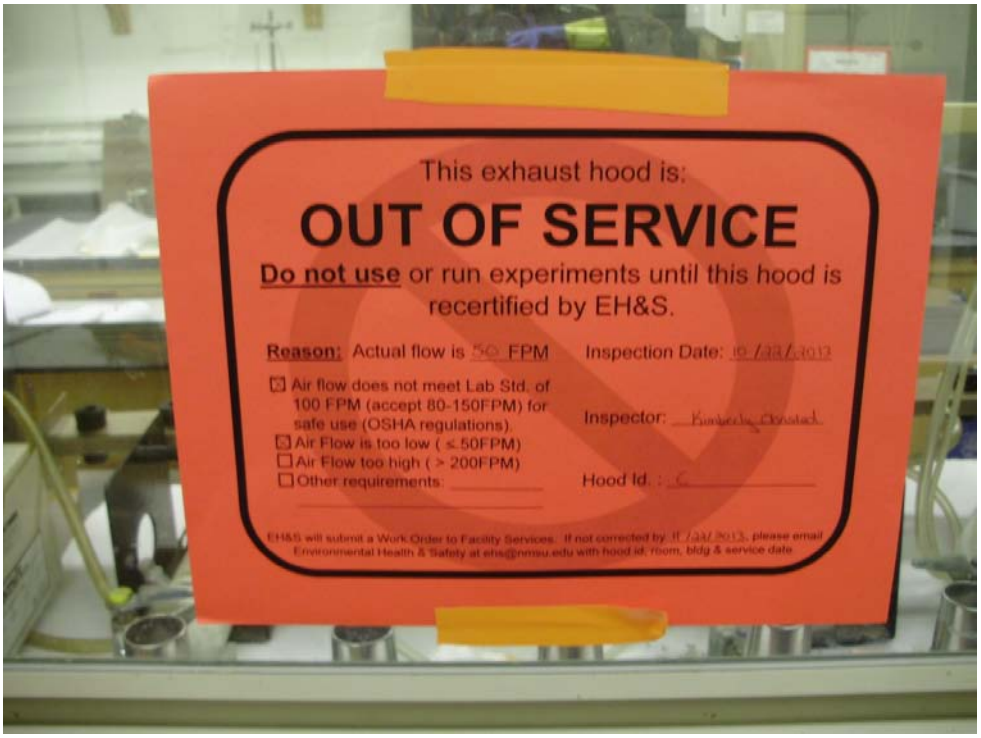
Exhaust Hood Summary Sheet	
Building Name:	Gerald Thomas
Building Room ID:	268
Equipment Identification	GT.268
Date of Survey	12/20/2013
Measured Average Flow	450 fpm
Flow Station Measured Flow	N/A
Flow at Last Inspection	N/A
Last Inspection Date:	None
Pass Inspection (Y/N):	No
Equipment Type:	Lab Fume Hood
Equipment Manufacturer	No ID
Signage in Place:	No
Sash (Y/N):	Yes
Sash Opening Distance:	18" x 54"
Sash Motion:	Vertical
Sash Stops (Y/N)	No
Connected to Other Hoods (Y/N):	No
Hood Fan Switch (Y/N):	Yes
Damper (Y/N):	No
Caustic Chemicals Used (type)	Acid/Caustic
Hood Monitor:	None
Air Flow Station:	No
Volume Control:	Constant Volume
Alarms:	No
Make-Up Air (Y/N)	Through Return Chase
Condition Rating (Green, Yellow, Red)	Red
Comment	No inspection sticker, flow too high, old, consider replacing.

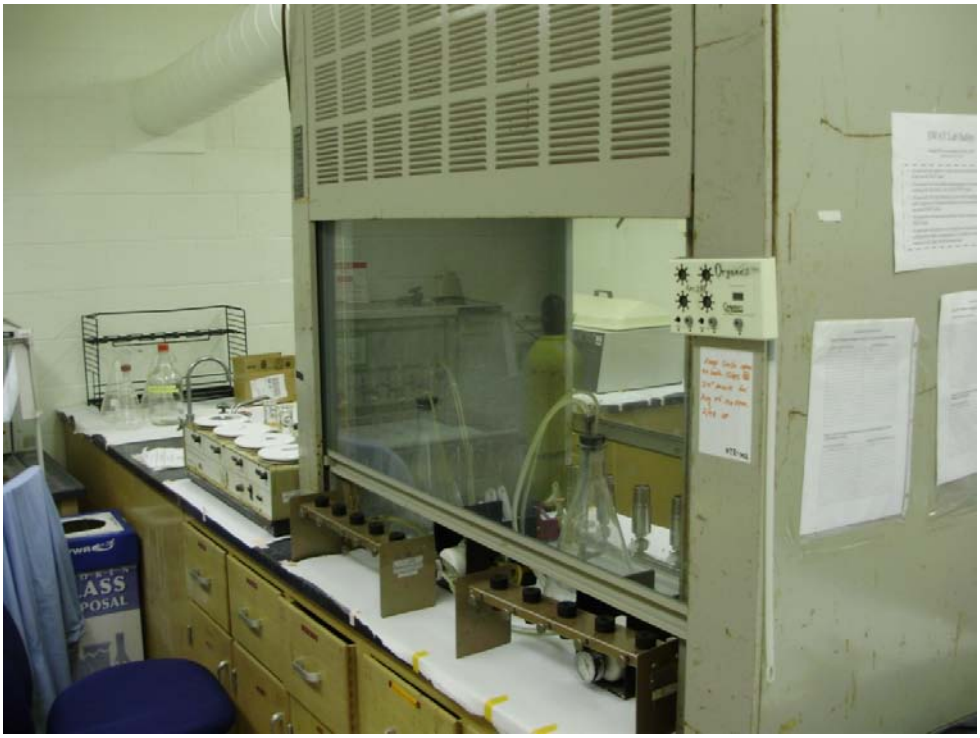

WEAR GOGGLES
FACE SHIELD
RUBBER GLOVES
AND
PROTECTIVE
CLOTHING

Exhaust Hood Summary Sheet	
Building Name:	Gerald Thomas
Building Room ID:	272
Equipment Identification	GT.272
Date of Survey	12/20/2013
Measured Average Flow	275 fpm
Flow Station Measured Flow	N/A
Flow at Last Inspection	150 fpm
Last Inspection Date:	7/3/2103
Pass Inspection (Y/N):	Yes
Equipment Type:	Lab Fume Hood
Equipment Manufacturer	No ID
Signage in Place:	No
Sash (Y/N):	Yes
Sash Opening Distance:	11" x 29"
Sash Motion:	Vertical
Sash Stops (Y/N)	No
Connected to Other Hoods (Y/N):	No
Hood Fan Switch (Y/N):	Yes
Damper (Y/N):	No
Caustic Chemicals Used (type)	Acid/Caustic
Hood Monitor:	None
Air Flow Station:	No
Volume Control:	Constant Volume
Alarms:	No
Make-Up Air (Y/N)	Through Return Chase
Condition Rating (Green, Yellow, Red)	Red
Comment	Glass is cracked, poor construction for exhaust duct, no hood monitor. Consider replacing.


WEAR GOGGLES
FACE SHIELD
RUBBER GLOVES
AND
PROTECTIVE
CLOTHING

Exhaust Hood Summary Sheet	
Building Name:	Gerald Thomas
Building Room ID:	273
Equipment Identification	GT.273.C
Date of Survey	12/20/2013
Measured Average Flow	None
Flow Station Measured Flow	None
Flow at Last Inspection	50 fpm
Last Inspection Date:	10/22/2013
Pass Inspection (Y/N):	No
Equipment Type:	Lab Fume Hood
Equipment Manufacturer	No ID
Signage in Place:	Yes
Sash (Y/N):	Yes (two sides)
Sash Opening Distance:	24" x 54"
Sash Motion:	Vertical
Sash Stops (Y/N)	No
Connected to Other Hoods (Y/N):	No
Hood Fan Switch (Y/N):	Yes (two sides)
Damper (Y/N):	No
Caustic Chemicals Used (type)	No Caustic Chemicals Observed
Hood Monitor:	None
Air Flow Station:	No
Volume Control:	Constant Volume
Alarms:	No
Make-Up Air (Y/N)	Through Return Chase
Condition Rating (Green, Yellow, Red)	Red
Comment	Doesn't pass minimum flow requirements, monitors don't seem to be operating correctly. Consider Replacing. Location may cause operational concerns with nearby hoods.


This exhaust hood is:
OUT OF SERVICE
Do not use or run experiments until this hood is recertified by EH&S.
Reason: Actual flow is 50 FPM
Inspection Date: 10/23/2013
Air flow does not meet Lab Std. of 100 FPM (accept 80-150FPM) for safe use (OSHA regulations).
Air Flow is too low (≤ 50FPM)
Air Flow too high (> 200FPM)
Other requirements:
Inspector: Kimberly Donald
Hood Id. : 6
EH&S will submit a Work Order to Facility Services. If not corrected by 11/23/2013, please email Environmental Health & Safety at ehs@nmsu.edu with hood id, room, bldg & service date.




Organics
Rm 293
Organics
REAR — L — FRONT
REAR — R — FRONT
OVEN
Keep Sash open
on both sides @
24" mark for
Avg of 140 FPM
2/98 HP
NTE-002

Exhaust Hood Summary Sheet	
Building Name:	Gerald Thomas
Building Room ID:	273
Equipment Identification	GT.273.A
Date of Survey	12/20/2013
Measured Average Flow	155 fpm
Flow Station Measured Flow	N/A
Flow at Last Inspection	117 fpm
Last Inspection Date:	7/3/2013
Pass Inspection (Y/N):	Yes
Equipment Type:	Lab Fume Hood
Equipment Manufacturer	No ID
Signage in Place:	No
Sash (Y/N):	Yes
Sash Opening Distance:	12" x 41"
Sash Motion:	Vertical
Sash Stops (Y/N)	No
Connected to Other Hoods (Y/N):	No
Hood Fan Switch (Y/N):	Yes
Damper (Y/N):	No
Caustic Chemicals Used (type)	No Caustic Chemicals Observed
Hood Monitor:	None
Air Flow Station:	No
Volume Control:	Constant Volume
Alarms:	No
Make-Up Air (Y/N)	Through Return Chase
Condition Rating (Green, Yellow, Red)	Red
Comment	Unit is old, no monitor or alarm in place. Consider replacing. Location may cause operational concerns with nearby hoods.


NOTICE
NO


DID YOU
TURN OFF
THE NITROGEN??

Exhaust Hood Summary Sheet	
Building Name:	Gerald Thomas
Building Room ID:	273
Equipment Identification	GT.273.B
Date of Survey	12/20/2013
Measured Average Flow	None
Flow Station Measured Flow	N/A
Flow at Last Inspection	180 fpm
Last Inspection Date:	7/3/2013
Pass Inspection (Y/N):	Yes
Equipment Type:	Lab Fume Hood
Equipment Manufacturer	Labconco
Signage in Place:	No
Sash (Y/N):	Yes
Sash Opening Distance:	9" x 46"
Sash Motion:	Swing
Sash Stops (Y/N)	No
Connected to Other Hoods (Y/N):	No
Hood Fan Switch (Y/N):	Yes
Damper (Y/N):	No
Caustic Chemicals Used (type)	Nitrogen, Non Caustic Asphyxiate
Hood Monitor:	None
Air Flow Station:	No
Volume Control:	Constant Volume
Alarms:	No
Make-Up Air (Y/N)	Through Return Chase
Condition Rating (Green, Yellow, Red)	Yellow
Comment	Could combine hood exhaust with Hood A. Needs adequate make-up air. Location may cause operational concerns with nearby hoods.


NITROGEN
CAUTION
LABCONCO
VWR


MERGENCY
NMSU/CAHE I
NMSU/CAHE PROPERTY
AGHT 000841
VWR
MANUFACTURED FOR VWR Scientific
NEW MEXICO STATE UNIVERSITY
116319

Exhaust Hood Summary Sheet	
Building Name:	Gerald Thomas
Building Room ID:	356
Equipment Identification	GT.356
Date of Survey	12/20/2013
Measured Average Flow	160 fpm
Flow Station Measured Flow	N/A
Flow at Last Inspection	96 fpm
Last Inspection Date:	7/3/2012
Pass Inspection (Y/N):	Yes
Equipment Type:	Lab Fume Hood
Equipment Manufacturer	Labconco
Signage in Place:	No
Sash (Y/N):	Yes
Sash Opening Distance:	10.5" x 60"
Sash Motion:	Vertical
Sash Stops (Y/N)	No
Connected to Other Hoods (Y/N):	No
Hood Fan Switch (Y/N):	Yes
Damper (Y/N):	No
Caustic Chemicals Used (type)	No Acids Recommended
Hood Monitor:	None
Air Flow Station:	No
Volume Control:	Constant Volume
Alarms:	No
Make-Up Air (Y/N)	Through Return Chase
Condition Rating (Green, Yellow, Red)	Red
Comment	No indication for sash height, lacks alarms and fume hood monitor.


WEAR GOGGLES
FACE SHIELD
RUBBER GLOVES
AND
PROTECTIVE
CLOTHING


LABCONCO
LABCONCO CORPORATION
KANSAS CITY MISSOURI 64132
CATALOG NO.
SERIAL NO.
59000
40584
VOLTS A.C.
PHASE
CYCLE
AMP.
115
1
60
THIS FUME HOOD IS NOT RECOMMENDED
FOR USE WITH PERCHLORIC ACID
LABCONCO CORPORATION KANSAS CITY, MISSOURI 64132

Exhaust Hood Summary Sheet	
Building Name:	Gerald Thomas
Building Room ID:	326
Equipment Identification	GT.326
Date of Survey	12/20/2013
Measured Average Flow	Out of Service
Flow Station Measured Flow	Out of Service
Flow at Last Inspection	0 fpm
Last Inspection Date:	4/24/2012
Pass Inspection (Y/N):	No
Equipment Type:	Lab Fume Hood
Equipment Manufacturer	No ID
Signage in Place:	Yes
Sash (Y/N):	Yes
Sash Opening Distance:	9.5" x 41"
Sash Motion:	Vertical
Sash Stops (Y/N)	Yes
Connected to Other Hoods (Y/N):	No
Hood Fan Switch (Y/N):	Yes
Damper (Y/N):	No
Caustic Chemicals Used (type)	Unknown
Hood Monitor:	None
Air Flow Station:	No
Volume Control:	Constant Volume
Alarms:	No
Make-Up Air (Y/N)	Through Return Chase
Condition Rating (Green, Yellow, Red)	Red
Comment	Out of Service, last inspection in 2012. Marked as "extremely dangerous" Consider replacing or removing.


DANGER
ACID


Extremely Dangerous
THIS EQUIPMENT IS OUT OF SERVICE
REASON: FAILED OSHA STANDARD AT 36 FPM - NEEDED 80-150 RANGE, IDEAL IS 100 FPM
New actual = 11 FPM
DATE OF INSPECTION: 4/28/2011, 5/25/2011, 4/24/2012
* A work order will be submitted *
Before Resubmitting Another W/O contact
Questions: To EH&S, 646-3327
Reference: Equipment, Room, Building
646-4604
Fernie Ortega

Exhaust Hood Summary Sheet	
Building Name:	Gerald Thomas
Building Room ID:	W300
Equipment Identification	GT.W300
Date of Survey	12/20/2013
Measured Average Flow	65 fpm
Flow Station Measured Flow	N/A
Flow at Last Inspection	84 fpm
Last Inspection Date:	7/3/2013
Pass Inspection (Y/N):	Yes
Equipment Type:	Lab Fume Hood
Equipment Manufacturer	No ID
Signage in Place:	No
Sash (Y/N):	Yes
Sash Opening Distance:	14" x 694"
Sash Motion:	Vertical
Sash Stops (Y/N)	No
Connected to Other Hoods (Y/N):	No
Hood Fan Switch (Y/N):	Yes
Damper (Y/N):	Unknown
Caustic Chemicals Used (type)	Corrosive Chemicals Could be Used
Hood Monitor:	None
Air Flow Station:	No
Volume Control:	Constant Volume
Alarms:	No
Make-Up Air (Y/N)	Through Return Chase
Condition Rating (Green, Yellow, Red)	Red
Comment	No hood monitor, low performance, consider replacing. No NFPA Labeling


HOOD
W1
W2
CAUTION
CORROSIVE

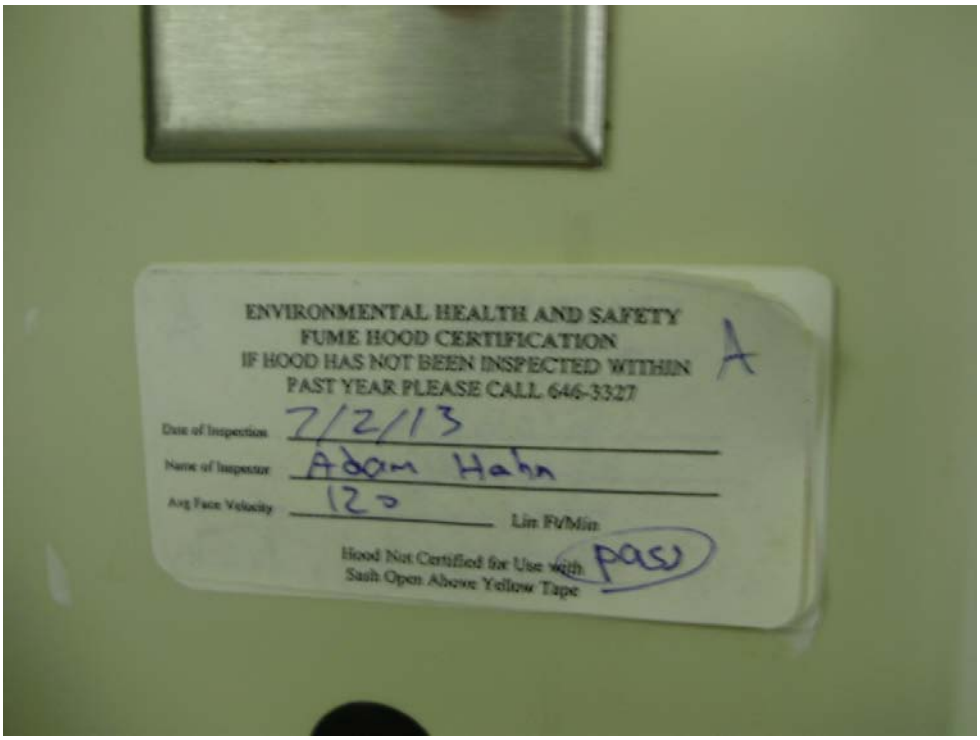
Exhaust Hood Summary Sheet	
Building Name:	Gerald Thomas
Building Room ID:	155
Equipment Identification	GT.155
Date of Survey	12/20/2013
Measured Average Flow	75 fpm
Flow Station Measured Flow	84 fpm
Flow at Last Inspection	84 fpm
Last Inspection Date:	7/2/2013
Pass Inspection (Y/N):	Yes
Equipment Type:	Lab Fume Hood
Equipment Manufacturer	Kewaunee
Signage in Place:	Yes, Emergency Procedures
Sash (Y/N):	Yes
Sash Opening Distance:	12" x 64"
Sash Motion:	Vertical & Horizontal
Sash Stops (Y/N)	No
Connected to Other Hoods (Y/N):	No
Hood Fan Switch (Y/N):	Yes
Damper (Y/N):	Yes
Caustic Chemicals Used (type)	Potentially Caustic
Hood Monitor:	Kewaunee Air Alert 600
Air Flow Station:	Unknown
Volume Control:	Constant Volume
Alarms:	No
Make-Up Air (Y/N)	Through Return Chase
Condition Rating (Green, Yellow, Red)	Yellow
Comment	Not enough flow. Check Exhaust Fan


CAUTION
KEWAUNEE


AIRFLOW MONITOR
81
KEWAUNEE
AIR ALERT

Exhaust Hood Summary Sheet	
Building Name:	Gerald Thomas
Building Room ID:	159W
Equipment Identification	GT.159W.A
Date of Survey	12/20/2013
Measured Average Flow	290 fpm
Flow Station Measured Flow	N/A
Flow at Last Inspection	128 fpm
Last Inspection Date:	7/15/2013
Pass Inspection (Y/N):	Yes
Equipment Type:	Lab Fume Hood
Equipment Manufacturer	No ID
Signage in Place:	No
Sash (Y/N):	Yes
Sash Opening Distance:	13" x 36"
Sash Motion:	Vertical
Sash Stops (Y/N)	No
Connected to Other Hoods (Y/N):	No
Hood Fan Switch (Y/N):	Yes
Damper (Y/N):	No
Caustic Chemicals Used (type)	No Corrosive Chemicals Observed
Hood Monitor:	None
Air Flow Station:	No
Volume Control:	Constant Volume
Alarms:	No
Make-Up Air (Y/N)	Through Return Chase
Condition Rating (Green, Yellow, Red)	Yellow
Comment	Relatively New, supply diffuser directly in front of fume hood. Add fume hood monitor.

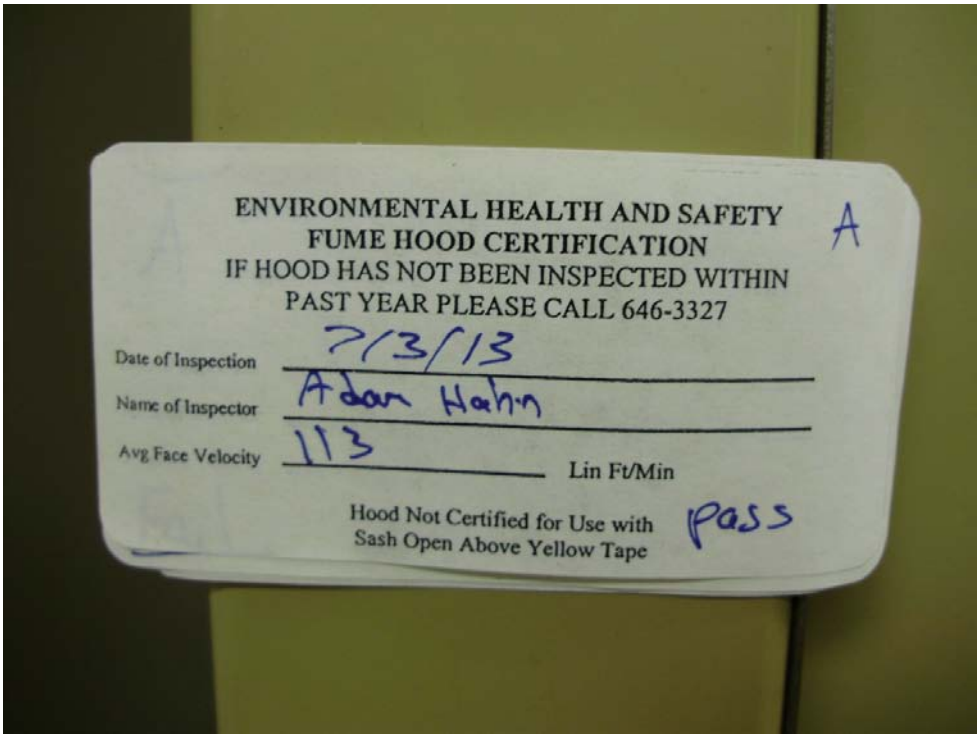

CAUTION
CAUTION
FLAMMABLE


ENVIRONMENTAL HEALTH AND SAFETY
FUME HOOD CERTIFICATION
IF HOOD HAS NOT BEEN INSPECTED WITHIN
PAST YEAR PLEASE CALL 646-3327
A
Date of Inspection 7/2/13
Name of Inspector Adam Hahn
Avg Face Velocity 120 Lin Ft/Min
Hood Not Certified for Use with Sash Open Above Yellow Tape
pass

Exhaust Hood Summary Sheet	
Building Name:	Gerald Thomas
Building Room ID:	159E
Equipment Identification	GT.159E.B
Date of Survey	12/20/2013
Measured Average Flow	300 fpm
Flow Station Measured Flow	N/A
Flow at Last Inspection	127 fpm
Last Inspection Date:	7/15/2013
Pass Inspection (Y/N):	Yes
Equipment Type:	Lab Fume Hood
Equipment Manufacturer	No ID
Signage in Place:	No
Sash (Y/N):	Yes
Sash Opening Distance:	15" X 36"
Sash Motion:	Vertical
Sash Stops (Y/N)	No
Connected to Other Hoods (Y/N):	No
Hood Fan Switch (Y/N):	Yes
Damper (Y/N):	No
Caustic Chemicals Used (type)	No Corrosive Chemicals Observed
Hood Monitor:	None
Air Flow Station:	No
Volume Control:	Constant Volume
Alarms:	No
Make-Up Air (Y/N)	Through Return Chase
Condition Rating (Green, Yellow, Red)	Yellow
Comment	Relatively New, supply diffuser directly in front of fume hood.

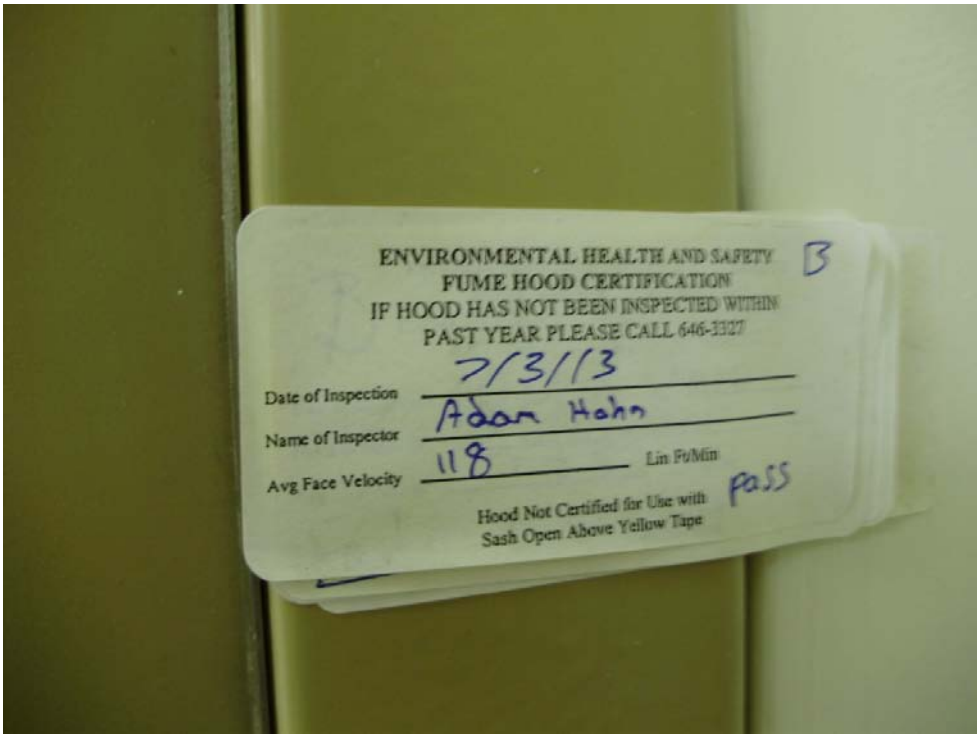

CAUTION
CAUTION

Exhaust Hood Summary Sheet	
Building Name:	Gerald Thomas
Building Room ID:	160W(A)
Equipment Identification	GT.160W.A
Date of Survey	12/20/2013
Measured Average Flow	175 fpm
Flow Station Measured Flow	N/A
Flow at Last Inspection	113 fpm
Last Inspection Date:	7/3/2013
Pass Inspection (Y/N):	Yes
Equipment Type:	Lab Fume Hood
Equipment Manufacturer	No ID
Signage in Place:	Yes
Sash (Y/N):	Yes
Sash Opening Distance:	16" x 41"
Sash Motion:	Vertical
Sash Stops (Y/N)	No
Connected to Other Hoods (Y/N):	Yes
Hood Fan Switch (Y/N):	Yes
Damper (Y/N):	No
Caustic Chemicals Used (type)	LiCl, EtOH, Ethanol etc
Hood Monitor:	None
Air Flow Station:	No
Volume Control:	Constant Volume
Alarms:	No
Make-Up Air (Y/N)	Through Return Chase
Condition Rating (Green, Yellow, Red)	Yellow
Comment	Unit is old, has no hood monitor. No NFPA Labeling


ENVIRONMENTAL HEALTH AND SAFETY
FUME HOOD CERTIFICATION
IF HOOD HAS NOT BEEN INSPECTED WITHIN
PAST YEAR PLEASE CALL 646-3327
A
Date of Inspection 7/3/13
Name of Inspector Adam Hahn
Avg Face Velocity 113 Lin Ft/Min
Hood Not Certified for Use with
Sash Open Above Yellow Tape
pass

Exhaust Hood Summary Sheet	
Building Name:	Gerald Thomas
Building Room ID:	160E(B)
Equipment Identification	GT.160E.B
Date of Survey	12/20/2013
Measured Average Flow	430 fpm
Flow Station Measured Flow	N/A
Flow at Last Inspection	118 fpm
Last Inspection Date:	7/3/2013
Pass Inspection (Y/N):	Yes
Equipment Type:	Lab Fume Hood
Equipment Manufacturer	No ID
Signage in Place:	Yes
Sash (Y/N):	Yes
Sash Opening Distance:	16" x 41"
Sash Motion:	Vertical
Sash Stops (Y/N)	No
Connected to Other Hoods (Y/N):	Yes
Hood Fan Switch (Y/N):	Yes
Damper (Y/N):	No
Caustic Chemicals Used (type)	LiCl, EtOH, Ethanol etc
Hood Monitor:	None
Air Flow Station:	No
Volume Control:	Constant Volume
Alarms:	No
Make-Up Air (Y/N)	Through Return Chase
Condition Rating (Green, Yellow, Red)	Yellow
Comment	Unit is old, has no hood monitor. No NFPA Labeling


WASTE
ACCUMULATION
POINT

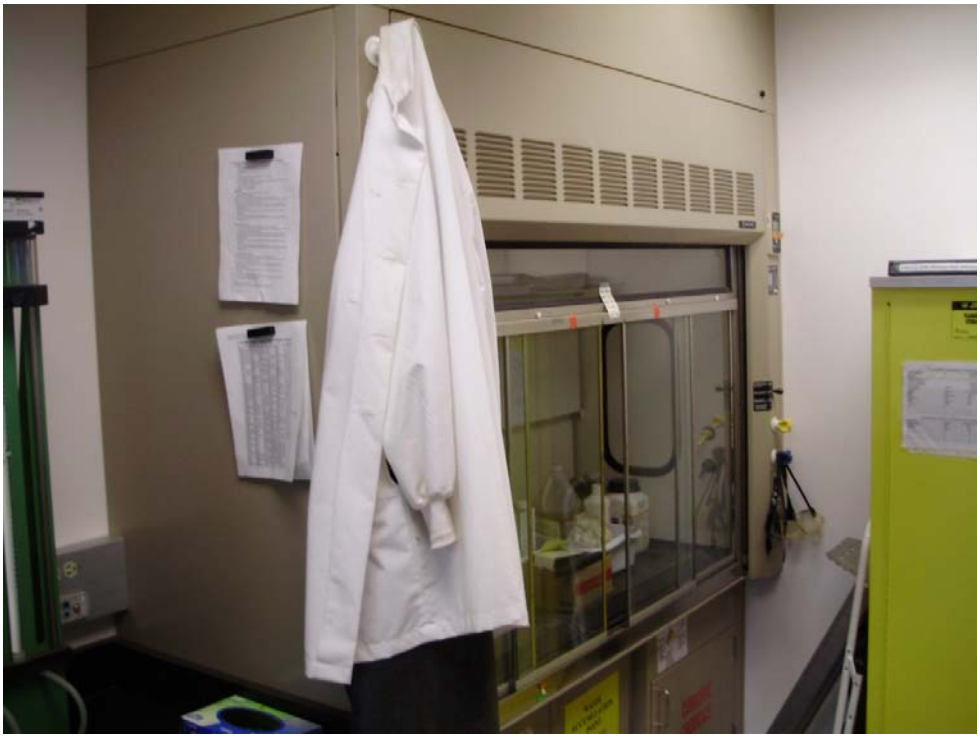

ENVIRONMENTAL HEALTH AND SAFETY
FUME HOOD CERTIFICATION
IF HOOD HAS NOT BEEN INSPECTED WITHIN
PAST YEAR PLEASE CALL 646-3327
B
Date of Inspection 7/3/13
Name of Inspector Adam Hahn
Avg Face Velocity 118 Lin Ft/Min
PASS
Hood Not Certified for Use with
Sash Open Above Yellow Tape

Exhaust Hood Summary Sheet	
Building Name:	Wooten Hall
Building Room ID:	259
Equipment Identification	WH.259
Date of Survey	12/20/2013
Measured Average Flow	32 fpm
Flow Station Measured Flow	Hi
Flow at Last Inspection	32.2 fpm
Last Inspection Date:	8/21/2013
Pass Inspection (Y/N):	No
Equipment Type:	Lab Fume Hood
Equipment Manufacturer	Fisher Hamilton
Signage in Place:	No
Sash (Y/N):	Yes
Sash Opening Distance:	32" x 62"
Sash Motion:	Vertical & Horizontal
Sash Stops (Y/N)	No
Connected to Other Hoods (Y/N):	No
Hood Fan Switch (Y/N):	Yes
Damper (Y/N):	Yes
Caustic Chemicals Used (type)	Corrosive Inorganic Acid
Hood Monitor:	Safeaire by Fisher Scientific Model 54L335
Air Flow Station:	Yes
Volume Control:	Variable Volume
Alarms:	Yes, In Hi Flow Alarm
Make-Up Air (Y/N)	Not Determined
Condition Rating (Green, Yellow, Red)	Red
Comment	Hood Scheduled to be removed, Out of Service. Supply diffuser too close to hood.


OUT OF SERVICE


ALARM
CAUTION
GOOD
SAFEAIRE
EMERG PURGE
Fisher Hamilton
TEST RESET
54L0335
ANNUAL LEV SURVEY
Bldg. No. Torreon Room No. 259
Identifier # Fume Hood Alcove
Fan EF 3 # 3A
Airflow 100 FPM Date 7-16-02
Test By R. Quiroga

Exhaust Hood Summary Sheet	
Building Name:	Wooten Hall
Building Room ID:	159
Equipment Identification	WH.159.A
Date of Survey	12/20/2013
Measured Average Flow	228 fpm
Flow Station Measured Flow	Not Calibrated
Flow at Last Inspection	113 fpm
Last Inspection Date:	8/21/2013
Pass Inspection (Y/N):	Yes
Equipment Type:	Lab Fume Hood
Equipment Manufacturer	Fisher Hamilton
Signage in Place:	Yes
Sash (Y/N):	Yes
Sash Opening Distance:	16" x 60"
Sash Motion:	Horizontal
Sash Stops (Y/N)	No
Connected to Other Hoods (Y/N):	No
Hood Fan Switch (Y/N):	No
Damper (Y/N):	Yes
Caustic Chemicals Used (type)	Corrosive Chemicals Used
Hood Monitor:	Safeaire by Fisher Scientific Model 54L335
Air Flow Station:	Needs Calibration
Volume Control:	Variable Volume
Alarms:	Yes
Make-Up Air (Y/N)	Yes
Condition Rating (Green, Yellow, Red)	Green
Comment	Calibrate fume hood monitor




ALARM
CAUTION
GOOD
WARNING
Unit is not calibrated!
Remove label only after field calibration is complete.
Fisher Hamilton
54L0335
TEST
RESET
LABORATORY FUME HOOD

Exhaust Hood Summary Sheet	
Building Name:	Wooten Hall
Building Room ID:	169
Equipment Identification	WH.169.B
Date of Survey	12/20/2013
Measured Average Flow	270 fpm
Flow Station Measured Flow	None Displayed
Flow at Last Inspection	107 fpm
Last Inspection Date:	8/22/2013
Pass Inspection (Y/N):	Yes
Equipment Type:	Lab Fume Hood
Equipment Manufacturer	Fisher Hamilton
Signage in Place:	Yes
Sash (Y/N):	Yes
Sash Opening Distance:	118" x 60"
Sash Motion:	Horizontal
Sash Stops (Y/N)	No
Connected to Other Hoods (Y/N):	No
Hood Fan Switch (Y/N):	No
Damper (Y/N):	Yes
Caustic Chemicals Used (type)	Corrosive Chemicals Used
Hood Monitor:	Safeaire by Fisher Scientific Model 54L335
Air Flow Station:	Needs Calibration
Volume Control:	Constant Volume
Alarms:	Yes
Make-Up Air (Y/N)	Yes
Condition Rating (Green, Yellow, Red)	Green
Comment	Calibrate fume hood monitor


ALARM
CAUTION
GOOD
SAFEAIRE
EMERG PURGE
Fisher Hamilton
54L0335
TEST RESET
APPROVED FUME HOOD
PREWIRED*
SERIES NO.
HOOD TYPE
YES NO 54L BENCH
YES NO 60L BENCH

Exhaust Hood Summary Sheet	
Building Name:	NMDA
Building Room ID:	A102
Equipment Identification	NMDA.A102
Date of Survey	12/20/2013
Measured Average Flow	140 fpm
Flow Station Measured Flow	N/A
Flow at Last Inspection	103 fpm
Last Inspection Date:	8/1/2013
Pass Inspection (Y/N):	Yes
Equipment Type:	Lab Fume Hood
Equipment Manufacturer	Microzone
Signage in Place:	No
Sash (Y/N):	Yes
Sash Opening Distance:	12" x 51"
Sash Motion:	Vertical
Sash Stops (Y/N)	No
Connected to Other Hoods (Y/N):	No
Hood Fan Switch (Y/N):	Yes
Damper (Y/N):	No
Caustic Chemicals Used (type)	Gasoline
Hood Monitor:	None
Air Flow Station:	No
Volume Control:	Constant Volume
Alarms:	No
Make-Up Air (Y/N)	Not Determined
Condition Rating (Green, Yellow, Red)	Yellow
Comment	Return air grille directly above hood opening.

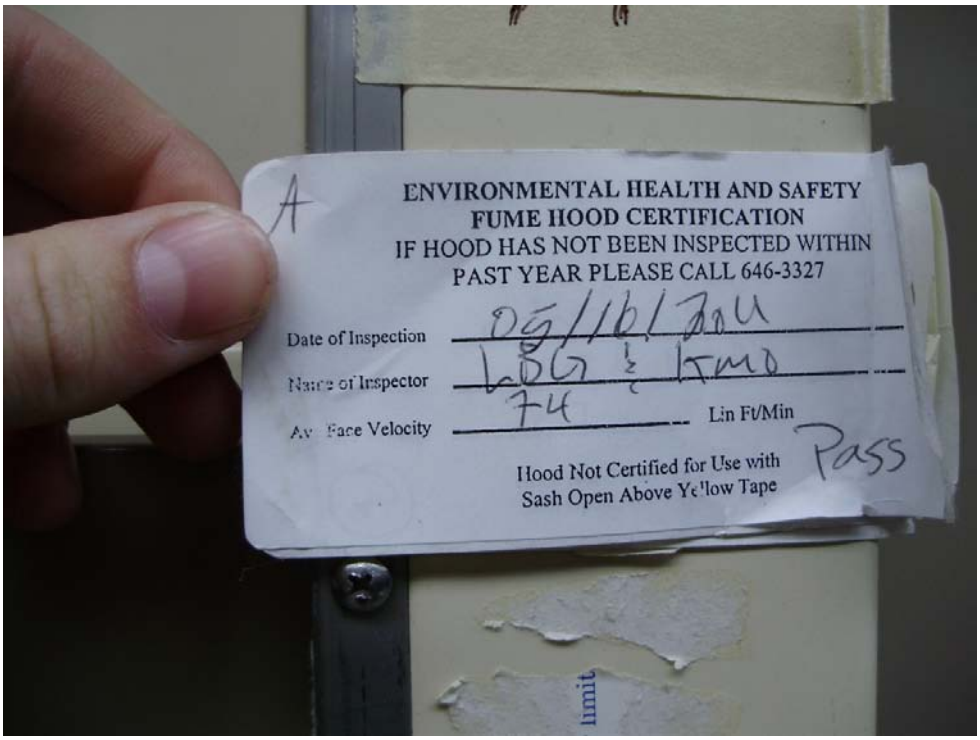

MICROZONE
CORPORATION
NEPEAN, CANADA, K2H 7V1 (613) 829-1433
MADE IN CANADA
SERIAL NO.
MODEL NO.
ELECTRICAL
AMPS
CONTROL
N/A
HP
N/A
05/12/91
KA-030

Exhaust Hood Summary Sheet	
Building Name:	NMDA
Building Room ID:	A101
Equipment Identification	NMDA.A101
Date of Survey	12/20/2013
Measured Average Flow	150 fpm
Flow Station Measured Flow	N/A
Flow at Last Inspection	94 fpm
Last Inspection Date:	8/1/2013
Pass Inspection (Y/N):	Yes
Equipment Type:	Lab Fume Hood
Equipment Manufacturer	Microzone
Signage in Place:	No
Sash (Y/N):	Yes
Sash Opening Distance:	18" x 27"
Sash Motion:	Vertical
Sash Stops (Y/N)	No
Connected to Other Hoods (Y/N):	No
Hood Fan Switch (Y/N):	Yes
Damper (Y/N):	No
Caustic Chemicals Used (type)	Gasoline
Hood Monitor:	None
Air Flow Station:	No
Volume Control:	Constant Volume
Alarms:	No
Make-Up Air (Y/N)	Not Determined
Condition Rating (Green, Yellow, Red)	Yellow
Comment	Needs alarm and fume hood monitor. Rebalance Hood


MICROZONE
CORPORATION
NEPEAN, CANADA, K2H 7V1 (613) 829-1433
MADE IN CANADA
SERIAL NO.
MODEL NO.
ELECTRICAL
AMPS
CONTROL
HP

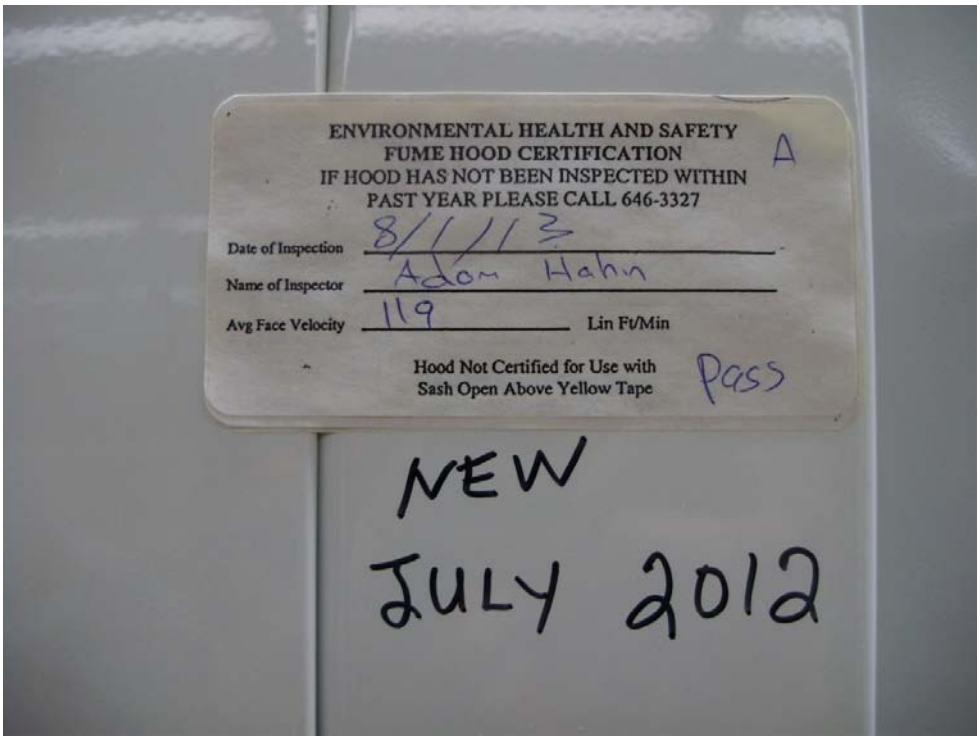
Exhaust Hood Summary Sheet	
Building Name:	NMDA
Building Room ID:	123
Equipment Identification	NMDA.123.A
Date of Survey	12/20/2013
Measured Average Flow	275 fpm
Flow Station Measured Flow	N/A
Flow at Last Inspection	74 fpm
Last Inspection Date:	5/16/2011
Pass Inspection (Y/N):	Yes
Equipment Type:	Lab Fume Hood
Equipment Manufacturer	KenMetal
Signage in Place:	Yes
Sash (Y/N):	Yes
Sash Opening Distance:	18" x 53"
Sash Motion:	Vertical
Sash Stops (Y/N)	No
Connected to Other Hoods (Y/N):	No
Hood Fan Switch (Y/N):	No
Damper (Y/N):	No
Caustic Chemicals Used (type)	None
Hood Monitor:	None
Air Flow Station:	No
Volume Control:	Constant Volume
Alarms:	No
Make-Up Air (Y/N)	Not Determined
Condition Rating (Green, Yellow, Red)	Yellow
Comment	Fume hood running, but being used only for non caustic storage. Turn fan off.


THIS EQUIPMENT HAS
LIMITED SERVICE


A
ENVIRONMENTAL HEALTH AND SAFETY
FUME HOOD CERTIFICATION
IF HOOD HAS NOT BEEN INSPECTED WITHIN
PAST YEAR PLEASE CALL 646-3327
Date of Inspection 05/16/2014
Name of Inspector LDG & KMD
Av Face Velocity 74 Lin Ft/Min
Pass
Hood Not Certified for Use with
Sash Open Above Yellow Tape

Exhaust Hood Summary Sheet	
Building Name:	NMDA
Building Room ID:	126
Equipment Identification	NMDA.126.A
Date of Survey	12/20/2013
Measured Average Flow	162 fpm
Flow Station Measured Flow	N/A
Flow at Last Inspection	119 fpm
Last Inspection Date:	8/1/2013
Pass Inspection (Y/N):	Yes
Equipment Type:	New Lab Hood
Equipment Manufacturer	Thermo Scientific
Signage in Place:	Yes
Sash (Y/N):	Yes
Sash Opening Distance:	17" x 69"
Sash Motion:	Vertical
Sash Stops (Y/N)	No
Connected to Other Hoods (Y/N):	No
Hood Fan Switch (Y/N):	Yes
Damper (Y/N):	No
Caustic Chemicals Used (type)	Perchloric Acid
Hood Monitor:	None
Air Flow Station:	No
Volume Control:	Constant Volume
Alarms:	No
Make-Up Air (Y/N)	Not Determined
Condition Rating (Green, Yellow, Red)	Yellow
Comment	Supply duct in front of hood opening. No hood monitors or alarms. Rebalance Hood. No NFPA Labeling


REVCO


ENVIRONMENTAL HEALTH AND SAFETY
FUME HOOD CERTIFICATION
IF HOOD HAS NOT BEEN INSPECTED WITHIN
PAST YEAR PLEASE CALL 646-3327
A
Date of Inspection 8/1/13
Name of Inspector Adam Hahn
Avg Face Velocity 119 Lin Ft/Min
Hood Not Certified for Use with
Sash Open Above Yellow Tape
Pass
NEW
JULY 2012

Exhaust Hood Summary Sheet	
Building Name:	NMDA
Building Room ID:	126
Equipment Identification	NMDA.126.B
Date of Survey	12/20/2013
Measured Average Flow	210 fpm
Flow Station Measured Flow	N/A
Flow at Last Inspection	119 fpm
Last Inspection Date:	8/1/2013
Pass Inspection (Y/N):	Yes
Equipment Type:	New Lab Hood
Equipment Manufacturer	Labconco Protector Lab Hood
Signage in Place:	Yes
Sash (Y/N):	Yes
Sash Opening Distance:	17" x 38"
Sash Motion:	Vertical
Sash Stops (Y/N)	No
Connected to Other Hoods (Y/N):	No
Hood Fan Switch (Y/N):	Yes
Damper (Y/N):	No
Caustic Chemicals Used (type)	Perchloric Acid
Hood Monitor:	None
Air Flow Station:	No
Volume Control:	Constant Volume
Alarms:	No
Make-Up Air (Y/N)	Not Determined
Condition Rating (Green, Yellow, Red)	Yellow
Comment	Supply duct in front of hood opening. Rebalance Hood. No NFPA Labeling


LABCONCO
ACID


LABCONCO

Exhaust Hood Summary Sheet	
Building Name:	Engineering 1
Building Room ID:	118
Equipment Identification	EC1.118
Date of Survey	12/20/2013
Measured Average Flow	110 fpm
Flow Station Measured Flow	N/A
Flow at Last Inspection	95 fpm
Last Inspection Date:	8/28/2013
Pass Inspection (Y/N):	Yes
Equipment Type:	Labe Fume Hood
Equipment Manufacturer	Labconco
Signage in Place:	Yes
Sash (Y/N):	Yes
Sash Opening Distance:	11" x 50"
Sash Motion:	Vertical
Sash Stops (Y/N)	No
Connected to Other Hoods (Y/N):	No
Hood Fan Switch (Y/N):	Yes
Damper (Y/N):	No
Caustic Chemicals Used (type)	Perchloric Acid
Hood Monitor:	None
Air Flow Station:	No
Volume Control:	Constant volume
Alarms:	No
Make-Up Air (Y/N)	Through Supply
Condition Rating (Green, Yellow, Red)	Yellow
Comment	Add Hood Monitor, Add Sash Stops. No NFPA Labeling


CAUTION


PERCHLORIC ACID
FUME HOOD
HClO4
FOR USE WITH SUBSTANCES
DO NOT USE WITH
U.S. GOVT. PROPERTY
971214

Exhaust Hood Summary Sheet	
Building Name:	Engineering 1
Building Room ID:	218
Equipment Identification	EC1.218
Date of Survey	12/20/2013
Measured Average Flow	98 fpm
Flow Station Measured Flow	N/A
Flow at Last Inspection	98 fpm
Last Inspection Date:	12/18/2013
Pass Inspection (Y/N):	Yes
Equipment Type:	Labe Fume Hood
Equipment Manufacturer	VWR Scientific Products
Signage in Place:	Yes
Sash (Y/N):	Yes
Sash Opening Distance:	9" x 52"
Sash Motion:	Vertical
Sash Stops (Y/N)	No
Connected to Other Hoods (Y/N):	No
Hood Fan Switch (Y/N):	Yes
Damper (Y/N):	No
Caustic Chemicals Used (type)	Perchloric Acid
Hood Monitor:	Kewaunee Alert 300 (Alarm Only)
Air Flow Station:	No
Volume Control:	Constant Volume
Alarms:	Yes
Make-Up Air (Y/N)	Through Dual Duct Supply Box
Condition Rating (Green, Yellow, Red)	Green
Comment	Add Sash Stops. No NFPA Labeling


CAUTION


AIR ALERT 300
NORM
TEST
RESET
WARNING
Unit is not calibrated!
Remove label only after field
calibration is complete.
KEWAUNEE®

APPENDIX C

Replacement Hood Product Information

Thermo Scientific
Hamilton Air Flow Products

Product Specification Catalog

Table of Contents

Fume Hood Technology

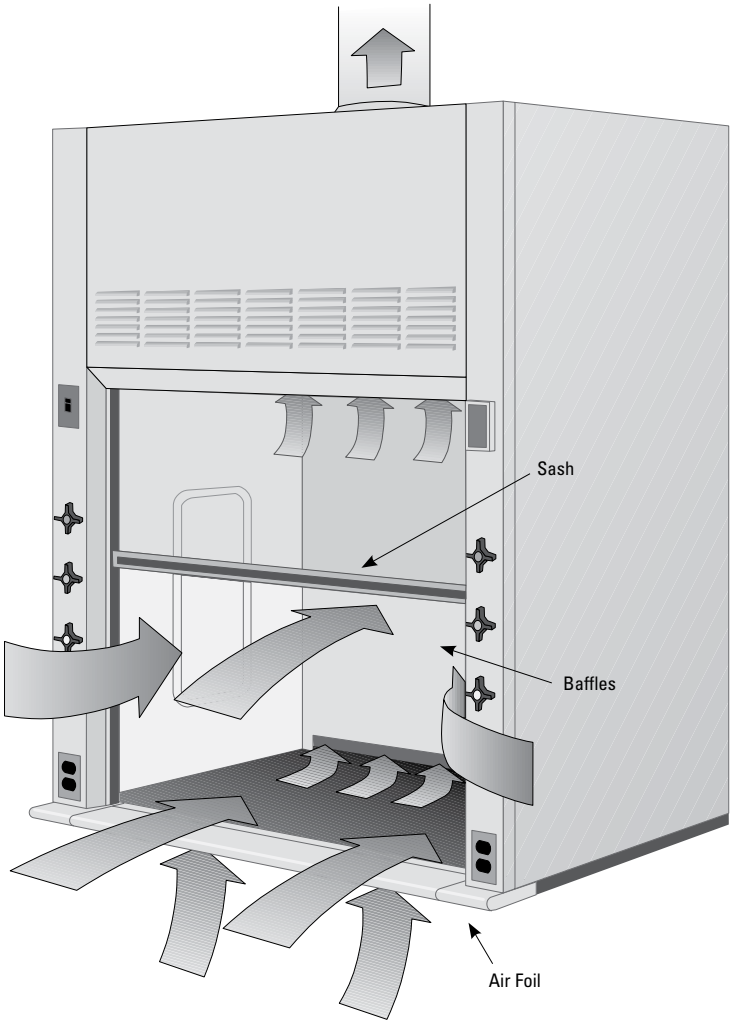
How a Fume Hood Works

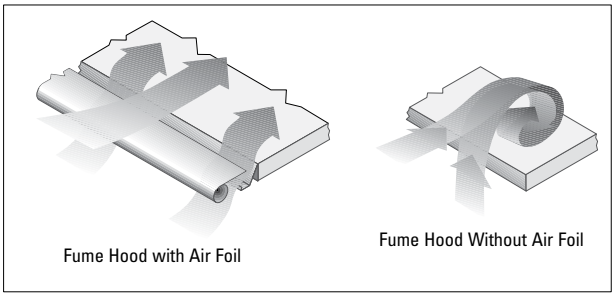
The complexities of fume hood operation become apparent when the many variables involved in exhausting fumes generated in the space are considered.

An adequate "pull" of air, known as **face velocity** is required to move fumes from the fume hood through the ductwork. Face velocity is measured in feet per minute (FPM) at the vertical sash plane. In order to maintain consistent face velocity, a certain quantity of air, or **exhaust volume**, is required. Exhaust volume is measured in cubic feet per minute (CFM).

Sash position also impacts face velocity. The sash is a transparent panel set in the fume hood face.

Airflow patterns into the fume hood are influenced by the **air foil**. Located just beneath the sash, the air foil decreases turbulence of air entering the fume hood. Some fume hoods feature air foils on the left and right sides of the sash as well.





These diagrams illustrate how an air foil can reduce the turbulence of air entering a fume hood, thus improving fume hood containment.

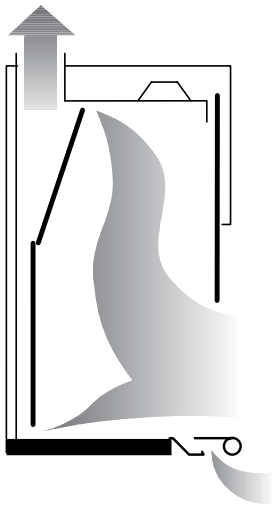
Fume Hood Technology

How a Fume Hood Works (continued)

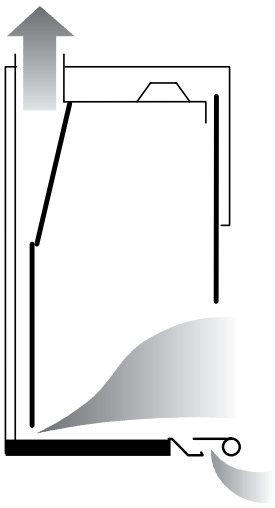
Located across the inside rear of the fume hood, **baffles** control airflow patterns through the fume hood. Baffle panels are located in a position determined to be most effective for the application. A remote adjustment option allows the user to reposition the baffles according to characteristics of effluents generated in the fume hood.

Remote baffle adjustment located on the outside of the fume hood corner post complies with OSHA Lab Standard recommendations.

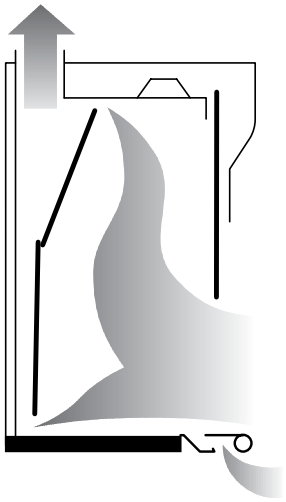
Baffle Positions



For lighter-than-air gases and high heat generation, maximum airflow is provided at the top of the fume hood. The top slot is adjusted to wide open, center and side slots remain at normal position, and the bottom slot is reduced.

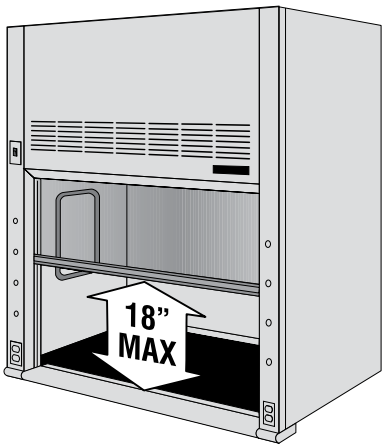


For heavier-than-air gases and fumes generated at the work surface, maximum air flow is provided at the bottom of the fume hood, near the work surface. The top slot is closed, and the center, side and bottom slots are open.

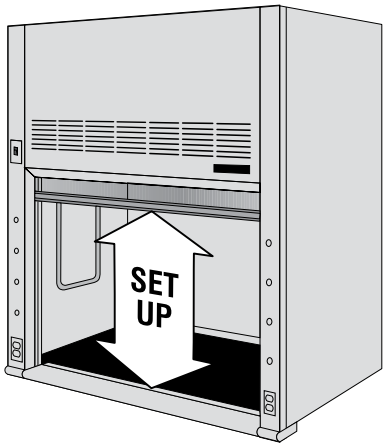


Concept and Pioneer fume hoods only have a fixed baffle for lower face velocity applications.

Sash Positions



Sash operating position while work is being performed in the fume hood is a maximum 18" opening for vertical rising sashes.



Sash setup position is defined as an opening greater than the operating position for loading materials with which to perform work. Work should not be performed in the setup position.

Fume Hood Technology

Fume Hood Exhaust Systems

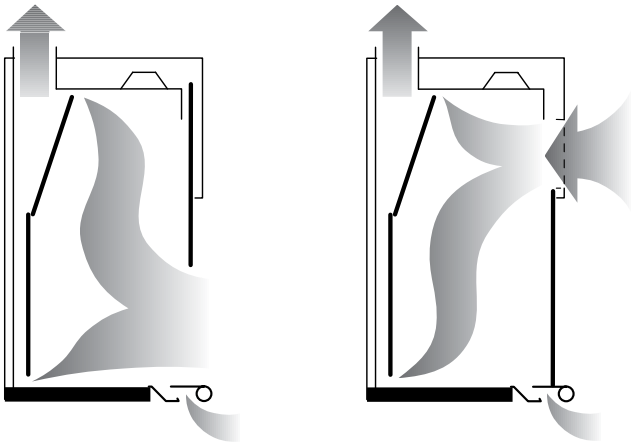
Two types of fume hood exhaust systems are **constant volume (CV) and variable air volume (VAV).** Either system can be used with individual or manifold duct and blower configurations (see page 8). The fume hood exhaust system must be compatible with the room's HVAC system.

The type of fume hood and related exhaust system will depend on the building's HVAC system, the number of fume hood in the lab, and any special or unique requirements. Consult with the Thermo Fisher Scientific representative, Facilities Manager and/or HVAC contractor.

Constant Volume Exhaust Systems

Constant volume fume hoods maintain consistent exhaust volume regardless of sash position. Face velocity varies as the sash is moved. Three types of fume hoods can provide constant volume function: Bypass, Auxiliary Air, and Restricted Bypass.

Bypass Fume Hood with Constant Volume Exhaust Systems



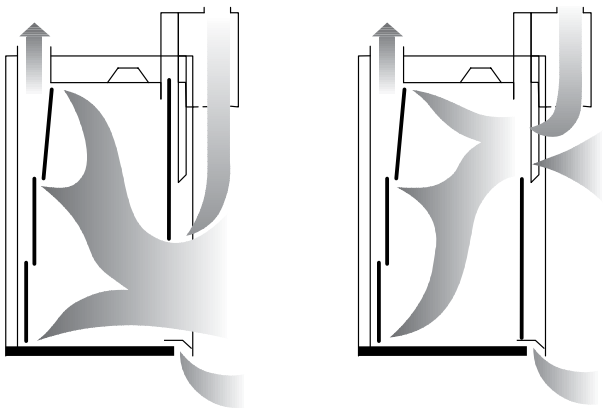
A Constant Volume Bypass fume hood shown first with the sash in the operating position and room air entering from the sash opening, then with the sash closed and room air entering through the louvered and lower bypass openings.

Incorporating a bypass, or additional source of exhaust air when the sash is lowered, is one way to keep face velocities within an acceptable range while maintaining a balance between the room ventilating system and fume hood exhaust volume.

Constant volume fume hoods are equipped with a bypass located above the sash which open as the sash is lowered thereby allowing additional air to enter the fume hood. Thermo Scientific Hamilton fume hoods also feature a **lower bypass** located below the bottom air foil sill which continuously purges the work surface area.

The face velocity will increase as the sash is lowered. The bypass acts as a relief to limit the increase in face velocity. This negates adverse effects on papers, powders or flames inside the fume hood.

Auxiliary Air Fume Hood with Constant Volume Exhaust Systems



An Auxiliary Air fume hood shown first with the sash in operating position and auxiliary air entering from the sash opening, then with the sash closed and auxiliary air entering directly into the fume hood compartment.

When there is insufficient room air to supply the fume hood's exhaust volume requirements, an **auxiliary air** fume hood may be recommended.

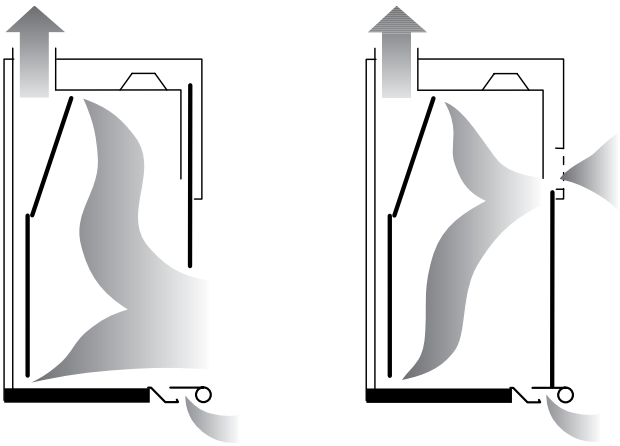
Air is brought in from the outside, heated to room temperature in winter, or cooled to room temperature +20° in summer, then supplied to the fume hood. (Thermo Scientific Hamilton fume hoods will reach over 95% efficiency in controlling and capturing the supply air when its temperature falls in the "room air to +20°F" range.)

When the sash is raised, auxiliary air is directed to the fume hood face. When the sash is lowered, auxiliary air enters the fume hood from above.

Operating with 50 to 70% auxiliary supply air, these fume hoods use significantly less room air, which can result in energy savings. However, supply air temperature and moisture content should be carefully controlled to manage containment effects on work performed in the fume hood. Undesirable turbulence at the fume hood face can be minimized by careful balancing of the fume hood with the room ventilation system.

Fume Hood Technology

Restricted Bypass Fume Hood with Constant Volume Exhaust Systems



A Restricted Bypass fume hood shown first with sash in the operating position and air entering through the sash opening, then with sash closed and very little air entering the fume hood compartment.

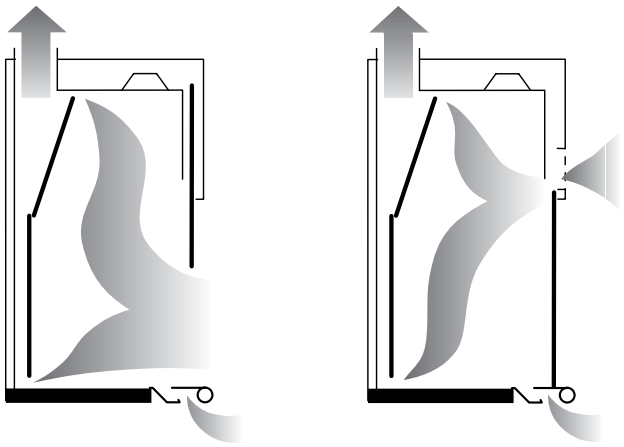
Constant volume operation can be achieved when Restricted Bypass fume hoods are equipped with "face opening reducing devices" and when the exhaust system is sized to maintain operational exhaust volume and face velocity at the reduced opening.

Face opening reducing devices used with restricted bypass fume hood designs include horizontal sashes, combination sashes, and postless sashes. (See page 15.) These modified sash designs can reduce exhaust volumes by as much as 30% to 60%. This reduced exhaust volume enables the bypass to be reduced thus achieving constant volume operation without excessive face velocity increases.

Variable Air Volume (VAV) Exhaust Systems

VAV systems maintain constant face velocities by varying exhaust volume in response to changes in sash position. Maximum air is exhausted when the sash is open; minimum air is exhausted when the sash is closed. A minimum flow of 25 CFM per square foot of interior work space, as stated by NFPA, should be maintained to achieve optimum containment and satisfactory dilution with the sash closed.

Restricted Bypass Fume Hood with VAV Exhaust Systems



A Variable Air Volume (VAV) system with restricted bypass, shown first with sash in the operating position and damper fully open, then with sash closed and damper allowing minimal exhaust.

All VAV systems should be used with a restricted bypass fume hood. Since only the amount of air needed to maintain the specified face velocity is pulled from the room, significant energy savings can be realized when the sash is in a closed position.

Either vertical or horizontal sash configurations can be used effectively in VAV applications.

Important: Correlate multiple VAV fume hood controllers with room air supply units so that sufficient air volume is available for every fume hood and room pressure is maintained.

Fume Hood Technology

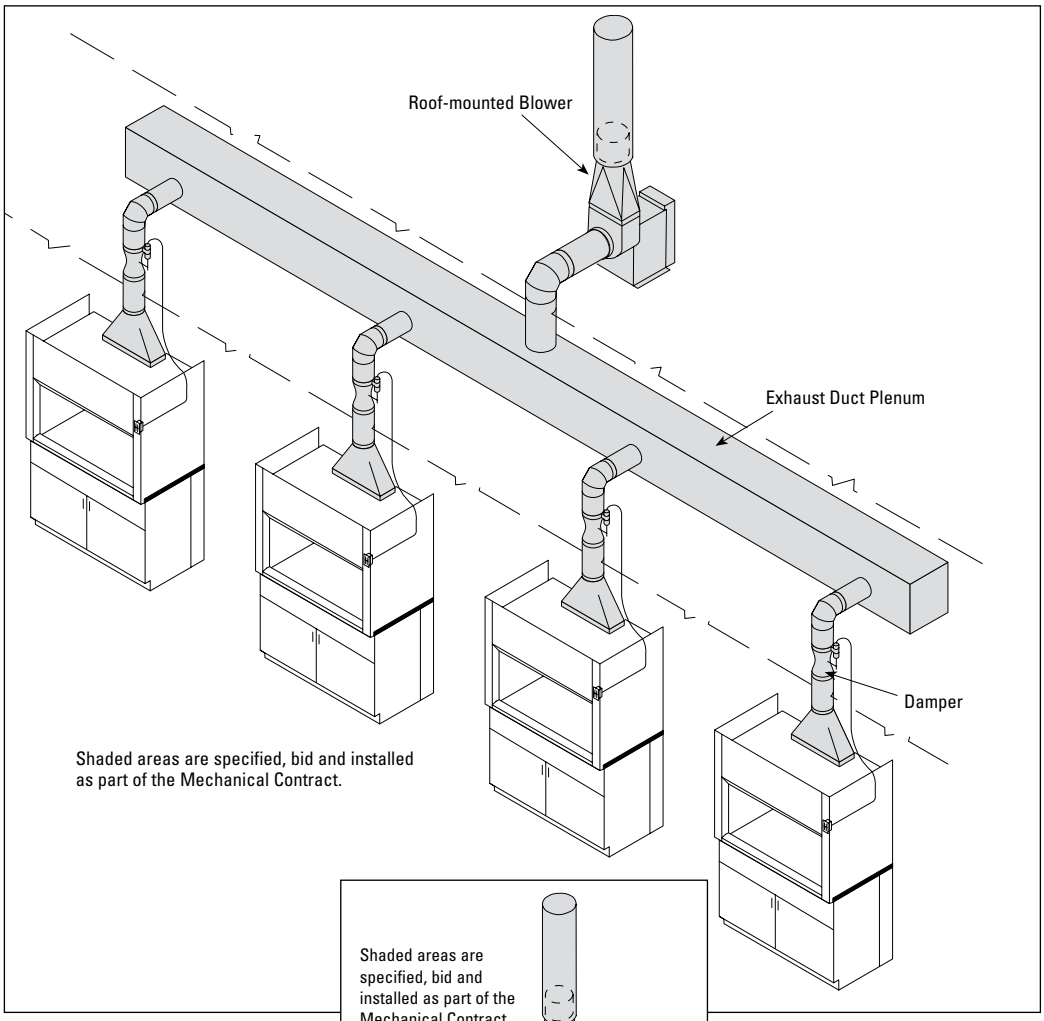
Typical Fume Hood Duct & Blower Configurations

Both manifold and individual configurations can be used with either constant volume or variable air volume exhaust systems.

Manifold System

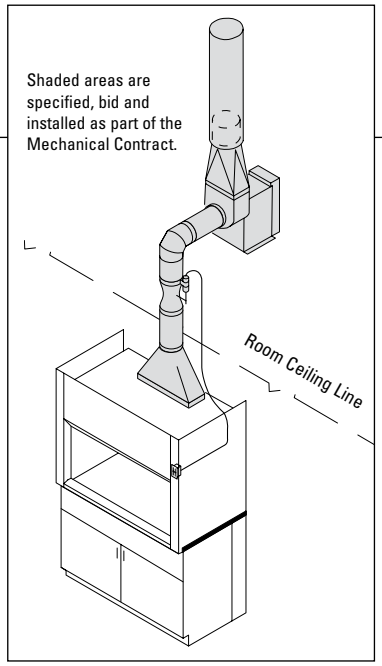
Manifold systems are popular for multiple-fume hood applications. Each fume hood's exhaust is pulled into the exhaust duct plenum and removed by a centralized blower.

Manifold systems cost less to install than individual fume hood/blower systems because they share a common blower and duct system. However, it is extremely important that adequate makeup air is available for each fume hood (regardless of the number of fume hood in operation at any given time) and that the total room HVAC system is properly balanced.



Individual System

This is the simplest approach to exhausting a fume hood. This configuration can be used with single and multiple fume hood installations. Although installation and material costs are higher with individual blower systems, they are easier to balance, and failure of one blower will not affect use of remaining fume hood systems.



Important:

- Perchloric Acid fume hoods should not be connected to a manifold system.
- Both Individual and Manifold configurations can be designed for constant volume or variable air volume (VAV) systems.

Fume Hood Technology

Face Velocity, Exhaust Volume, and Static Pressure

Face velocity, exhaust volume, and static pressure are critical parameters in fume hood performance, functioning in unison with the room's HVAC design.

Published Face Velocity Guidelines

The appropriate face velocity will vary depending on usage of the fume hood and the way in which the fume hood has been set up. There are several published guidelines that indicate general ranges for face velocity settings. Additional state and local guidelines for face velocity may exist.

Organization	Reference	Face Velocity
OSHA	29 CFR 1910 • 1450	60-100 FPM
ACGIH	Industrial Ventilation Manual 23rd Edition,	60-100 FPM
ANSI/AIHA	Z9.5, 2003	80-120 FPM
NFPA	NFPA 45, 2000	80-120 FPM
SEFA	SEFA 1, 2006	60-100 FPM

Consult with a planner for the appropriate face velocity for the fume hood selected, taking into account fume hood setup processes and the specific application.

Under typical operating conditions, Thermo Scientific Hamilton fume hoods most reliably provide containment at the levels specified by applicable industry standards when operated at a 100 feet per minute face velocity.

For other Thermo Scientific Hamilton fume hoods, please refer to the appropriate product specifications and consult with a lab planner to determine an appropriate face velocity for each specific application.

Determining Exhaust Volume

In order to calculate exhaust volume, fume hood type, size and the number of air changes per hour for the lab are required. (Consult with an HVAC professional or mechanical engineer.)

To determine the quantity of room air available for fume hood exhaust (in CFM), use the following equation:

Exhaust volume (CFM) =
Room size (cubic feet) x [room changes per hour ÷ 60]

To determine exhaust volume for a particular fume hood, use the following equation:

Exhaust Volume (CFM) =
Face velocity (FPM) x fume hood opening (ft^2)

Minor discrepancies can be resolved by adjusting fume hood exhaust volume or the amount of air delivered to the room. Choosing an alternative fume hood style or sash configuration may be the only way to reconcile major differences.

As part of the balance contract at installation, a duct traverse should be performed to determine proper fume hood volume.

Static Pressure

Static pressure is the resistance created as air moves through a fume hood. Sometimes referred to as static pressure loss, it is measured in inches of water. Fume hoods operate more efficiently and with less noise at lower static pressure values.

A low fume hood static pressure rating indicates that the fume hood is offering minimal resistance to air flow, resulting in reduced noise and requiring a smaller exhaust fan. A few fume hood design characteristics that also affect static pressure include:

- Larger baffle slots make it easier for air to move through the fume hood
- A larger exhaust outlet enables more air to pass through at lower velocity
- A tapered exhaust collar reduces turbulence
- Together, the correct exhaust collar and baffle configuration will reduce fume hood static pressure

The static pressure rating of the fume hood is very important to correct sizing of the blower system and should be provided to the HVAC contractor to ensure a properly sized exhaust system.

Fume Hood Technology

Glossary

ACGIH – American Conference of Governmental Industrial Hygienists

ADA – Americans with Disabilities Act

Air Foil – Shaped or streamlined member at fume hood entrance designed to enhance movement of air into the fume hood

Air Volume – Rate of air flow, normally expressed in cubic feet per minute (CFM)

ASHRAE – American Society of Heating, Refrigerating and Air Conditioning Engineers, a professional group that sets industry-accepted standards for fume hood testing procedures

Auxiliary Air – Supply or make-up air delivered external to the chamber of a fume hood to reduce air consumption

Baffle – Panels located across back of fume hood interior which control pattern of air moving through the fume hood

Bench – Type of fume hood designed to rest atop a counter or base cabinet

Blower – Air-moving device (or fan) consisting of motor, impeller and scroll

Bypass – Compensating opening that helps maintain constant volume exhaust from fume hood, regardless of sash position

Canopy Fume Hood – Ceiling-suspended ventilating device for non-critical use with heat, water vapor, odors, etc.

CFM – Cubic feet per minute; unit of air volume measurement

Combination Sash – Horizontal panels in a vertically rising frame; see Sash

Constant Volume – Type of fume hood exhaust system that exhausts the same volume of air, regardless of sash position

Containment – Extent to which fumes are confined within the fume hood compartment

Damper – Device installed in duct to control air flow volume

Demonstration Fume Hood – Fume hood accessible from front and back sides used for demonstration purposes

Diversity – Percentage of total fume hood that are in operation at one time

Duct – Round, square, or rectangular tube used to enclose moving air

Duct Velocity – Speed of air moving in duct, measured in feet per minute (FPM)

Entrance – Fume hood front or access opening

Exhaust Collar – Place where exhaust duct connects to fume hood and through which all exhaust air passes

Exhaust Volume/Parameters – Quantity of air exhausted by the fume hood; quantity of air required to maintain desired face velocity, expressed in cubic feet per minute (CFM)

Face Velocity – Speed of air moving into the fume hood through the face opening (through the sash), measured in feet per minute (FPM)

Floor-mounted – Tall or full-height type of fume hood, designed for large or tall apparatus

FPM – Feet Per Minute; measurement of air velocity

Fume Hood – Five-sided ventilated enclosure used in laboratories to collect and exhaust contaminants

Fume Hood Diversity – See **Diversity**

Liner – Fume hood interior sides, back and top, including baffle

Lintel – Portion of fume hood front located above access opening

Louvers – Slit-like openings in the lintel that allow bypass air to enter the fume hood when the sash is closed

LPM – Liters Per Minute; Metric measurement of air volume

Magnehelic – Type of gauge suitable for measuring very low air pressures

Manometer – Device used to measure air pressure differential

Makeup Air – Free or available air needed to permit fume hood to develop face velocity

MPM – Meters Per Minute; Metric measurement for air velocity

NFPA – National Fire Protection Association

Negative Pressure – Pressures lower than one atmosphere

Plenum Chamber – Chamber or enclosure where air moves at reduced velocity and has different pressure from balance of system or atmosphere

Positive Pressure – Pressures higher than one atmosphere

Restricted Bypass Fume Hood – Fume hood operating type, designed with limited bypass area; commonly used in conjunction with Variable Air Volume (VAV) exhaust systems and restricted sash opening designs

Safety Shield – Transparent horizontal panel used in conjunction with a bench fume hood and vertical-rising sash that provides added protection for the user

Sash – Sliding glass panel set in the fume hood face that provides access to the fume hood interior

Sash Operating Position – Position of the sash while work is being performed in fume hood, typically an 18" opening for vertical rising sashes

Sash setup Position – Position of the sash while the fume hood is being loaded with materials to perform work

Service Fitting – Water faucets and gas valves mounted on or fastened to the fume hood

Slot Velocity – Speed of air moving through fume hood baffle openings

Fume Hood Technology

Glossary (continued)

Smoke Stick – Smoke-producing item used in evaluating fume hood airflow patterns and containment performance

Static Pressure – Air pressure, or resistance, in fume hood or duct, expressed in inches of water

Superstructure – Portion of the fume hood supported by base cabinets, the work surface or the floor

Supplemental Air – Air delivered to a fume hood to reduce volume of air exhausted from room, also known as supply air; see **Auxiliary Air**

Total Pressure – Sum of velocity pressure and static pressure as measured in duct

Transport Velocity – Speed of air moving in duct; used when particles must be carried by air stream

UL 1805 – Verifies conformance to electrical, mechanical and airflow characteristics

VAV – See Variable Air Volume

Variable Air Volume – Type of fume hood exhaust system that typically maintains constant fume hood face velocity by adjusting blower motor speed or a balance damper in response to changes in sash position

Velocity – Speed of air, measured in Feet per Minute (FPM)

Velocity Pressure – Force per square inch applied by moving air

Velometer – Instrument used to measure air flow velocity

Volume – Quantity of air, usually measured in cubic feet per minute (CFM)

Water Gauge (WG) – Measuring device using the weight of a column of water, calibrated in inches

Work Surface – Top material; area in fume hood where apparatus rests and where work takes place

General Fume Hood Operating Instructions

Warning

This product is intended for use with certain chemicals that can cause serious injury or illness through inhalation or physical contact. While this product is intended to minimize exposure to certain hazardous chemicals when selected, installed and operated properly, its performance and the safety of the user is affected by a number of factors. These include the HVAC system, the specific chemicals and processes being used, proper operation and the condition of the room.

Before using this fume hood, consult the owner's industrial hygienist or safety representative to make sure: 1) the specific fume hood alarms, controls and the HVAC system have been properly selected and are operating correctly, 2) the fume hood has been tested after installation and routinely thereafter to ensure the fume hood is providing the proper containment for the specific chemicals and processes being used, 3) there has been appropriate training on the correct use of the fume hood and handling of the specific chemicals and the fume hood operating instructions have been reviewed, 4) any personal protective devices that are required are properly selected and provided, and 5) the fume hood is being operated at the appropriate face velocity. The fume hood should never be operated with the sash in the full open position.

Failure to follow these instructions could result in physical injury or illness

1) Do not use this fume hood unless you have received proper training from the owner's industrial hygienist or safety representative.
2) This fume hood is not intended to be used with all chemicals or all chemical processes. Consult the owner's industrial hygienist or safety representative to determine whether the fume hood is appropriate for the chemicals and processes to be used.
3) Verify that the fume hood exhaust system and controls are operating properly and providing the necessary air flow. If in doubt, the owner's industrial hygienist or safety representative should be consulted. It is recommended that the fume hood be equipped with an air flow monitoring device. Before using the fume hood, verify that the monitor is operating properly by testing the monitor.
4) The fume hood should not be operated with the sash in the full open (setup) position. When the fume hood is in use, the opening of the sash glass should be kept at a minimum. On a vertical rising sash, the sash glass should be no higher than 18". Horizontal sliding panels on combination sashes must be closed when sash is raised vertically. The sash should remain closed when the fume hood is not in use.
5) Place chemicals and other work materials at least six (6) inches inside the sash.
6) Do not restrict air flow inside the fume hood. Do not put large items in front of the baffles. Large apparatus should be elevated on blocks. Remove all materials not needed for the immediate work. The fume hood must not be used for storage purposes.
7) Never place your head inside the fume hood.
8) External air movement can affect the performance of the fume hood. Do not operate near open doors, open windows or fans. Avoid rapid body movements. Do not open the fume hood if there are cross-drafts or turbulence in front of the fume hood. Do not open the sash rapidly.
9) If this fume hood is equipped with adjustable baffles, do not adjust the baffles without consulting the owner's industrial hygienist or safety representative.
10) Wear gloves and other protective clothing if contact with contaminants is a hazard.
11) Clean spills immediately.
12) If fumes or odors are present, stop operating the fume hood, close the sash and contact the owner's industrial hygienist or safety representative immediately.
13) It is recommended that this fume hood be tested and certified annually by the owner according to applicable industry and government standards.

Research and testing

Quality Control Testing & Certification

The Thermo Scientific Hamilton Fume Hood Test Facility is used for quantitative and qualitative evaluations, quality control and product development purposes.

Testing and certification to ANSI/ASHRAE 110 1995 is standard procedure for each type and size of fume hood.

Testing procedures include the following criteria:

- **Face velocity** profile is generated from a computer which monitors a probe grid. Probes in the grid, which is placed in front of the fume hood, take multiple readings per second.
- **Fume hood containment** is tested using a mannequin with a leak meter mounted to its breathing zone to simulate a person standing in front of a fume hood. When a tracer gas is injected into the fume hood, the meter measures escaping gas.

Inspections are also performed at each critical stage in the manufacturing process to ensure that every fume hood is built to the highest Thermo Scientific Hamilton standards.

Testing Custom Fume Hood Designs

If none of the products in the standard offering will meet specific application requirements, Thermo Fisher Scientific technicians will develop a custom fume enclosure to perform to specifications. A prototype may be developed and operating parameters verified in the Fume Hood Test Facility.

Testing for Special Lab Conditions – Before Purchase

Achieving optimum fume hood operation is challenging under any circumstances due to the complexity of the variables involved. By evaluating a specific fume hood under a variety of operating conditions prior to purchase specifications are confirmed before installation.

The Fume Hood Test Facility has a sealed, environmentally controlled chamber where critical aspects of a specific laboratory environment can be recreated.

- The fully adjustable exhaust system can duplicate fume hood operating parameters, including face velocity and exhaust volume.
- Supply air temperatures can be adjusted to simulate both winter and summer conditions.
- The location of air vents, traffic aisles and doorways can be recreated to simulate their impact on containment and face velocities.
- Smoke generation equipment reveals airflow vectors under all conditions.

Prototypes and new designs are routinely subjected to this type of intensive testing. Technicians also will test samples of standard fume hood under specific operating conditions upon request. Customers are encouraged to be present at the Two Rivers facility for this testing.

See Fume Hood in Operation

Visits to the Product Showroom in Two Rivers, Wisconsin are encouraged. Several types of working fume hoods are installed for personal inspection. Contact your local Thermo Fisher Scientific representative to set up an appointment.

Visiting the showroom presents an opportunity to view all lines of Thermo Scientific Hamilton laboratory casework, furniture systems, fixtures and accessories.

Ordering Information

Follow the steps in this section to select the best fume hood model for a particular application, then fit it out with appropriate options and accessories.

Please record the following information before beginning:

- Room size (length x width x height)
- Lineal feet of fume hood space required
- Room air changes per hour*
- Lab heat load*
- Type of lab and nature of work performed
- Types of materials handled
- Frequency of use
- Sizes of apparatus to be used in the fume hood

*Consult with the facilities manager or HVAC contractor.

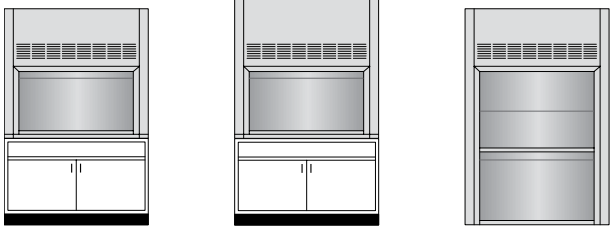
IMPORTANT: Fume hood must be carefully coordinated with the building's HVAC system, sink outlet material, trap material, and building acid waste system. Failure to verify compatibility of these elements can result in costly alterations or less-than-optimal component or system function. **Compatibility is the responsibility of the laboratory specifier, as is compliance with local and state codes.**

Step 1 Select a Physical Style

Bench fume hoods are superstructures designed for installation on base cabinet/work surface assemblies.

High-line fume hoods are bench models designed with extra interior clearance to accommodate apparatus up to 60" (1524 mm) high.

Floor-mounted fume hoods are designed for large, complex laboratory apparatus setups and roll-in equipment. For flexible work and storage arrangements, Floor-mounted fume hoods can be combined with removable shelves and/or an adjustable-height table.



Bench | High-line | Floor Mounted

Step 2 Determine if a Special-Purpose Fume Hood is Required

A Special-Purpose fume hood may be required when, for example:

- Radioactive materials or perchloric acid will be handled in the fume hood.
- Neither a general-purpose high-line nor general-purpose floor-mounted model will accommodate especially tall or large apparatus.
- Wheelchair-bound persons will be using the fume hood.
- A classroom situation calls for special demonstration fume hood.

If any of these conditions apply to a special situation, review special-purpose fume hood product pages. If one of these fume hood meet a particular need, continue with Step 4 to determine the base product number.

If a special-purpose fume hood is required and none of the models in this catalog will meet a specific need, a Thermo Fisher Scientific representative will help design a custom fume hood for the specific requirements.

Special Purpose Fume Hood

Education	ADA	Research/ Chemical	Other
Horizon	Concept ADA	Radioisotope	Canopy
Pass/Through Demonstration		Perchloric Acid	
PaceAire		Postless Sash	
Table Tops			

Step 3 Determine the Appropriate Operating Type

By now a determination of the style and size of fume hood needed, and a decision made that you do not require a special purpose model.

The next step is to determine the operating type that is most appropriate for the particular application.

Refer to pages 4-9 for information on fume hood exhaust systems, and consult with the facilities manager, architect, lab planner, HVAC contractor, or Thermo Fisher Scientific representative if assistance is needed.

The diagram illustrates the operating-type choices available for each style of general purpose fume hood. Review the product page for the fume hood that is preferred. If none of these models are appropriate, a Thermo Fisher Scientific representative will help design a custom fume hood that meets a specific requirement.

General Purpose Fume Hood

Bench	Bench High-line	Floor-mounted
Bypass	Bypass	Bypass
Auxiliary Air	Auxiliary Air	Auxiliary Air
Restricted Bypass	Restricted Bypass	Restricted Bypass
		Restricted Bypass Distillation

Step 4 Select a Liner Material

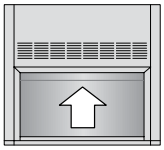
Liner Material	Suffix*	Advantages	Disadvantages
Polyresin	P	High illumination, easy to clean. Strong and resilient. High chemical resistance	
Cement-based Board	R	Low cost.	Low light reflectivity. Difficult to clean. Brittle.
Cement-based Board with White Enamel	E	High light reflectivity, easy to clean.	Brittle.
Stainless Steel	S	Work surface is caulked to superstructure.	Subject to attack by some chemicals.
Stainless Steel	K	Coved corners make this easy to clean. Ideal for Perchloric Acid use.	Subject to attack by some chemicals.
PVC	C	Excellent for highly corrosive applications.	Material loses structural integrity when exposed to high temperatures.

* Suffix for ordering purposes.
See Page 151-152 for more complete liner descriptions.

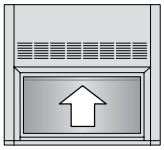
Step 5 Select a Sash Type

The standard sash on most fume hood models is a vertical rising frameless sash. The unique frameless design captures the edge of the sash glass in a vertical sash track located behind the fume hood front corner post. In the event of an explosion, this positive containment design is significantly more effective in retaining the glass sheet than a framed sash. A second benefit of an unframed sash is full width visibility of the fume hood interior.

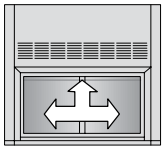
Optional sash configurations include framed vertical rising, horizontal, and combination. If you are interested in energy conservation, compare the exhaust volume value in the Exhaust Parameters chart on the product information page with the exhaust volume indicated for the sash option being considered. The lower the exhaust volume value, the greater is the potential energy savings.



Unframed
Vertical Rising



Framed
Vertical Rising



Combination
Vertical/Horizontal

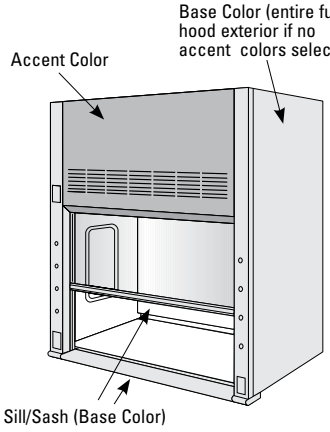
Most fume hood models are available with an optional sash. Sash options applicable to each fume hood model are indicated on the specific product information page.

Sash Types: O = Standard unframed
F = Framed sash option
B = Combination sash option - bench-top fume hood

Step 6 Select a Color

The two-digit color codes are listed separate from the product number. Three selections can be made:

1. **Base Color** - this is side panels and front vertical corner posts if an accent color is selected, or, the entire exterior panel surface if an accent color is not selected.
2. **Accent Color** - a second color applied to the lintel panel above the sash.
3. **Sash/Sill** - sash pull and sill airfoil will be the same color as the base color unless otherwise specified.



Fume Hood Base and Accent Colors

BK	Black	**IN**	Indigo
BL	Blue	**KK**	Khaki
BS	Blue Slate	**PW**	Petal White
BD	Brown Burgundy	**PM**	Piedmont Green
CH	Chameleon	**PL**	Platinum
DK	Dark Khaki	**PA**	Purple
G1	Dove Grey	**SA**	Sand
G3	Grey Slate	**SS**	Sandstone
HG	Hunter Green	**SW**	Shell White

RECOMMENDATION: Prior to making your final selection, please contact your representative to obtain samples.

The Thermo Scientific Hamilton SafeAire II has been designed and tested to incorporate the latest in technology, performance and ergonomic features. The ergonomic flush sill provides user comfort, and the secondary trough increases safety SafeAire® II fume hood are available in either bench or floor-mounted designs of widths 36- to 96-inches and depths 31- to 43-inches.

Exterior Fluorescent Lighting

Located safely away from harmful fumes and vapors, the fluorescent lighting system provides excellent task lighting.

Unique Exhaust Collar Design

A contoured rectangular exhaust collar provides more vertical space, reduces noise levels and conserves energy by maintaining lower static pressure.

Louvered Bypass

Louvers provide an additional source of exhaust air when the sash is lowered, helping to maintain consistent face velocities.

Gasketed Access Panel

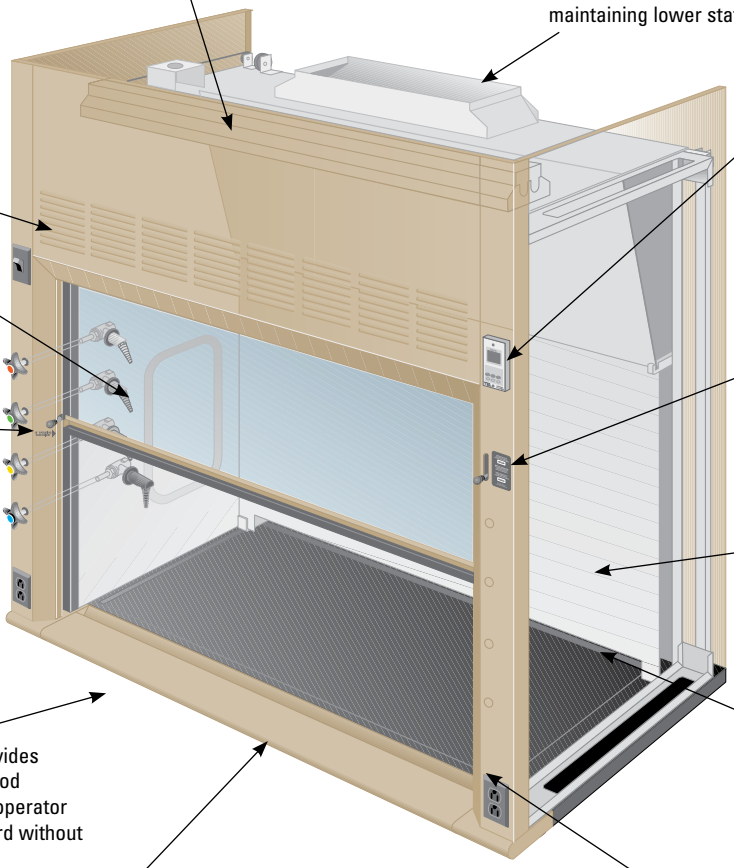
Soft PVC gasket on the interior access panel eliminates contaminant seepage into sidewall.

Sash Safety Features

The unframed sash design has greater impact resistance. The 18" sash lock/release defines the operating position.

Service Fixture Options

A choice of remote control fixtures is available, all with acid-resistant finishes. The fixtures are color coded for added safety.



Safety Monitor (Recommended)

The optional electronic safety monitor activates an alarm if face velocity reaches a predetermined set point.

Remote Baffle Control

The optional two-position remote baffle control can be used to adjust baffle position according to the types of fumes generated in the fume hood.

Liner Materials

Several liner materials available and have low flame spread ratings and meet NFPA standards.

Perimeter Baffle Slots

Side slots increase fume containment and eliminate dead spaces where fumes can accumulate.

Low Profile Air Foil

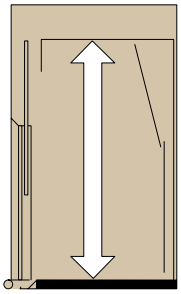
The ergonomically designed airfoil provides obstruction-free access to the fume hood interior. The pivoting airfoil allows the operator to use a hospital grade 20 amp plug cord without obstructing the work area.

Secondary Trough

The secondary trough provides an additional safeguard for the containment of spills not secured by a dished work surface.

Chemical-resistant Finish

Independently tested 1.0-1.5 mil thick urethane powdercoat finish has excellent chemical and abrasion resistance. Thermo Scientific Hamilton fume hood finishes are SEFA 8 and U.S. Green Building Council LEED compliant in 18 standard colors.



Increased Vertical Space

The exhaust collar and baffle angle designs create additional space and are perfect for taller apparatus.

Life-cycle Tested Sash Counter Balance System

This system features a single weight and cable system. The full weight of the counterweight is retained in the event of a cable break.

Metal-free Interior

Five non-metallic liners are resistant to high temperatures and meet all NFPA 45 standards. Interiors do not have metal brackets, angles or screw heads (which can rust or corrode).

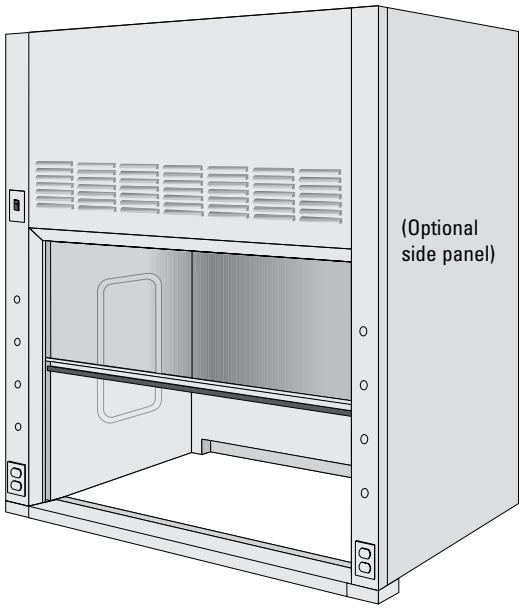
Full-frame Construction

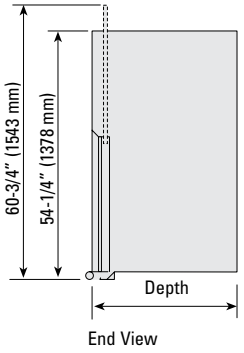
All panels are attached to full-perimeter steel frame members for long term strength and durability.

SafeAire II Restricted Bypass Superstructure

For use with Constant Volume or Variable Air Volume Exhaust Systems

- Designed for installation on 26-1/8" (663 mm) to 42" (1067 mm) deep work surface.
- Recommended for use when an independent VAV controller (supplied by others) is utilized.
- Also recommended for use with horizontal or combination sashes used in conjunction with VAV or constant volume systems.
- Incorporates a 2" (51 mm) bypass above sash when closed to minimize leakage at minimum flow.
- Vertical sash is full-view, laminated safety glass with full-width recessed pull.
- 28-1/2" (724 mm) high opening for setup.
- Two-tube (T-8) fluorescent light fixture, black light switch and flush plate, and two black duplex 120 VAC receptacles and flush plates.
- 96" (2438 mm) wide units have two light fixtures.
- Plugged holes for future service fixture installation standard on both posts.
- Shipped assembled.
- 31-1/4" (794 mm) deep fume hoods require a sink base unit below a rear cupsink.
- UL 1805 classified
- See page 17 for additional product features common to all SafeAire II fume hoods.





Exhaust Parameters							
		100 FPM Vertical Sash 28-1/2" Opening*		100 FPM Vertical Sash 18" Opening*		100 FPM Combination Sash 28-1/2" Opening	
Fume Hood Size	Collar Size	CFM	SP	CFM	SP	CFM	SP
36" (914 mm)	6" x 9" (152 x 229 mm)	520	.22	360	.12	N/A	N/A
48" (1219 mm)	6" x 15" (152 x 381 mm)	760	.18	485	.09	420	.06
60" (1524 mm)	6" x 23" (152 x 584 mm)	1000	.18	660	.09	570	.07
72" (1829 mm)	6" x 23" (152 x 584 mm)	1250	.27	785	.13	690	.12
96" (2438 mm)	6" x 30" (152 x 762 mm)	1710	.26	1081	.09	980	.08

See page 12 for operating instructions.
*Vertical 28-1/2" sash opening is for setup only; operating position is an 18" opening.
Combination sash volume is based on vertically closed horizontally open sash position.

SafeAire II Restricted Bypass Superstructure

For Use With Constant Volume or Variable Air Volume Exhaust Systems

	Base Product Numbers							
	31-1/4" Depth		36" Depth		37-1/4" Depth		43-1/4" Depth	
Width	Fixed Baffle	Remote Baffle Adjustment	Fixed Baffle	Remote Baffle Adjustment	Fixed Baffle	Remote Baffle Adjustment	Fixed Baffle	Remote Baffle Adjustment
36" (914 mm)	54L2766__	54L2768__	60L2766P_	60L2768P_	—	—	—	—
48" (1219 mm)	54L2769__	54L2771__	60L2769P_	60L2771P_	61L2769P_	61L2771P_	62L2769P_	62L2771P_
60" (1524 mm)	54L2772__	54L2774__	60L2772P_	60L2774P_	61L2772P_	61L2774P_	62L2772P_	62L2774P_
72" (1829 mm)	54L2775__	54L2777__	60L2775P_	60L2777P_	61L2775P_	61L2777P_	62L2775P_	62L2777P_
96" (2438 mm)	54L2778__	54L2780__	60L2778P_	60L2780P_	61L2778P_	61L2780P_	62L2778P_	62L2780P_

Liner Materials – Insert suffix in **8th** digit of product number for 31-1/4" depth only:
- P – Polyresin
- R – Cement-based Board
- E – Cement-based Board/White Enamel
- S – Stainless Steel (Not available on 36" wide fume hood)
- C – PVC

Sash Options – Insert suffix in **9th** digit of product number:

Sash Type	Suffix
Standard	0
Combination	B
Framed	F

See page 15 for additional sash information.

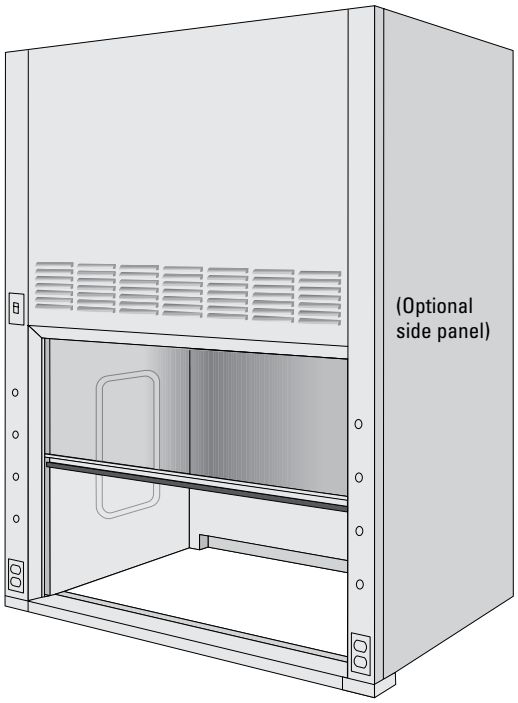
36" wide fume hood only available with standard sash.

Other Information – To complete the fume hood assembly, refer to the sections listed below:
- Fixtures (pages 88-95).
- Alarms (page 96).
- Work surfaces, cupsinks and traps (pages 98-103).
- Base cabinets (pages 105-108).
- Ceiling/Blower Enclosures (pages 110-118)
- Accessories (pages 119-123).
- Order end panels separately (page 117).

SafeAire II High-line Restricted Bypass Superstructure

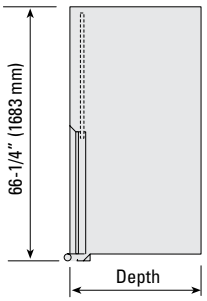
For use with Constant Volume or Variable Air Volume Exhaust Systems

- Designed for installation on 26-1/8" (663 mm) to 42" (1067 mm) deep work surface.
- Extra-height interior to accommodate apparatus up to 60" (1524 mm) high.
- Recommended when an independent VAV controller is used (supplied by others).
- Also recommended for use with horizontal or combination sashes used in conjunction with VAV or constant volume systems.
- Incorporates a 2" (51 mm) bypass above sash when closed to minimize leakage at minimum flow.
- Vertical sash is full-view, laminated safety glass with full-width recessed pull.
- Choice of 28-1/2" (724 mm) or 36" (914 mm) high opening for setup.
- Two-tube (T-8) fluorescent light fixture, black light switch and flush plate, and two black duplex 120 VAC receptacles and flush plates.
- 96" (2438 mm) wide units have two light fixtures.
- Plugged holes for future service fixture installation standard on both posts.
- Shipped assembled.
- 31-1/4" (794 mm) deep fume hoods require a sink base unit below a rear cupsink.
- UL 1805 classified.
- See page 17 for additional product features common to all SafeAire II fume hoods.



Exhaust Parameters

		100 FPM Vertical Sash 28-1/2" Opening*		100 FPM Vertical Sash 18" Opening*		100 FPM Vertical Sash 36" Opening*		100 FPM Horizontal Sash 28-1/2" Opening		100 FPM Horizontal Sash 36" Opening	
Fume Hood Size	Collar Size	CFM	SP	CFM	SP	CFM	SP	CFM	SP	CFM	SP
48" (1219 mm)	6" x 15" (152 x 381 mm)	760	.18	485	.09	960	.27	420	.06	510	.06
60" (1524 mm)	6" x 23" (152 x 584 mm)	1000	.18	660	.09	1260	.28	570	.07	690	.07
72" (1829 mm)	6" x 23" (152 x 584 mm)	1250	.27	785	.13	1560	.35	690	.12	830	.12
96" (2428 mm)	6" x 30" (152 x 762 mm)	1710	.26	1081	.09	2160	.34	980	.08	1180	.08



End View

See page 12 for operating instructions.
*Vertical 28-1/2" (724 mm) and 36" (914 mm) sash openings are for setup only; operating position is an 18" (45.7 mm) opening. Combination sash volume is based on vertically closed horizontally open sash position.

SafeAire II High-line Restricted Bypass Superstructure

For Use With Constant Volume or Variable Air Volume Exhaust Systems

		Base Product Numbers							
		31-1/4" Depth		36" Depth		37-1/4" Depth		43-1/4" Depth	
Width	Sash Opening Height	Fixed Baffle	Remote Baffle Adjustment	Fixed Baffle	Remote Baffle Adjustment	Fixed Baffle	Remote Baffle Adjustment	Fixed Baffle	Remote Baffle Adjustment
48" (1219 mm)	28-1/2" (724 mm)	54L2801__	54L2803__	60L2801P_	60L2803P_	61L2801P_	61L2803P_	62L2801P_	62L2803P_
48" (1219 mm)	36" (914 mm)	54L2813__	54L2815__	60L2813P_	60L2815P_	61L2813P_	61L2815P_	62L2813P_	62L2815P_
60" (1524 mm)	28-1/2" (724 mm)	54L2804__	54L2806__	60L2804P_	60L2806P_	61L2804P_	61L2806P_	62L2804P_	62L2806P_
60" (1524 mm)	36" (914 mm)	54L2816__	54L2818__	60L2816P_	60L2818P_	61L2816P_	61L2818P_	62L2816P_	62L2818P_
72" (1829 mm)	28-1/2" (724 mm)	54L2807__	54L2809__	60L2807P_	60L2809P_	61L2807P_	61L2809P_	62L2807P_	62L2809P_
72" (1829 mm)	36" (914 mm)	54L2819__	54L2821__	60L2819P_	60L2821P_	61L2819P_	61L2821P_	62L2819P_	62L2821P_
96" (2438 mm)	28-1/2" (724 mm)	54L2810__	54L2812__	60L2810P_	60L2812P_	61L2810P_	61L2812P_	62L2810P_	62L2812P_
96" (2438 mm)	36" (914 mm)	54L2822__	54L2824__	60L2822P_	60L2824P_	61L2822P_	61L2824P_	62L2822P_	62L2824P_

Liner Materials – Insert suffix in **8th** digit of product number for 31-1/4" depth only:
P – Polyresin
R – Cement-based Board
E – Cement-based Board/White Enamel
C – PVC

Sash Options – Insert suffix in **9th** digit of product number:

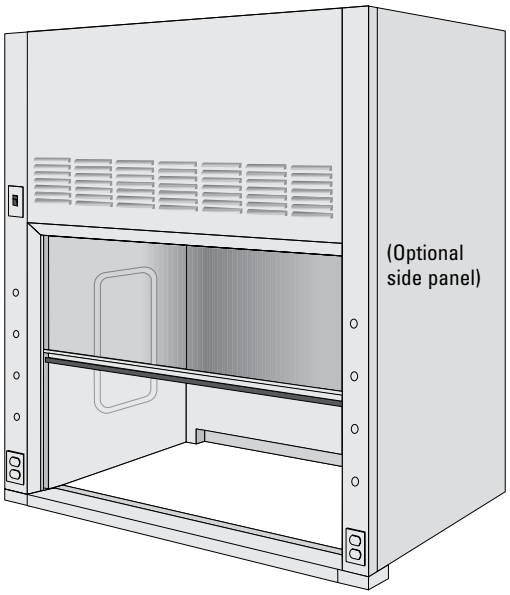
Sash Type	Suffix
Standard	0
Combination	B
Framed	F

See page 15 for additional sash information.

Other Information – To complete the fume hood assembly, refer to the sections listed below:
Fixtures (pages 88-95).
Alarms (page 96)
Work surfaces, cupsinks and traps (pages 98-103).
Base cabinets (pages 105-108).
Ceiling/Blower Enclosures (pages 110-118)
Accessories (pages 119-123).
Order end panels separately (page 117).

SafeAire II Constant Volume Bypass Superstructure

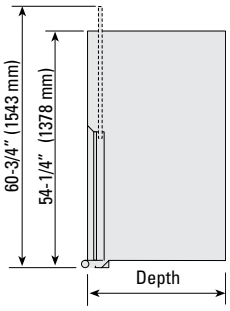
- Designed for installation on 26-1/8" (663 mm) to 42" (1067 mm) deep work surface.
- Incorporates double bypass to maintain constant exhaust volume at all sash positions.
- Designed to permit exact balancing of room ventilation system with fume hood exhaust volume.
- Vertical sash is full-view, laminated safety glass with full-width recessed pull.
- 28-1/2" (724 mm) high opening for setup.
- Two-tube (T-8) fluorescent light fixture, black light switch and flush plate, and two black duplex 120 VAC receptacles and flush plates.
- 96" (2438 mm) wide units have two light fixtures.
- Plugged holes for future service fixture installation standard on both posts.
- Shipped assembled.
- 31-1/4" (794 mm) deep fume hoods require a sink base unit below a rear cupsink.
- UL 1805 classified.
- See pages 17 for additional product features common to all SafeAire II fume hoods.



Exhaust Volumes

		100 FPM 28-1/2" Sash Opening*		100 FPM 18" Sash Opening*	
Fume Hood Size	Collar Size	CFM	SP	CFM	SP
36" (914 mm)	6" x 9" (152 x 229 mm)	520	.22	360	.12
48" (1219 mm)	6" x 15" (152 x 381 mm)	760	.18	485	.09
60" (1524 mm)	6" x 23" (152 x 584 mm)	1000	.18	660	.09
72" (1829 mm)	6" x 23" (152 x 584 mm)	1250	.27	785	.13
96" (24.8 mm)	6" x 30" (152 x 762 mm)	1710	.26	1081	.09

See page 12 for operating instructions.
*28-1/2" (724 mm) openings are for setup only; operating position is an 18" (457 mm) opening.



End View

SafeAire II Constant Volume Bypass Superstructure

Base Product Numbers								
	31-1/4" Depth		36" Depth		37-1/4" Depth		43-1/4" Depth	
Width	Fixed Baffle	Remote Baffle Adjustment	Fixed Baffle	Remote Baffle Adjustment	Fixed Baffle	Remote Baffle Adjustment	Fixed Baffle	Remote Baffle Adjustment
36" (914 mm)	54L2586__	54L2588__	60L2586P_	60L2588P_	—	—	—	—
48" (1219 mm)	54L2589__	54L2591__	60L2589P_	60L2591P_	61L2589P_	61L2591P_	62L2589P_	62L2591P_
60" (1524 mm)	54L2592__	54L2594__	60L2592P_	60L2594P_	61L2592P_	61L2594P_	62L2592P_	62L2594P_
72" (1829 mm)	54L2595__	54L2597__	60L2595P_	60L2597P_	61L2595P_	61L2597P_	62L2595P_	62L2597P_
96" (2438 mm)	54L2598__	54L2600__	60L2598P_	60L2600P_	61L2598P_	61L2600P_	62L2598P_	62L2600P_

Liner Materials – Insert suffix in **8th** digit of product number for 31-1/4" depth only:
- P – Polyresin
- R – Cement-based Board
- E – Cement-based Board/White Enamel
- S – Stainless Steel
  (Not available on 36" wide fume hood)
- C – PVC

Sash Options – Insert suffix in **9th** digit of product number:

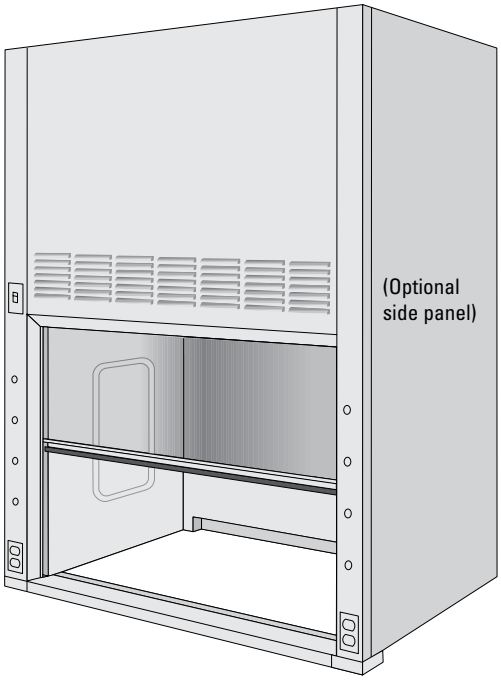
Sash Type	Suffix
Standard	0
Framed	F

See page 15 for additional sash information.
36" wide fume hood only available with standard sash.

Other Information – To complete the fume hood assembly, refer to the sections listed below:
Fixtures (pages 88-95).
Alarms (page 96).
Work surfaces, cupsinks and traps (pages 98-103).
Base cabinets (pages 105-108).
Ceiling/Blower Enclosures (pages 110-118).
Accessories (pages 119-123).
Order end panels separately (page 117).

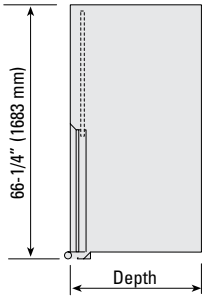
SafeAire II High-line Constant Volume Bypass Superstructure

- Designed for installation on 26-1/8" (663 mm) to 42" (1067 mm) deep work surface.
- Extra-height interior to accommodate apparatus up to 60" (1524 mm) high.
- Incorporates a double bypass to maintain constant exhaust volume at all sash positions.
- Designed to permit exact balancing of room ventilation system with fume hood exhaust volume.
- Vertical sash is full-view, laminated safety glass with full-width recessed pull.
- Choice of 28-1/2" (724 mm) or 36" (914 mm) high opening for setup.
- Two-tube (T-8) fluorescent light fixture, black light switch and flush plate, and two black duplex 120 VAC receptacles and flush plates.
- 96" (2438 mm) wide units have two light fixtures.
- Plugged holes for future service fixture installation standard on both posts.
- Shipped assembled.
- 31-1/4" (794 mm) deep fume hoods require a sink base unit below a rear cupsink.
- UL 1805 classified.
- See page 17 for additional product features common to all SafeAire II fume hoods.



Exhaust Volumes

		100 FPM 28-1/2" Sash Opening*		100 FPM 18" Sash Opening*		100 FPM 36" Sash Opening*	
Fume Hood Size	Collar Size	CFM	SP	CFM	SP	CFM	SP
48" (1219 mm)	6" x 15" (152 x 381 mm)	760	.18	485	.09	960	.27
60" (1524 mm)	6" x 23" (152 x 584 mm)	1000	.18	660	.09	1260	.28
72" (1829 mm)	6" x 23" (152 x 584 mm)	1250	.27	785	.13	1560	.35
96" (2438 mm)	6" x 30" (152 x 762 mm)	1710	.26	1081	.09	2160	.34



End View

See page 12 for operating instructions.
*28-1/2" (724 mm) and 36" (914 mm) openings are for setup only; operating position is an 18" (457 mm) opening.

SafeAire II High-line Constant Volume Bypass Superstructure

		Base Product Numbers							
		31-1/4" Depth		36" Depth		37-1/4" Depth		43-1/4" Depth	
Width	Sash Opening Height	Fixed Baffle	Remote Baffle Adjustment	Fixed Baffle	Remote Baffle Adjustment	Fixed Baffle	Remote Baffle Adjustment	Fixed Baffle	Remote Baffle Adjustment
48" (1219 mm)	28-1/2" (724 mm)	54L2685__	54L2687__	60L2685P_	60L2687P_	61L2685P_	61L2687P_	62L2685P_	62L2687P_
48" (1219 mm)	36" (914 mm)	54L2697__	54L2699__	60L2697P_	60L2699P_	61L2697P_	61L2699P_	62L2697P_	62L2699P_
60" (1524 mm)	28-1/2" (724 mm)	54L2688__	54L2690__	60L2688P_	60L2690P_	61L2688P_	61L2690P_	62L2688P_	62L2690P_
60" (1524 mm)	36" (914 mm)	54L2700__	54L2702__	60L2700P_	60L2702P_	61L2700P_	61L2702P_	62L2700P_	62L2702P_
72" (1829 mm)	28-1/2" (724 mm)	54L2691__	54L2693__	60L2691P_	60L2693P_	61L2691P_	61L2693P_	62L2691P_	62L2693P_
72" (1829 mm)	36" (914 mm)	54L2703__	54L2705__	60L2703P_	60L2705P_	61L2703P_	61L2705P_	62L2703P_	62L2705P_
96" (2438 mm)	28-1/2" (724 mm)	54L2694__	54L2696__	60L2694P_	60L2696P_	61L2694P_	61L2696P_	62L2694P_	62L2696P_
96" (2438 mm)	36" (914 mm)	54L2706__	54L2708__	60L2706P_	60L2708P_	61L2706P_	61L2708P_	62L2706P_	62L2708P_

Liner Materials – Insert suffix in **8th** digit of product number for 31-1/4" depth only:
- P – Polyresin
- R – Cement-based Board
- E – Cement-based Board/White Enamel
- C – PVC

Sash Options – Insert suffix in **9th** digit of product number:

Sash Type	Suffix
Standard	0
Framed	F

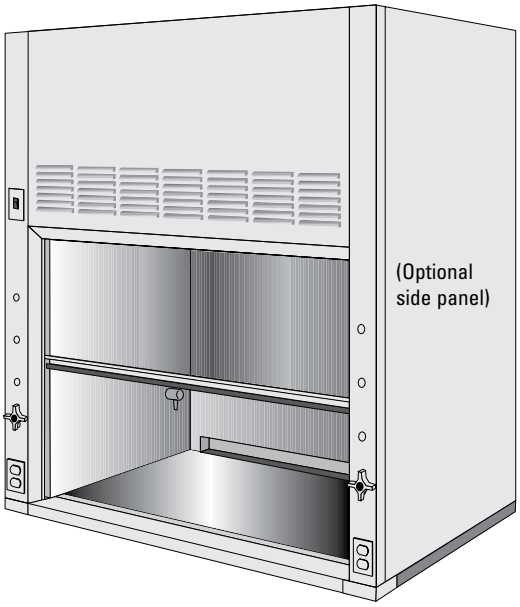
See page 15 for additional sash information.

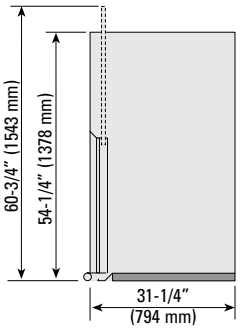
Other Information – To complete the fume hood assembly, refer to the sections listed below:
- Fixtures (pages 88-95).
- Alarms (page 96).
- Work surfaces, cupsinks and traps (pages 98-103).
- Base cabinets (pages 105-108).
- Ceiling/Blower Enclosures (pages 110-118).
- Accessories (pages 119-123).
- Order end panels separately (page 117).

SafeAire II Perchloric Acid Restricted Bypass Superstructure

For Use With Constant Volume or Variable Air Volume Exhaust Systems

- Designed specifically and exclusively for perchloric acid procedures to minimize possibility of fire and explosion.
- One-piece type 304 stainless steel interior includes dished work surface, with all joints coved, welded and ground.
- Optional type 316 stainless steel interior with integral work surface for high abuse applications (Special order – extended leadtime).
- Integral full-width trough at back of work surface for collection and disposal of wash-down waters; double drain for large volumes.
- High-volume spray heads behind upper baffle.
- Vertical sash is full-view, laminated safety glass with full-width recessed pull.
- 28-1/2" (724 mm) high opening for setup.
- One each remote control cold water faucet with vacuum breaker and control valve for fume hood washdown (Additional valves are required for duct washdown).
- Two each 120 VAC black duplex receptacles and flush plates.
- One vapor-proof light with black switch and flush plate on 48" (1219 mm) wide hood; two vapor-proof lights with one black switch and flush plate on 72" (1829 mm) wide fume hood.
- Does not include sidewall access panel.
- Baffles are non-adjustable.
- UL 1805 classified
- Not investigated by UL for use with perchloric acid.
- See page 17 for additional product features common to all SafeAire II fume hoods .





End View

Exhaust Volumes

		100 FPM @ 28-1/2" Sash Opening*		100 FPM @ 18" Sash Opening*	
Fume Hood Size	**Collar Size**	**CFM**	**SP**	**CFM**	**SP**
48" (1219 mm)	6" x 15" (152 x 381 mm)	760	.18	485	.09
72" (1829 mm)	6" x 23" (152 x 584 mm)	1250	.27	785	.13

See page 12 for operating instructions.
*28-1/2" (72.4 mm) openings are for setup only; operating position is an 18" (45.7 mm) opening.

SafeAire II Perchloric Acid Restricted Bypass Superstructure

For Use With Constant Volume or Variable Air Volume Exhaust Systems

Base Product Numbers	
Product No.	**Width**
54L2793K_	48" (1219 mm)
54L2797K_	72" (1829 mm)

Liner Material – Stainless steel Type 304, consult factory for optional Type 316 high-abuse stainless steel.

Sash Options – Insert suffix in **9th** digit of product number:

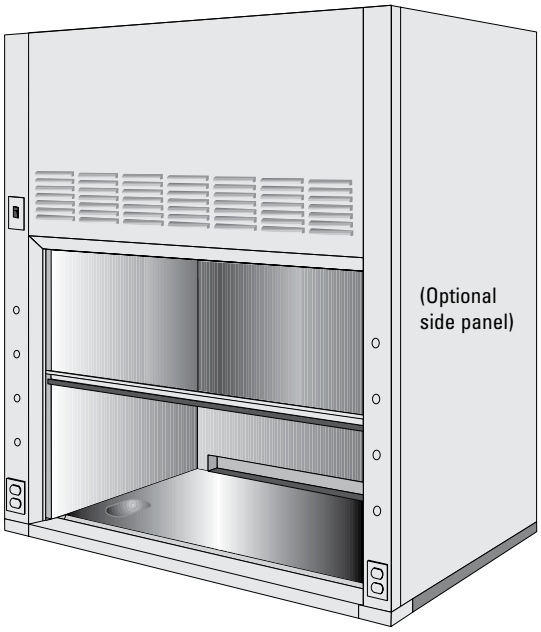
Sash Type	Suffix
Standard	0
Framed	F

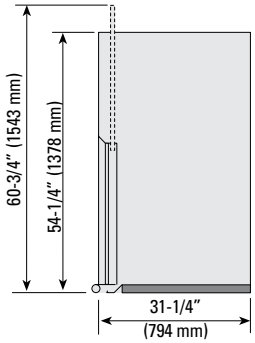
Other Information – To complete the fume hood assembly, refer to the sections listed below:

Fixtures (pages 88-95).
Alarms (page 96).
Ceiling/Blower Enclosures (pages 110-118).
See pages 128-131 for blower requirements.
Order end panels separately (page 117).

SafeAire II Constant Volume Radioisotope Bypass Superstructure

- Designed for handling of radioactive isotopes.
- One-piece type 304 stainless steel interior and work surface with integral cupsink located at left front corner, all corners coved, welded and ground (Relocating cupsink extends leadtime).
- Filter system recommended; see page 125.
- Weight capacity of reinforced work surface is 200 lbs per square foot.
- Incorporates double bypass to maintain constant exhaust volume at all sash positions.
- Designed to permit exact balancing of room ventilation system with hood exhaust volume.
- Vertical sash is full-view, laminated safety glass with full-width recessed pull.
- 28-1/2" (724 mm) high opening for setup.
- Does not include sidewall access panel.
- Two-tube (T-8) fluorescent light fixture, black light switch and flush plate, two 120 VAC black duplex receptacles and flush plates.
- 96" (2438 mm) wide units have two light fixtures.
- Plugged holes for future service fixture installation standard on both posts.
- UL 1805 classified
- Not investigated by UL for use with radiological materials.
- See page 17 for additional product features common to all SafeAire II fume hoods.





End View

Exhaust Volumes

		100 FPM @ 28-1/2" Sash Opening*		100 FPM @ 18" Sash Opening*	
Fume Hood Size	**Collar Size**	**CFM**	**SP**	**CFM**	**SP**
48" (1219 mm)	6" x 15" (152 x 381 mm)	760	.18	485	.09
60" (1524 mm)	6" x 23" (152 x 584 mm)	1000	.18	660	.09
72" (1829 mm)	6" x 23" (152 x 584 mm)	1250	.27	785	.13
96" (2438 mm)	6" x 30" (152 x 762 mm)	1710	.26	1081	.09

See page 12 for operating instructions.
*28-1/2" (724 mm) openings are for setup only; operating position is an 18" (457 mm) opening.

SafeAire II Constant Volume Radioisotope Bypass Superstructure

For Use With Constant Volume Exhaust Systems

Base Product Numbers		
Width	Fixed Baffle	Remote Baffle Adjustment
48" (1219 mm)	54L2733K_	54L2735K_
60" (1524 mm)	54L2736K_	54L2738K_
72" (1829 mm)	54L2739K_	54L2741K_
96" (2438 mm)	54L2742K_	54L2744K_

Liner Material – Stainless Steel, **No Options**

Sash Options – Insert suffix in **9th** digit of product number:

Sash Type	Suffix
Standard	0
Framed	F

Other Information – To complete the fume hood assembly, refer to the sections listed below:

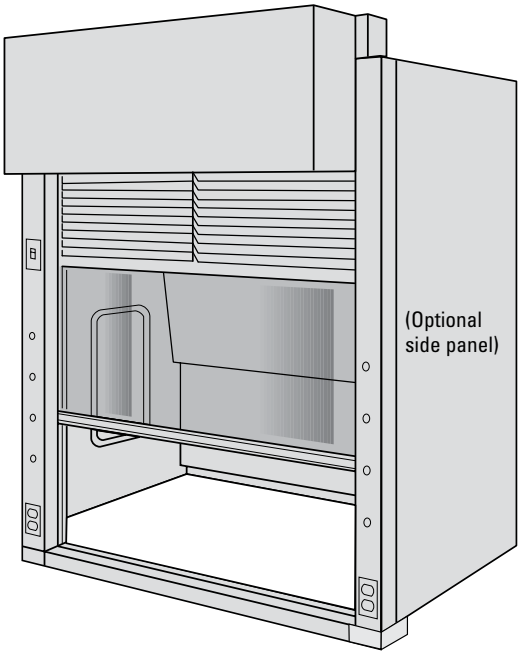
Fixtures (pages 88-95).
Alarms (page 96).
Base cabinets (pages105-108).
Ceiling/Blower Enclosures (pages 110-118)
Accessories (pages 119-123).
Order end panels separately (page 117).

Acid or Flammable Liquid storage cabinets cannot be positioned below the existing cupsinks.

SafeAire II Auxiliary Air Superstructure

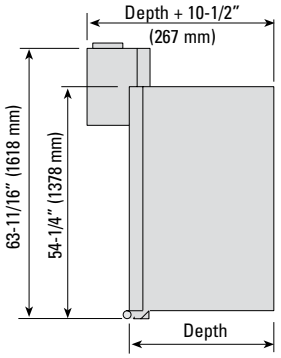
For Use With Constant Volume Exhaust Systems

- Designed to utilize semi-tempered outside air as supply air when total fume hood exhaust volume exceeds room exhaust volume requirements.
- Designed to yield a higher percentage capture rate with lower auxiliary air velocities.
- Vertical sash is full-view, laminated safety glass with full-width recessed pull.
- 28-1/2" (724 mm) high opening for setup.
- Two-tube (T-8) fluorescent light fixture, black light switch and flush plate, and two black duplex 120 VAC receptacles and flush plates.
- 96" (2438 mm) wide units have two light fixtures.
- Plugged holes for future service fixture installation standard on both posts.
- Shipped assembled.
- UL 1805 classified.



Exhaust Volumes

		100 FPM 28-1/2" Sash Opening*		100 FPM 18" Sash Opening*	
Fume Hood Size	Collar Size	CFM	SP	CFM	SP
48" (1219 mm)	6" x 15" (152 x 381 mm)	760	.18	485	.09
60" (1524 mm)	6" x 23" (152 x 584 mm)	1000	.18	660	.09
72" (1829 mm)	6" x 23" (152 x 584 mm)	1250	.27	785	.13
96" (2438 mm)	6" x 30" (152 x 762 mm)	1710	.26	1081	.09



End View

Supply Air Requirements

Percent of Fume Hood Air Requirement	Fume Hood Size	100 FPM 28-1/2" Sash Opening* CFM	SP	100 FPM 18" Sash Opening* SP CFM	SP
70%	48" (1219 mm)	532	.14	340	.07
	60" (1524 mm)	700	.29	460	.14
	72" (1829 mm)	875	.34	550	.20
	96" (2438 mm)	1197	.31	760	.26
60%	48" (1219 mm)	456	.12	290	.05
	60" (1524 mm)	600	.26	295	.12
	72" (1829 mm)	750	.26	470	.22
	96" (2438 mm)	1026	.33	650	.202
50%	48" (1219 mm)	380	.09	245	.03
	60" (1524 mm)	500	.16	330	.10
	72" (1829 mm)	625	.20	335	.18
	96" (2438 mm)	855	.30	540	.17

See page 12 for operating instructions.
*28-1/2" (724 mm) openings are for setup only; operating position is an 18" (457 mm) opening.

SafeAire II Auxiliary Air Superstructure

For Use With Constant Volume Exhaust Systems

	Base Product Numbers			
	33-13/16" Depth	38-9/16" Depth	39-13/16" Depth	45-13/16" Depth
Width	Fixed Baffle	Fixed Baffle	Fixed Baffle	Fixed Baffle
48" (1219 mm)	54L2625__	60L2625P_	61L2625P_	62L2625P_
60" (1524 mm)	54L2628__	60L2628P_	61L2628P_	62L2628P_
72" (1829 mm)	54L2631__	60L2631P_	61L2631P_	62L2631P_
96" (2438 mm)	54L2634__	60L2634P_	61L2634P_	62L2634P_

Liner Materials – Insert suffix in **8th** digit of product number for 33-13/16" depth only:
P – Polyresin
R – Cement-based board
E – Cement-based board/white enamel
S – Stainless Steel
C – PVC

Sash Options – Insert suffix in **9th** digit of product number:

Sash Type	Suffix
Standard	0
Framed	F

See page 15 for additional sash information.

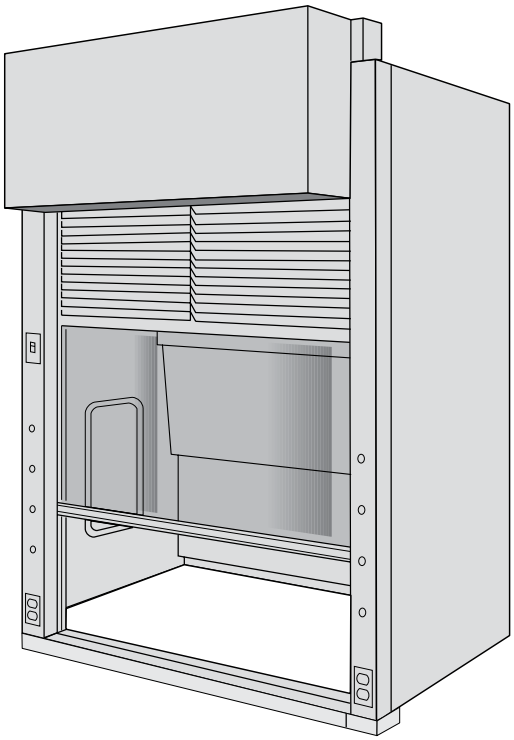
Side Panels – Order separately; see page 117.

Other Information – To complete the fume hood assembly, refer to the sections listed below:
Fixtures (pages 88-95).
Alarms (page 96).
Work surfaces, cupsinks and traps (pages 98-103).
Base cabinets (pages 105-108).
Ceiling/Blower Enclosures (pages 110-118).
Accessories (pages 119-123).

SafeAire II High-line Auxiliary Air Superstructure

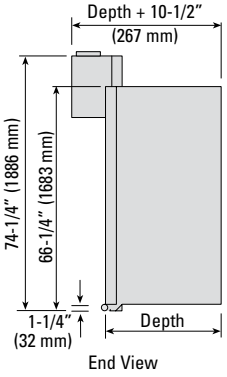
For Use With Constant Volume Exhaust Systems

- Designed to utilize semi-tempered outside air as supply air when total fume hood exhaust volume exceeds room exhaust volume requirement.
- Extra-height interior to accommodate apparatus up to 60" (1524 mm) high.
- Designed to yield a higher percentage capture rate with lower auxiliary air velocities.
- More headroom than standard bench models.
- Vertical sash is full-view, laminated safety glass with full-width recessed pull.
- Choice of 28-1/2" (724 mm) or 36" (914 mm) high opening for setup.
- Two-tube (T-8) fluorescent light fixture, black light switch and flush plate, and two black duplex 120 VAC receptacles and flush plates.
- 96" (2438 mm) wide units have two light fixtures.
- Plugged holes for future service fixture installation standard on both posts.
- Shipped assembled.
- UL 1805 classified.



Exhaust Volumes

		100 FPM @ 28-1/2" Sash Opening*		100 FPM @ 18" Sash Opening*		100 FPM @ 36" Sash Opening*	
Fume Hood Size	**Collar Size**	**CFM**	**SP**	**CFM**	**SP**	**CFM**	**SP**
48" (1219 mm)	6" x 15" (152 x 381 mm)	760	.18	485	.09	960	.27
60" (1524 mm)	6" x 23" (152 x 584 mm)	1000	.18	660	.09	1260	.28
72" (1829 mm)	6" x 23" (152 x 584 mm)	1250	.27	785	.13	1560	.35
96" (2438 mm)	6" x 30" (152 x 762 mm)	1710	.26	1081	.09	2160	.34



Supply Air Requirements

Percent of Fume Hood Air Requirement	Fume Hood Size	100 FPM @ 28-1/2" Sash Opening* CFM	SP	100 FPM @ 18" Sash Opening* CFM	SP	100 FPM @ 36" Sash Opening* CFM	SP
70%	48" (1219 mm)	532	.14	340	.08	672	.16
	60" (1524 mm)	700	.29	460	.14	882	.33
	72" (1829 mm)	875	.34	550	.17	1092	.38
	96" (2438 mm)	1197	.31	760	.24	1517	.41
60%	48" (1219 mm)	456	.12	290	.06	576	.15
	60" (1524 mm)	600	.26	400	.14	756	.30
	72" (1829 mm)	750	.26	470	.16	936	.32
	96" (2438 mm)	1026	.33	650	.21	1296	.37
50%	48" (1219 mm)	380	.09	240	.04	480	.12
	60" (1524 mm)	500	.16	330	.12	630	.22
	72" (1829 mm)	625	.20	390	.13	780	.26
	96" (2438 mm)	855	.30	540	.16	1080	.33

See page 12 for operating instructions.

*28-1/2" (724 mm) and 36" (914 mm) sash openings are for setup only; operating position is an 18" (457 mm) high sash opening.

SafeAIre II High-line Auxiliary Air Superstructure

For Use With Constant Volume Exhaust Systems

		Base Product Numbers			
		33-13/16" Depth	38-9/16" Depth	39-13/16" Depth	45-13/16" Depth
Width	Sash Opening Height	Fixed Baffle	Fixed Baffle	Fixed Baffle	Fixed Baffle
48" (1219 mm)	28-1/2" (724 mm)	54L2709__	60L2709P_	61L2709P_	62L2709P_
48" (1219 mm)	36" (914 mm)	54L2721__	60L2721P_	61L2721P_	62L2721P_
60" (1524 mm)	28-1/2" (724 mm)	54L2712__	60L2712P_	61L2712P_	62L2712P_
60" (1524 mm)	36" (914 mm)	54L2724__	60L2724P_	61L2724P_	62L2724P_
72" (1829 mm)	28-1/2" (724 mm)	54L2715__	60L2715P_	61L2715P_	62L2715P_
72" (1829 mm)	36" (914 mm)	54L2727__	60L2727P_	61L2727P_	62L2727P_
96" (2438 mm)	28-1/2" (724 mm)	54L2718__	60L2718P_	61L2718P_	62L2718P_
96" (2438 mm)	36" (914 mm)	54L2730__	60L2730P_	61L2730P_	62L2730P_

Liner Materials – Insert suffix in 8**th** digit of product number for 33-13/16" depth only:
- P – Polyresin
- R – Cement-based board
- E – Cement-based board/white enamel
- C – PVC

Sash Options – Insert suffix in **9th** digit of product number:

Sash Type	Suffix
Standard	0
Framed	F

See page 15 for additional sash information.

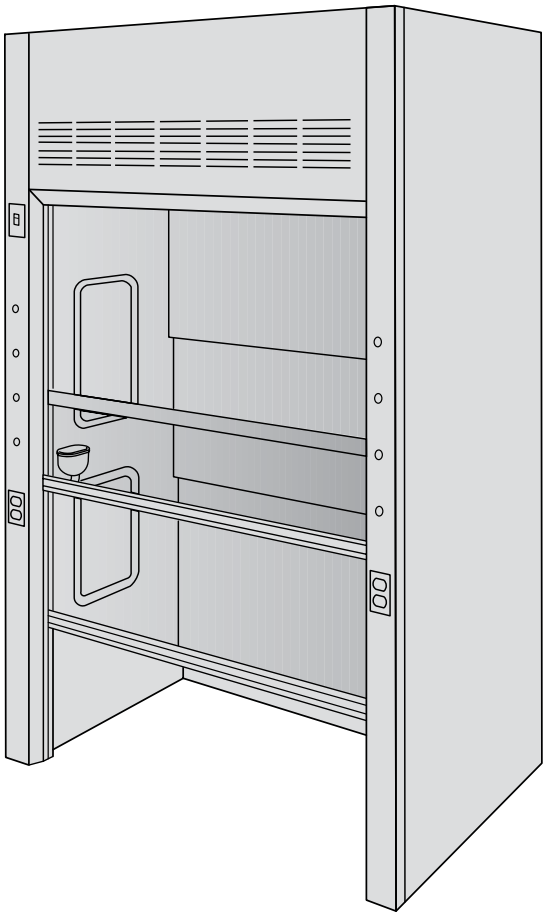
Side Panels – Order separately; see page 117.

Other Information – To complete the fume hood assembly, refer to the sections listed below:
- Fixtures (pages 88-95)
- Alarms (page 96)
- Work surfaces, cupsinks and traps (pages 98-103)
- Base cabinets (pages 105-108)
- Ceiling/Blower Enclosures (pages 110-118)
- Accessories (pages 119-123)

SafeAire II Restricted Bypass Floor-mounted

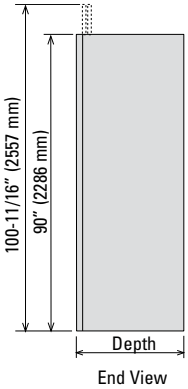
For use with Constant Volume or Variable Air Volume Exhaust Systems

- Three standard depth choices.
- Designed for large and complex laboratory apparatus setups and roll-in equipment.
- Recommended when an independent VAV controller is used (supplied by others).
- Also recommended with horizontal or combination sash used in conjunction with VAV or constant volume systems.
- Incorporates a 2" (51 mm) bypass to minimize leakage and maintain minimum flow.
- Double-hung, vertical sash is full-view, laminated safety glass with full-width recessed pulls.
- Sashes raise completely for easy setup (66-1/2" (1689 mm) sash opening).
- Two side-wall access panels with PVC gasket on left side, one on right.
- One cupsink included at front left location. The 96" (2438 mm) wide fume hood has one cupsink and two access panels at each side.
- Two-tube (T-8) fluorescent light fixture, black light switch and flush plate, and two black duplex 120 VAC receptacles and flush plates.
- 96" (2438 mm) wide units have two light fixtures.
- Plugged holes for future service fixture installation standard on both posts.
- All floor-mounted fume hoods except those with stainless steel liners are shipped knocked-down and require job-site assembly.
- UL 1805 classified.



Exhaust Volumes

		100 FPM @ 31-1/2" Vertical Sash Opening*		100 FPM Combination (Horizontal) Sash Opening	
Fume Hood Size	**Collar Size**	**CFM**	**SP**	**CFM**	**SP**
48" (1219 mm)	6" x 15" (152 x 381 mm)	850	.18	480	.09
60" (1524 mm)	6" x 23" (152 x 584 mm)	1110	.20	670	.09
72" (1829 mm)	6" x 23" (152 x 584 mm)	1380	.32	790	.13
96" (2438 mm)	6" x 30" (152 x 762 mm)	1900	.29	1125	.10



End View

See page 12 for operating instructions.

*Floor mounted fume hood should be operated through a maximum face opening of 18" (457 mm) through a single sash with the other sash closed.

SafeAire II Restricted Bypass Floor-mounted

For Use With Constant Volume or Variable Air Volume Exhaust Systems

	Base Product Numbers		
	32-11/32″ Depth	38-11/32″ Depth	44-11/32″ Depth
Width	Fixed Baffle	Fixed Baffle	Fixed Baffle
48″ (1219 mm)	554S2326__	551S2326P_	552S2326P_
60″ (1524 mm)	554S2329__	551S2329P_	552S2329P_
72″ (1829 mm)	554S2332__	551S2332P_	552S2332P_
96″ (2438 mm)	554S2335__	551S2335P_	552S2335P_

Liner Materials – Insert suffix in **9th** digit of product number for 32-11/32″ depth only:
P – Polyresin
S – Stainless Steel

Sash Options – Insert suffix in **10th** digit of product number:

Sash Type	Suffix
Standard	0
Combination, upper frame only	B
Framed	F

See page 15 for additional sash information.

Side Panels – Order separately; see page 120.

Other Information – To complete the fume hood assembly, refer to the sections listed below:
Distillation Shelf (page 59)
Fixtures (pages 88-95)
Alarms (page 96)
Ceiling/Blower Enclosures (pages 110-118)
Accessories (pages 119-123)
Distillation Shelf (page 59)

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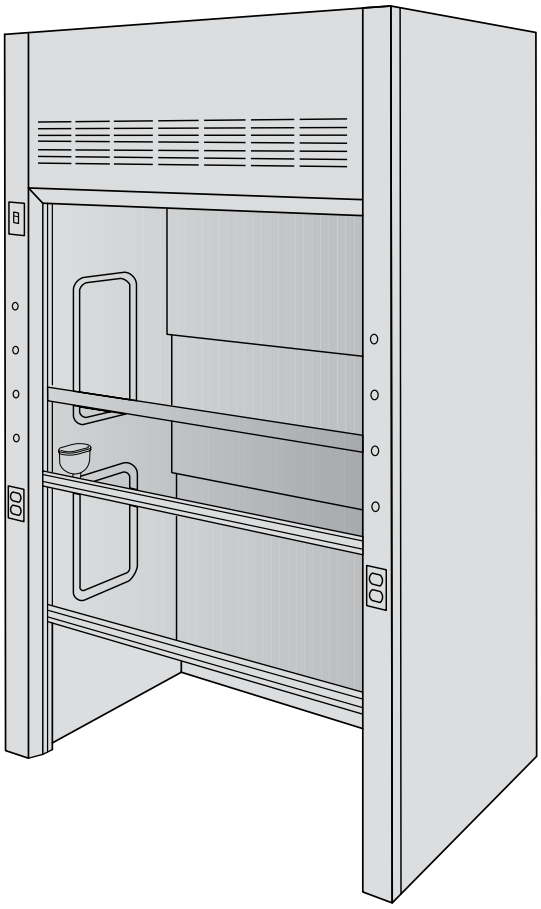
SafeAire II Constant Volume Floor-mounted

For use with Constant Volume Exhaust Systems

- Three standard depth choices available.
- Designed for large and complex laboratory apparatus setups and roll-in equipment.
- Incorporates double bypass to maintain constant exhaust volume at all sash positions.
- Designed to permit exact balancing of room ventilation system with fume hood exhaust volume.
- Double-hung, vertical sash is full-view, laminated safety glass with full-width recessed pulls
- Sashes raise completely for easy setup (66-1/2" (1689 mm) sash opening).
- Two side-wall access panels with PVC gasket on left side, one on right.
- One cupsink and two side-wall access panels with PVC gasket included at front left location; 96" (2438 mm) wide fume hood has two cupsinks and two access panels at each side.
- Two-tube (T-8) fluorescent light fixture, black light switch and flush plate, and two black duplex 120 VAC receptacles and flush plates.
- 96" (2438 mm) wide units have two light fixtures.
- Plugged holes for future service fixture installation standard on both posts.
- All floor-mounted fume hood except those with stainless steel liners are shipped knocked-down and require job-site assembly.
- UL 1805 classified.

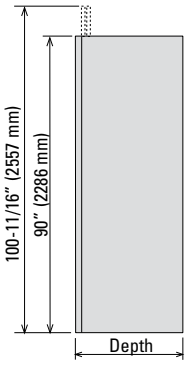


Exhaust Volumes

		100 FPM @ 31-1/2" Sash Opening*	
Fume Hood Size	**Collar Size**	**CFM**	**SP**
48" (1219 mm)	6" x 15" (152 x 381 mm)	850	.18
60" (1524 mm)	6" x 23" (152 x 584 mm)	1110	.20
72" (1829 mm)	6" x 23" (152 x 584 mm)	1380	.32
96" (2438 mm)	6" x 30" (152 x 762 mm)	1900	.29

See page 12 for operating instructions.

*Floor mounted fume hood should be operated through a maximum face opening of 18" (457 mm) through a single sash with the other sash closed.



End View

SafeAire II Constant Volume Floor-mounted

	Base Product Numbers		
	32-11/32" Depth	38-11/32" Depth	44-11/32" Depth
Width	Fixed Baffle	Fixed Baffle	Fixed Baffle
48" (1219 mm)	554S2705__	551S2705P_	552S2705P_
60" (1524 mm)	554S2708__	551S2708P_	552S2708P_
72" (1829 mm)	554S2711__	551S2711P_	552S2711P_
96" (2438 mm)	554S2714__	551S2714P_	552S2714P_

Liner Materials – Insert suffix in **9th** digit of product number for 32-11/32" depth only:
P – Polyresin
S – Stainless Steel

Sash Options – Insert suffix in **10th** digit of product number:

Sash Type	Suffix
Standard	0
Framed	F

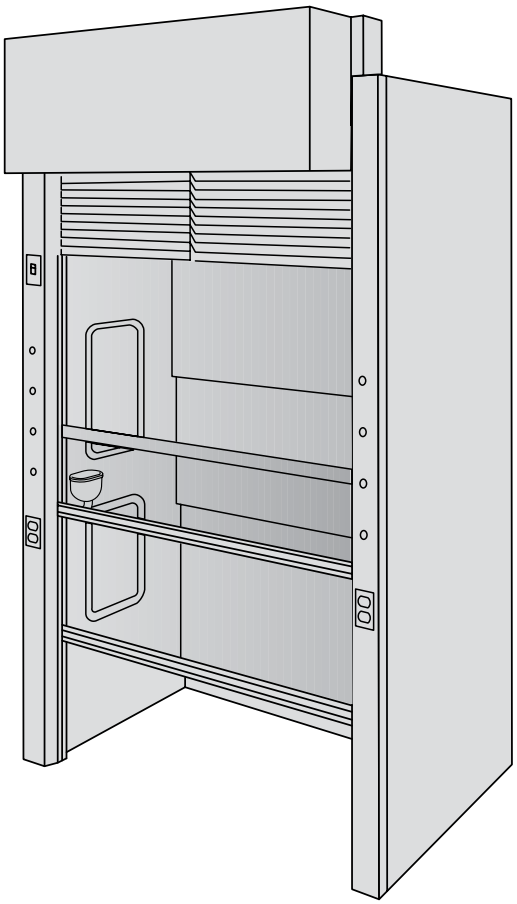
See page 15 for additional sash information.

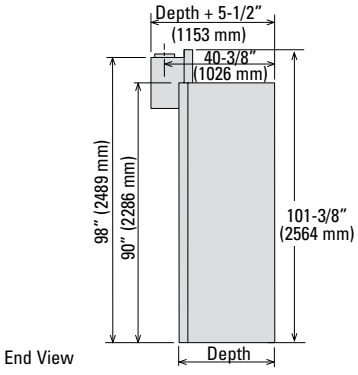
Side Panels – Order separately; see page 120.

Other Information – To complete the fume hood assembly, refer to the sections listed below:
Distillation Shelf (page 59)
Fixtures (pages 88-95)
Alarms (page 96)
Ceiling/Blower Enclosures (pages 110-118)
Accessories (pages 119-123)

SafeAire II Constant Volume Auxiliary Air Floor-mounted

- Three standard depth choices available.
- Designed for large and complex laboratory apparatus setups and roll-in equipment.
- Designed to utilize semi-tempered outside air when total fume hood exhaust volume exceeds room exhaust volume required.
- Designed to yield a higher percentage capture rate with lower auxiliary air velocities.
- Double-hung, vertical sash is full-view, laminated safety glass with full-width recessed pulls.
- Sashes raise completely for easy setup (66-1/2" (1689 mm) sash opening).
- One cupsink and two side-wall access panels with PVC gasket included at front left location. The 96" (2438 mm) wide fume hood has one cupsink and two access panels at each side.
- Two-tube (T-8) fluorescent light fixture, black light switch and flush plate, and two black duplex 120 VAC receptacles and flush plates.
- 96" (2438 mm) wide units have two light fixtures.
- Plugged holes for future service fixture installation standard on both posts.
- All floor-mounted fume hoods except those with stainless steel liners are shipped knocked-down and require job-site assembly.
- UL 1805 classified.





Supply Air Requirements

Percent of Fume Hood Air Requirement	Fume Hood Size	100 FPM @ 31-1/2" Sash Opening* CFM	SP
70%	48" (1219 mm)	532	.14
	60" (1524 mm)	700	.29
	72" (1829 mm)	875	.34
	96" (2438 mm)	1197	.31
60%	48" (1219 mm)	456	.12
	60" (1524 mm)	600	.26
	72" (1829 mm)	750	.26
	96" (2438 mm)	1026	.33

Exhaust Volumes

Fume Hood Size	Collar Size	100 FPM @ 31-1/2" Sash Opening* CFM	SP
48" (1219 mm)	6" x 15" (152 x 381 mm)	850	.18
60" (1524 mm)	6" x 23" (152 x 584 mm)	1110	.20
72" (1829 mm)	6" x 23" (152 x 584 mm)	1380	.32
96" (2438 mm)	6" x 30" (152 x 762 mm)	1900	.29

*Floor-mounted fume hood should be operated through a maximum face opening of 18" (457 mm) through a single sash with the other sash closed.

See page 12 for operating instructions.

SafeAire II Constant Volume Auxiliary Air Floor-mounted

For use with Constant Volume Exhaust Systems

	Base Product Numbers		
	34-15/16" Depth	40-15/16" Depth	46-15/16" Depth
Width	Fixed Baffle	Fixed Baffle	Fixed Baffle
48" (1219 mm)	554S2720__	551S2720P_	552S2720P_
60" (1524 mm)	554S2723__	551S2723P_	552S2723P_
72" (1829 mm)	554S2726__	551S2726P_	552S2726P_
96" (2438 mm)	554S2729__	551S2729P_	552S2729P_

Liner Materials – Insert suffix in **9th** digit of product number for 34-15/16" depth only:
P – Polyresin
S – Stainless Steel

Sash Options – Insert suffix in **10th** digit of product number:

Sash Type	Suffix
Standard	0
Framed	F

See page 15 for additional sash information.

Side Panels – Order separately; see page 120.

Other Information – To complete the fume hood assembly, refer to the sections listed below:
Distillation Shelf (page 59)
Fixtures (pages 88-95)
Alarms (page 96)
Ceiling/Blower Enclosures (pages 110-118)
Accessories (pages 119-123)

SafeAire II Combination Bench/Floor-mounted Constant Volume

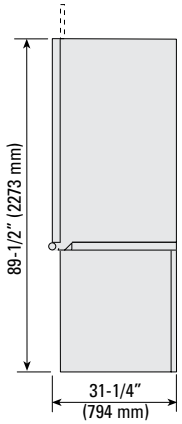
- Combination bench/floor-mounted assembly consisting of fume hood superstructure, work surface and base cabinets.
- Designed for unlimited access to work area for setup of wide apparatus.
- Half of work surface is removable; cupboard base cabinet opens for roll-in capability.
- Air foil design with double bypass to maintain constant exhaust volume at all sash positions.
- Fixed work surface is dished epoxy resin; removable surface is flat stainless steel.
- Choice of left or right side floor-mounted.
- Vertical sash is full-view, laminated safety glass with full-width recessed pull.
- 28-1/2" (724 mm) high opening for setup.
- Polyresin liner; no options.
- Two double-tube (T-8) fluorescent light fixtures, black light switch and flush plate, two 120 VAC black duplex receptacles and flush plates.
- Plugged holes for future service fixture installation standard on both posts.
- 96" (2438 mm) width only.
- Extended lead time.
- UL 1805 classified.

Exhaust Volumes

		100 FPM @ 28-1/2" Sash Opening*	
Fume Hood Size	**Collar Size**	**CFM**	**SP**
96" (2438 mm)	6" x 30" (152 x 762 mm)	1710	.26

See page 12 for operating instructions.

*28-1/2" (724 mm) openings are for setup only; operating position is an 18" (457 mm) opening.



End View

SafeAire II Combination Bench/Floor-mounted Bypass Assembly

For use with Constant Volume Exhaust Systems

Base Product Numbers	
Product No.	**Walk-In Side**
Fixed Baffle	
554S2350P	Left
554S2353P	Right

Liner Material – Polyresin, no options.

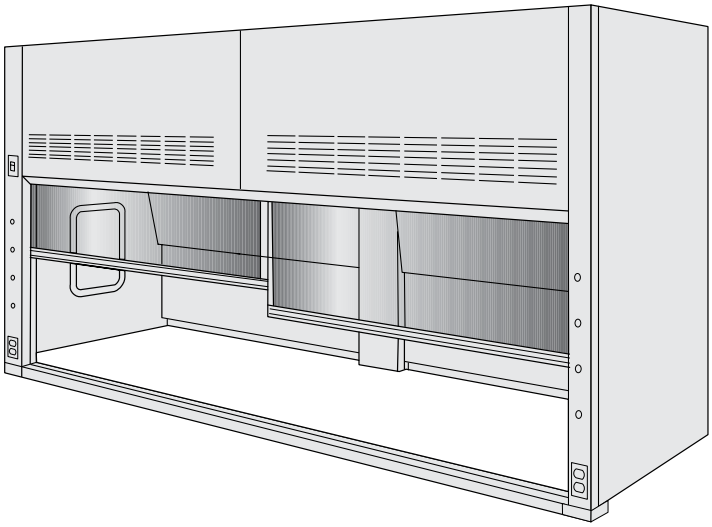
Side Panels – Order separately; see page 117.

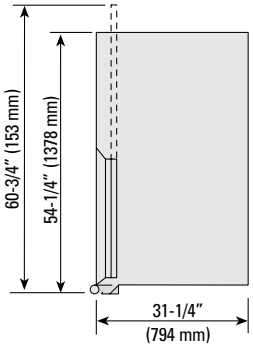
Other Information – To complete the fume hood assembly, refer to the sections listed below:
Fixtures (pages 88-95)
Alarms (page 96)
Ceiling/Blower Enclosures (pages 110-118)
Accessories (pages 119-123)

SafeAire II Framed Postless Sash Restricted Bypass Superstructure

For use with Constant Volume or Variable Air Volume Exhaust Systems

- Designed for unlimited access to work area for setup of wide apparatus.
- Two independently-operating framed vertical sashes are full-view, laminated safety glass with full-width recessed pull and disappearing guides.
- 28-1/2" (724 mm) high opening for setup.
- Incorporates a restricted bypass to eliminate leakage and maintain minimum flow.
- Polyresin liner; no options.
- Two-tube (T-8) fluorescent light fixtures, black light switch and flush plate, two 120 VAC black duplex receptacles and flush plates.
- Plugged holes for future service fixture installation standard on both posts.
- 120" (3049 mm) and 144" (3658 mm) wide units shipped in two sections and require job-site assembly and central support to ceiling.
- Two exhaust collars each on 120" (3049 mm) and 144" (3658 mm) models.
- UL 1805 classified.





End View

Exhaust Volumes
Based on both sashes open

		100 FPM @ 28-1/2" Sash Opening*		100 FPM @ 18" Sash Opening*	
Fume Hood Size	**Collar Size**	**CFM**	**SP**	**CFM**	**SP**
72" (1829 mm)	6" x 23" (152 x 584 mm)	1250	.27	785	.13
96" (2438 mm)	6" x 30" (152 x 762 mm)	1710	.26	1081	.09
120" (3048 mm)	Two 6" x 23" (152 x 584 mm)	2180	.18	1384	.10
144" (3658 mm)	Two 6" x 23" (152 x 584 mm)	2660	.29	1684	.15

See page 12 for operating instructions.
*28-1/2" (724 mm) openings are for setup only; operating position is an 18" (457 mm) opening.

SafeAire II Framed Postless Sash Restricted Bypass Superstructure

For use with Constant Volume or Variable Air Volume Exhaust Systems

Base Product Numbers	
Width	**Fixed Baffle**
72" (1829 mm)	54L2781P_
96" (2438 mm)	54L2784P_
120" (3048 mm)	54L2787P_
144" (3658 mm)	54L2790P_

Liner Material – Polyresin, no options

Sash Type – Insert suffix in **9th** digit of product number:

Sash Type	Suffix
Combination	B
Framed	F

Side Panels – Order separately; see page 117.

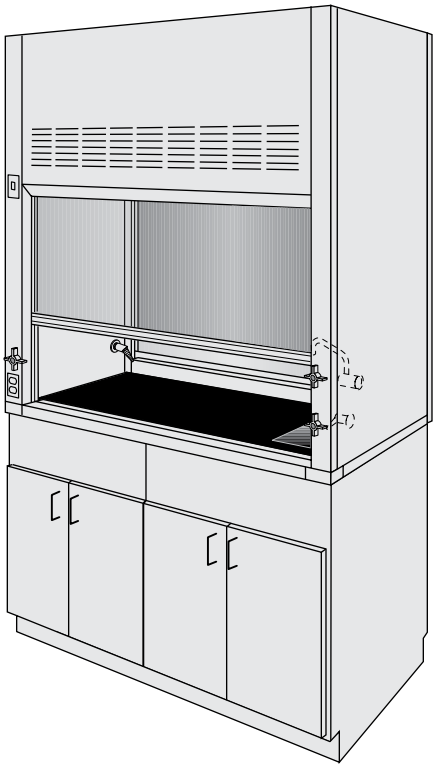
Other Information – To complete the fume hood assembly, refer to the sections listed below:

Fixtures (pages 88-95)
Alarms (page 96)
Work Surfaces, Cupsinks and Traps (pages 98-103)
Base Cabinets (pages 105-108)
Ceiling/Blower Enclosures (pages 110-118)
Accessories (pages 119-123)

SafeAire II Pass-through Demonstration Assembly

For use with Constant Volume or Variable Air Volume Exhaust Systems

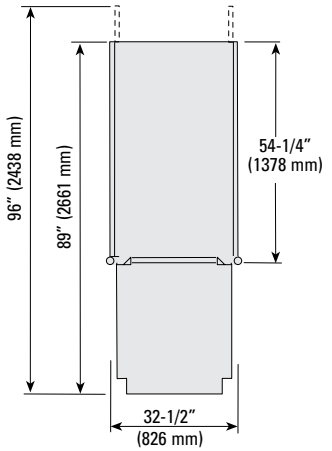
- Designed to permit demonstration and observation from either side.
- Assembly consists of a Restricted Bypass fume hood superstructure, work surface and base cabinets.
- Can be used freestanding or positioned in a wall between a classroom and a prep room.
- Two 30" (762 mm) wide wood base cabinets with double hinged doors and one shelf. Cabinets are not double-faced.
- Work surface is 1-1/4" (32 mm) thick epoxy resin without marine edge.
- Standard fixtures include: one cold water gooseneck faucet; two single gas fixtures; two black duplex AC outlets/flush plates; one 16" x 8" x 7" (406 mm x 203 mm x 178 mm) molded resin sink; two exhaust collars. Maximum two fixtures per side.
- All electrical is pre-wired to a junction box at the top of the fume hood.
- Two full-view vertically rising sashes made of 7/32" (6 mm) laminated safety glass with recessed pulls (one each side).
- 28-1/2" (724 mm) high opening for setup.
- Fixed baffle position.
- Two-tube (T-8) fluorescent light fixture (protected by safety glass panel) and black light switch/flush plate, mounted on each side of fume hood.
- Optional sash interlock 90L162N0 allows only one sash to be opened at a time (special order and extended lead time).
- 60" (1524 mm) wide.
- UL 1805 classified (only with 90L162N0 sash interlock factory installed).



Exhaust Volumes
Based on sash open one side only.

Fume Hood Width	Collar Size (Two Collars)	100 FPM @ 18"* Sash Opening CFM	SP
60" (1524 mm)	6" x 15" (152 x 381 mm)	700	.1

See page 12 for operating instructions.
*28-1/2" (72.4 mm) openings are for setup only; operating position is an 18" (45.7 mm) opening (one side only).



End View

SafeAire II Pass-through Demonstration Assembly

For Use With Constant Volume or Variable Air Volume Exhaust Systems

Base Product Number

Product No.	Width	Liner Material
Complete Assembly		
554C2325E0	60″ (1524 mm)	Cement-based board – white enamel
554C2325P0	60″ (1524 mm)	Polyresin
Superstructure Only		
54L2825E0	60″ (1524 mm)	Cement-based board – white enamel
54L2825P0	60″ (1524 mm)	Polyresin

Optional sash interlock
Order product number 90L162N0; requires extended lead time.

Side Panels – Order separately; see page 117.

APPENDIX D

Estimates of Probable Cost

NMSU CAMPUS FUME HOOD COST ANALYSIS

Building:	**FOSTER HALL**
Date:	2/28/2014

Overhead Costs	
General Contractor Profit	10%
General Contractor Overhead	30%
Design Fee	10%

Recommendation	Recommendation Description	RS Means Reference Number	QTY	Units	$/Unit	Total Cost
Install Stops	Sash Stops	N/A	1	ea	$45.00	**$45.00**
	Labor for install	N/A	2	Hr	$50.00	**$100.00**

Hoods: FH.220, FH.120, FH.441

Cost per hood with Overhead:	**$217.50**
Number of Hoods:	**$3.00**
Task Total:	**$652.50**

Install Fume Hood Monitor	Hood Monitor with Flow and Alarm	N/A	1	ea	$1,000.00	**$1,000.00**
	CFM/Transducer (Duct Flow)	23 09 23.10 0170	1	ea	$730.00	**$730.00**
	Control Wiring	23 09 23.10 5010	50	C.L.F	$3.30	**$165.00**
	Installation/Calibration time and fees	23 09 53.10 9000	8	hr	$126.90	**$1,015.20**
	Electrical Work-Simple System	11 53 43.13 8150	10%	% Cost	$291.02	**$291.02**

Hoods: FH.220, FH.120

Cost per hood with Overhead:	**$4,801.83**
Number of Hoods:	**$2.00**
Task Total:	**$9,603.66**

Fix or Install Exhaust Fan	New Centrifugal Roof Exhaust 600 CFM	11 53 13.23 0650	1	ea	$1,120.43	**$1,120.43**
	Air balancing Fan	23 05 93.10 1400	4	hr	$236.03	**$944.12**
	Old Fan Demo	23 05 05.10 2120	1	ea	$146.00	**$146.00**
	Wiring 1 HP Motor	26 05 80.10 0110	1	motor	$77.12	**$77.12**
	HVAC Demo of Metal Ductwork	23 05 05.10 1570	100	LB	$1.75	**$175.00**

Hoods: FH.120

Cost per hood with Overhead:	**$3,694.01**
Number of Hoods:	**$1.00**
Task Total:	**$3,694.01**

Replace Existing Fume Hood	New lab hood, incl fixtures and HVAC	11 53 13.23 0660	1	ea	$8,793.80	**$8,793.80**
	Air balancing	23 05 93.10 1400	8	hr	$236.03	**$1,888.24**
	Standard Sheet Metal duct Work	01 93 13.15 0940	50	L.F.	$2.71	**$135.50**
	HVAC Demo of Metal Ductwork	23 05 05.10 1570	100	LB	$1.75	**$175.00**
	Hood Monitor with Flow and Alarm	N/A	1	ea	$1,000.00	**$1,000.00**
	Control Contractor Work	23 09 53.10 9000	8	hr	$126.90	**$1,015.20**
	Electrical Work-Simple System	11 53 43.13 8150	10%	% Cost	$1,300.77	**$1,300.77**

Hoods: FH.120

Cost per hood with Overhead:	**$21,462.77**
Number of Hoods:	**$1.00**
Task Total:	**$21,462.77**

NMSU CAMPUS FUME HOOD COST ANALYSIS

Building:	**FOSTER HALL**
Date:	2/28/2014

Overhead Costs	
General Contractor Profit	10%
General Contractor Overhead	30%
Design Fee	10%

Recommendation	Recommendation Description	RS Means Reference Number	QTY	Units	$/Unit	Total Cost
Commissioning	Building Retro Commissioning	N/A	90,000	SQ FT	$0.40	**$36,000.00**

Cost per hood with Overhead:	**$54,000.00**
Task Total:	**$54,000.00**

Total Cost of all Items	**$89,412.94**

NMSU CAMPUS FUME HOOD COST ANALYSIS

Building:	**SKEEN HALL**
Date:	2/28/2014

Overhead Costs	
General Contractor Profit	10%
General Contractor Overhead	30%
Design Fee	10%

Recommendation	Recommendation Description	RS Means Reference Number	QTY	Units	$/Unit	Total Cost
Add Stops	Sash Stops	N/A	1	ea	$ 45.00	**$ 45.00**
	Labor for install	N/A	2	Hr	$ 50.00	**$ 100.00**

Hood: SKH.W122, SKH.W138.B, SKH.W330.A, SKH.W330.B, SKH.W342A.A, SKH.W356

Cost per hood with Overhead:	**$ 217.50**
Number of Hoods:	**6**
Task Total:	**$ 1,305.00**

Calibrate Fume Hood Monitors	Perform Hood Air Balance	23 05 93.10 1400	2	ea	$ 236.03	**$ 472.06**
	Control Contractor Calibration	23 09 53.10 9000	2	ea	$ 126.90	**$ 253.80**

Hood: SKH.W330.A, SKH.W330.B, SKH.W342A.A, SKH.W356

Cost per hood with Overhead:	**$ 1,088.79**
Number of Hoods:	**4**
Task Total:	**$ 4,355.16**

Total Cost of all Items	**$ 5,660.16**

NMSU CAMPUS FUME HOOD COST ANALYSIS

Building:	**GERALD THOMAS HALL**
Date:	2/28/2014

Overhead Costs	
General Contractor Profit	10%
General Contractor Overhead	30%
Design Fee	10%

Recommendation	Recommendation Description	RS Means Reference Number	QTY	Units	$/Unit	Total Cost
Install Stops	Sash Stops	N/A	1	ea	$ 45.00	**$ 45.00**
	Labor for install	N/A	2	Hr	$ 50.00	**$ 100.00**
Hoods:	GT.155, GT.W206, GW.W206.B, GT.W200, GT.262, GT.268, GT.272, GT.273.A, GT.273.B, GT.273.C, GT.356, GT.326, GT.W300, GT.250, GT.159W.A, GT.159E.B, GT.160W.A, GT.160E.B				**Cost per hood with Overhead:**	**$ 217.50**
					Number of Hoods:	**18**
					Task Total:	**$ 3,915.00**
Install Fume Hood Monitor	Hood Monitor with Flow and Alarm	N/A	1	ea	$ 1,000.00	**$ 1,000.00**
	CFM/Transducer (Duct Flow)	23 09 23.10 0170	1	ea	$ 730.00	**$ 730.00**
	Control Wiring	23 09 23.10 5010	50	C.L.F	$ 3.30	**$ 165.00**
	Installation/Calibration time and fees	23 09 53.10 9000	8	hr	$ 126.90	**$ 1,015.20**
	Electrical Work-Simple System	11 53 43.13 8150	10%	% Cost	$ 291.02	**$ 291.02**
Hoods:	GT.W206, GW.W206.B, GT.W200, GT.262, GT.268, GT.272, GT.273.A, GT.273.B, GT.273.C, GT.356, GT.326, GT.W300, GT.250, GT.159W.A, GT.159E.B, GT.160W.A, GT.160E.B				**Cost per hood with Overhead:**	**$ 4,801.83**
					Number of Hoods:	**17**
					Task Total:	**$ 81,631.11**
Fix or Install Exhaust Fan	New Centrifugal Roof Exhaust 600 CFM	11 53 13.23 0650	1	ea	$ 1,120.43	**$ 1,120.43**
	Air balancing Fan	23 05 93.10 1400	4	hr	$ 236.03	**$ 944.12**
	Old Fan Demo	23 05 05.10 2120	1	ea	$ 146.00	**$ 146.00**
	Wiring 1 HP Motor	26 05 80.10 0110	1	motor	$ 77.12	**$ 77.12**
	HVAC Demo of Metal Ductwork	23 05 05.10 1570	100	LB	$ 1.75	**$ 175.00**
Hoods:	GT.155, GT.W300,				**Cost per hood with Overhead:**	**$ 3,694.01**
					Number of Hoods:	**2**
					Task Total:	**$ 7,388.01**
Replace Existing Fume Hood	New lab hood, incl fixtures and HVAC	11 53 13.23 0660	1	ea	$ 8,793.80	**$ 8,793.80**
	Air balancing	23 05 93.10 1400	8	hr	$ 236.03	**$ 1,888.24**
	Standard Sheet Metal duct Work	01 93 13.15 0940	50	L.F.	$ 2.71	**$ 135.50**
	HVAC Demo of Metal Ductwork	23 05 05.10 1570	100	LB	$ 1.75	**$ 175.00**
	Hood Monitor with Flow and Alarm	N/A	1	ea	$ 1,000.00	**$ 1,000.00**
	Control Contractor Work	23 09 53.10 9000	8	hr	$ 126.90	**$ 1,015.20**
	Electrical Work-Simple System	11 53 43.13 8150	10%	% Cost	$ 1,300.77	**$ 1,300.77**
Hoods:	GT.W300, GT.326, GT.356, GT.273A, GT.273C, GT.272, GT.268, GT.262, GT.250, GT.W200, GT.W206A, GT.W206B				**Cost per hood with Overhead:**	**$ 21,462.77**
					Number of Hoods:	**12**
					Task Total:	**$ 257,553.25**

NMSU CAMPUS FUME HOOD COST ANALYSIS

Building:	**GERALD THOMAS HALL**
Date:	2/28/2014

Overhead Costs	
General Contractor Profit	10%
General Contractor Overhead	30%
Design Fee	10%

Recommendation	Recommendation Description	RS Means Reference Number	QTY	Units	$/Unit	Total Cost
Rebalance	Rebalance Fume Hoods	23 05 93.10 1400	4	hr	$ 236.03	**$ 944.12**
Hoods:	GT.W206, GW.W206.B, GT.W200, GT.268, GT.155, GT.160E.B, GT.160W.A, GT.159E.B, GT.159W.A, GT.W300					
					Cost per hood with Overhead:	**$ 1,416.18**
					Number of Hoods:	**10**
					Task Total:	**$ 14,161.80**
Relocate Diffuser	HVAC Diffusers, registers, and grilles, Selective Demo	23 05 05.10 1630	1	EA	$ 9.41	**$ 9.41**
	HVAC Demo of Metal Ductwork	23 05 05.10 1570	50	LB	$ 1.75	**$ 87.50**
	Blanket type insulation 2"	23 07 13.10 3180	50	SF	$ 3.94	**$ 197.00**
	8" round volume control damper	23 33 13.13 8414	1	EA	$ 60.50	**$ 60.50**
	8" Flexible ductwork	23 33 46.10 1980	8	LF	$ 9.65	**$ 77.20**
Hoods:	GT.159W.A					
					Cost per hood with Overhead:	**$ 647.42**
					Number of Diffusers:	**1**
					Task Total:	**$ 647.42**

Total Cost of all Items $ 365,296.59

NMSU CAMPUS FUME HOOD COST ANALYSIS

Building:	**WOOTEN HALL**
Date:	2/28/2014

Overhead Costs	
General Contractor Profit	10%
General Contractor Overhead	30%
Design Fee	10%

Recommendation	Recommendation Description	RS Means Reference Number	QTY	Units	$/Unit	Total Cost
Add Stops	Sash Stops	N/A	1	ea	$ 45.00	**$ 45.00**
	Labor for install	N/A	2	Hr	$ 50.00	**$ 100.00**

Hoods: WH.159.A, WH.169.B

Cost per hood with Overhead:	**$ 217.50**
Number of Hoods:	**2**
Task Total:	**$ 435.00**

Calibrate Fume Hood Monitors	Perform Hood Air Balance	23 05 93.10 1400	2	ea	$ 236.03	**$ 472.06**
	Control Contractor Calibration	23 09 53.10 9000	2	ea	$ 126.90	**$ 253.80**

Hoods: WH.159.A, WH.169.B

Cost per hood with Overhead:	**$ 1,088.79**
Number of Hoods:	**2**
Task Total:	**$ 2,177.58**

Total Cost of all Items	**$ 2,612.58**

NMSU CAMPUS FUME HOOD COST ANALYSIS

Building:	**NEW MEXICO DEPT. OF AGRICULTURE**
Date:	2/28/2014

Overhead Costs	
General Contractor Profit	10%
General Contractor Overhead	30%
Design Fee	10%

Recommendation	Recommendation Description	RS Means Reference Number	QTY	Units	$/Unit	Total Cost
Install Stops	Sash Stops	N/A	1	ea	$ 45.00	**$ 45.00**
	Labor for install	N/A	2	Hr	$ 50.00	**$ 100.00**

Hoods: NMDA.A102, NMDA.A101, NMDA.126.A, NMDA.126.B

Cost per hood with Overhead:	**$ 217.50**
Number of Hoods:	**4**
Task Total:	**$ 870.00**

Install Fume Hood Monitor	Hood Monitor with Flow and Alarm	N/A	1	ea	$ 1,000.00	**$ 1,000.00**
	CFM/Transducer (Duct Flow)	23 09 23.10 0170	1	ea	$ 730.00	**$ 730.00**
	Control Wiring	23 09 23.10 5010	50	C.L.F	$ 3.30	**$ 165.00**
	Installation/Calibration time and fees	23 09 53.10 9000	8	hr	$ 126.90	**$ 1,015.20**
	Electrical Work-Simple System	11 53 43.13 8150	10%	% Cost	$ 291.02	**$ 291.02**

Hoods: NMDA.A102, NMDA.A101, NMDA.126.A, NMDA.126.B

Cost per hood with Overhead:	**$ 4,801.83**
Number of Hoods:	**4**
Task Total:	**$ 19,207.32**

Fix or Install Exhaust Fan	New Centrifugal Roof Exhaust 600 CFM	11 53 13.23 0650	1	ea	$ 1,120.43	**$ 1,120.43**
	Air balancing Fan	23 05 93.10 1400	4	hr	$ 236.03	**$ 944.12**
	Old Fan Demo	23 05 05.10 2120	1	ea	$ 146.00	**$ 146.00**
	Wiring 1 HP Motor	26 05 80.10 0110	1	motor	$ 77.12	**$ 77.12**
	HVAC Demo of Metal Ductwork	23 05 05.10 1570	100	LB	$ 1.75	**$ 175.00**

Hoods: NMDA.A102, NMDA.A101,

Cost per hood with Overhead:	**$ 3,694.01**
Number of Hoods:	**2**
Task Total:	**$ 7,388.01**

Rebalance	Rebalance Fume Hoods	23 05 93.10 1400	4	hr	$ 236.03	**$ 944.12**

Hoods: NMDA.A101, NMDA.126.A, NMDA.126.B

Cost per hood with Overhead:	**$ 1,416.18**
Number of Hoods	**3**
Task Total:	**$ 4,248.54**

NMSU CAMPUS FUME HOOD COST ANALYSIS

Building:	**NEW MEXICO DEPT. OF AGRICULTURE**
Date:	2/28/2014

Overhead Costs	
General Contractor Profit	10%
General Contractor Overhead	30%
Design Fee	10%

Recommendation	Recommendation Description	RS Means Reference Number	QTY	Units	$/Unit	Total Cost
Relocate Diffuser	HVAC Diffusers, registers, and grilles, Selective Demo	23 05 05.10 1630	1	EA	$ 9.41	**$ 9.41**
	HVAC Demo of Metal Ductwork	23 05 05.10 1570	50	LB	$ 1.75	**$ 87.50**
	Blanket type insulation 2"	23 07 13.10 3180	50	SF	$ 3.94	**$ 197.00**
	8" round volume control damper	23 33 13.13 8414	1	EA	$ 60.50	**$ 60.50**
	8" Flexible ductwork	23 33 46.10 1980	8	LF	$ 9.65	**$ 77.20**

Hoods: NMDA.A102, NMDA.126.A

Cost per hood with Overhead:	**$ 647.42**
Number of Diffusers:	**2**
Task Total:	**$ 1,294.83**

Total Cost of all Items	**$ 33,008.70**

NMSU CAMPUS FUME HOOD COST ANALYSIS

Building:	**ENGINEERING COMPLEX 1**
Date:	2/28/2014

Overhead Costs	
General Contractor Profit	10%
General Contractor Overhead	30%
Design Fee	10%

Recommendation	Recommendation Description	RS Means Reference Number	QTY	Units	$/Unit	Total Cost
Install Stops	Sash Stops	N/A	1	ea	$ 45.00	**$ 45.00**
	Labor for install	N/A	2	Hr	$ 50.00	**$ 100.00**

Hoods: EC1.218, EC1.118

Cost per hood with Overhead:	**$ 217.50**
Number of Hoods:	**2**
Task Total:	**$ 435.00**

Install Fume Hood Monitor	Hood Monitor with Flow and Alarm	N/A	1	ea	$ 1,000.00	**$ 1,000.00**
	CFM/Transducer (Duct Flow)	23 09 23.10 0170	1	ea	$ 730.00	**$ 730.00**
	Control Wiring	23 09 23.10 5010	50	C.L.F	$ 3.30	**$ 165.00**
	Installation/Calibration time and fees	23 09 53.10 9000	8	hr	$ 126.90	**$ 1,015.20**
	Electrical Work-Simple System	11 53 43.13 8150	10%	% Cost	$ 291.02	**$ 291.02**

Hoods: EC1.118

Cost per hood with Overhead:	**$ 4,801.83**
Number of Hoods:	**1**
Task Total:	**$ 4,801.83**

Total Cost of all Items	**$ 5,236.83**

APPENDIX E

New Mexico State University

Fume Hood Study Agreement

THE AGREEMENT between
The REGENTS of NEW MEXICO STATE UNIVERSITY
and the ARCHITECT

1. PARTIES TO THE CONTRACT

THIS AGREEMENT effective this 21st day of October, 2013, **BY AND BETWEEN THE REGENTS OF NEW MEXICO STATE UNIVERSITY** hereinafter called the **REGENTS**, and

Name: **Huitt-Zollars**
Whose address is **6501 Americas Parkway NE, Suite 550,**
Albuquerque, NM 87110

Telephone: **505.883.8114** Fax **505.883.5022** E-mail: **jjarrard@Huitt-Zollars.com**

hereinafter called the **ARCHITECT/ ENGINEER**.
The Architect is licensed in New Mexico under License #1658.

WITNESSETH:

2. PROJECT

That for and in consideration of the mutual covenants and agreements herein the parties hereto agree as follows:

The Regents agree to employ and do hereby employ and engage the Architect, under the terms and conditions of this contract, to perform for the Regents all professional, architectural and engineering services for the Analysis of the campus fume hoods and the infrastructure of the building project herein referred to as the

_Analysis of Campus Fume Hoods
and hereinafter called the PROJECT.

General Statements:

NMSU has a number of fume hoods which have at times not been able to meet the velocity range of 80-150 feet per minute across the face of the hood. These velocities are measured and recorded every six months by the NMSU Environmental Health and Safety department student employees with a calibrated hot wire anemometer. NMSU also has hoods which may be beyond their useful life.

The project will require coordination with the NMSU PM and Environmental Health & Safety department as some data will be obtained from the NMSU database.

There are recent and ongoing studies and designs that can be referred to but are not the focus of this report. Jett Hall is coming up on a major renovation; Knox Hall exhaust and supply air design; and the recently completed Chemistry building study.

The Project is to provide for the following:

- Preparation of a study of select fume hoods to include investigation of ductwork, controls, and confirmation that the appropriate make up air and exhaust is available. The hoods to be investigated are located in Engineering Complex 1 (Algae lab), NMDA, Foster Hall, Gerald Thomas Hall, and Skeen Hall. This constitutes a minimum of 25 hoods and associated 6 building system. *(Only 5 are listed)*
- Review the NMSU database and make general observations and suggestions pertaining to the above referenced hoods. Provide recommendations on the useful life of the hoods or systems. Attention should be given to those hoods drawing out acids resulting in a shorter useful life. Provide a general system analysis of the listed buildings.
- Provide a cursory inspection to get a general sense of the campus hood problems. Provide recommendations on the useful life of the hoods or systems. Attention should be given to those hoods and systems known to have problems.
- Review the NMSU policies pertaining to hood inspections. Compare with OSHA and governing agency requirements for compliance. Verify that NMSU inspection processes are complete; provide recommendations on process and equipment improvements.
- Provide recommendations on proper hood operation. Identify hoods presently not in operation, and hoods that need continuous monitoring added.
- Provide recommendations and probable opinion of costs for HVAC improvements.
- Provide recommendations, probable opinion of costs, and simple payback analysis specific to hoods for energy management/conservation measures. Recommendations could include occupancy sensors, control strategies (VFDs, control valves), or those units suitable for on/off operation.
- A minimum of three (3) meetings with NMSU PD&E staff will be required: project initiation, 60% submittal review, and 95% submittal review. Meetings shall provide updates and convey information, transfer of plans, sketches, and calculations.
- Final report shall consist of three (3) bound copies and one electronic PDF.

3. THE REGENTS' RESPONSIBILITY

THE REGENTS AGREE:

(a) To designate representatives to act in its behalf. The Regents' Representative for the Project is Glen Haubold, Assistant Vice President for Facilities & Services, or his designee.

(b) NOT USED

(c) The Architect is responsible for compiling and verifying all required information regarding existing conditions. Only the staff members who are under the authority and supervision of Regents' Representative are authorized to release information on the existing conditions.

(d) To give consideration to sketches, estimates, working drawings, specifications, proposals and

other documents submitted by the Architect. All response to the Architect shall be in writing.

(e) To give the Architect written notice of any desired change in the quality and scope of the Project.

(f) To give prompt written notice to the Architect of any defects in the Project design which the Regents observe or are aware. The Architect has to respond in writing on any comments with which he disagrees and to explain the nature of the disagreement. Otherwise, the Architect is expected to correct the defects identified.

(g) The Regents may furnish other special engineering data or direct Architect to provide tests and data. In the latter event, only direct costs for the tests or data shall be paid for by the Regents. The Architect will not be responsible for data furnished by others.

4. SERVICES TO BE PERFORMED BY THE ARCHITECT

THE ARCHITECT AGREES to perform all necessary professional services in connection with the **Analysis of Campus Fume Hoods** of this project including those as enumerated below:

(a) After receiving the Project Program, to visit the site with Regents' Representative in order to familiarize himself with all governing site conditions. The Architect is responsible for incorporating any visible conditions into the project assessment and report.

(b) NOT USED

(c) To attend such conferences with the Regents' Representative as may be requested by the Representative to complete the Architects' understanding of this Project. In addition, the Architect agrees to comply with written directives provided by the Regents' Representative from time to time.

(d) After reviewing program with Owner, prepare an Engineering Report per Design Services proposal dated October 21, 2013 and preliminary cost estimates for the options.

(e) through (l) NOT USED.

(m) The Architect/Engineer shall comply with the New Mexico Architect's Act and provide an architect, licensed in the State of New Mexico, during the entire project, who has the authority to make decisions in the name of the Architect. This architect must have a complete understanding of the project and be available on site within twenty-four (48) hours of notice by the Regents' Representative.

(n) NOT USED

(o) The Architect/Engineer shall be responsible for the professional quality, technical accuracy, timely completion, and coordination of all designs, drawings, reports, and other services to be furnished under the contract.

5. ARCHITECT'S SERVICES DURING BIDDING AND CONSTRUCTION - NOT USED

6. EMPLOYMENT OF ENGINEERS AND CONSULTANTS

THE ARCHITECT AGREES to employ, at Architect's own expense, consultants including competent structural, mechanical, electrical or other professional engineers, licensed in New Mexico, and such consultants as are normally required during this phase of this Project. However, the Architect shall be entitled to reimbursement of the direct cost ONLY of site surveys, borings, material testing (if requested by the Regents' Representative) or such other consultants, including Specialty Consultants, required for Regents' benefit. The Architect shall furnish to the Regents a list of architects, engineers and consultants for approval prior to engaging them for this Project (ref. SCHEDULE C). Architect shall furnish any license number and, if the consultant is a corporation, a corporate resolution authorizing the work and the name and address of its registered agent in New Mexico.

7. AUTHORIZED AGENT OF THE REGENTS

THE ARCHITECT AGREES that the performance of all work required of Architect under the terms of his employment is to be subject to the direction of the Regents or of the Regents' Representative. Such person designated by the Regents shall be the authorized agent and representative of the Regents. All information or directions desired or required by the Architect for the performance of his work and services hereunder shall be requested from the Regents' Representative. If the Architect accepts directions and information from other than the Regents' Representative, he is liable for the cost of any changes that may be occasioned by any incorrect information, unless it confirmed such a direction with the Regents' Representative in writing.

8. ASSIGNMENTS AND SUCCESSORS

THE ARCHITECT AGREES that Architect will not sell, assign this Agreement, or any portion of the work included herein, and that Architect will not enter into a partnership with any persons without the written permission of the Regents.

9. DISABILITY OR DEATH OF ARCHITECT

If in the opinion of the Regents, the prime licensed architect working upon this project, becomes incapacitated, the Architect shall promptly deliver to the Regents all drawings and papers relating to his work and services hereunder. The Regents shall pay to the Architect such equitable proportion of the remuneration provided herein as the work actually done by the Architect at the time of such stoppage bears to the whole of the work required to be done by the Architect under the terms of this Agreement. Such payment shall be in accordance with the requirements of Paragraph 4 (b) subject to the limitations under the Phase in Paragraph 18 (c) in which the Architect is then working.

10. PERFORMANCE TIME

THE ARCHITECT shall prosecute this contract with diligence and continuous effort, and that Architect will not delay this work in order to perform other contracts entered into by the Architect. The Architect agrees that time is of the essence in the performance of this Agreement and construction of the Project. The Architect understands that if the Architect fails to meet any of the

time schedules or milestones without the written approval of the Regents, Regents may suffer damages as a result of such delay. Should such damage occur, Regents will take all appropriate action for recovery of such damage. However, Architect will not be responsible for consequential damages resulting from delays beyond his control.

11. LIABILITY INSURANCE

THE ARCHITECT shall maintain a policy for general liability insurance, automobile liability and such insurance required by law, as approved by the Regents' Representative. Proof of insurance shall be delivered to the Regents' Representative. The professional liability will be no less than Five Hundred Thousand Dollars ($500,000.00), and the Architect will provide a Certificate of Insurance to the Regents' Representative.

12. OWNERSHIP OF DOCUMENTS – NOT USED

13. TERMINATION OF AGREEMENT

(a) THIS AGREEMENT may be terminated by either party upon **seven (7) day written notice** to the other party. In the event of termination of the Architect, the Architect shall be paid for services performed to the date of written termination, and only such terminal expenses as shall be established by the written agreement of the parties.

14. COMPENSATION OF THE ARCHITECT

THE REGENTS AGREE TO PAY THE ARCHITECT FOR WORK AND SERVICES PERFORMED UNDER THE TERMS OF THIS AGREEMENT ON THE BASIS OF A NEGOTIATED LUMP SUM, AS FOLLOWS:

(a) A lump sum, including New Mexico Gross Receipts Tax, due the Architect shall not exceed the total fee in Paragraph 18. In case the Regents substantially change the scope of the Project after the approval of HVAC Condition Assessment and Engineering Report, the Architect's compensation may be renegotiated. However, such change in compensation must be agreed upon in writing at the time of change of scope and/or quality signed by the NMSU Senior Vice President for Administration & Finance or appointed designee.

(b) For the Architect's additional services, for scope beyond that covered by the original approved Regents' Project Program. Compensation for additions or reductions shall be computed as follows:

SEE ATTACHED SCHEDULE "A": Additional Services

Additional travel expenses or printing expenses if required by the Regents' Representative, based on actual printing cost or travel cost or time spent traveling, the expenses are computed as follows: *Is this an allowable reimbursable for our engineers?*

SEE ATTACHED SCHEDULE "B": Additional Expenses

(c) and (d) NOT USED.

(e) No further compensation shall be paid for travel expenses, routine printing, telephone or mailing

costs during any phase of the project.

15. METHOD OF PAYMENT

(a) **The total Architects' fee** shall be as set forth in Paragraph 18 and **will not be exceeded except by a written modification to this contract**.

(b) All invoices for payment for architectural services shall be submitted in such a manner as to show work accomplished to date (percent of phase), fee paid, fee payable, fee remaining in each phase and total fee.

(c) Architect shall not submit more than monthly billings and only for work actually accomplished to the date of the bill. In the event the bill covers work not as yet accomplished, the bill will remain unpaid until the work is accomplished causing unnecessary delays. In some instances of pre-billing, such a bill will be returned to the architect for reissuance.

16. AMENDMENTS

Every change to this Contract shall be in writing, signed by the Senior Vice President for Administration & Finance of New Mexico State University, or designee, and the Architect.

17. MEETINGS WITH ARCHITECT AND REGENTS' EMPLOYEES

(a) Every meeting between the Architect and any employee of the Regents shall be memorialized within **five (5) working days** by written minutes prepared by the Architect. A copy of these minutes shall be delivered immediately to the Regents Representative for review, correction and/or amendment. Corrected minutes shall be filed within **seven (7) working days** after receipt of any corrections and/or amendment.

18. SPECIAL CONDITIONS

The special conditions to this Agreement include the following: (None)_____.

(a) Basis for the negotiation of Lump Sum Fee. Total Architect's Fee: **$29,371.50**
(includes all applicable New Mexico Gross Receipts Tax, etc.):

Breakdown of the fee:	A/E Fee for Architectural Basic Services:	**$ 27,450.00**
	NMGRT (7.0%):	**$ 1921.50**

(b) Payments for the Architect's Services (including applicable New Mexico Gross Receipts Tax) for this phase of the project shall be made on a percentage complete method, submitted monthly to the University.

c) **THE INDICATED ARCHITECTURAL FEE IS THE MAXIMUM FEE THE ARCHITECT WILL RECEIVE UNLESS OTHERWISE AGREED IN WRITING BY THE ARCHITECT AND REGENTS.** No expense will be incurred until increase in fee has been agreed to in writing. In the event expense is incurred without a written approval, the Architect assumes potential liability for such an expense.

(d) Architect hereby lists all engineers/consultants to be used for this project (ref. Paragraph 6). The Regents retain the right to approve any and all changes to the engineer/consultants.

SEE ATTACHED SCHEDULE "C": Engineering Consultant Team, Including Special Consultants

(e) The Architect shall assume responsibility for all personal and travel expenses except as per Article 14(b) if approved for additional services (not for basic services that are part of this contract). Such costs are included in the lump sum fee.

(f) Other special conditions: (if any)

THE REGENTS OF NEW MEXICO STATE UNIVERSITY

_____

BY:

TITLE:

THE ARCHITECT**:** **Huitt Zollars**

_____

BY: John Jarrard/ Huitt Zollars AIA

TITLE: Architect/Engineer

SCHEDULE A

ADDITIONAL SERVICES

Fees for additional services shall be based upon time spent and in accordance with the following rate schedule:

Classification	HourlyRate
PROFESSIONAL LEVEL VII Engineer VII Architect VII Landscape Architect VII Interior Designer VII	$178.00
PROFESSIONAL LEVEL VI Engineer VI Architect VI Landscape Architect VI Interior Designer VI	$151.00
PROFESSIONAL LEVEL V Engineer V Architect V Landscape Architect V Interior Designer V	$134.00
PROFESSIONAL LEVEL IV Engineer III, IV Architect IV, Intern (Architect) IV Landscape Architect IV Interior Designer IV Technologist IV Resident Project Representative IV	$116.00
PROFESSIONAL LEVEL III Engineer I/II Architect III, Intern (Architect) III Landscape Architect III Intern (Landscape Architect) III Interior Designer III Technologist III Resident Project Representative III	$98.00
PROFESSIONAL LEVEL II Intern (Architect) II Interior Designer II, Intern (Interiors) II Landscape Architect II Technologist II Clerical Supervisor II Resident Project Representative II	$87.00
PROFESSIONAL LEVEL I Intern (Architect) I Intern (Interiors) I Intern (Landscape Architect) I Technologist I Resident Project Representative I Clerical Supervisor I	$79.00
SUPPORT STAFF III Engineering Technician III, IV CADD III, IV Administrative Secretary III Architect Technician III, IV Project Assistant I/II	$76.00
SUPPORT STAFF II Architect Technician I, II Engineering Technician I, II CADD I, II Accounting Clerk I, II Administrative Secretary I, II Project Assistant EL Word Processor I, II Receptionist I, II File Clerk I	$70.00
SUPPORT STAFF I Architectural Student EL Engineering Student EL Landscape Architecture Student EL Interiors Student EL CADD EL Accounting Clerk EL Word Processor EL Receptionist EL File Clerk EL	$40.00

SCHEDULE B

ADDITIONAL EXPENCES

Reimbursable expenses shall be based upon actual expenditures and in accordance with the following rate schedule:

Printing, 24” x 36”	At Cost
Printing, 8 ½” x 11” (B/W)	At Cost
Printing, 8 ½” x 11” (Color)	At Cost
Printing, 11” x 17”	At Cost
Printing, 4” x 6” (Color Photos)	At Cost
Printing, 8 ½” x 11” (Color Photos)	At Cost
Printing, Outsourced	At Cost
Aerial Photographs, In-House	At Cost
Aerial Photographs, Outsourced	At Cost
Meals	At Cost
Mileage	At Current IRS Rate
Travel Expenses	At Cost
Federal Express/Postage	At Cost
Supplies	At Cost

SCHEDULE C

CONSULTANTS

ALL CONSULTING WILL BE BY Huitt Zollars