MODEL: ASPS – SS

Automatic Sash Positioning System – SS – for Bench Hoods

SEQUENCE OF OPERATION

Automatic Opening Mode:

When a laboratory technician is sensed in front of the fume hood, the sash will open in less than 3 seconds to an open position of 18-inches ±1 inch. The user will be able to manually move the sash to a higher or lower position without releasing any type of sash locks. Once NO object is sensed, the control module will delay 60 seconds (adjustable), then slowly close the sash in less than 10 seconds. If an object is sensed in the path of the sash, the control module will immediately stop the sash and turn on a sash interference light. To re-open the sash after the sash has been stopped the laboratory technician has to be sensed in front of the hood and the "Push to Open" button activated.

Push Button Mode:

When a laboratory technician is sensed in front of the fume hood, and the "Push-to-Open" button is activated the sash will open in less than 3 seconds to an open position of 18-inches ±1 inch. The user will be able to manually move the sash to a higher or lower position without releasing any type of sash locks. Once NO object is sensed, the control module will delay 60 seconds, (adjustable), then slowly close the sash in less than 10 seconds. If an object is sensed in the path of the sash, the control module will immediately stop the travel of the sash and turn on a sash interference light. To re-open the sash after the sash has been stopped the laboratory technician has to be sensed in front of the hood and the "Push to Open" button activated.

MODEL: ASPS – WI

Automatic Sash Positioning System – WI – for Walk in Fume Hoods

SEQUENCE OF OPERATION

Automatic Opening Mode:

When a laboratory technician is sensed in front of the hood the upper sash shall open in less than 3 seconds to 18-inch height open position ±1 inch. The user shall be able to manually move the upper sash to a higher or lower position without releasing any type of sash locks. Once NO object is sensed, the control module shall delay 60 seconds (adjustable), then slowly close the upper sash in less than 10 seconds. If the upper sash travels in the most interior track and if an object is sensed in the path of the sash the control module shall immediately stop the upper sash. When lower sash is raised, ASPS for upper sash is disengaged and is able to be manually moved. A red light is illuminated to indicate to the user that the ASPS on the upper sash is disengaged.

Push Button Mode:

When a laboratory technician is sensed in front of the hood and the Push-to-Open button is activated the upper sash shall open in less than 3 seconds to 18-inch height open position ±1 inch. The user shall be able to manually move the upper sash to a higher or lower position without releasing any type of sash locks. Once NO object is sensed, the control module shall delay 60 seconds, (adjustable), then slowly close the upper sash in less than 10 seconds. If the upper sash travels in the most interior track and if an object is sensed in the path of the upper sash the control module shall immediately stop the sash. When lower sash is raised, ASPS for upper sash is disengaged and is able to be manually moved. A red light is illuminated to indicate to the user that the ASPS on the upper sash is disengaged.

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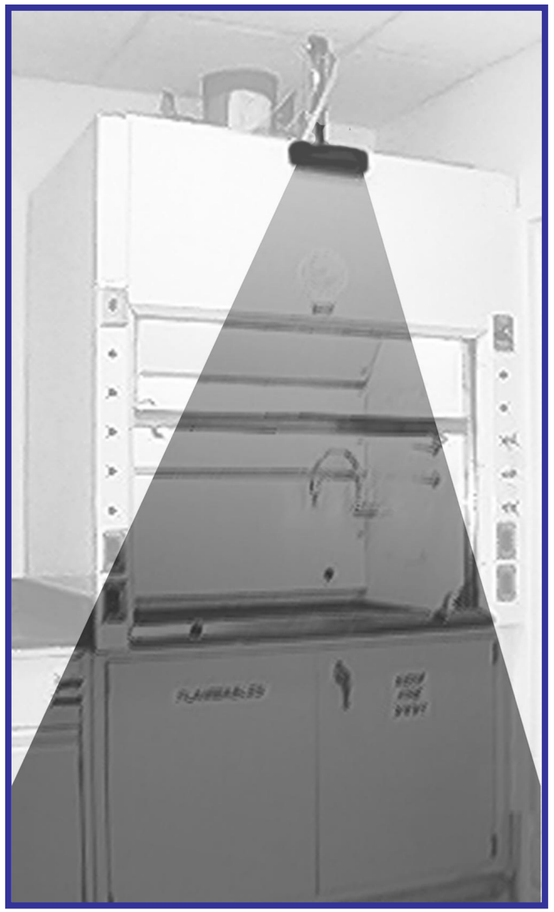
Manufacturer of Patented Automatic Sash Positioning System, Down Draft Tables, Custom Fume Hoods and Slot Exhausters.



ASPS™

Automatic Sash Positioning System

Your Cost Savings SAFE Solution

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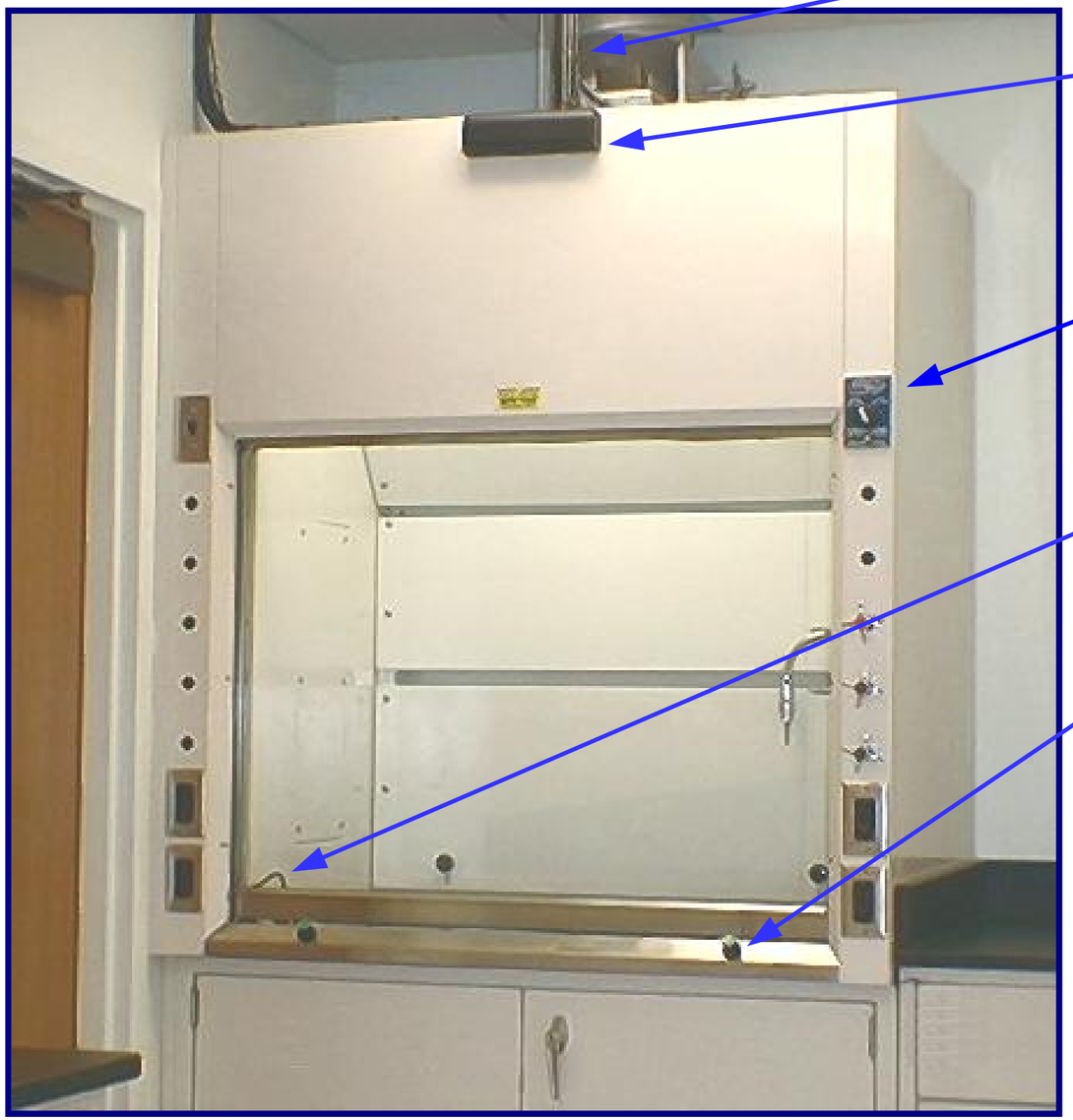
Automatic Sash Positioning System

The ASPS™ is designed for any vertical sash fume hood – retrofit or new!



- **SASH ACTUATOR:** The sash actuator is a one-inch dia. industrial grade pneumatic cable cylinder. It allows for individual force opening speed and closing speed. The actuator is designed for easy retrofit to either attach to the top of the sash frame or glass, sash cable, or sash counter weight.

- **PRESENCE SENSOR:** The presence sensor sees the technician in front of the fume hood and can identify non-moving objects like carts or chairs to tell when the fume hood is being used. The presence sensor can be set to see as close as 4 inches in front of the fume hood for high traffic areas, 24 inches for normal working areas, or as far as 48 inches for sashes that are used in "Automatic" mode that need to be opened before the technician reaches the hood. The presence sensor has four selectable frequencies so any adjoining fume hoods do not interfere with each other.

- **MODE SWITCH:** The mode switch option is available on ASPS™ units when both **"Push-Button" and "Automatic" modes** and a sash interference light. The standard "Push-Button" mode requires the presence sensor see the technician and the activation button to be pushed. In this way a person can walk by or view a fume hood without the sash opening. The "Automatic" mode allows for the sash to open as soon as the presence sensor sees the technician. This mode is for fume hoods where there is very low walk-by traffic as well as hoods that require access when both hands are full.

- **SAFETY EYE:** The **patented safety eye** rides below the sash preventing the sash from closing on any object or causing an accident as **required by ANSI/AIHA Z9.5*.** This is accomplished by using a reflecting polarized infra-red beam that can detect a ¼ inch glass rod at seven feet. The ASPS™ can be installed so that when an object is detected the sash will return to normal working height or stop.

- **ACTIVATION BUTTON:** The activation button is used in Push-Button mode to initiate the opening of the sash to the normal working height. By holding the button during the sash opening the sash can be opened to any height greater than the normal working height when more access into the fume hood is required.

- **CONTROL MODULE:** The control module, which is mounted on top of the hood, contains the sash actuator's force (**as required by ANSI/AIHA Z9.5***), opening speed and closing speed are adjusted. The control module also contains the time delay relay that allows the adjustment of the time to start the closing of the sash.

- **LIMIT SWITCH:** The limit switch, which is mounted behind the bypass panel, sets the sash opening normal "safe" working height.

- **SERVICE REQUIREMENTS:** Each ASPS™ is individually powered with a 2-amp 12vdc regulated power supply, plugged into a 120V duplex outlet provided on top of the fume hood. The ASPS™ also requires a source of 20psi instrument grade air.

This product is covered by one or more of the following New-Tech™ patents: 6,024,638; 5,759,096; 5,303,659; 4,774,878; 4,667,353; 4,594,742; 4,502,375 and other U.S./Foreign Patents Pending.

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Down Draft Tables, Custom Fume Hoods and Slot Exhausters.

THE AUTOMATIC SASH POSITIONING SYSTEM PROVIDES ENERGY AND CAPITAL SAVINGS

What is the benefit of laboratory fume hood Variable Air Volume (VAV) systems when the fume hood sashes are not closed? On average, a fume hood only requires the sash to be open 20 minutes per day. Normally, once a sash has been opened they rarely ever are shut. As in turning off a light, the inconvenience of closing a sash lends itself to leaving the fume hood sash open knowing you will be back soon. This habit then leads to the sash being left open as the norm, not the exception. Other factors leading to open sashes are the worry over cross contamination or exposures caused by touching the sashes or the need for using both hands to move chemicals into and out of the hood.

Just like any store entrance door that automatically opens and closes for you, a fume hood sash can be easily automated. When a fume hood sash is automated, fume hood sashes are closed whenever possible providing maximum safety and compliance with NFPA-45 6.8.3 "Laboratory Hood Sash Closure".

The Cost of Air Airflow exhausted by fume hoods first needs to be pulled from the outside, filtered, cooled and heated, and finally supplied to the laboratory. Once all of this energy is used to condition the outside air, the air is drawn into the fume hood and the contaminated air is exhausted out of the building. Typically, the industrial rate for conditioning one CFM of outside air is $3.50 per year. This cost varies by climate, utility costs and HVAC equipment efficiency. To provide year round containment within the laboratory the boilers and chillers are sized to handle the peak heating and cooling loads. Because of the cooling and dehumidification of the laboratory air, the chillers are a substantial cost of the laboratory HVAC system. Usually the peak cooling needs of outside air are about 200 CFM/ton. For a typical six foot fume hood with a 28 inch sash travel and maintaining 100 FPM capture velocity (NFPA-45 A.6.4.6), the exhaust and supply requirements are 1230 CFM with the sash open. From an HVAC system standpoint, this outside air would require 6.2 tons of cooling when at peak outside air cooling loads.

With VAV fume hoods the exhaust/supply airflow can be proportionately reduced as the sash is lowered until a minimum of 25 CFM/sq.ft. of working surface is reached (NFPA-45 A.6.4.6), a six foot fume hood requires 265 CFM. This means if the fume hood were shut at peak cooling loads the HVAC system cooling load would be reduced from 6.2 tons to 1.4 tons.

Shutting the Sash Understandably, not all fume hood sashes can be shut at all times or at peak cooling loads. With the addition of the Automatic Sash Positioning System (ASPS™), the fume hood sashes are closed when the fume hood is unattended. This automatic closure ensures that a minimum number of fume hoods will be open at any time. To determine this usage, on a random basis over several days, visually survey technicians using the fume hood to provide a statistical baseline. Figure 1 shows that the average fume hood usage at this research facility is 6 of 48 hoods open at

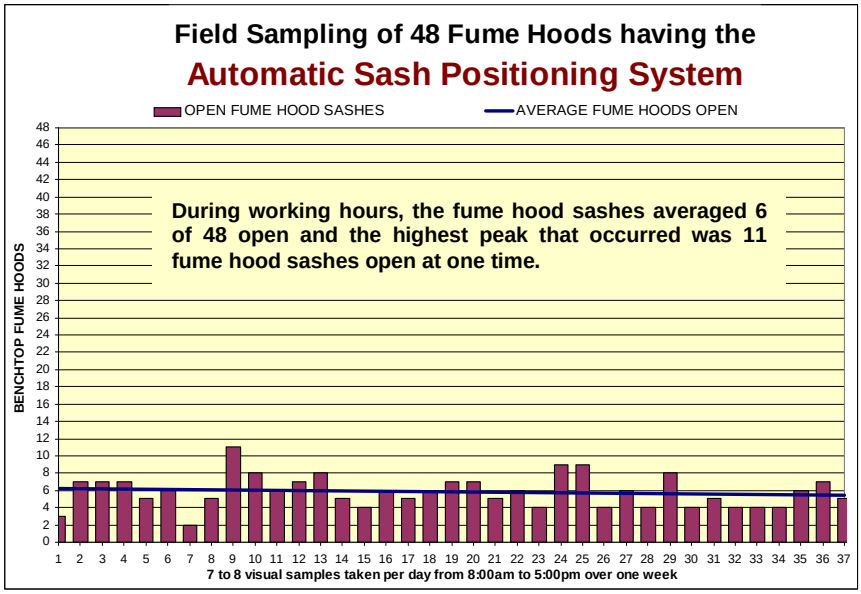

Figure 1. Research laboratory with 48-benchtop fume hoods, surveyed for open fume hood sashes. On average, at least one technician was assigned to work in one fume hood. No fume hoods were used as storage.

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one time. From an energy usage standpoint, the average for an eight-hour day is 6 fume hood sashes open and the other 42 fume hood sashes closed for one-third of a day. For the other two-thirds of a day all 48 fume hoods will be closed. Using six foot fume hoods, the average airflow per hood is:

$$\frac{1/3(6\times 1230\ CFM + 42\times 265\ CFM) + 2/3(48\times 265\ CFM)}{48\ hoods} = 305\ CFM$$

Knowing that the average fume hood airflow is 305 CFM using the ASPS™ and VAV the average energy savings compared to a 1230 CFM constant volume fume hood is:

$$(1230\ CFM - 305\ CFM) \times \$3.50/CFM/year = \$3{,}237/year$$

This energy savings assumes that the minimum airflow of the fume hood is greater than the minimum air change rate of the laboratory and no extra cooling airflow is needed for equipment.

HVAC Equipment Sizing What can be even more important than yearly energy savings is an HVAC system capacity reduction. Fume hood usage can be calculated using mathematical probability equations similar to the "Hunter's Curves" used for plumbing fixtures. HVAC system sizing can be calculated using probability and safety factors to account for the importance of the HVAC equipment relative to the containment of the fume hood.

When the average of 6 of 48 fume hoods open is applied to the "Probability of Use" a 5% probability is found, see Table 1, Column 3. Using a 3 times safety factor, or 15% probability, can be used to find the load for Chillers and Boilers. Table 1, Column 2 shows that 13 of 48 fume hoods would be open. As in Figure 1, a peak of 11 of 48 fume hoods was seen open. Sizing the chiller for 13 fume hoods open produces:

$$\frac{(13\times 1230\ CFM + 35\times 265\ CFM)}{200\ CFM/ton} = 126\ tons$$

In comparison if the chiller were sized for all 48 fume hoods at maximum airflow the required chiller size would be:

$$\frac{48\times 1230\ CFM}{200\ CFM/ton} = 295\ tons \qquad \text{Total Reduction} = 169\ \text{tons}\ (57\%)$$

At a capital cost of $ 2,000/ton installed, the 169 ton reduction would equate to a $338,000 capital cost savings on the chiller system alone. This savings could pay for the ASPS™ and VAV fume hood systems. The $3,237/hood/year energy savings is additional the capital cost reduction. This equates to an average 3.5 ton/hood reduction in peak load to the chiller system would be achived.

Simularly, appling a safety factor of 5 times to a single ganged exhaust and single supply fan system will find that these systems can be be sized for 19 of 48 hoods open. (see Table 1, Column 1)

$$19\times 1230\ CFM + 29\times 265\ CFM = 31{,}055\ CFM$$

In comparison if the exhaust and supply were sized for all 48 fume hoods at maximum airflow the required fan sizes would be:

$$48\times 1230\ CFM = 59{,}040\ CFM \qquad \text{Total Reduction} = 27{,}985\ \text{CFM}\ (47\%)$$

Improving Safety while Saving Energy A laboratory is not built to save energy, it is built to provide maximum safety for the people using the facility. The ASPS™ not only provides maximum safety but when combined with any VAV system provides maximum energy savings and minimum HVAC system costs.

1 **Exhaust & Supply**		*2* **Chiller & Boiler**		*3* **Average Use**	
Using a 5X Safety Factor These system can be sized for a 25% Probability		Using a 3X Safety Factor These system can be sized for a 15% Probability		5% Probability of Used for Energy Analysis	
Number Of Hoods	Hoods Open	Number Of Hoods	Hoods Open	Number Of Hoods	Hoods Open
1	1	1	1	1 – 3	1
2	2	2 – 3	2	4 – 9	2
3 – 4	3	4 – 6	3	10 – 17	3
5 – 6	4	7 – 10	4	18 – 26	4
7 – 9	5	11 – 13	5	27 – 38	5
10 – 11	6	14 – 17	6	**38 – 48**	**6**
12 – 13	7	18 – 21	7	49 – 66	7
14 – 16	8	22 – 25	8	67 – 81	8
17 – 19	9	26 – 30	9	82 – 97	9
20 – 22	10	31 – 34	10	98 – 112	10
23 – 24	11	35 – 39	11	113 – 128	11
25 – 27	12	40 – 43	12	129 – 143	12
28 – 30	13	**44 – 48**	**13**	144 – 159	13
31 – 33	14	49 – 55	14	160 – 175	14
34 – 36	15	56 – 60	15	176 – 191	15
37 – 39	16	61 – 65	16	192 – 207	16
40 – 42	17	66 – 70	17	208 – 223	17
43 – 45	18	71 – 75	18	224 – 239	18
46 – 48	**19**	76 – 80	19	240 – 255	19

TABLE 1, Probability of Use for Fume Hood Systems using the ASPS™.

When YOUR laboratory fume hoods are left open...

Codes & Standards

NFPA 45 6-8.3 * **Laboratory Hood Sash Closure.** Laboratory hood sashes shall be kept closed whenever possible. When a fume hood is unattended, its sash shall remain fully closed.

ANSI/AIHA Z9.5-2003 ** **3.1.1.4 Automatic Sash Closers.** The following factors shall be considered before automatic sash closing devices are installed on a laboratory chemical hood.

- Automatic sash positioning systems shall have obstruction sensing capable of stopping travel during sash closing operations without breaking glassware, etc.
- Automatic sash positioning shall allow manual override of positioning with forces of no more than 45 [N] mechanism (10 lbs.) both when powered and during fault modes during power failures.

NFPA standards have been referenced by the federal government's Occupational Safety and Health Administration, the Veterans Administration, the Department of Health and Human Services, and other federal agencies. In addition, many *NFPA standards are referenced by the Model Building Codes making them code and law.*

AIHA *Clarification and Explanation of the Requirements:*

"Having the sash closed is an additional measure of safety since this condition will provide additional containment in the event of a hazardous release."

"If the user does not close the sash, energy consumption will increase and an automatic sash closer may be advantageous.

Liability

Lab personnel are unnecessarily exposed to hazards associated with open sashes

Minimize exposure assuring maximum containment with sashes closed most of the time. Maximum containment reduces liability.

"A Safe Hood has a Closed Sash"

Energy

HVAC systems with hoods having face velocity controls, designed with diversity, exceed equipment capability.

The HVAC system fails to achieve energy savings.

Shortages of heating, cooling and total exhaust air result.

Procedures

Safe handling methods encourage sashes to remain open.

Holding Chemicals while moving the sash bypasses lab procedures.

Open sashes eliminate cross contamination caused by touching Sashes.

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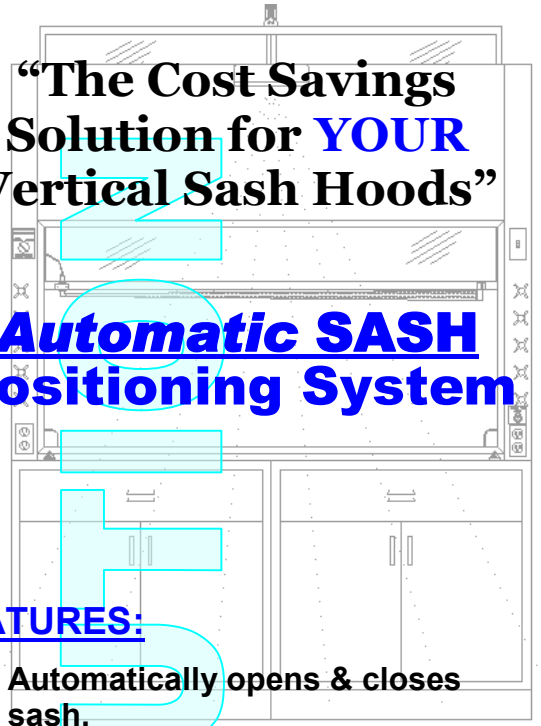
"The Cost Savings Solution for YOUR Vertical Sash Hoods"



Automatic SASH Positioning System

FEATURES:

- **Automatically opens & closes sash.**
- **Protects against closing on objects, even glass.**
- **Provides both fully automatic and push-button opening modes.**
- **Improves productivity by total hands free operation.**
- **Sash can be manually moved.**
- **Designed for field retrofit.**
- **Units in service since 1980.**
- **Provides an ADA barrier free environment**

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APPLYING NFPA-45 TO PHOENIX USAGE BASED CONTROLS® AND NEW-TECH AUTOMATIC SASH POSITIONING SYSTEM™

NFPA-45 - 2000 Edition*

6.4.6 Laboratory hood face velocities and exhaust volumes shall be sufficient to contain contaminants generated within the hood and exhaust them outside of the laboratory building. The hood shall provide containment of the possible hazards and protection for personnel at all times when chemicals are present in the hood.

A.6.4.6 Laboratory fume hood containment can be evaluated using the procedures contained in ASHRAE 110, *Method of Testing Performance of Laboratory Fume Hoods*. Face velocities of 0.4 m/sec to 0.6 m/sec (80 ft/min to 120 ft/min) generally provide containment if the hood location requirements and laboratory ventilation criteria of this standard are met.
In addition to maintaining proper fume hood face velocity, fume hoods that reduce the exhaust volume as the sash opening is reduced should maintain a minimum exhaust volume to ensure that contaminants are diluted and exhausted from a hood. The hood exhaust airflow should not be reduced to less than 127 L/sec/m^2 (25 cu. ft /min/ft^2) of internal hood work surface even when the sash is fully closed.

When using fume hoods the face velocity is typically controlled at 100 fpm over the travel of the sash for open sash containment per the NFPA 45 A.6.4.6 code. The only exception to the 100 fpm is when the hood is fully closed at which time a minimum 25 CFM/ sq. ft. of work surface (or 50 CFM/ft of sash for a 24-inch deep work surface) is required. The minimum airflow equates to about 20% of the maximum airflow when the fume hood sash is fully open. This minimum ensures that when the fume hood sash is closed the fumes do not build up inside the hood.

6.8.3 Laboratory Hood Sash Closure. Laboratory hood sashes shall be kept closed whenever possible. When a fume hood is unattended, its sash shall remain fully closed.

A.6.8.3 Users should be instructed and periodically reminded not to open sashes rapidly and to allow hood sashes to be open only when needed and only as much as necessary.

Typically, during the day, fume hoods are only attended 5% of the working hours yet left open 100% of the time. This 5% equates to less than 30 minutes a day that a person needs to have there hands inside a fume hood. For this reason the Phoenix Usage Based Controls® (UBC) was developed to save energy and the New-Tech Automatic Sash Positioning System™ (ASPS™) was developed to improve safety and save energy.

The Phoenix UBC will reduce the 100 fpm to 60 fpm (a 40% reduction in airflow) when the fume hood is unattended. However, this reduction cannot reduce the minimum airflow of 50 CFM/ft of sash when the hood is closed. So the only time the UBC system is utilized is when the sash is open and unattended which is against the NFPA 45 6.8.3 code.

The New-Tech ASPS™ closes the fume hood sash when the fume hood is unattended thus the minimum airflow of 50 CFM/ft is achieved with any VAV fume hood airflow control system (a 80% reduction in airflow). Ensuring that the fume hood sash is closed when the fume hood is unattended complies with NFPA-45 6.8.3, provides maximum containment and energy savings.

The ASPS™ doubles the energy savings compared to UBC System and the ASPS™ complies with the NFPA 45 6.8.3 code without the need for periodically reminding and instructing the users of fume hoods to shut the sash. The ASPS also opens the fume hood sash and controls the opening speed to optimize containment per the NFPA 45 A.6.8.3 code.

For more information about the Phoenix Usage Based Controls® (UBC) please see
http://www.phoenixcontrols.com/Laboratory.html#UBC

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Automatic Sash Positioning System
Repeat Customer Discount

New-Tech has recognized that most of the ASPS™ sales have been coming from retrofitting existing fume hoods. We understand that from a budget and installation coordination standpoint, installing several small groups of ASPS™ units are easier than one large installation. With these factors in mind New-Tech has established the Repeat Customer Discount program.

The Repeat Customer Discount program will provide large quantity purchase material pricing to several small quantity purchases as they occur. The material price of the ASPS™ is discounted as the quantity of units increase.

QUANTITY	DISCOUNT
1-5	No Discount
6-15	3.8% savings compared to the 1-5 rate.
16-30	7.6% savings compared to the 1-5 rate.
31-50	11.6% savings compared to the 1-5 rate.
51+	15.4% savings compared to the 1-5 rate.

To provide these discounts to small quantity purchases we will compare the material price of ASPS™ units paid to date plus the current order with the discounted cost if all of the ASPS™ units were purchased at one time. The discounted difference will then be credited to the current order. This discounting will start at the release of first order and continue for TWO years after that date. The Repeat Customer Discount program does not apply to any installation cost.

For information about the Minimum Risk Trial Offer please contact: New-Tech (866) 631-8324 or fill out the "Contact Us" online request form at www.newtechtm.com.

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Automatic Sash Positioning System Minimum-Risk Trial Offer

New-Tech would like to offer a Minimum-Risk Trial Offer of the ASPS™ for anywhere in the United States. We would like you to try the ASPS™ for up to six months with no cost for materials. Simply cover New-Tech's cost of installation. Please call for a price quote for your location. At the end of the six-month period the ASPS™ can be purchased or returned to New-Tech in good condition.

As an added benefit to the Trial Offer, if the trial unit is purchased and fifteen (15) more units are installed within one year of the installation of the trial unit, 50% of the cost of the trial unit will be credited to the fifteen 15 units. Alternatively, if thirty (30) units are installed within one year of the trial unit, 100% of the cost of the trial unit will be credited to the 30 units.

What New-Tech needs as a show of good faith is a purchase order for the trial unit with payment terms of net 180 day (6 months) after installation of unit. This means that after the trial unit is installed an invoice for the unit will be sent. At the end of 180 day either the unit is paid for, or the unit is returned in good condition and no monies are owed.

For information about the Minimum-Risk Trial Offer please contact: New-Tech (866) 631-8324 or fill out the "Contact Us" online request form at www.newtechtm.

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Some of the Clients Using the

Automatic Sash Positioning Systems™

3M Austin Center - 1996
Abbott Labs - 1995, 1996, 1998
AMGEN - 2006
Applied Biosystems - 2005
BASF Life Science Division - 1994, 1995, 1996, 1997, 1998, 1999
Central Michigan University - 2006
Colorado State University - Pueblo - 2005
CPI Engineering - 2002
Delta College - University Center, MI - 1998
Dow Chemical USA - 1996, 1997, 1998, 1999, 2002
Dow Corning Corporation - 1997, 2000
Glaxo Smith Kline - 2001, 2002
Johnson-Mathey Laboratories, Inc. - 2000, 2002
Minnesota State University Moorhead - 1996
North Oakland Medical Center, Michigan - 1995
Oklahoma State University - 1998
PCS Phosphate - 1995, 1997
Savant, Inc. - 1999
S.C. Johnson & Son, Inc. - 1998
Texas Department of Transportation - 1998
University of Oregon - 2006
University of California, Irvine - 2006
Wyeth Research - 2006

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