



180 Technology Parkway NW, Peachtree Corners, GA 30092
404-636-8400

DRAFT

TC/TG/MTG/TRG MINUTES COVER SHEET

(Minutes of all Meetings are to be distributed to all persons listed below within 60 days following the meeting.)

TC/TG/MTG/TRG No. _____ TC 9.10 _____ DATE June 24, 2025

TC/TG/MTG/TRG TITLE Laboratory Systems

DATE OF MEETING June 24, 2025 LOCATION Phoenix Arizona

MEMBERS PRESENT	YEAR APPTD	MEMBERS ABSENT	YEAR APPTD	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE
Kelley Cramm	2024	Wei Sun	2021	Christine Reinders (CM)
Chris Kirchner	2022	Danny Sanchez	2023	David Rausch (CM)
Ken Crooks	2023			Keith Hammelman (CM)
Kurt Monteiro	2024			Brad Cochran (CM)
Anne Juran	2023			Brendon Burley (CM)
Justin Garner	2024			Brent Fullerton (CM)
Mark Malkin	2023			Duncan Green (CM)
Rachel Romero	2022			Gordon Sharp (CM)
Jim Coogan	2024			Jason Atkisson (CM)
Ryan Parker	2023			John Castelvevchi (CM)
				John Varley (CM)
				Mark Richards (CM)
				Mitchell Swann (CM)
				Robert Weidner (CM)
				Ryan Soo (CM)
				Scott Macmurray (CM)
				Thomas Smith (CM)
				Victor Cincola (CM)
				Victor Neuman (CM)
				William Lin (CM)

MEMBERS PRESENT	YEAR APPTD	MEMBERS ABSENT	YEAR APPTD	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE
				Ali Salim Shirazi (CM)
				Roland Charneaux (CM)
				Greg Gross (CM)
				Guy Perreault (CM)
				Christine Samchuk (CM)
				Raajesh Kumar Murugesan (CM)
				Danny McGrail (CM)
				Jake Edmondson (CM)
				Joy Altwies (G)
				Alex Oliver (G)
				Anke Beyer-Lout (G)
				Bob Valbracht (G)
				Bill Stump (G)
				Jason Hauska (G)
				Jeremy Miller (G)
				Manish Kalmegh (G)
				Phil Arnold (G)
				Kurt Rindoks (G)
				Zara Sardooee (G)
				Dianthe Van Weerden (G)
				Adam Donovan (PCM)
				Mark VanderKooy (PCM)
a				Ray Delgado (PCM)
				Trevor Zeller (PCM)
DISTRIBUTION: <i>All Members of TC/TG/MTG/TRG plus the following:</i>				
TAC Section Head: Joy Altwies			SH9@ashrae.net Where 9 is the section number	
All Committee Liaisons As Shown On TC/TG/MTG/TRG Rosters (Research, Standards, ALI, etc.)			See ASHRAE email alias list for needed addresses.	
Steve Hammerling, Assistant Manager of Research & Technical Services			AMORTS@ashrae.net	

Note: These draft minutes have not been approved and not the official, approved record until approved by the TC.

CALL TO ORDER

Kelley Cramm called the meeting to order at 3:29 PM MST

CODE OF ETHICS

In ASHRAE meetings, we will act with honesty, fairness, courtesy, competence, inclusiveness and respect for others, which exemplify our core values of excellence, commitment, integrity, collaboration, volunteerism and diversity, and shall avoid all real or perceived conflicts of interest. Our culture is one of inclusiveness, acknowledging the inherent value and dignity of each individual. We celebrate diverse and inclusive communities, understanding that doing so fuels better, more creative and more thoughtful ideas, solutions and strategies for the Society and the communities our Society serves. We respect and welcome all.

<https://www.ashrae.org/about/governance/code-of-ethics>

TITLE, PURPOSE, SCOPE for TC9.10

Kelley highlighted our Title, Purpose, and Scope: TC 9.10 is concerned with HVAC components for laboratory systems and their use therein. These components include but are not limited to air intakes, supply air conditioning systems, air distribution methods, laboratory fume hoods, biological safety cabinets, exhaust systems and exhaust discharge. The technical committee will address the unique requirements of all types of laboratories. These laboratories include but are not limited to nuclear, pharmaceutical/medical, general chemistry, and teaching. Additional TC 9.10 concerns are; (1) the reduction of energy usage in laboratory systems, (2) the monitoring of government regulations affecting laboratory operation.

INTRODUCTIONS

The group did not do self-introductions in the interest of time.

Guy Perreault called roll call for voting members. Quorum has been established.

WEBSITE

Jim Coogan reported that he is interested in someone else to take over website updates. Kurt Monteiro. volunteered to take over as webmaster. Guy to update the roster showing Kurt as web master as of July 1.

MEMBERSHIP

Guy reported Quorum achieved. After this meeting we have 3 members rolling off and 3 new members rolling on for a total of 13 voting members.

MEETING MINUTES

Rachel Romero **moved** and Ken Crooks seconded to approve the minutes from the last meeting as distributed. The minutes were **approved unanimously** with the edits as noted that Bob Weidner should not be listed as a voting member.

SECTION HEAD REPORT

Joy Altwies indicated that we need to use the current activity form. Continue to engage international members and communities. CEBD has a new free publication available, the strategic decarbonization planning guide. Our new roster is effective July 1. Funding from the board has been requested for an automated activity form. Programs are due August 1st. Joy will be rolling off of TAC July 1, and Kevin Muldoon will be the new section head for section 9.

You can contact Joy or Kevin at: SH9@ashrae.net
For general questions email: Asktae@ashrae.net

TOM SMITH'S CORNER

Tom Smith gave a presentation on "Shutting the Sash Saves Energy". See attached presentation.

GUIDELINE 36 UPDATE

Jim Coogan gave a presentation on the Status updates to Guideline 36. The addendum for lab room control is still in public review until July 7th. There is still some room for improvement and the group is looking for comments. Contact Jim if you have questions about the addendum. There is a 2nd addendum in the works on exhaust system control. New members are involved on this new addendum.

PROGRAM SUBCOMMITTEE REPORT

Rachel Romero provided a report. We had 2.5 sponsored programs in this conference. There were good questions and panel engagement. The next conference is Las Vegas, we will be resubmitting a forum, a seminar on air flow rates, a lab case studies electrification seminar needs a chair which Ryan Soo volunteered for. A lab decarb seminar also needs a chair. Brad is submitting a forum on AI in labs, Victor will be assisting Brad.
See attached report for more information.

RESEARCH SUBCOMMITTEE REPORT

Greg Gross provided a report. The research subcommittee met June 6th.
New section 9 RAC Liaison – Connor Murray, Roland will be vice chair of RAC.
There was only 1 RTAR submissions across all TC's for this review this year. There is money, please review and contact Greg if they have ideas. RAC is working on a new RTAR template.
TC 9.10 has one current research project, 1835.
RTAR 1963 was accepted by RAC.
WS 1936 is currently out to bid.
See attached report.

LAB CLASSIFICATION SUBCOMMITTEE

Guy provided a report. This committee met June 3rd. Tom is working on reorganization the table. Brad is working on updating the minimum exhaust rates. The draft document should be available to review by Q4. The goal is to have the final version ready by Q1 of 2026. To promote the new version, we plan to utilize the DL program and an ASHRAE Journal article. Brendan Burley has agreed to step in to help lead these efforts.

Tom and Jim to check for a liaison for MOU between ASHRAE and AIHA.

STANDARDS SUBCOMMITTEE

Justin Garner gave a report. Report is available on Basecamp. Standard 100 report needed from Glenn. Standard 110 met yesterday and the 2016 standard will be reinstated and is now out for public review until July 28th. Tom is going to lead a working group on the performance characteristics regarding the updated standard. There is no timeline right now for the updated standard. Standard 129 is on track. NFPA 45 will be out for public review in October.
See attached report.

NSF 49

Justin gave a report. Committee took feedback and agreed on updating wording. Justin is reaching out to individuals who gave input to gather specification language on flow accuracy.

DESIGN GUIDE

Ann Juran provided a report. The committee met June 5th and discussed the new organization of the document. A volunteer is needed for chapter 18 system economics. The TC would need to vote to approve a white paper addressing controls in advance of the rest of the design guide. Action item to prepare the white paper, Jim will prepare the draft, Guy and Kelley will review the draft paper. The controls white paper material could also be an ASHRAE journal article.

HANDBOOK SUBCOMMITTEE

Mark Malkin reported on chapter 17 for applications 2027. The committee met on June 9th. Many edits have been completed. The goal is to provide additional updates by the end of August.

ASHRAE JOURNAL

Roland Charneux reported that there are no labs articles in the last 6 months. There will be a new article coming soon on lab controls. Kelley is also working on an article on plug loads.

BASECAMP CLEANUP

David reported Basecamp cleanup is complete. David reviewed the new structure and locations on where to put subcommittee minutes. Let David know if you are having trouble finding a document.

ALI COURSES

Laboratory Design Course – Danny McGrail taught 3 times this year, Orlando, May, and in person in Phoenix. Attendance was only 5 people at this conference. Moving forward suggesting twice a year. Danny also suggested modifying the title. The new laboratory controls course is also under review. Brad's laboratory exhaust course is still needing updating.

LIAISON REPORTS

TC 1.4 Control Theory and Application – Jim Coogan reported on updated Guideline 36 updates.

TC 2.2 Plant and Animal Environment

TC 4.3 Ryan Parker had 2.5 RTARS accepted last year. Both projects are in project evaluation and multiple bidders.

TC 5.1 Fans – Mark Vanderkooy is the incoming chair. This liaison needs to be updated in the roster.

TC 5.3 Room Air Distribution – no report

TC 7.6 Building Energy Performance – cognizant to 90.1. Update liaison to Christine Reinders

TC 7.9 Building Commissioning –Justin Garner reported no major updates for this TC.

TC 9.2 Industrial Air Conditioning and Ventilation. No report

TC9.6 Healthcare Facilities – nothing to report

TC9.7 Educational Facilities – Keith Hammelman reported a push to collaborate on maker spaces.

TC9.11 Clean Spaces – Roland provided a report that the clean room design book is under review.

MTG ACR – 2 Research projects ongoing.

62.1 Ventilation for Acceptable IAQ – Brendon Burley reported that 62.1 voted to change to laboratories in addendum z to match Z9.5.

90.1 – Kelley provided a report. New Liaison needed for 90.1 Justin will act as liaison until we have a new permanent liaison. Addendum bx was sent to full TC and related to laboratories. The details were not appropriate for all laboratories and members of 9.10 made comments on our concerns. Addendum bx is wanted to be included in the 2025 issue of 90.1. A working group has been formed between 90.1 Mechanical Subcommittee and TC 9.10. Additional members from 9.10 are needed for the working group. Guy volunteered to participate, Jason Atkisson will also be participating.

SMACNA – No report

ISPE – no report

AIHA Lab Health & Safety – Jim Coogan gave a report. Several of the updates in 90.1 addendum bx are in title 24 already and Jim has been working with users and AIHA to provide guidelines for safety officers.

ASTM Z9.5 – no report

I2SL – Gordon reported on a new I2SL software called AIM and the International Fume Hood Challenge. See attached slides.

Title 24 – California Energy Code – As mentioned earlier, new setback requirements have been added.

NEW BUSINESS

No new business.

CLOSING THOUGHTS

Next Meeting – 3pm in Las Vegas on February 23rd 2026

ADJOURN It was moved and seconded to adjourn at 5:39 PM MST

Shutting the Sash Saves Energy ... and other common misperceptions



1

People rely on proper performance fume hoods to protect
them from exposure to airborne hazards

Vertical Sash Opening



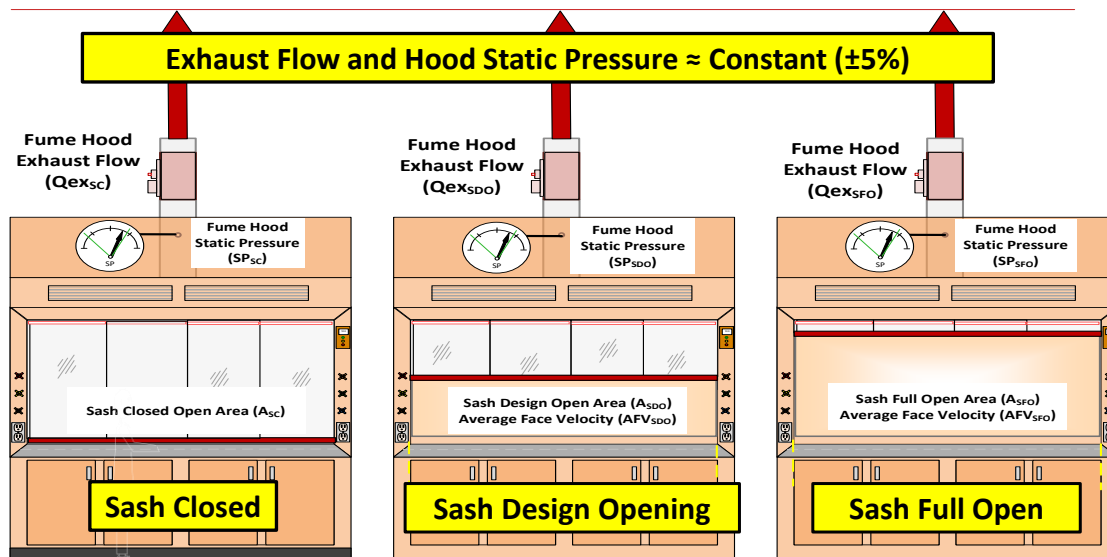
Horizontal Sash Opening



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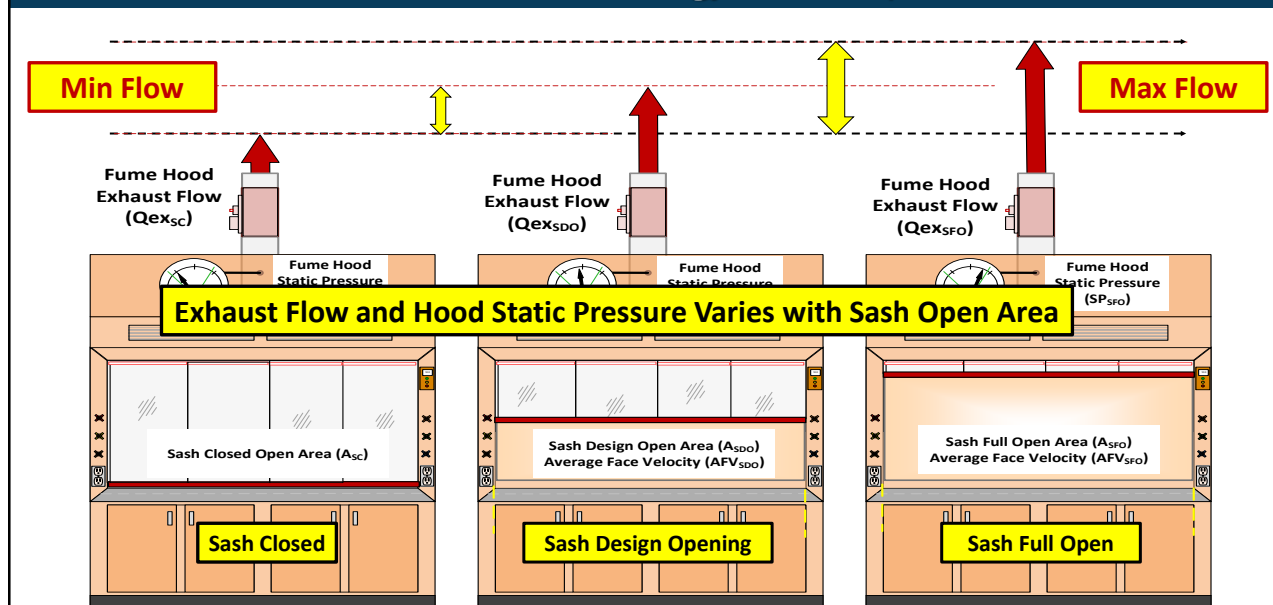
2

Shutting the Sash on Constant Air Volume (CAV) Fume Hoods Enhances Safety with No Potential for Energy Savings



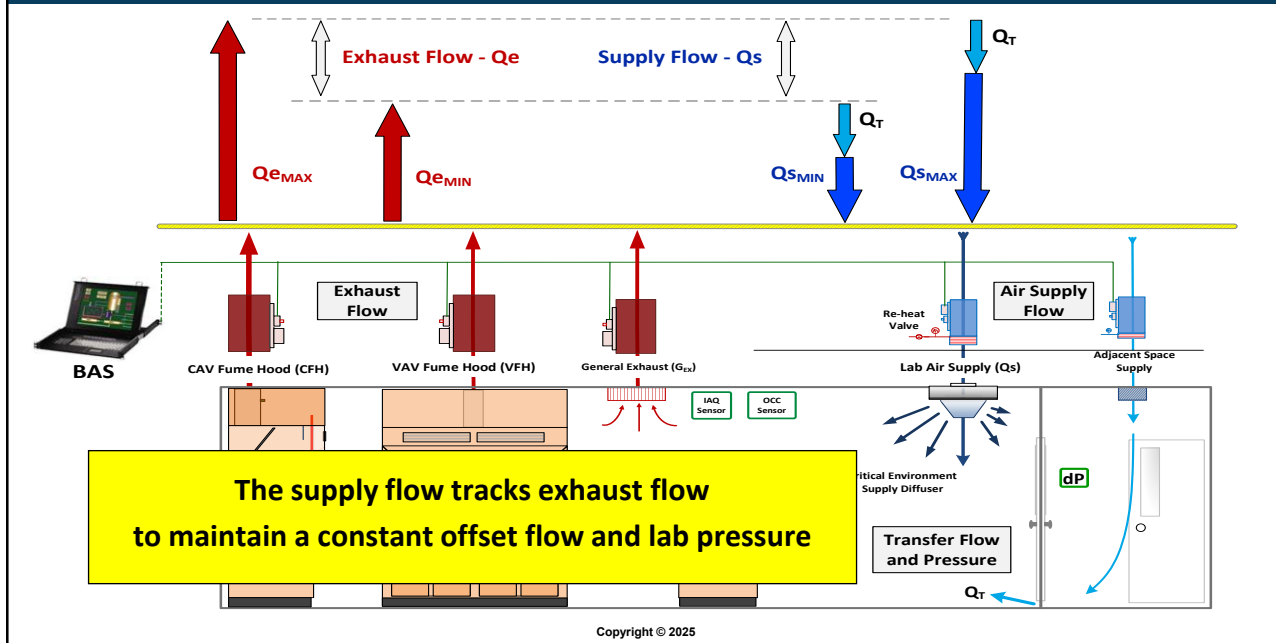
3

Modern Variable Air Volume (VAV) Fume Hoods Modulate Flow to Reduce Energy Consumption



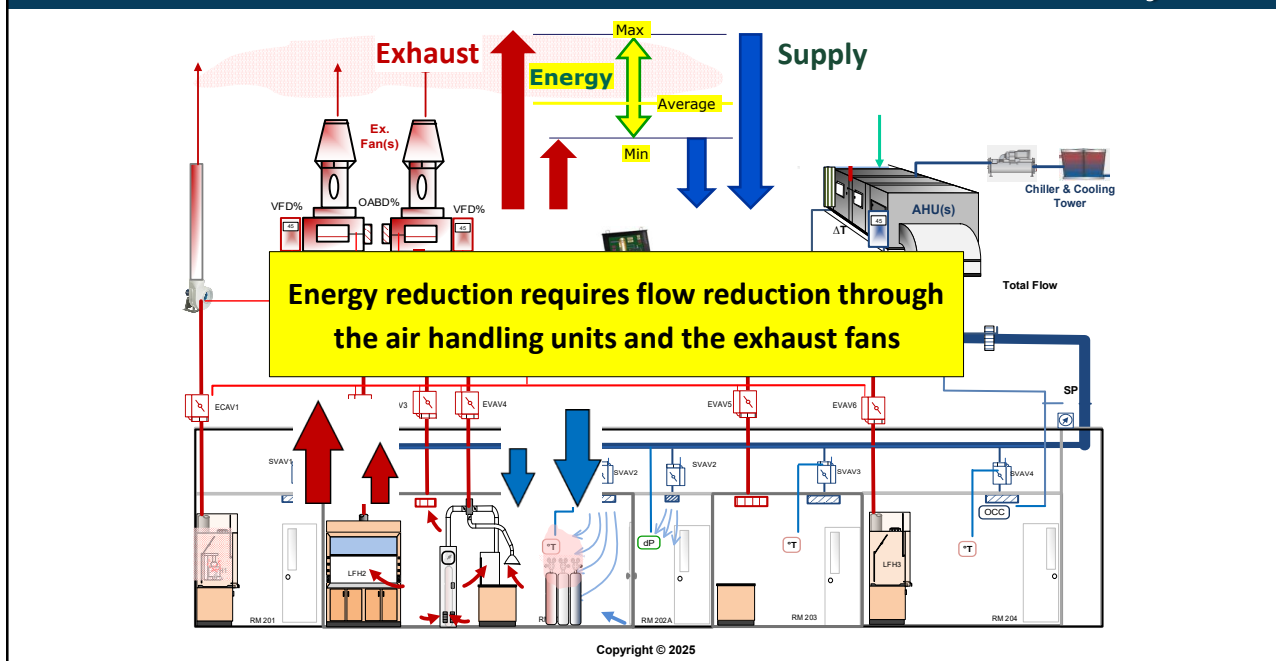
4

VAV Fume Hood Flow Requires VAV Supply Flow Modulation



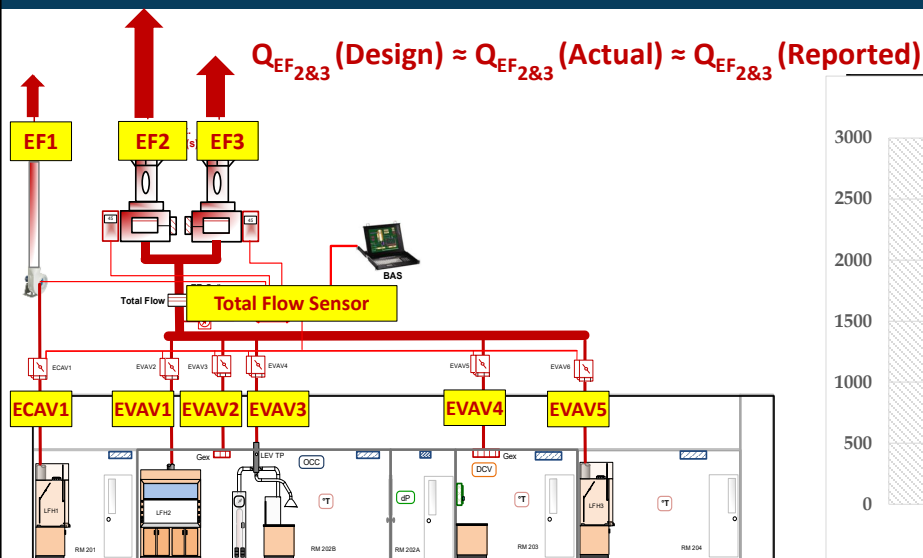
5

Flow reduction at the hood must translate to the lab and the system



6

Determine the Range of Exhaust Flow Modulation



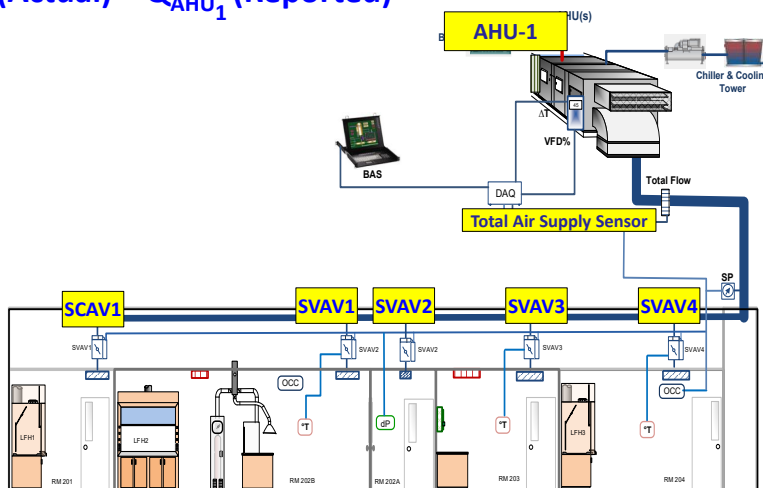
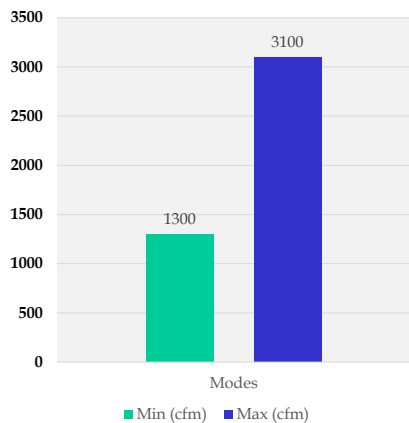
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Determine the Range of Air Supply Modulation

$$Q_{AHU_1} \text{ (Design)} \approx Q_{AHU_1} \text{ (Actual)} \approx Q_{AHU_1} \text{ (Reported)}$$

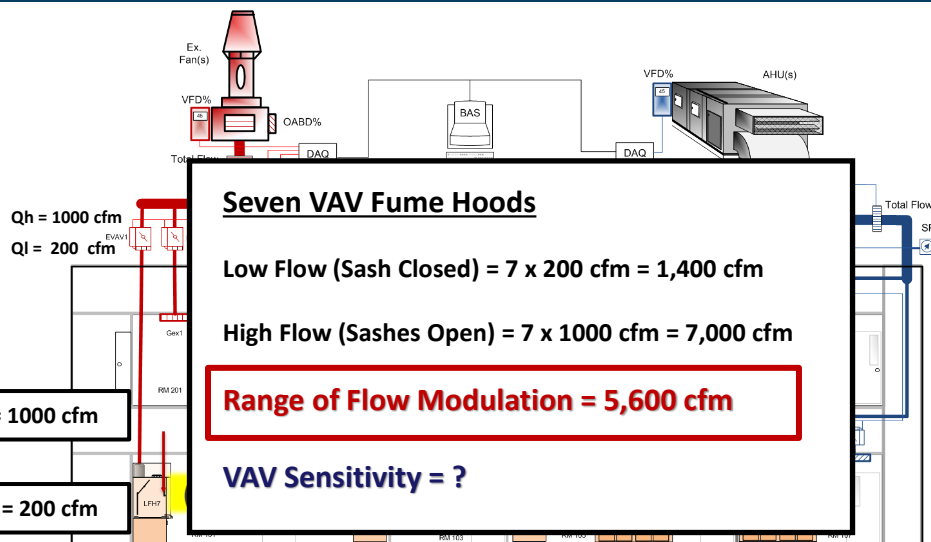
Range of Air Supply



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A System Operating Mode Test (SOMT) is used to measure the modulation of flow for a VAV Fume Hood System



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Results of System Operating Mode Tests (SOMTs) – Building 1

Expected Flow Modulation = 5,600 cfm

Test Mode	EF#	Duct Size	Pitot Traverse (fpm)	
Max	1 & 2	Multiple	Multiple	20,632
Max	3 & 4	Multiple	Multiple	11,767
Min (End)	1 & 2	Multiple	Multiple	14,683
Min (End)	3 & 4	Multiple	Multiple	1,225
Max	8 & 9	Multiple	Multiple	10,437
Min (Start)	8 & 9	Multiple	Multiple	5,671
Min (End)	8 & 9	Multiple	Multiple	6,495

Success!

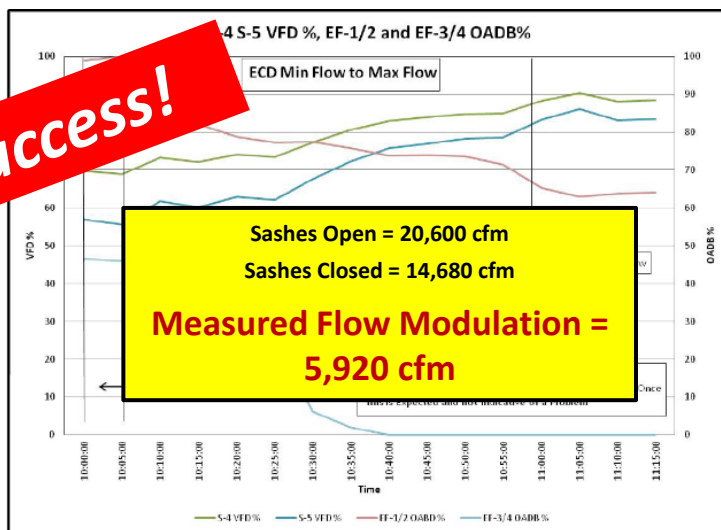


Figure 1 S-4 S-5 VFD %, EF-1/2 and EF-3/4 OABD% Min ECD Flow to Max ECD Flow

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Results of System Operating Mode Tests (SOMTs) – Building 2

Expected Flow Modulation = 84,800 cfm

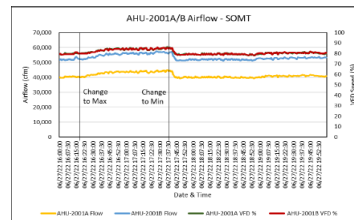
Test Mode	AHU	VFD Speed (%)	Measured Airflow (cfm)	Total Measured Airflow (cfm)	Max-Min (cfm)
Minimum Mode Sash Closed/Heating	2001A	72.3	65,088	282,816	55,440
	2001B	71.2	66,240		
	2002A	69.8	48,528		
	2002B	67.3	47,520		
Maximum Mode Sash Open/Cooling	2001A	72.3	65,088	282,816	55,440
	2001B	71.2	66,240		
	2002A	77.9	72,864		
	2002B	77.3	72,576		

Measured Flow Modulation = 55,440 cfm

**29,360 cfm (35%) Lower than Expected
Extra Cost = \$147,000 per year**

Test Mode	Measured Airflow (cfm)	BAS Airflow (cfm)	Airflow Error (%)
Minimum Mode Sash Closed/Heating	65,088	39,754	-38.9%
	66,240	51,801	-21.8%
	48,528	48,682	0.3%
	47,520	46,601	-1.9%
Maximum Mode Sash Open/Cooling	65,088	43,812	-32.7%
	72,864	56,915	-21.9%
	72,288	47,663	-34.1%
	72,576	46,908	-35.4%

BAS Error = <1% to as high as 39%



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Results of System Operating Mode Tests – Building 3

Sashes Closed to Sashes Open

Expected Flow Modulation = 14,900 cfm

Test Mode	AHU	VFD (Hz)	Design Airflow (cfm)	Measured Airflow (cfm)	Total Measured Airflow (cfm)	Max-Min (cfm)
Minimum Mode Sash Closed	AHU-2	50	76,000	58,653	58,653	969
Maximum Mode Sash Open	AHU-2	50	76,000	59,622	59,622	969

Measured Flow Modulation = 970 cfm

**13,930 cfm (93%) Lower than Expected
With Extra Cost = \$70,000 per year**

	VFD (Hz)	OABD (%)	Design Airflow (cfm)	Calculated Exhaust Airflow (cfm)	Total Lab Exhaust (cfm)	Max-Min (cfm)
Minimum Mode Sash Closed	1A	49	82%	25,500	20,825	41,608
	1B	48.9	81%	25,500	20,783	
Maximum Mode Sash Open	1A	49	82%	25,500	20,825	41,608
	1B	48.9	81%	25,500	20,783	

Exhaust Modulation = 0 cfm

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Results of System Operating Mode Tests (SOMTs) – Building 4

Sashes Closed to Sashes Open

Expected Flow Modulation = 19,940 cfm

Test Mode	AHU	VFD (Hz)	VFD (Fraction)	Design Flow (cfm)	Calc. Flow at VFD (cfm)	Measured Airflow (cfm)	Total Measured (cfm)
Min. Flow Mode LFH Sashes Closed	AHU-1	15.0	25%	25,650	6,413		
	AHU-1A	60.0	100%	25,650	25,650		
	AHU-1B	47.8	80%	25,650	20,435		
Max Flow Mode LFH Sashes Open	AHU-1	40.4	67%	25,650	17,271	11,198	
	AHU-1A	60.0	100%	25,650	25,650	32,194	
	AHU-1B	47.8	80%	25,650	20,435	23,068	
							66,460

Fail!

Measured Flow Modulation = 2,050 cfm

**17,890 cfm (90%) Lower than Expected
With Extra Cost = \$89,000 per year**

Test Mode	EF	VFD (Hz)	VFD %	Design	Estimated Lab Exhaust (cfm)	Estimated Total Lab Exhaust (cfm)
Min. Flow Mode LFH Sashes Closed	1	38.4	64%	25790	16506	
	1A	38.4	64%	25790	16506	
	1B	38.4	64%	25790	16506	
	2	52.2	87%	17880	15556	
	2A	52.2	87%	17880	15556	
	2B	0	0%	17880	0	
Max Flow Mode LFH Sashes Open	1	47.1	79%	25790	20245	
	1A	47.1	79%	25790	20245	
	1B	47.1	79%	25790	20245	
	2	59.6	99%	17880	17761	
	2A	59.6	99%	17880	17761	
	2B	0	0%	17880	0	

Measured Flow Modulation = 15,600 cfm

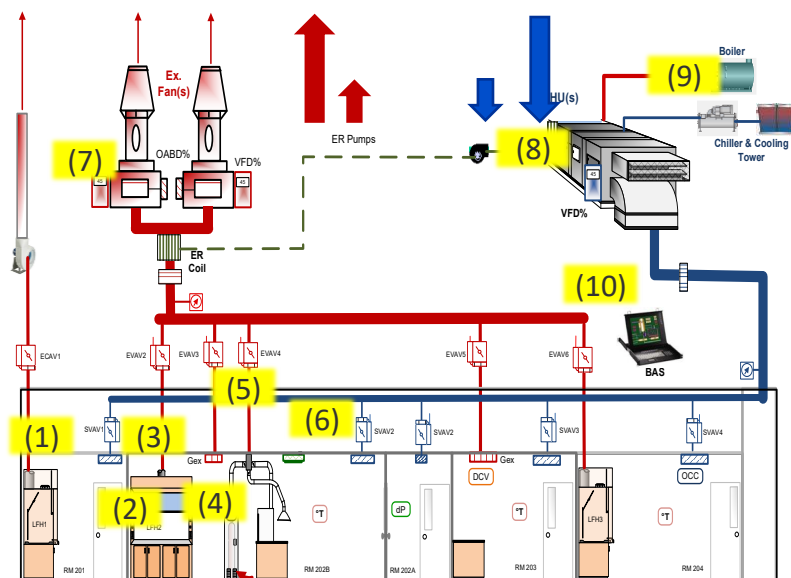
4,300 cfm (21%) Lower than Expected

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Many factors affect sash to system flow reduction and energy use

- 1) CAV Fume Hoods and Devices
- 2) Improper flow set points
- 3) Improper VAV Response
- 4) CAV Exhaust Devices
- 5) Dysfunctional Flow Controls
- 6) Improper air supply tracking
- 7) CAV exhaust fans with OABD
- 8) AHU Response and Sequence of operations
- 9) Poor integration with boilers and chillers
- 10) BAS and Sensor Accuracy and Control

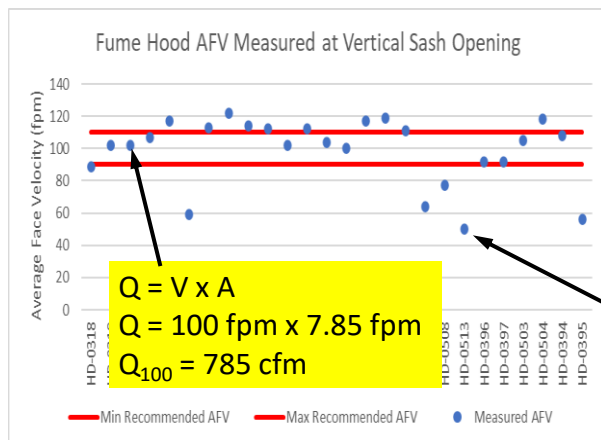


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Fume Hood Face Velocity Tests and Flow at Sash Open

26 Fume Hoods were tested
 Vertical Sash Open 18 inches, Area = 7.85 ft²
 Target Design Face Velocity = 100 fpm
 Recommended Range = 90 fpm – 110 fpm



6-ft Combination Sash, VAV Fisher Hamilton Safeaire Fume Hood

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VAV Response is measured to verify proper flow control

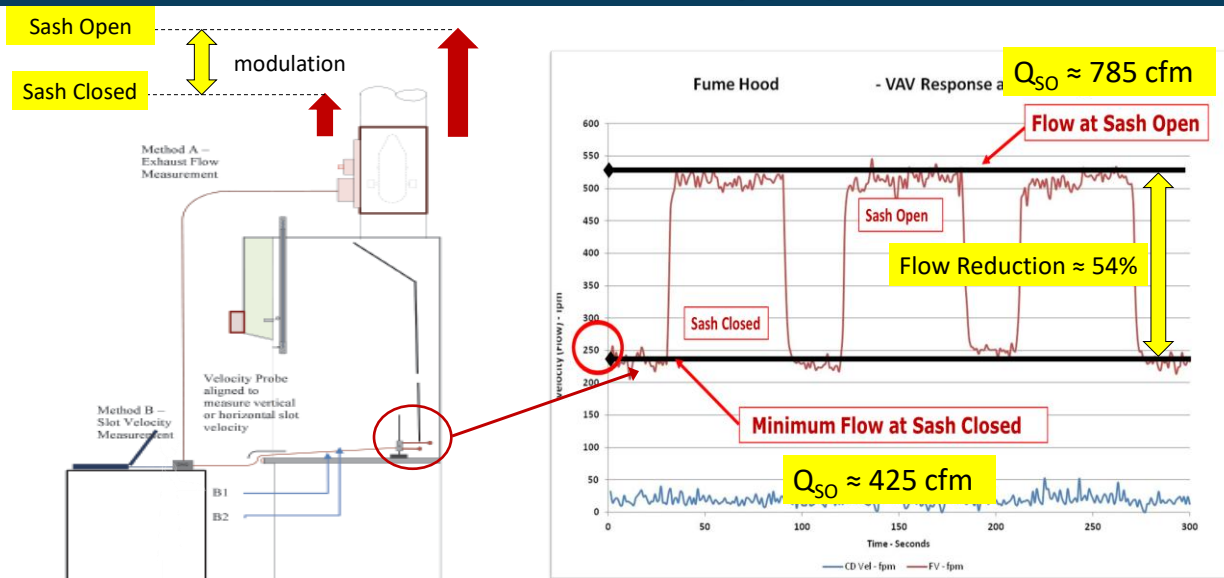


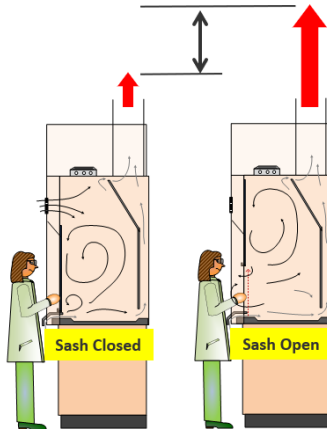
FIGURE 6.2 Sash movement effect flow test.

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VAV Response Tests verify fume hood flow modulation

VAV Fume Hood
Minimum Flow Tests

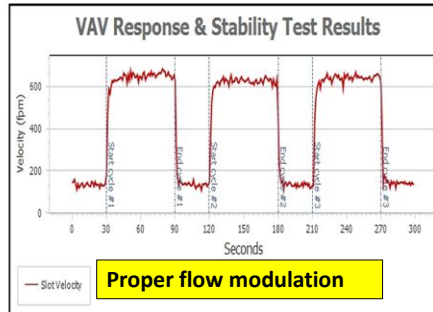


Fume Hood 1

VAV Response & Stability Test Results

Length of Capture: 300 secs

Speed of Response (seconds): VAV Stability Cycle 1: 7%
Speed of Response Rating: VAV Stability Cycle 2: 6%
Stability Rating: VAV Stability Cycle 3: 7%

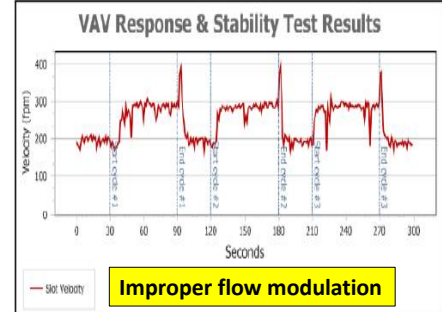


Fume Hood 2

VAV Response & Stability Test Results

Length of Capture: 300 secs

Speed of Response (seconds): 15 VAV Stability Cycle 1: 22%
Speed of Response Rating: Fail VAV Stability Cycle 2: 12%
Stability Rating: Fail VAV Stability Cycle 3: 22%



Improper operation of the VAV controls limits potential for energy savings

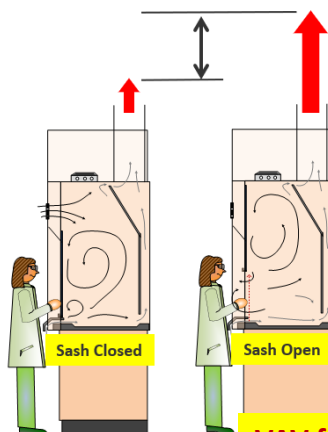
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Pfizer – B259 - Sample of Fume Hood VAV Operation

VAV Fume Hood
Minimum Flow Tests



Fume Hood B259-1009-HD-0317

Datasheet - Fume Hood Performance Test Results

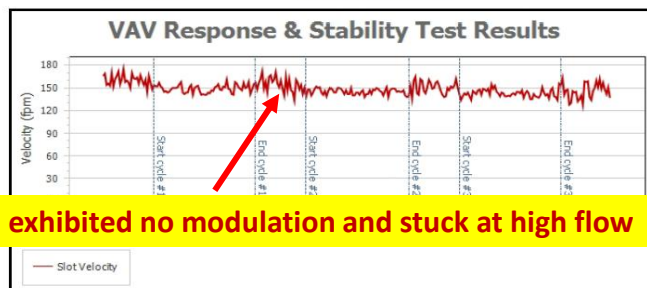
DB Name: Pfizer Technician: MB
Building Name: B259 Test Name: 2024-10-16
Laboratory: 1009 Test Date: 10/16/2024
Hood: HD-0317 Test Cycle: 1

VAV Response & Stability Test Results

Length of Capture: 300 secs

Average Face Velocity = 107 fpm.

Speed of Response (seconds): VAV Stability Cycle 1: 10%
Speed of Response Rating: VAV Stability Cycle 2: 8%
Stability Rating: VAV Stability Cycle 3: 10%



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Lab Environment Tests verify flow modulation for labs

Supply and Exhaust Measurement



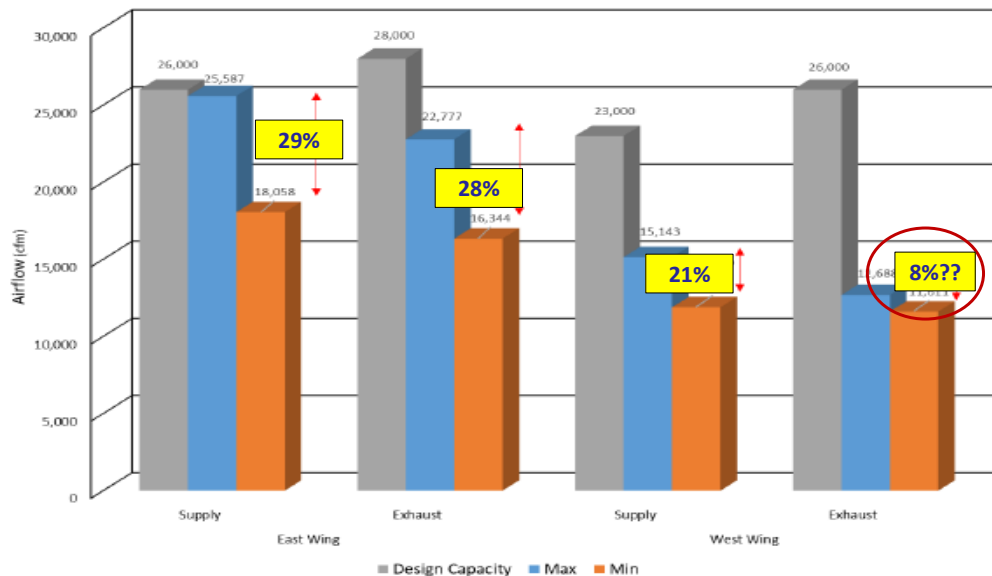
Flow measurements indicated room ACH ranged from 7 ACH to as high as 42 ACH due to excess general exhaust and high fume hood minimum flow.

Lab	Supply (cfm)		Exhaust (cfm)			Tot. Exh		Exh. ACH at Min	Exh. ACH at Max	RCB Rating	RCB Min. ACH Occupied	RCB Min ACH Unoccupied
	Min	Max	Type	Min.	Max.	Min.	Max.					
134	5817	5817	6' FH	872	803	5382	5970	15	16	2	6	3
			8' FH	562	1255							
			Snorkel	145	145							
			Snorkel	165	165							
			Snorkel	176	176							
			Snorkel	231	231							
			GEX	76	539							
			GEX	1157	661							
			GEX	1048	1086							
			GEX	931	936							
180	2380	2362	Transfer	48	0	2661	2976	7	7	1	4	2
			Transfer	-29	-27							
			FH	490	633							
			Snorkel	300	300							
			FH	484	625							
			GEX	260	269							
			GEX	288	287							
			GEX	94	95							
			GEX	124	116							
			GEX	188	195							
234	10596	13193	GEX	181	264	9733	15417	27	42	2	6	3
			GEX	252	182							
			FH	693	1174							
			FH	721	1178							
			FH	779	1245							
			FH	693	1174							
			FH	580	1100							

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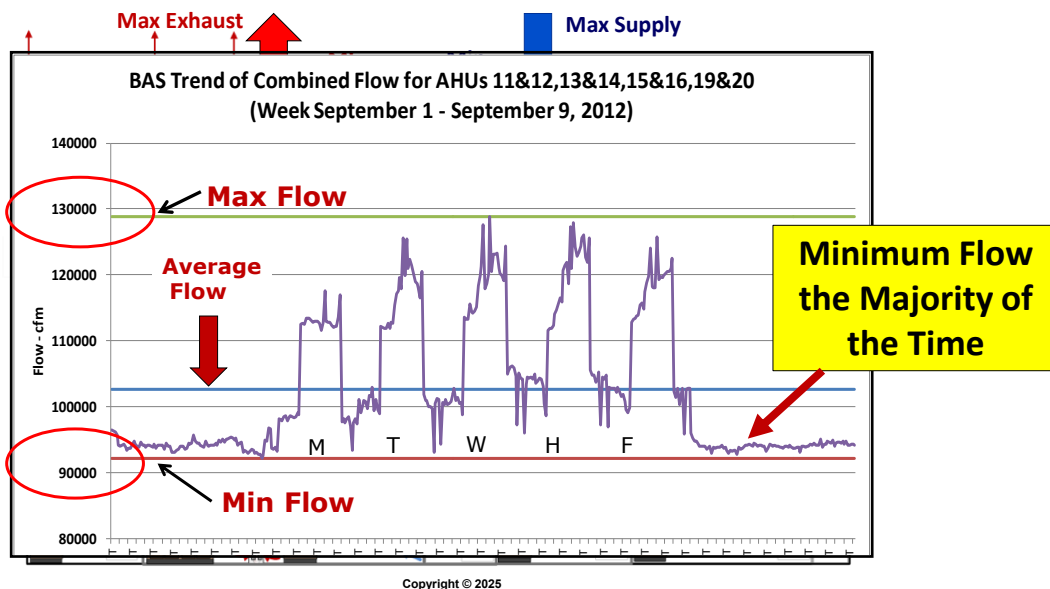
SOMTs verify modulation of flow through the systems



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Success of a “Shut the Sash” Program depends on modulation of flow through the building



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Conclusions and Recommendations

- Shutting the sash must result in flow reduction through the fume hood – the VAV controls must operate properly!
- Shutting the sash must result in flow reduction through the lab – The air supply must track the reduction in exhaust flow!
- Shutting the sash must result in reduced flow through both the exhaust fans and the air handling units!
- The flow reduction must translate to energy savings!
- In our experience, greater than 50% of systems have significant operational problems that will undermine program success.

TEST – TEST – TEST – You can’t control what you don’t measure!



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22

Thank You!



Questions



Thomas C. Smith
919-319-4290
tcsmith@3flow.com
www.3flow.com

The Right Airflow in the Right Place and the Right Time

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**ASHRAE TC 9.10 Laboratory Systems
Program Sub Committee
Tuesday, June 3, 1:00 - 2:00 PM EDT
Agenda**

Program Sub Committee Meeting, Phoenix Annual Meeting 2025

Attendees:

Rachel Romero, Kelley Cramm, Guy Perreault, Kimberly Thompson, Tom Smith, Greg Gross, Christine Reinders, Jake Edmondson, Ryan Soo, Roland Charneaux, Brad Cochran

Bob Weidner, Beth Mankaymeyer, Jerry Bogert, Ken Crooks, Kishor Khankari, David Rausch, Raajesh Kumar Murugesan, Jason Atkinson, Kurt Monteiro

In ASHRAE meetings, we will act with honesty, fairness, courtesy, competence, inclusiveness and respect for others, which exemplify our core values of excellence, commitment, integrity, collaboration, volunteerism and diversity, and shall avoid all real or perceived conflicts of interest. Our culture is one of inclusiveness, acknowledging the inherent value and dignity of each individual. We celebrate diverse and inclusive communities, understanding that doing so fuels better, more creative and more thoughtful ideas, solutions and strategies for the Society and the communities our Society serves. We respect and welcome all.

1. Review of Roles:

Programs Chair:

- Maintain a list of program ideas
- Solicit program chairs and speakers
- Solicit reviewers for Conference Papers
- Assist in submitting programs online
 - Go to Track Chair or ASHRAE staff for assistance
- Serve as the liaison between your TC and CEC
- Not responsible for presenting all of your TC's programs
- Notify chairs of areas of potential conflict times for TC 9.10:
 - TC 9.10 meetings on Tuesday from 2-6 pm
 - SGPC Guideline 36- Monday 8 am -12 pm (avoid if possible)
 - Other?

Session Chair:

- Develop a detailed **program abstract** and identify speakers (contact Track Chair with questions)
- Upload the required information on the session and speakers to the Conference website
- Preview speaker presentations to check that they meet the ASHRAE Conference Presentation Policy (found at <https://www.ashrae.org/file%20library/conferences/speaker%20resources/>)
- Make sure speaker presentations are uploaded prior to the Conference
- Coordinate presentations to minimize overlap and make sure the timing is correct
- Introduce and monitor session at the Conference
- Assist authors in identifying learning objectives & completing Q&A

2. Sponsored Program in Phoenix:

Seminar 9: Laboratory Plug Loads: What's Real and What's Not?

Sunday, June 22, 9:45 AM – 10:45 AM MST

Speakers: Kelley Cramm, Jake Edmondson

Chair: Rachel Romero

Location: Phoenix Convention Center North Building , 227AB

Panel 1: Role of Air Change Rates in IAQ Codes and Standards

Sunday, June 22, 11:00 AM – 12:30 PM MST

Speakers: William Bahnfleth, Marwa Zaatari, Max Sherman, Michael Sheerin, Travis English

Chair: Kishor Khankari, PhD

Location: Phoenix Convention Center North Building , 229A

Panel 6: IAQ of Industrial Facilities: Protecting Human Assets (Not officially sponsored by TC 9.10)

Tuesday, June 24, 9:45 AM – 10:45 AM MST

Chair: Cindy Moreno

Speakers: Kelley Cramm, Tracey Jumper, Kathleen Owen

3. Future ASHRAE Conferences

Jan. 31-Feb. 4, 2026 – Las Vegas, NV

June 27-July 1, 2026 – Austin, TX

Jan. 23-27, 2027 – Chicago, IL

June 12-16, 2027 – New Orleans, LA

Feb 5-9, 2028 - Orlando, FL

Speaker Resources

<https://www.ashrae.org/conferences/speaker-resources>

https://www.ashrae.org/File%20Library/Conferences/Speaker%20Resources/SpeakersManual_0718.pdf

a. Las Vegas Winter 2026 Conference Deadlines

- Thursday, June 19, 2025 | Website Opens for Extended Abstracts and Seminar, Workshop, Forum, Debate, and Panel Proposals
- **Friday, August 1, 2025** | Debate, Panel, Seminar, Forum, Workshop, and Debate Proposals Due
- Friday, October 3, 2025 | Debate, Panel, Seminar, Forum, Workshop Scheduling Notifications

b. Las Vegas Tracks

1. Conference Chair : Aaron Boranian (aaron.boranian@bigladdersoftware.com)
2. Fundamentals and Applications
3. HVAC&R Systems & Equipment
4. Refrigeration and Refrigerants
5. Research Summit
6. Energy Storage and Grid Resiliency
7. Pathways to Building Decarbonization

8. Artificial Intelligence
9. Advancements in Construction
10. Ventilation and Indoor Environmental Quality for Healthy Buildings
11. Future-Proofing the Built Environment

c. Suggested formats:

- **Seminar:** feature presentations on subjects of current interest
- **Panel Discussion:** can feature a broad range of subjects and explore different perspectives on industry related topics. This session format includes a panel of 3-4 speakers each addressing a facet of the session topic, followed by an interactive discussion lead by the session chair.
- **Debates:** highlight hot-button issues commonly faced by our membership. Industry experts, either on teams or as individuals, argue opposing sides of an issue, concluding with position summaries and audience feedback.
- **Forums:** The sessions are “off-the-record” discussed held to promote a free exchange of ideas. Reporting of forums is limited to allow individuals to speak confidentially without concern of criticism. There are no papers attached to forum
- **Workshop:** enable technical committees and other ASHRAE committees to provide a series of short presentations on a topic requiring specific expertise. These short presentations are provided with an increased emphasis on audience participation and training in a specific set of skills (60 or 90 minutes)

4. Proposed Programs for Las Vegas:

- RESUBMIT for Las Vegas: Forum: Is it Risky to use Total Energy Wheels heat recovery devices?
 - **Chair: Roland Charneux-** AI to Bob to send email to confirm resubmission
 - Note: resubmission- and note that there is a research project about this.
 - Risk vs energy benefits, look at proper application
 - **AI: Rachel to submit this**
 - This is the third time of submission. This is the last time we try.
- Las Vegas: Total flow through the building- System operating mode test- turn down air flow rates fan flow doesn't go down
 - Workshop Discussion - Presenters: Tom Smith
 - Start with a short presentation
 - Track: Ventilation and Indoor Environmental Quality for Healthy Buildings Or Pathways to Building Decarbonization
 - Special requests: re-submission from Jim Coogan
 - Jason Atkisson and Beth Mankameyer interested
 - Justin Garner from Engineered air balance
 - Brad Cochran- exhaust systems
 - Include facility operator? To talk about controls

- **Chair: Christine Reinders**
- Las Vegas: Lab case studies to decarb
 - Jason Atkisson (USGS)?? Or Jessica Mangler
 - GSA/FDA- Smith Group- Rob Thompson or Adam Denmark
 - Track: Pathways to Building Decarbonization
 - Wade Conlan- Case studies
 - Chris Kirchner- refrigerant switch out at pharma sites?
 - **Chair: Rachel to find chair**
 - **Kelley can ask Danny as backup**
- LV conference: Electrification- All Electric Labs
 - Chris Kirchner- might have a project?
 - Kurt Monteiro- NHP vivarium project
 - EMAPS at NREL with SmithgGroup
 - Potential track: Future-Proofing the Built Environment
 - **Chair: Find a chair at committee meeting**
- Forum: What is the perceived role of AI in design and operation of labs?
 - Track: AI
 - **Chair: Brad Cochran**
 - Look for someone to partner with Brad at committee meeting

On hold:

- On hold: Standard 100 Energy Efficiency and emissions efficiency for existing buildings- lab specific tables- Glenn Friedman
 - Forum- How to categorize lab? Can we define this enough to start research on this.
 - Could work with Healthcare TC, manufacturing, data centers 9.9
- On hold: Keith Hammelman- Education committee- 3-D printing exhaust?- could be case study as part of a different grouping – Makerspace- Kelly Cramm-
 - Elizabeth C at Cornell?
 - Tom could make some IH recommendations?
 - UL2904 standard
 - Panel discussion format
 - Chair: Christine Reinders
- Austin: Guideline 36 in Labs
 - **Chair: David Rausch**
 - Air handlers

- Speakers: Jim Coogan
- This is out of public review 6/2025
- On Hold: General air cleaning seminar
 - 145 came out of this
 - How this may relate to labs?
 - Bob to work with 185.5 (testing protocols) to get speakers together
 - **Chair: Bob**

Unassigned:

- Control tuning and lab performance- Ryan Soo
 - Tom Smith? Ryan?
- Energy modeling of labs?
 - ORNL?
- Commissioning in labs with TC 7.9- Justin Gardener
- Characterize Savings of controls (Phoenix)
 - PG&E through Tom Smith
 - Correlation between flow and energy to \$
 - Add to program above?

5. New topics

6. Potential Chairs in the future:

- Jake Edmondson
- Raajesh

ASHRAE TC 9.10 Research Subcommittee - 2025 Summer Meeting Minutes (June 6, 2025)

1. Attendees

- a. Kelley Cramm, Robert Weidner, Roland Charneux, Jim Coogan, Brad Cochran, Greg Gross, Raajesh Murugesan, Guy Perreault, Rachel Romero, David Rausch, Mark Malkin

2. Introductions and News

- a. Research Chair – Greg Gross
- b. Section 9 RAC Liaison - Conor Murray (TC 9.11 Clean Spaces)
- c. RPS Chair - Roland Charneux
 - i. As of July 2025 – Will be RAC Vice Chair
- d. Only 1 RTAR received for Summer 2025, no RTARs were received for Spring 2025...plenty of opportunity for research project consideration!

3. Current Research Projects

- a. 1835-RP (Characterizing the Performance of Entrained Flow Stacks)
 - i. Latest update from May 2025 PMS meeting indicated additional data sets had been collected on conventional stack configuration.
 - ii. Continued effort in fitting measured data and correlation/comparison with ASHRAE calculations.
 - iii. Follow-up PMS meeting to discuss current progress being scheduled for Monday, June 23, 2025 during the Phoenix conference.
 - 1. Review latest data with PI and determine how to proceed with RP scope.

4. Research Projects in RTAR or Work Statement

- a. RTAR 1963: "Develop a methodology to characterize and quantify emission rates from processes in labs."
 - i. Accepted by RAC as WS as of May 2025.
 - 1. Roland Charneux spearheading, Tom Smith is co-author, Rachel Romero helped refine
 - ii. Method of test: Bottles, chemicals, equipment, specific processes.
 - 1. Box to contain chemicals to measurement
 - 2. Establishing airflow
 - 3. Risk assessment
 - iii. AIHA may be interested in collaboration based on recent MOU
 - 1. Jim Coogan will take the lead on coordination between groups
 - 2. Possible cosponsor
 - iv. PES Volunteers (5-6 people)
 - 1. Brad Cochran, Guy Perreault, Rachel Romero, Roland Charneux, Tom Smith, Raajesh Murugesan
- b. WS 1936 - Ventilation Effectiveness for Labs:
 - i. Currently out to bid as of May 2025 (TRP-1936)
 - 1. Received 6 bids, PES will meet pre-Summer 2025, Roland to chair
 - 2. Decision to be made during conference Summer 2025
 - ii. Variety of Groups working on this - I2SL, ASHRAE MTG ACR, SP 129
 - iii. Funded by Price, Phoenix

5. Research Topics Under Consideration (but no specific movement)

Topic	Interest/Responsibility	Status/Action
1780 Part 2 – Cross-contamination in Sensible Wheels	Roland Charneux, Robert Weidner, Otto Van Geet,	- RTAR draft has been completed, to be discussed. - Meeting scheduled for June 12, 2025 - Robert Weidner will be primary author - Concerns to be studies: - Impact of velocity through the wheels (500 fpm) - Test simultaneously with different chemicals to reduce the cost of testing. - Sensible only wheel test - Human and bio-contaminant transfer - Transfer at low concentration of chemicals - Forum proposed but not accepted for Phoenix...will try one last time for Las Vegas - Check with previous 1780 team for co-sponsorship
Demand Control Ventilation in Labs via Contaminant Monitoring	David Rausch	- Goal of reducing airflow rates in labs - What is it? How does it work? - Possible speakers...Kishor, Gordon Sharp, Tom Smith - Previously discussed as ready to present...just need to get a couple more speakers. - Possible TC 9.11 cosponsor?
Hourly Data on Lab Plug Loads for Design Guidance	Rachel Romero	- Coordinate with I2SL Labs2Zero and Laboratory Benchmarking Tool - TC 9.6 is collecting data...possible to collaborate? - RP-1816...imaging equipment (MRI, etc.) - Inquire about WS info from TC 9.6 for guidance? - Equipment specific ranges for calculation guidance - Could be useful for design guide
Using AI to Better Operate Buildings	Jim Coogan	- Low Priority - Not currently much interest in moving forward, but keeping for consideration - Jim will poll the Siemens team to see if there is interest/progress - Trend analysis, actionable items, preventative maintenance
Duct Velocities for Lab Exhaust	Tom Smith	- Low Priority - Transport velocities required for chemical removal, prevention of condensate, heated acid vapors - Coordinate with 110 Committee for guidance
Hazardous Emissions in Vivarium Exhaust	Henry Hayes	- Low Priority - Concerned with nuisance odors, air changes, historic design practices, advancements in technology - Discussion with TC 2.2 - Will reach out to Henry Hayes to determine if this is still a research interest and possible involvement

6. Review of Pertinent Ongoing Research Outside of TC 9.10

- a. 90.1 Updates
 - i. Proposed that TC 9.10 review updates and create RTAR to evaluate energy savings methods
 - ii. Discussed adding to research topic list with Kelley Cramm as responsible party.
- b. ASHRAE 110 Method of Fume Hood Performance
 - i. Final draft completed with committee vote held in January 2025
 - 1. SPC voted to reaffirm old standard, not ready to replace with new standard.
- c. ASHRAE 129 Estimation of Ventilation Effectiveness for Ventilated Indoor Spaces (Tom Smith?)
 - i. 4 subgroups currently working on:
 - 1. Original Research Method
 - 2. New Field Test Methods
 - a. Intensive Investigation Method
 - b. Simplified Commissioning Test
 - 3. CFD Method
 - 4. Metrics and Definitions
- d. ASTM WK882 78 Lab Vent (Previously ANSI/ASSP Z9.5 American National Standard for Lab Ventilation)
 - i. Recently migrated standard from ASSP to ASTM
 - ii. Jim Coogan leading effort and committee formation
 - 1. No current progress since February 2025
 - iii. Many parts of standard do not match ASTM framework, rewriting will be needed per Jim Coogan and Brad Cochran to address these differences
 - 1. Evaluate keeping portions of Z9.5 that do not fit framework and add to laboratory handbook section or design guide
 - 2. Siemens tech writer turned ANSI/ASSP Z9.5 into ASTM formatted document.
 - a. May need to be broken out into two or more standards... to address ASTM differences.
 - b. Practice? Guide? Test method?
 - 3. Greg Gross expressed interest in assisting with review.
- e. 3D Printing Hazardous Issues (nano particles, chemicals, fumes, etc.)
 - i. TC 9.7 discussing; Roland Charneux to follow up and also Jason Atkisson – Protocol for investigation for contaminant emission could be used for 3D. (Keith Hammelman was mentioned as potential lead) – Kelley Cramm interested; UL 2904 Test Method for assessing particle and VOCs from 3D printers
 - 1. RTAR 1963 could be used to measure this contaminant
 - ii. Need to review documentation and research to determine currently available guidance
 - iii. Possible in-situ measurements and tie-in with RTAR 1963 scope
- f. Bill Stump with DEDC, was heavily involved with TC 9.10 previously, now more focused on TC 7.9 (Building Commissioning) but looking for opportunities to collaborate on research between groups.
 - i. Not present at recent subcommittee meeting...any new coordination opportunities?

7. Open Floor for Research Topic Discussion

- a. No additional topics for update.

8. Adjourn

TC 9.10 Standards Sub-committee Meeting (June 4, 2025 @11 AM CST) - Phoenix 2025:

Attendees (8): Justin Garner (Chair), Jim Coogan, Riley Apen, Rachel Romero, Brian Schanely, Tom Smith, Dave Rausch, Kimberly Thompson

ASHRAE Standards and Guidelines

Guideline 36 (Best in Class HVAC Control Sequences) Jim Coogan, Kelley Cramm, Ryan Soo, Jason Atkisson

- Traci Hanegan will reach out to TC 9.6 to discuss how these sequences affect healthcare applications
- Working Group has been formed, 9.10 members are on the working group. This group has been effective at advancing the guide.
- Lab Room sequence out for public review (closing July 7) – very close to a good sequence
- Lab Exhaust system sequences are in process – public review expected late 2025

Standard 90.1 (Energy Code) – Jim Coogan reported

- Required sash closers, unoccupied setback, room cooling coil, heat recovery
- Tom Smith discussed concerns with maintenance challenges with sash closers
 - Jim asked Tom to bring Fume Hood concerns to the committee
- Jim is working on a better sequence for unoccupied setbacks – involve safety officers
 - Same effort with Title 24
- TC members submitted comments through the public review process
- Kelley Cramm is trying to get a direct dialogue with committee members

Standard 100 – Glenn Friedman (absent) – No report

- To be added as pertinent to TC 9.10 (90.1 of existing buildings)
- Is there a way to classify labs to allow them to be included as an existing building types?

Standard 110 (Laboratory Fume Hoods Performance Testing) Tom Smith

- Targeted for publication in 2026
- Complete Draft posted for committee review
- Voted to re-instate 2016 in Orlando
- Round Robin testing on tracer gas (IPA and Propylene)
 - IPA still needs some work procedurally (ejector) – modified process in 6 months; full ANSI process possibly 12-18 months
 - Propylene is difficult as a field gas (explosive)

Standard 129 (Measuring Air Change Effectiveness) Kishor Khankari / Tom Smith

- Committee's objective is to evaluate ventilation effectiveness
- MOT is currently for lab testing
- Modifying standard to add field testing (98% complete) with hybrid air tracer (IPA)
 - Airflow patterns are driving factor
 - CFD modeling is evaluated against field data
 - Tom presenting the field testing method in Phoenix at STD meeting
 - Tom will post a link on Basecamp
- Formed four task groups – lab, CFD, field testing, metrics

Standard 170 (Ventilation of Health Care Facilities) – Brendon Burley / Traci Hanegan (absent)

Standard 241 (Control of Infectious Aerosols) Kishor Khankari (Absent) -Tom Smith reported

- Update Field Testing and Appendix – Equivalent Outside Air Method
- Updating to ANSI
- Submitted for Public Review

Other Industry Standards

Z9.5 (Laboratory Ventilation) Jim Coogan

- Need to advance the content for failure scenarios
- Moving document into ASTM format – largest current hurdle
- All Z9's moved to ASTM - will get a new number (TBD)
- Asked for new membership to help sustain the committee

NSF 49 (Bio-Safety Cabinets) Justin Garner

- Working group evaluating language in the standard that mandates dedicated exhaust systems for 2B2 cabinets; committee recognizes the reality of current design applications and has asked for input from the lab controls marketplace
- In the recent meeting of the task group, BSC manufacturers agreed to provide additional data to support the 2% exhaust accuracy requirement; Justin Garner is tasked with discussing possible specification language for the 2% performance requirement with LCS manufacturers and the design community (TC 9.10)

NFPA 45 – Ken Crooks (absent) – No report

- 2024 edition is out with section on ductless fume hoods
- Healthcare labs added

Respectfully submitted by Justin Garner, June 4, 2025

TC 9.10 Handbook Sub-committee meeting – June 6, 2025

(Minutes by Mark Malkin on 6/9/25)

Attendance:

Nine people participated in the meeting last week:

- Brad Cochran, Jim Coogan, Kelley Cramm, Greg Gross, Mark Malkin, Raajesh Kumar Murugesan, David Rausch, Rachel Romero, Bob Weidner

Eight other TC 9.10 members previously expressed interest:

- Ken Crooks, Tyler Kee, Chris Kirchner, Ryan Parker, Guy Perreault, Tom Smith, Ryan Soo, Brooks Stout

Timeline:

- Online report on progress to-date at the ASHRAE annual meeting in Phoenix on June 24, 2025
- Target date of August 31, 2025 for an initial review of the track changes to edited sections of the Handbook (2027 HVAC Applications) Chapter 17 – Laboratories
- Review a collated version of the updated chapter prior to the next Handbook sub-committee meeting, before the Las Vegas winter conference in January 2026
- Our final version needs to be uploaded to the ASHRAE Authoring Portal by April 2026
- Voting members of TC 9.10 to approve changes at the annual meeting in Austin on June 30, 2026

New proposed text reviewed at the sub-committee meeting:

- Section 1.2 – Hazard Assessment: Laboratory Ventilation Management Plan – Jim Coogan
 - Review the major topics list, and possibly revise for a less conversational tone
- Section 1.3 – Design Parameters: MAQs and laboratory suites in the 2018 IBC – Mark Malkin
- Section 1.3 – Design Parameters: Sub-ducts for laboratory exhaust ductwork – Mark Malkin
 - Will incorporate general exhaust in the description, besides fume hood specific
- Section 4.9 – Energy: As related to Industrial Hygienists and I²SL reference – Rachel Romero
 - Question for ASHRAE on the difference between a reference and the bibliography

Reminder of additional text, with volunteers or candidates listed:

- Maker space considerations from Journal article – Kelley Cramm
- Guideline 36 sequence of operations in labs – Jim Coogan
- Containment and monitoring of lab exhaust – Greg Gross and Ryan Parker
- Cross-contamination in energy recovery wheels – Bob Weidner
- Summary of Section 3 overview from the Design Guide – Chris Kirchner
- Air change rates during design influenced by CFD modeling – Jason Atkisson
- How to specify minimum flow for VAV fume hoods – Tom Smith
- Revisions to section 4.0 on Commissioning – Bill Stump

Additional work needed – to be mentioned at meeting in Phoenix:

- Any suggestions for additional subjects that readers of the Handbook might benefit from?
- Someone new (besides Kelley and Mark) to read the whole chapter before it is uploaded?

Summer 2025 I2SL Update for TC9.10



International Institute for
Sustainable Laboratories

Gordon Sharp
I2SL President

2025 Annual Conference – Dallas Oct 19-22, 2025



- **Registration is open – Early bird rates apply!**
 - **Packed agenda with over 100 presentations**
 - **Optional tours & pre-conference workshops.**
 - **Some booths & sponsorships still available.**
-
- **Get ready for 2026—we're going to Boston!**



The Labs2Zero AIM Report Software:

**Release is
this Summer!**



AIM: Actionable Insights & Measures Report

AIM is an automated energy and emissions audit for lab buildings

- Calculates rough savings, costs, and ROIs for many measures

Standardized, immediate, objective audits

- High level, screening audit
- Helps develop business case for further action

Software Release: Late July/Early August

- Beta & Pilot testing completed
- Paywall, help center & final updates in process

The AIM Report
“aims” the user in the
right direction on their
decarbonization journey

Super Test Facility

Building Dashboard

Building Parameters

Packages

2025 Improvements v1

2025 Improvements v2

2025 Improvements v1

Impacts & Measures

Savings Details

Case Studies

Reports

Financial Impacts

Annual Energy Savings

-

Implementation Cost

-

Simple Payback

-

Energy Impacts

Energy Score

-

Existing building: 58

Site EUI

-

Existing building: 267.1kBTU/ft²

Measures Included in Package

No measures in package

Add Measure



In AIM, you assemble energy savings measures into a package

A package is a set of measures that you implement together

Activity

Building Updated

2025-02-17 11:01

Building Updated

2025-02-17 10:57

Building Updated

2025-02-17 10:55

Building Updated

2025-02-17 10:45

Building Updated

2025-02-17 10:45

Our Sponsors

Diamond Sponsors



Platinum Sponsors



Gold Sponsors



Silver Sponsors



265.5kBtu/ft² ↓ 1.6



Add Measure to Package

Already in Building

6.5 years

267.1kBTU/ft²

When hood sashes are lowered and the hood exhaust flow is reduced, the lab occupants may experience less noise from the HVAC system. Reduced airflow rates may also allow the building air handling and exhaust systems to operate more efficiently.

**Choose one
you like and
add it to your
package**

Super Test Facility

[Building Dashboard](#)[Building Parameters](#)

Packages

2025 Improvements v1

2025 Improvements v2

2025 Improvements v1

[Generate Report](#)

Impacts & Measures

Savings Details

Case Studies

Reports

Financial Impacts

Annual Energy Savings

\$165,611

Implementation Cost

\$729,664

Simple Payback

4.4 years

Energy Impacts

Energy Score

71 ↑ 13

Existing building: 58

Site EUI

220.6 kBtu/ft² ↓ 46.4

Existing building: 267.1kBtu/ft²

Measures Included in Package (4 Measures) [Clear All](#)

Only the measure at the top of the package can be removed.

[Add Measure](#)

ECM181 Setting Ultra-Low Temperature Freezers to -70C

\$6,614

Annual Energy Savings

\$1,258

Incremental Cost

0.2 years

Simple Payback

71

Energy Score

220.6kBtu/ft² ↓ 0.3

Site EUI



ECM085 Unoccupied Room Airflow Setback

\$44,282

Annual Energy Savings

\$31,567

Incremental Cost

0.7 years

Simple Payback

71 ↑ 4

Energy Score

221.0kBtu/ft² ↓

Site EUI



ECM184 Shut-the-Sash Program for Fume Hoods

\$8,312

Annual Energy Savings

\$3,840

Incremental Cost

0.5 years

Simple Payback

67 ↑ 1

Energy Score

236.7kBtu/ft² ↓ 2.7

Site EUI



ECM095 Variable Air Volume Controls for Fume Hoods

\$106,403

Annual Energy Savings

\$693,000

Incremental Cost

6.5 years

Simple Payback

66 ↑ 8

Energy Score

239.4kBtu/ft² ↓ 27.7

Site EUI

Activity

Building Updated

2025-02-24 15:09

Building Updated

2025-02-24 14:57

Building Updated

2025-02-24 14:56

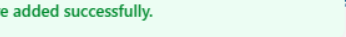
Building Updated

2025-02-24 14:56

Building Updated

2025-02-24 14:56

Our Sponsors



This package
now contains
4 measures

Measure added successfully.

Super Test Facility

Building Dashboard

Building Parameters

Packages +

2025 Improvements v1

2025 Improvements v2

**Detailed
savings charts
provide more
savings info**

2025 Improvements v1

Generate Report

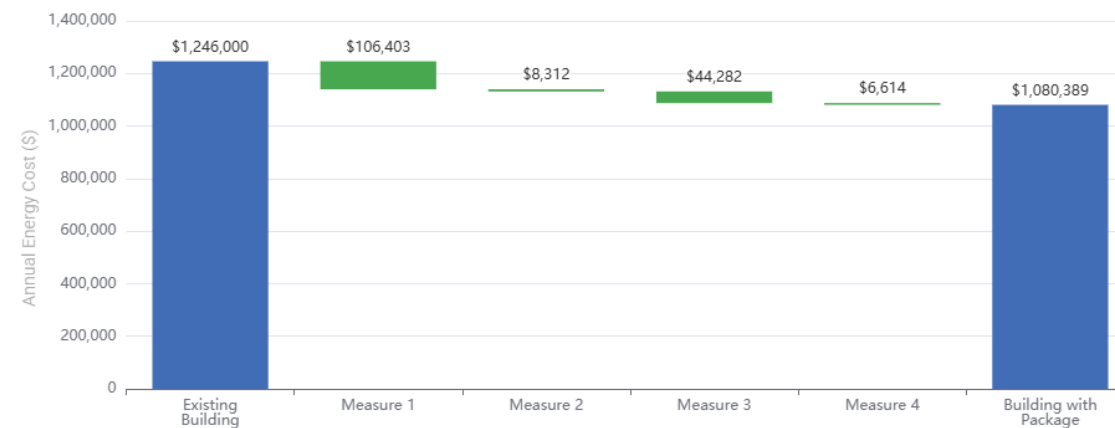
Impacts & Measures

Savings Details

Case Studies

Reports

Energy Cost Savings by Measure



Measures In Package:

Measure 1:

Variable Air Volume Controls for Fume Hoods

Measure 2:

Shut-the-Sash Program for Fume Hoods

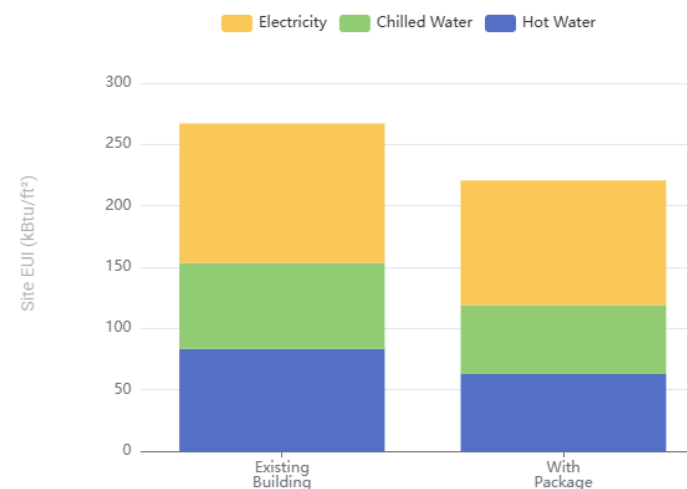
Measure 3:

Unoccupied Room Airflow Setback

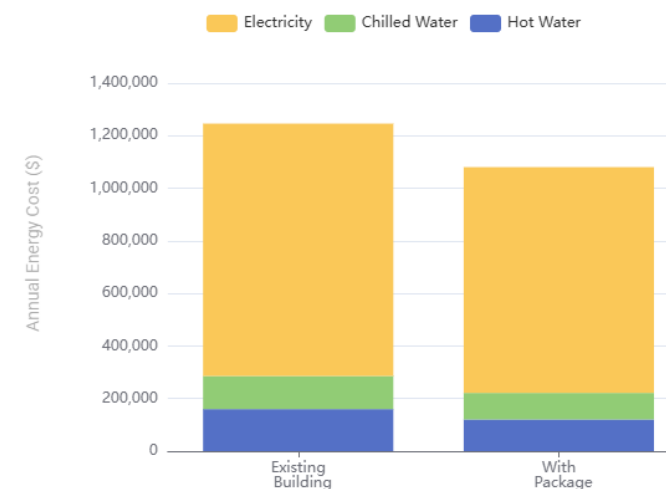
Measure 4:

Setting Ultra-Low Temperature Freezers to -70C

Site EUI Reductions by Utility



Energy Cost Savings by Utility



Activity

Building Updated

2025-02-24 15:09

Building Updated

2025-02-24 14:57

Building Updated

2025-02-24 14:56

Building Updated

2025-02-24 14:56

Building Updated

2025-02-24 14:56

Our Sponsors

Diamond Sponsors



Platinum Sponsors



Gold Sponsors



Silver Sponsors



Super Test Facility

Dashboard

meters

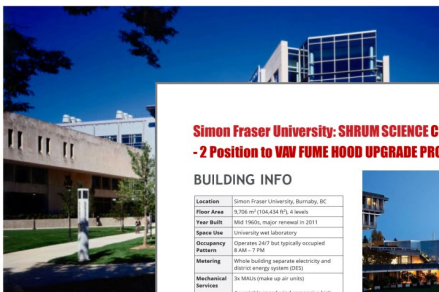
+

-

-

Case studies
are scored by
relevance and
quality

University of Chicago's Smart Labs Building Performance at the Ellen and Melvin Gordon Center for Integrative Science



The University of Chicago's Ellen and Melvin Gordon Center for Integrative Science (GCIS) is among the University's largest buildings. The majority of the 472,000 square foot building is also the largest energy consumer on campus. As such, the building was identified as a key target for the University's ongoing safety and energy efficiency program. This ongoing safety and energy efficiency program across several UChicago departments includes the Engineering, Building Automation, and Biological Sciences Division, Smart Labs program at GCIS. The program focuses on energy efficiency, comfort, improved lab safety, and

The effort started with a detailed energy audit and testing of key mechanical components as part of the UChicago Preventive

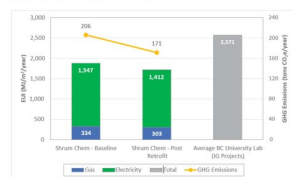
Simon Fraser University: SHRUM SCIENCE CHEMISTRY BUILDING - 2 Position to VAV FUME HOOD UPGRADE PROJECT

BUILDING INFO

Location	Simon Fraser University, Burnaby, BC
Floor Area	9,706 m ² (104,434 ft ²), 4 levels
Year Built	Mid 1960s, major renovation in 2011
Space Use	University east laboratory
Occupancy Pattern	Operates 24/7 but typically occupied 8 a.m. - 7 p.m.
Features	Whole building separate electricity and district energy system (DES)
Measuring	As variable speed serial responsive high pressure (DS) exhaust fans
Mechanical Services	DS water to water heat pumps (DS fans, etc.) provide heating and cooling Source: Heat recovery, DES Regulation: Field control



ENERGY & GHG BENCHMARKING



BUSINESS CASE & LIFECYCLE ANALYSIS FOR RETROFITTING 53 FUME HOODS

ECM Description	Energy Savings Electricity (kWh/yr)	District Heating (GJ/yr)	Annual GHG Savings (tCO ₂ e/yr)	Cost Savings (\$/yr)	Option of Probable Cost (\$)	Simple Payback (yr)	NPV (\$)	IRR (%)	GHG Savings (tCO ₂ e/yr)	Abatement Cost (\$/tCO ₂ e)
VAV Fume Hood Retrofit	365,000	300	34.6	\$ 32,870	\$293,400	8.9	\$160,000	12.5%	692	\$ 312

*Discount Rate = 7.5%, Energy Cost Escalation = 3% p.a.

2025 Improvements v1

Generate Report

Impacts & Measures

Savings Details

Case Studies

Reports

McGill - Efficient Labs For University

Match Score

66.1

The Otto Maass Laboratory Building, owned by McGill University, is located at 801 rue Sherbrooke Ouest, Montreal, Quebec, Canada, and was originally built in 1966. Primarily used for education and research in chemistry, the building includes teaching and research laboratories, classrooms, a lounge, and a large lecture hall. The renovation project was led by NFOE Architects with engineering by Pageau Morel. The building has a gross area of 140,000 SF, with 125,000 SF of conditioned space. The case study highlights the significant reduction in energy consumption achieved through the renovation completed in 2011, which focused on heat recovery and airflow control based on user needs.

See More

Fume Hood Retrofit

Match Score

63

The study focuses on the Stauffer I Laboratory Building at Stanford University in Stanford, California. The building, primarily used for chemical research, was built in 1959-60 and has a gross area of 28,000 square feet with 22,000 square feet of conditioned space. The retrofit project, completed in 2007, was led by Taylor Engineers. The building features three stories and includes both wet and dry laboratories, as well as support spaces for researchers and administrators. The HVAC system consists of three central 100% outdoor air constant volume air-handling units and three exhaust fans. The project maintains multiple fume hoods.

Good VAV Upgrade

Match Score

62

The Building at Simon Fraser University in Burnaby, BC, underwent a fume hood upgrade project to improve energy efficiency and reduce energy consumption. The 9,706 m² (104,434 ft²) building, originally built in the mid-1960s with a major renovation in 2011, houses wet laboratory spaces and outlines the retrofitting of 53 fume hoods and the subsequent energy and cost savings.

The project involved upgrading the existing 2 position fume hoods to a variable air volume (VAV) system, allowing for better control of exhaust airflow based on

Commissioning

Match Score

58.3

The building, owned by the University of California, is located in San Francisco. It serves as a specialized vivarium for basic research and includes support rooms, staff rooms, and cage wash and processing areas. The building, completed in 2005, has a gross area of 191,000 square feet. The facility operates with a continuous 100% outdoor air ventilation requirement, supported by four exhaust fans. This case study focuses on the energy and operational improvements achieved through monitoring-based commissioning in 2013 by Sherrill Engineering, resulting in significant annual savings for the university.

Activity

Building Updated

2025-02-17 11:01

Building Updated

2025-02-17 10:57

Building Updated

2025-02-17 10:55

Building Updated

2025-02-17 10:45

Building Updated

2025-02-17 10:45

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Super Test Facility

Building Dashboard

Building Parameters

Packages

2025 Improvements v1

2025 Improvements v2

Introduction

What Is The AIM Report?

How Does The AIM Report Work?

Financial Impacts

Energy Impacts

Help

v1.0.7.9

2025 Improvements v1

Generate Report

Impacts & MeasuresSavings DetailsCase StudiesReports

For best results, please export using the 'Save as PDF' option. Using other methods may cause formatting issues.

2025 Improvements v1 - revised

ajfarm+i2sl@gmail.com Mon, February 17, 2025, 11:08 AM

Export PDF

2025 Improvements v1

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Introduction

What Is The AIM Report?

How Does The AIM Report Work?

The Package Of Measures: 2025 Improvements V1

Executive Summary

Building Performance (2024 Data)

Measures Included In The Package

How To Use These Results

About Us

Our Sponsors

Acknowledgements

AIM Report

2025 Improvements V1

Super Test Facility

120 Kingston St, Boston, MA, USA

AIMReport

Actionable Insights And Measures

Activity

Report "2025 Improvements v1 - revised" Created

2025-02-17 11:08

Report "2025 Improvements v1" Created

2025-02-17 11:07

Building Updated

2025-02-17 11:01

Building Updated

2025-02-17 10:57

Building Updated

2025-02-17 10:45

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AKF

ANTEC

BICASA

BURO HAPFOLD

FLAD

Fundermax

Report generated successfully

JACOBS

mygreen lab

Phenoxia Controls

SciShield

Export a 30 to 40 page PDF report to share with others

AIM Software Subscription Pricing



- **Subscription plans:**
 - Monthly and annual plans
 - Free **demo** version w/ limited measures
- First version will be US-only
- Late 2025: **Int'l Version & Added Features**
 - Metric units, Int'l currencies & ~15K locations
 - Enhanced accuracy & more detailed modeling
 - More energy savings measures!



	Proposed cost per month
Monthly plan	\$775
Annual plan	\$259

Prices for 1 user, before discounts

Discounts:

10% I2SL member
25% org. member
20-33% multi-user
+ sponsors

Also a special introductory discount offer this summer!

Coming in 2026: The International Fume Hood Challenge



Fume Hood
Challenge

Coming in 2026: Int'l Fume Hood Challenge

New I2SL Fume Hood initiative similar to the Freezer Challenge

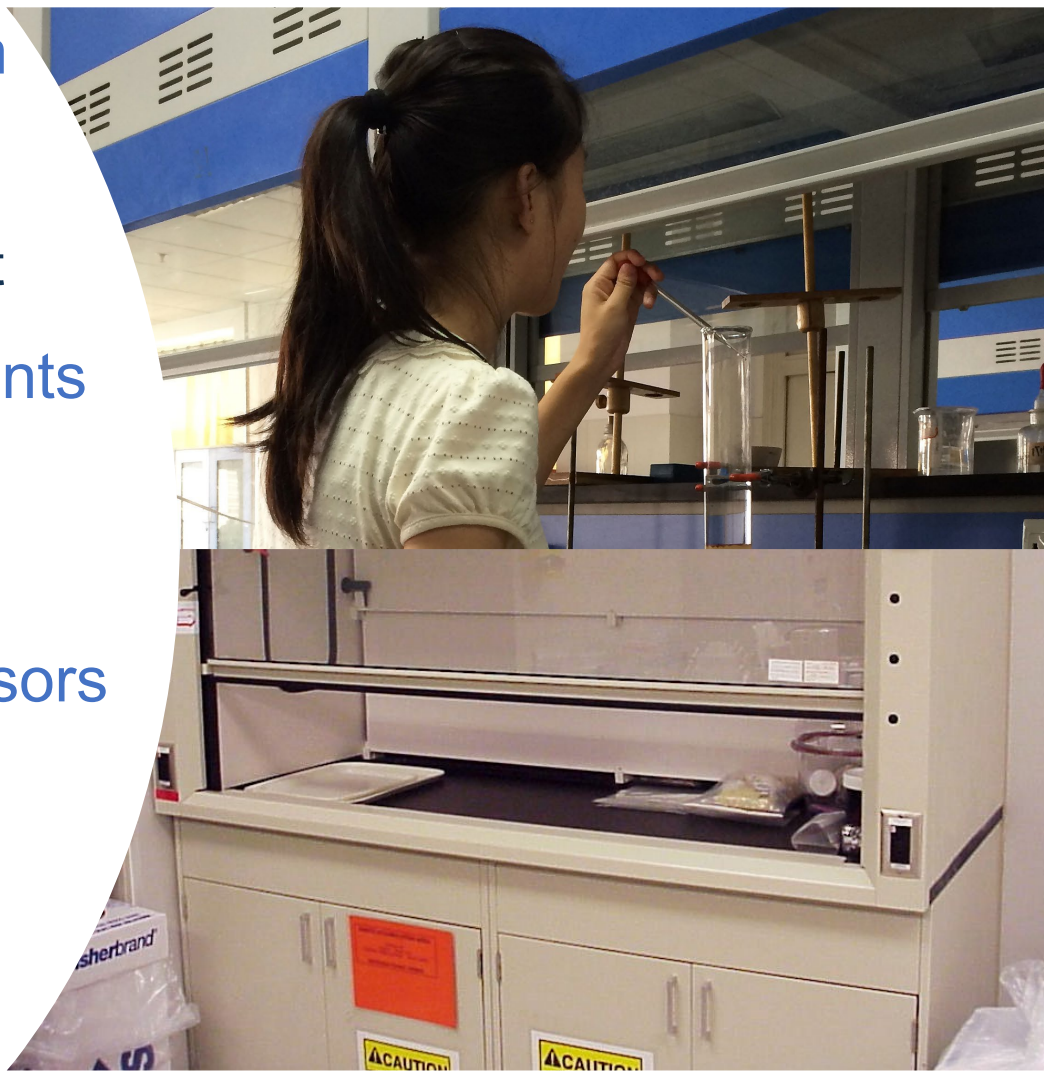
- Currently in development for 2026 competition
- Builds upon 2024 Shut the Sash Challenge
 - ✓ Pilot led by Kevin Tu & University Alliance Group
- The Fume Hood Challenge has a broader scope:
 - ✓ Evaluate opportunities for best hood energy savings
 - ✓ Encourage system testing to ensure safety & savings
 - ✓ Education & behavior change on fume hood use
 - ✓ Promote energy efficiency and safety upgrades
 - ✓ Optimize fume hood utilization and hibernation
- Will engage many stakeholders



Coming in 2026: Int'l Fume Hood Challenge

The Fume Hood Challenge will integrate with the LBT & Labs2Zero

- LBT will be the data entry & dashboard platform
- A “free” AIM report version will point to savings
 - ✓ AIM to identify lab buildings with greatest impact
- Competition will engage different levels of entrants
 - ✓ Goal of involving a wide scope of participants
 - ✓ Recognition for varying levels of engagement
- Program will be looking soon for founding sponsors
 - ✓ Funds for software development & operations



Please contact us if you are interested in sponsoring or assisting with the program

Thank you!

Get involved

- Serve on our TACs
- Pilot our scores
- Contribute data
- Sponsor the program

Contact Info

Gordon: president@i2sl.org

