

**ASHRAE TC 9.10 Laboratory Systems
Atlanta
Tuesday June 30, 2015
Meeting Minutes**

**AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING
ENGINEERS, INC.
1791 TULLIE CIRCLE, N.E./ATLANTA, GA 30329
404-636-8400**

TC/TG/TRG MINUTES COVER SHEET

TC/TG/TRG NO	9.10	DATE	January 7, 2016
TC/TG/TRG TITLE	Laboratory Systems		
DATE OF MEETING	June 30, 2015	LOCATION	Atlanta

Members Present	Term Expires	Members Absent	Term Expires	Ex-officio members and additional attendance
Kelley Cramm	2017	Gerhard Knutson	2017	
Roland Charneux	2016	So-Yeng Chen		Mary Foutz
Mark Hydeman	2018	Henry Hays	2018	Fred Lorch
Carl Crow	2017	Ginger Scoggins	2015	K. Khankari
Jim Coogan	2018			B. Fullerton
John O Varley	2016			D. Novosel
Adam Bare	2015			J. MacMurray
Charles Coward	2018			A. Wengerd
Brad C Cochran	2015			Guy Perreault
Carol Ann Donovan	2018			Frank Spevak
Robert Weidner	2018			K. Inge
Traci Hanegan	2015			E. Phelps
Charles Henck	2017			Guy Perreault
Gordon Sharp	2016			Coker
John Castelvechi	2017			Peter Gardner
				Kenneth W Kuntz
				J. Hardin
				Jason A Atkinson
				W. Conlan

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3. Membership Update (Guy Perreault)

All interested in becoming a corresponding member should give their card to Roland, Traci, or Guy with their ASHRAE number.

Discussion about Fred Lorch retiring and the transition plan for his vice chair position. Fred has graciously agreed to be present at the next meeting to assist with the transition. Starting at the January 2016 meeting in Orlando, Traci will be Vice Chair and Brad Cochran will be secretary. This will continue for the June 2016 meeting. After 01 July 2016, Traci will be Chair and Brad will be Vice-Chair.

After 01 July 2016, the following voting members become corresponding: Roland Charneux, Gordon Sharp, and John Varley

Kishor mentioned that a multi-task group is being explored to provide a scientific point of view on air change rates. Please see him if you are interested.

4. Approval of previous minutes

Minutes from the Chicago meeting were emailed previously.

Minutes from the Chicago meeting were reviewed. Traci accepted an update to the Research Report. John C. noted that he was in attendance, but noted as absent. This was corrected.

Moved and seconded to accept the minutes.

Motion passed. (14-0-1 CNV)

5. Section Head Report (Fred Lorch)

There is a new provisional corresponding member category.

Developing easier standard website template.

New email position alias for many TC positions.

RAC is prioritizing research projects based on goal 3, Reduce energy consumption in existing homes.

New MTG operation and maintenance activities that impact energy efficiency

6. Program Subcommittee (Carol Donovan)

See attached subcommittee minutes.

The committee thanked Carol for all of her effort on the lab sessions in the meeting.

7. Research (Bob Weidner)

See attached subcommittee minutes.

Kishor provided some tips for RTARs as there is a new RTAR form.

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- 1) Include background which includes that you did your homework and some literature reading.
- 2) Include relevance to ASHRAE.
- 3) Don't say too much on the budget. If RTAR gets approved you have a chance to revise the approach and the budget.

8. Handbook

The subcommittee did not meet this time. The last revision just went out. The next meeting will be in Orlando in January 2016.

9. Standards (Gaylon Richardson)

See attached subcommittee minutes.

10. Design Guide (Henry Hays)

The design guide is completed and is on pre-sale at this meeting. It will be released this summer.

11. Lab Classification Subcommittee (Adam Bare)

See attached subcommittee minutes.

12. Laboratory Energy Efficiency (Guy Perreault)

See attached subcommittee minutes

The energy efficiency committee met twice, making use of the time slot that had been reserved for the Design Guide. Discussion about when they should meet next time.

13. Journal (Roland Charneux)

Roland Charneux reported that we had one article in January. Jason Atkinson from AEI will try to do a journal article on the plug loads/water seminar they did at this conference. It was good, but there were not a lot of people in attendance.

John Varley did another Laboratory Design Course. There were 30 people in attendance, which is smaller than usual, but this was the first time at a summer meeting. John also did a class this year in Bankor and is planning an online webinar sometime this fall and another class in Orlando. John needs to re-work some things based on the design guide.

14. Liaison Reports

TC 1.4 Control Theory and Applications – (Jim Coogan reported)

Working on control sequences. Advisory public review recently. Some growing interest in working with other committees and organizations for network security.

TC 2.2 Plant and Animal Environment (Jim Coogan reported for Henry Hays)

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Henry Hays attended by phone. Working on an RTAR about vivarium DCV. Intriguing stuff on agriculture, but not of interest to this committee.

TC 4.3 Ventilation Requirements and Infiltration (Brad Cochran reported)

RTAR – evaluation of dilution equations and another one maybe being considered. CFD modeling/testing of some systems. Didn't hear what type of systems. New website – mentioned we might could add seminars to them.

TC 4.10 Indoor Environmental Modeling (no Report)

TC 5.1 Fan Design and Application (Chuck Coward reported)

DOE and AMCA/ASHRAE 5.1 are trying to get rid of all of the low efficiency fans, either redesign or get rid of them. There is a lot of arm wrestling going on that could last for 5-7 months. Not sure how it will impact labs.

TC 5.3 Room Air Distribution (Fred Lorch reported)

Seminar on use of chilled beams and fan coil units in labs. They want 9.10 to co-sponsor that program. It's on Carol Donovan's list. Looking for presenters. AEI volunteered.

TC 5.8 Industrial Ventilation (no report)

TC 7.6 Building Energy Performance

Nothing direct. Observation – they are ready to authorize a research project and we can check on the application of something on lab buildings. If interested, let him know. They want to evaluate methodologies of what people have done in the past.

TC 7.7 Test and Balance

Seminar proposed for Orlando on lab airflow control devices: Dampers vs Flow valves. They would like us to co-sponsor. RTAR proposed an investigation of field velocity measuring instruments for canopy hoods, BSCs and fume hoods. They want co-sponsoring for that.

TC 7.9 Building Commissioning (no report)

TC 9.2 Industrial Air Conditioning (no report)

TC 9.6 Healthcare Facilities (Traci Hanegan reported)

Nothing at this time relevant to TC 9.10.

TC 9.11 Clean Spaces (Roland Charneux reported)

1604 RP on DCV on clean rooms. Energy efficiency sub-committee formed. They will have a design guide released next year.

SSPC 62.1 Ventilation for Acceptable Indoor Air Quality (Nathan Ho reported)

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Updated lab exhaust requirements. Distances – ANZI 9.5 no longer references NFPA 45. There is a new chair so they are reevaluating goals. Tell Nathan if you have any ideas.

SSPC 90.1 (Mark Hydeman reporting)

There is a new procedure to liaisons. Chair of 9.10 needed to send the 90.1 chair notice of his appointment. Roland did that by email. Mark can now be part of their conference calls.

SMACNA (no report)

NFPA 45 (no report)

NSF (no report)

ISPE (no report)

ASSE Z9.5 (Jim Coogan reported)

They are just getting started. Had first meeting. Will start going through chapter by chapter. Lack of people willing to work on Cx chapter.

I2SL (Gordon Sharp reported)

Conference coming up in San Diego. Lots of chapter stuff going on. Picking up more labs 21 material, including a benchmarking tool that Lawrence Berkley did. They also picked up the Wiki plug load tool that was out there. DOE will let them use it.

15. Old business (Roland Charneux)

Discussed potential Part 2 course on lab design with focus on lab controls. Jim started listing topics, but no outline yet. Lots of crossover. John C. attended the lab classes and asked what else they would want from controls. Some details of troubleshooting, but not much else specific. Just a general interest. Jim will post list, we can add to it, then establish learning objectives. That's next.

Part 3 on lab exhaust is under direction of Brad C, but that has not progressed further at this time.

16. New business

The MTGs were discussed.

USA today – article on Monday about CDC labs – news about misplacing samples from BSL-3 labs.

Recognized Carol Donovan and all the speakers – by Wade Conlan. Highly attended events were great. This really helped CEC out – almost created another track. In winter 2019 it will be back here in Atlanta.

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Jeff Hardin clarified that the Army has its own certification safety office.

Roland noted that this Committee is in good shape. We are encouraging people to attend subcommittees to share the load of tasks we would all like to accomplish and learn from each other. The majority of the work and information exchange takes place in the subcommittee meetings.

At the next meeting the lab energy subcommittee will meet Tuesdays at 1pm instead of on Sunday.

17. Adjourn at 4:43.

DRAFT

ASHRAE TC 9.10
Programs Subcommittee – Mini Conference in Atlanta
Atlanta Summer Conference
June 27th - July 1st, 2015

Atlanta Summer Conference – June 27-July 1, 2015

Website: www.ashrae.org/atlanta

Met our Goal for sponsoring a Mini-conference on Labs including seminars and forum.

Orlando Winter Conference – January 23 - 27, 2016

Website: www.ashrae.org/Orlando

The 2016 ASHRAE Winter Conference will have a fresh feel with new tracks focused on design-build practices and residential systems. Continue emphasis on energy efficiency and sustainability while addressing current engineering and construction practices outside of the U.S. and Canada. The conference is making an entire track out of debates.

ASHRAE announces Call for Seminar, Forum and Workshop Proposals

- Call for Seminar, Forum and Workshop Proposals opens June 4, 2015.
- Conference Papers due July 6, 2015.
- Conference Paper Notifications due August 3, 2015.
- Seminar, Forum and Workshop Proposals due August 10, 2015

ASHRAE offers two types of paper submissions:

- Conference Paper Abstracts due March 23, 2015. Upon acceptance, papers will be due July 6, 2015. These “final” papers undergo a single-blind review, are submitted as a PDF and have an eight single-spaced page maximum length.
- Full Technical Papers due April 20, 2015. Papers submitted for review must be both technically accurate and clearly written. These papers undergo a rigorous double-blind review and can be a maximum of 30 double-spaced pages.

Track 1: Systems and Equipment

Track Chair: Gary C. Debes

Email: gcdebes@verizon.net

Selection of equipment and systems is paramount to HVAC&R design. Papers and programs in this track will assist designers, engineers, and operators in the design, selection, and operation of HVAC&R systems and equipment.

Track 2: Fundamentals and Applications

Track Chair: Cynthia Moreno

Email: cindym@tmmechanical.com

Fundamentals are the foundation for understanding applications in engineering. Key components of ASHRAE fundamentals include thermodynamics, psychrometrics, fluid and mass flow, IAQ, and building envelope. This track provides opportunities for papers and presentations of varying levels across a large topic base. Concepts, design elements and shared experiences for theoretical and applied concepts of HVAC&R design are included.

Track 3: Design Build

Track Chair: James Liston

Email: jfliston@verizon.net

Joining the contractor and the designer into the same team, the design-build method of project delivery is increasing in percentage of projects awarded in the US. This track explores the challenges and benefits of D-B project delivery. Highlight successful projects; discuss contracts; review management responsibilities; offer alternative design and construction processes. These topics and more will be included.

Track 4: International Design

Track Chair: Leon Shapiro

Email: leoneshapiro@gmail.com

Design for various environmental elements, geography and culture demand that new and innovative strategies be developed. As an international organization, ASHRAE strives to meet the needs of a global membership. HVAC&R systems vary globally and this track provides an opportunity to share innovative and necessary design elements that can be shared internationally.

Track 5: Standards, Guidelines and Codes

Track Chair: Michael Collarin

Email: Michael.Collarin@parsons.com

ASHRAE is known for its standards and design guidelines – and they are constantly evolving with the intent on improving the built environment and its systems. Designers, Contractors, Architects and Owners must be able to keep up with the continuing changes in the current cycle but to also be prepared for the future changes. In addition, there is a large interaction of ASHRAE with the code authorities and government to incorporate these standards and guidelines. The series of sessions in this track highlight the changes to the standards and guidelines, their projected path and optimum design techniques to meet or exceed the standards.

Track 6: Cutting-Edge Technologies

Track Chair: Ann Peratt

Email: agregg.ksu@gmail.com

As energy codes become increasing more stringent, we are challenged to find creative ways to improve efficiencies in the effort to achieve net zero buildings. This track will include the most recent advances in HVAC&R system design, equipment, and construction techniques. Programs included will focus on efficiency, responsible use of resources and energy recovery.

Track 7: The Great Debate

Track Chair: Chuck Curlin

Email: ccurlin@shultzeg.com

Engineers commonly weigh multiple solutions to find the best match for a certain project. Centralized or Decentralized heating and cooling? Chemical or non-chemical water treatment? These sessions and papers will present divergent methods for accomplishing the same task. Hear all sides of the debate and decide for yourself.

Track 8: Modern Residential Systems

Track Chair: Jennifer E. Leach

Email: pennst8jen@yahoo.com

Engineering for residential HVAC and plumbing systems and equipment used to be referred to as catalog engineering: for a two bedroom house choose one from Column A; for a three bedroom house choose one from Column B. Recent years have seen a boom in energy efficient solutions for the savvy, fiscally-conscience home owner. From glazing to water heating to lighting, this track will provide you with the latest advances for the residential market.

Conference Program Chair: Jennifer Leach

Email: pennst8jen@yahoo.com

No.	Type	Title	Chair/Back-up	Abstract Submitted
1	Workshop	Lab Classification -	Adam Bare, Kelly/Roland	
2	Workshop	Lab Design Guide – What’s Changed		
3	Seminar, 2-3 speakers	Lab Renovations- Case Study	Dave Rausch Gary Cooper -	
4	Seminar,	Vivarium – ACH/environmental parameters, Renovation		
	1.	Demand Control Ventilation – Slashing energy use in vivarium	Gordon Sharp	Yes
	2.	Case Study of DCV in Japan	Masaya Ishihara	Yes
5	Seminar, 2-3 speakers	Labs – Air Change Effectiveness (TC 5.3 – Std 129)	Carol Donovan/Tom Smith	
6	Seminar, 2-3 speakers	Comparison of Fancoil Units and Chilled Beams (TC 5.3) – Gus fems and Jerry sipes, One more for design	Gaylon Richardson/ Jason Atkinson -	
7	Paper Session, 2-3 speakers	Test Procedures for Lab Controls Results from Manufacturers	Mark Hydeman, Gaylon Richardson	
8	Seminar, 2-3 Speakers	Clean Space – TC 9.11	Phil Naught	

Future ASHRAE CONFERENCES

Year	Winter	Annual
2015		Jun 27-July 1 – Atlanta, GA
2016	Jan 23-27 – Orlando, FL	Jun 25-29 – St. Louis, MO
2017	2017 Jan 28-Feb 1 – Las Vegas	Jun 24-28 – Long Beach, CA
2018	2018 Jan 20-Jan 24 – Chicago, IL	

ASHRAE RESEARCH - Atlanta 2015

TC9.10 LABORATORIES - RESEARCH ACTIVITY LIST

6/30/2015

DOCUMENT TYPE	MORTS NUMBER	DOCUMENT TITLE	CO-SPONSOR	PROJECT COST	AUTHOR	AUTHOR E-MAIL & TELEPHONE	STATUS	ACTION ITEMS	DUE DATES	6/30/15 Research & TC Meeting Comments
RTAR	1573	Determination of Suitable Replacement for SF ₆ When Used As a Tracer Gas In Accordance With ANSI/ASHRAE Standard 110	TC 5.8	\$125,000	M. HYDEMAN	mhydeman@taylor-engineering.com	Work Statement conditionally accepted. Work Statement is close to being completed from comments provided. RTAR update was also requested by RAC .Trying to be consistent with direction of work.	RTAR to be updated. Email Vote before August 15th for Work Statement to move project forward. Mark to pick up all the latest comments and prepare for email vote.	August 15th	See comments below
RTAR	1201	Cross Contamination of Energy Recovery Devices in Laboratory Exhaust Systems	62.1 90.1	TBD	Roland C.	rcharneux@pageaumorel.com	Roland updated RTAR for review in Atlanta. Potential Title Change.	Roland C. to update RTAR in preparation for Orlando based on recent feedback.	August 15th	See comments below
RTAR	TBD	Validation of Plume Dispersion Models	TC 9.10		Brad Cochran	bcochran@cppwind.com	TC 9.10 email voted to approve this RTAR; TC 4.3 is Sponsoring the RTAR. TC9.10 to Co-Sponsor. Awaiting Feedback from TC 4.3.	TC 4.3 to follow through and submit.	Orlando	See comments below
RTAR	TBD	Defining and characterization of air-change effectiveness in labs.	TC 9.6, TC 9.10	TBD	Tom Smith	tcsmith@labhoodpro.com		Tom to prepare RTAR in preparation for vote in Orlando	Atlanta	See comments below

Research Subcommittee Meeting Discussion - 6-28-15 with updates from TC9.10 Meeting

1573: Mark has requested final comments and is going to complete final edits on Work Statement in preparation for electronic vote by August 15th. Mark also has a list of potential bidders for the work statement. The Proposal Evaluation Subcommittee (PES) currently includes Fred Lorch, Carol Donovan, Ken Mead, Mark Hydeman and Bob Weidner. We are going to confirm if TC 5.8 will co-sponsor.

1201: Roland updated RTAR for Atlanta Meeting; He has received additional input and is planning to have RTAR completed for electronic vote by August 15th. TC 2.3 has expressed interest in co-sponsorship. Will confirm if 62.1 has an interest. A title change is under consideration based on review comments.

Validation of Fume Hood Dispersion Models: RTAR was submitted by Brad for approval. RTAR is being co-sponsored by TC 9.10 and sponsored by TC 4.3. Awaiting feedback on review.

Defining and Characterizing Air Change Effectiveness in Labs: Tom Smith will be writing RTAR. Anticipated for Jan 2016 - Orlando. Biggest issue was confirming title: Air Change Effectiveness vs. Ventilation Effectiveness vs. Purge Effectiveness.

The next three RTAR & WS submission deadlines are as follows:

8/15/15 – RAC Fall Meeting Review (Sep. - Oct. Timeframe)

12/15/15 – RAC Winter Meeting Review (Jan. - Feb. Timeframe)

5/15/16 - RAC Winter Meeting Review (Jun. - Jul. Timeframe)

RAC may or may not decide to also review RTAR and WSs at their spring 2016 meeting,

TC-9.10 Standards Sub-committee meeting

In the absence of Gaylon Richardson, Roland Charneux was chairing.

13 persons were present

Roland Charneux, Ken Kuntz, Brad Cochran, Martin Stangl, Eric Ballachey, Rob Chopowick, Jake Edmondson, Jim Coogan, Jason Atkinson, Paul Fuson, Kelley Cramm, Mark Hydeman, Tom Smith.

Standard 90.1

Addendum « u » on air transfer was released for comments. Jim Coogan made comments that were not accepted.

ASHRAE 110

Committee meeting will be held on Tuesday.

Standard 62.1

Nothing new to report. Addendum « k » on fume hood air classified as 4 unless E H&S officer is actually specify an other class.

ASSE Z-9.5

Actually under revision. Next publication will be in 2017. It is the right time to comment. Tom Smith, Brad Cochran, Jim Coogan, Gordon Sharp and Victor Newman are part of the committee.

I2SL

Tom and Gordon are on the board of I2SL. I2SL has made a survey of the knowledge of HVAC maintenance people that operates lab building. It seems that the systems complexity outpaced the competence of the maintenance people. I2SL is preparing training for these people. There could be collaboration between I2SL and ASHRAE ALI. Tom will discuss this with Kelley Cramm. I2SL also made a survey to see what should be added to the lab benchmarking tool.

Standard 170 2013

Addendum « c » was release in August 2014 which discuss demand control ventilation for labs in Healthcare and also air change rates.

ASHRAE TC 9.10
Lab Classification Subcommittee Meeting
Atlanta Summer Conference
Sunday, June 28th, 2015
5:15 – 6:00 p.m.

Meeting Minutes:

Attendees:

Adam Bare	Nathan Ho	Bob Weidner
Brad Cochran	Ken Kuntz	Mark Hydeman
Tom Smith	Eric Ballachey	Patrick Carpenter
Carol Donovan	Rob Chopowick	Jake Edmondson
Guy Perreault	David Norvell	Roland Charneux
Jim Coogan	Andrew Wengerd	Chuck Coward
Martin Stangl	Paul Fuson	Kelley Cramm

1. Discussed Forum 1, “Lab Safety and Energy Management: Understanding the Risk”, which occurred the morning of June 28th. In general, the feedback was positive. There was discussion about air change rates and room ventilation effectiveness, and the application of those requirements. Some specific feedback concerned whether the proposed guideline should also include the following criteria:
 - Failure mode analysis
 - Signage requirements
 - Testing requirements
 - The use of occupancy sensors to trigger an unoccupied mode (note: this is already covered)
 - A cost scale
2. The current CSDL table was distributed for open discussion (see attached table):
 - There was discussion about how the guideline should be applied in general, and by whom. The guideline will clarify that the starting point for any lab project should always be a risk assessment (e.g., control banding) by an EH&S professional. How the guideline gets applied by owners and designers requires further evaluation. The proposed guideline:
 - Would require a paradigm shift, and a different approach to how lab design criteria is defined.

- Should be tied to the EH&S risk assessment, provide guidance on the intended process and application, and point to the respective guideline(s). The American Chemical Society Committee on Chemical Safety's (CCS) guideline would be one example. That guideline is entitled "Identifying and Evaluating Hazards in Research Laboratories", and can be downloaded from the CCS's website.
- Minimum air change rates: the group discussed whether the guideline should include this criteria at all, and if so, how it should be applied.
 - The term "minimum" requires clarification. The current intent is for the listed air change rates to be increased by the EH&S professional on a case-by-case basis, based on their risk assessment. Concern has been raised that the listed minimums would in effect be treated as recognized standards rates, which is not the current intent.
 - Consideration should be given to listing maximum concentration limits (in ppm) rather than minimum ventilation rates. Or, potentially provide examples of how the appropriate ventilation rate can be determined based on generation rates and concentration limits, under a certain set of assumptions.
 - The use of "air change rates" versus "cfm per square foot" for minimum ventilation rates is still being evaluated by the committee. The final language may incorporate both.
 - The CCS's guideline references ventilation rates in general terms (i.e., low, moderate, high), and also points to a "laboratory ventilation management plan", but does not reference specific minimum rates. The coordination / interrelation between the proposed 9.10 guideline and CCS's guideline should be discussed further, especially with those involved with the ACS CCS.
- Room ventilation effectiveness:
 - Tom Smith's RTAR relates to this issue, focusing on the determination of room ventilation effectiveness via either computational analysis or physical testing.
 - Consideration should be given to determining the ventilation effectiveness in the breathing zone rather than the entire space, similar to the approaches by Standards 62.1 and 170.

- All agreed that the minimum ventilation rates and the ventilation effectiveness are very interrelated. Potentially these criteria would be combined down the road.

3. Next steps

- Continue monthly online meetings
- Engage other organizations to review and comment (e.g., I2SL, AIA)
- Next online meeting August 3rd, at 2:00pm EST

ITEM #	DESIGN CRITERION	CSDL-1 REQUIREMENTS	CSDL-2 REQUIREMENTS	CSDL-3 REQUIREMENTS	CSDL-4 REQUIREMENTS	CSDL-5 REQUIREMENTS
Laboratory Concept Description						
Description	Chemistry Expected To Be Conducted In This Setting	Use of small containers of volatile reagent chemicals (500 ml or less), pre-packaged kits, or consumer chemicals as specified on the manufacturer's label	Use of volatile chemicals for which dilution is an acceptable control strategy	Use of volatile chemicals in quantities that may require ventilation as part of an emergency response	Use of volatile chemicals which require use of local ventilation to maintain safe and healthful working conditions	Use of high hazard volatile chemicals which require specific engineering designs
Examples	Types of laboratories included in this group	<ul style="list-style-type: none"> • Temperature controlled rooms (warm rooms and cold rooms), • demonstration rooms with single experiments of less than 5 grams or 100 ml, • computer labs 	<ul style="list-style-type: none"> • Class laboratories with multiple concurrent experiments with small quantities (<100 ml) of volatile reagent chemicals, • Shop areas with consumer chemicals used and equipment emissions controlled by local exhaust, • Biological laboratories with no volatile chemical use beyond disinfectants 	<ul style="list-style-type: none"> • Laboratories with containers of more than 500 ml of volatile chemicals in storage or use • Laboratories that contain a limited number of fume hoods, and/or limited use of local exhaust 	Laboratories requiring fume hoods or local exhaust associated with specific equipment	Laboratories requiring specific safety analysis and devices to support the work, such as nanomaterials laboratories, radioactive chemicals laboratories
Air Recirculation Considerations						
1	Air Recirculation Within the Same Space is Permissible (by use of Supplemental Space Recirculation Units)	Yes	Yes, where permitted by Std. 62.1 (for Class I, II or III air). Confirm system compatibility (e.g., materials compatibility, potential equipment corrosion, equipment accessibility, reactivity with cooling coil condensation, etc.).	Same requirements as for CSDL-2	Same requirements as for CSDL-2	No
2	Enthalpy Wheels Permitted	Yes, where permitted by Std 62.1. Limit carryover per Std. 62.1 for the Class I air.	Same requirements as for CSDL-1	Same requirements as for CSDL-1	Yes, if proven to be appropriate by hazard analysis. Limit carryover per Std. 62.1 for the applicable air classification.	No
3	Air Recirculation at a Central Air Handling System is Permissible (where the system serves more than one space)	Yes, where permitted by Std. 62.1 (for Class I or II air only). Requires review and approval by an environmental health and safety professional.	No	No	No	No

ITEM #	DESIGN CRITERION	CSDL-1 REQUIREMENTS	CSDL-2 REQUIREMENTS	CSDL-3 REQUIREMENTS	CSDL-4 REQUIREMENTS	CSDL-5 REQUIREMENTS
Supply & Exhaust Airflow Requirements						
4	Occupied Minimum Exhaust Ventilation Rate (one-pass air)	Standard 62.1	Same requirements as for CSDL-1	6 air changes per hour	7 air changes per hour	8 air changes per hour
5	Unoccupied Minimum Exhaust Ventilation Rate (one-pass air)	Standard 62.1 (for unoccupied conditions)	Same requirements as for CSDL-1	Same requirements as for CSDL-1	4 air changes per hour	Same requirements as for CSDL-4
6	Evaluation/Confirmation of Room Ventilation Effectiveness	Using standard design practice, evaluate supply and return/exhaust devices locations and types, so as to provide adequate mixing of supply air with room air, and prevent stratification	Same requirements as for CSDL-1	Same requirements as for CSDL-1	Same requirements as for CSDL-1	In addition to the requirements for CSDL-1, verify room ventilation effectiveness via dispersion modeling or physical measurements
11	Consider Continuous Indoor Air Quality Monitoring	If specific volatile chemicals of concern are identified (for example, O2 levels in temperature control rooms)	No	No	When specific volatile contaminants of concern are identified	As specified by project requirements
13	Exhaust Air Filtration or Treatment	Not applicable	No	No	No	To Be Considered in specific situations
14	Spark Protection And Explosion Proof Exhaust Fans	Not applicable	For local exhaust systems	For local exhaust systems	For local exhaust systems	To Be Considered in specific situations
15	Duct Materials	Not applicable	Verify Fume Hoods and Exhaust Duct Materials Are Appropriate	Verify Fume Hoods and Exhaust Duct Materials Are Appropriate	Verify Fume Hoods and Exhaust Duct Materials Are Appropriate	Verify all ventilation elements are appropriate
16	Ventilation Diversity Factor	Not a factor	Factor to be considered	Factor to be considered	Factor to be considered	Should not be considered
17	Cooling Diversity	Not a factor	Factor to be considered	Factor to be considered	Factor to be considered	Should not be considered
18	Heating Diversity	Not a factor	Factor to be considered	Factor to be considered	Factor to be considered	Should not be considered
19	Exhaust Capture Velocities	Not applicable	Hood face velocities will be based on capture criteria	Hood face velocities will be based on capture criteria	Hood face velocities will be based on capture criteria	Equipment specific

ITEM #	DESIGN CRITERION	CSDL-1 REQUIREMENTS	CSDL-2 REQUIREMENTS	CSDL-3 REQUIREMENTS	CSDL-4 REQUIREMENTS	CSDL-5 REQUIREMENTS
Equipment Reliability						
20	Equipment Redundancy	No	No	No	Yes- Exhaust And Supply Air To Have Multiple Components, But Doesn't Have To Be N+1	Yes- Exhaust And Supply Air To Be N+1
21	Manifolding	Yes	Yes	Yes	Yes	Yes, If Chemical Compatibility Is Verified.
22	Emergency Power	Nothing Beyond Life Safety requirements	Nothing Beyond Life Safety requirements	Nothing Beyond Life Safety requirements	Life Safety requirements, plus: • Fume hood exhaust air should be considered. • Minimum lighting levels on the lab bench should be considered.	CSDL-4 requirements, plus: • General exhaust air should be considered. • Supply air should be considered, in order to prevent excessive negative pressurization.
Computational Fluid Dynamics (CFD) Modeling Requirements						
25	Dispersion modeling to assess building re-entrainment	No	No	No	Yes	Yes
Controls Requirements						
26	Variable Air Volume Permitted	Yes	Yes	Yes. Constant volume fume hood exhaust should be considered. For variable volume fume hood exhaust, minimum duct velocities should be considered.	Same as CSDL-3	CSDL-3 requirements, plus the supply and exhaust systems shall be capable of operating in a constant volume mode during an event.
27	Differential Pressure/Pressure Relationship	Not required	Required during emergency purge mode, if provided	Negative pressure in lab required at all times	Negative pressure in lab required at all times	Negative pressure of at Least 0.01" Wg required in laboratory at all times
28	Unoccupied Setback Permitted	Yes	Yes	Yes	Yes	No
29	Ventilation Parameters monitoring	Yes, alarm when outside design conditions	Yes, alarm when outside design conditions	Yes, alarm when outside design conditions	Yes, alarm when outside design conditions; provide local signals for fume hood operations	• Continuous Monitoring At All Times • Set Alarm Laboratory Parameters And Fume Hoods • Provide local alarms
30	Design Specific Failure Modes	N/A	Yes	Yes	Yes	Yes
32	Establish Equipment Calibration Schedules	No	Yes	Yes	Yes	Yes
33	Provide Trending Reports Capability	N/A	No	No	Yes	Yes
34	Provide emergency purge mode	Not required	Not required	Should be considered	Same as CSDL-3	Same as CSDL-3

ITEM #	DESIGN CRITERION	CSDL-1 REQUIREMENTS	CSDL-2 REQUIREMENTS	CSDL-3 REQUIREMENTS	CSDL-4 REQUIREMENTS	CSDL-5 REQUIREMENTS
General Laboratory Requirements						
35	Building/Room Tightness	Same As General Office Construction	Same As General Office Construction	Same As General Office Construction	Compartmentalization For Proper Pressure/Airflow Control	Same As CSDL-4, But Add Vestibules to improve pressurization controls
36	Operable Windows To Outside permitted?	Yes	Yes	Yes	No	No
37	Signage within room	Yes CSDL-1 required	Yes CSDL-2 required	Yes CSDL-3 required	Yes CSDL-4 required	Yes CSDL-5 required
38	Vestibule Required	No	No	No	No	Yes
39	Testing And Certification of operating parameters required	Laboratory temperature	Laboratory temperature and flow rates; control system operation; fume hood containment	Laboratory temperature and flow rates; control system operation; fume hood containment	Laboratory temperature and flow rates; control system operation; fume hood containment	Laboratory temperature and flow rates; control system operation; fume hood containment
40	Documentation	Yes, including equipment operating manuals	Yes, including equipment operating manuals, commissioning reports and fume hood containment testing	Yes, including equipment operating manuals, commissioning reports and fume hood containment testing	Yes, including equipment operating manuals, commissioning reports and fume hood containment testing	Yes, including equipment operating manuals, commissioning reports and fume hood and other ventilation equipment containment testing
41	Commissioning	Yes	Yes	Yes	Yes	Yes
42	Site Specific Emergency	No	No	Yes	Yes	Yes
Other						
43	# Of Bench top Fume Hoods Per Lab Module	None	1 per laboratory space with limited use and allowable	1-6' / 250/SF	1-6' / 250/SF	As required by use
44	Local Exhaust	None allowed	None allowed	Yes, has to be properly engineered to work with a Variable Air Volume system	Yes, has to be properly engineered to work with a Variable Air Volume system	Yes
45	Radioactive Material Use Permitted?	No	No	No	Yes, with risk review	Yes, with risk review
46	Nano Materials	No	No	No	Yes, with risk review	Yes, with risk review
47	Specialty Fume Hoods	None	None	None	1	Any

ASHRAE TC 9.10
Energy Efficiency Subcommittee Meeting
Atlanta Summer Conference
Sunday, June 28th, 2015
6:00 – 7:00 p.m.

Meeting Minutes :

David Rausch	Ken Kuntz	Brad Cochrane
Roland Charneux	Lloyd Le	Martin Strangl
Eric Ballachey	David Heinzerling	Jake Edmondson
Andrew Wengerd	Jason Atkison	J. Patrick Carpenter
Mark Hydeman	Bob Weidner	Nathan Ho
Tom Smith	Carl Crow	Guy Perreault

1. The first topic for discussion was the writing of a mission statement. Based on the discussion by the group a first draft will be written
2. The second point of discussion was to generate potential topics that were going to be addressed in the one page documents on energy efficiency in laboratories. It was mentioned that Labs 21 already had similar documents available.
 - Fume hood retrofit (T. Smith)
 - Decoupling heat loads and ventilation loads (N. Ho)
 - Evaluation of plug loads
 - Lower face velocity/pressure in air handlers (specific requirements for labs (N. Ho)
 - VAV System sensitivity in large systems (T. Smith)
 - Pressure set point reset (G. Perreault)
 - Trim and response strategy
 - Retro-commissioning specific to laboratories
 - Open sash alarms and sash closers
 - Combination sashes
 - High efficiency mixed flow fans (N. Ho)
 - Use the chilled water return to cool high load rooms with fan coils
 - Higher delta T (R. Charneux)
 - What would be the best typical lab (P. Carpenter)
 - Liquid heat recovery dessicant
3. Mark Hydeman, the official liaison for TC 9.10 with 90.1, will communicate comments and views of the sub-committee to the mechanical sub-committee of 90.1.
4. The committee will review the list of existing documentation available from other organizations.
5. Considering that the Laboratory Design Guide is completed, future meeting will be held during the former Laboratory Design Guide scheduled time, i.e. Tuesday PM prior to the main committee meeting.

6. All information gathered by this sub-committee will be potential updates for the next revisions of the design guide.

Additional information discussed during the informal meeting on June 30th,2015

Attendance:

Guy Perreault	Ken Kuntz	Carl Crow
Brad Cochrane	Mary Foutz	John Castelvechi
John Carter	Nathan Ho	Roland Charneux
Gordon Sharp	Traci Hanegan	Kelley Cramm
Eric Ballachey	Tom Smith	

1. A first draft of the mission statement is presented:

The ASHRAE TC 9.10 Laboratory Energy Efficiency Subcommittee, has for primary objective to promote existing energy efficient measures and to help develop more innovative methods in the design of laboratories while maintaining safety.

The subcommittee will be a forum providing energy efficiency strategies for laboratories. These strategies will be in the form of articles, short guidelines, design tools or other.

The subcommittee will also be a point of liaison for other groups within or outside ASHRAE regarding energy efficiency issues (e.g. STD 90.1).

Suggestions and comments are welcome to help improve the mission statement.

2. It is suggested that we reuse the existing FTP site that was used for the design guide to gather the information relative to the Energy Efficiency sub-committee. The participants must have an inbox capacity to share their information.
3. It is agreed that after review of the existing information available through I2SL or other organization that the sub-committee focus on new strategies at first. Eventually get involved on the revision of existing documents. Other topics were added to the last developed:
 - Reheat control strategies
 - How to calculate minimum fume hood airflow
 - Is your facility ready for retrofit?
 - Exhaust fan design strategies
4. Next steps,
 - Conference calls will be scheduled before the next meeting.
 - Groups will be formed by specific topics.
 - Draft documents will be written and added to the FTP site for review.