

All Committee Liaisons As Shown On TC/TG/TRG Rosters:	Name, Position Donald Brandt, ALI /PDC Robert Laneve, CTTC Patrick Marks, Handbook Systems and Equipment Piotr Domanski, Research Liaison Francis Mills, Special Publications Rick Larson, Standards Liaison Michael Vauhn, Staff Liaison
TC 5.5 Membership	TC0505@ashrae.net

General

1. Call to Order / Welcome
Call to Order 15:33 / 3:33 pm.
2. Introduction & Sign up (Current e-Mail & updates)
See Attendee list attached, GD's email address as changed GD_Mathur@ck-mail.com
3. Roll Call
See attendee list. Attendance: 8 out of 8 voting members present, quorum achieved
4. Chicago Minutes Approval post poned until quorum
Editorial changes to show GD in attendance rather than absent; Drake indicated as Liaison for SSPC, actually Greg. Klas H. makes a motion to approve the Chicago meeting; John D. seconds the motion.

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5. Chair's Report (Greg Dobbs) - News and announcements from Chair's Breakfast Meeting
Ethics training is available; slides are available on the ASHRAE webpage to provide information on TC activities. A new field (what type of organization) is in the ASHRAE bio section; everyone should update their biographical information. ASHRAE wishes to monitor this information to potentially provide a better balance on TCs. ASHRAE is beta-testing phone attendance to maintain quorum for some TCs at particular meetings, does not directly affect 5.5 as this has not been an issue in the past. Also, the TC calendar can now be added to Google calendar. Speakers will need to pay a registration fee, look at your scores as a speaker (if you are below 3.5), with 3 strikes will need formal remedial training in public speaking.

Subcommittee Reports

1. Handbook (Prakash Damshala / GD Mathur)
Chapter 26 in the handbook had a duplicated figure (this has already been corrected). There are two years to complete the next revision. There is a big push for the online version with requests for videos, animations, spreadsheet tools, etc. This has been asked for in the past (relating to CD+) but the request is coming again. Individuals can send their information to Prakash or GD. Note no logos can be present on graphics, although companies will be credited. TC 5.5 did a literature survey previously, but if members find references to energy recovery in other handbook chapters, they are asked to validate that the information is correct and un-biased and advise the Handbook Chair.
2. Research (Bob Besant)
TC 5.5 is looking to increase research initiatives and looking for support from other committees for the RTAR proposals ([see attached](#)).
 1. RTAR on contaminant transfer (Particularly on Class 3 and 4 Air)
 2. RTAR looking at other ways of evaluating wheels / energy recovery technologies, can this move towards a standard. Provides an economical alternative for manufacturer
 3. RTAR look at evaluating liquid to air in a coupled run-around systems; any air-to-air run around system should be considered to determine the least expensive method of test

Looking to improve RTARs with better alignment with the ASHRAE strategic plan; this is required for Standard development and advancement, which requires these RTARs. The Research Subcommittee has been expanded (Mathew, Blake, Tom, Prakash + Bob) with this goal in mind. ASHRAE is also offering a webinar service to have interim virtual meetings.

John Diekmann provided an update on 1565-RP Development of the ASHRAE Design Guide for Dedicated Outdoor Air Systems. Progress is going well with an estimated 18 month cycle before the document is produced. John is on the PMS and has been appointed official Liaison for future meetings.

3. Standard 84 (Matt Friedlander)
Standard 84 has been approved at this meeting with publication in February (per report attached) as provided by Mat F).
4. Membership (Bert Phillips)
No Updates.
5. Website (tbd)
With the departure of Charissa, Tom, Helen and Paul are to provide an update and are to contact Mike Vaughn; the TC will decide who will take the position at the next meeting
6. Program (tbd)
TC 5.5 held a very lively Forum (notes attached) with good scores and approximately 15 participants. The list of items should be examined by Research and Program for future RTARs and seminar topics. Research and Program are to review for potential topics before the next meeting

Drake, Ronnie, John, and Paul have committed to support Helen in Program and to form a sub-committee.

Mat made the motion to appoint Helen Chair of Program Committee with the mandate of creating a terrific session for "Fan Energy Associated with Air-to-Air Energy Recovery: Best Practices"; seconded by Klas.

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Volunteers for the Seminar are: Mat (who is to distil Drake's technical support documents from 90.1; Tom to discuss "Applications Based on Utility Costs and Economizer Operation Best Practices"; Ronnie to present how to correctly assign the allocation of fan energy when using air-to-air energy recovery.

Bob made the motion to co-sponsor the forum proposed by 5.10 and amend the title to "What are the Challenges for using Air-to-Air Energy Recovery for Kitchen Ventilation (CKV) and 90.1 Compliance"; seconded by Paul.

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Liaison Reports

1. SSPC 189.1 (Carol Marriott)
DOAS is being discussed for potential inclusion in 189.1.
2. SSPC 90.1 (Drake Erbe)

Addendum BT is the extension of the table down to 10% OA with cost justification. The 5000-CFM requirement for 4C and 5B was removed as they were not economically justified. Addendum BT will be published but with an additional addendum for 2015 (IECC) and is fully supported by the committee.

One (1) comment, to re-introduce the 5000-CFM requirement arose and will be addressed by Addendum CY. The comment related to 24/7 continuous operation. This will introduce an additional table so that there will one (1) table for Non-continuous occupancy and one (1) table for Continuous occupancy.

Addendum BC will address the cost-effectiveness of DCV.

3. Standard 62.1 (Hoy Bohannon)

With respect to wheels on laboratory exhaust, there is currently a public review draft addressing this issue and will go out for vote with the public review available in March or April.

Addendum K – includes a table to amend the classes of air where Class 4 needs to be exhausted. The request was made to re-classify some types of lab hoods as class 3 air (BSL 2 or less) and to allow energy recovery. This also references another section from an ANSI standard which makes it a little unclear.

4. TC 7.8 (Klas Haglid)

Energy recovery to include new buildings.

Prakash motioned to adjourn; seconded by Bob. (17:33 / 5:33 pm).

Other Old Business

No Old Business.

New Business

No New Business

ATTENDEES (see attached or otherwise embed)

ASHRAE Summer Meeting (Denver, CO)
Wednesday, June 26 - 9:45 PM - 10:45 AM

Forum 4

What Are the Challenges for Using Air-to-Air Energy Recovery for Commercial Kitchen Ventilation (CKV) and 90.1 Compliance?

Room: Governors Square 16

Forum Sponsor: TC 5.10 Kitchen Ventilation;
Co-sponsor: TC 5.5 Air-to-Air Energy Recovery

Forum Minutes

Forum Co-Chair and Moderator: Don Fisher
Forum Co-Chair and Secretary: Paul Pieper

Moderator (reading from enclosed/attached slides): Packaged and engineered systems incorporating HRV has been available for 30 years. It is very attractive to incorporate with high temperatures and available energy for recovery. We can achieve high sensible effectiveness but must deal with grease-laden air. Grease puts the system under NFPA, which would potentially require fire protection (or wash down) and consequently, these systems are more expensive.

From 90.1: If a kitchen/dining facility has a total kitchen hood exhaust airflow rate greater than 5,000-cfm, then it shall have one of the following:

- a) At least 50% of all replacement air is transfer air that would otherwise be exhausted.
- b) Demand ventilation system(s) on at least 75% of the exhaust air. Such systems shall be capable of at least 50% reduction in exhaust and replacement air system airflow rates, including controls necessary to modulate airflow in response to appliance operation and to maintain full capture and containment of smoke, effluent and combustion products during cooking and idle.
- c) Listed energy recovery devices with a sensible heat recovery effectiveness of not less than 40% on at least 50% of the total exhaust airflow.

Forum Focus seeking to answer the following questions:

- Doe the option for a "listed" energy recovery device challenge the design engineer?
- Does NFPA96 pose a challenge?
- Should 90.1 revise this requirement to exclude the word "listed" to allow an engineered system?

To clarify, we don't necessarily want to remove the word "listed" but may potentially change it to "listed and/or engineered".

There is a disconnect between kitchen ventilation hood manufacturers which are grease rated and HRV manufacturers which certify to different standards; most have been UL listed (to grease duct standard) and some of the pollution control units certify to other UL standards (UL710 and UL762 and UL18??). There are no ventilation products from these manufacturers. The response is "we thought about it, but don't feel the market is big enough to justify".

The verbiage that the system must be "listed" does this harm the use of engineered systems? Many of the systems were built and designed in the 80's were engineered. What can we do through research and programs to encourage this compliance path?

Attendee/Designer: Lot's of HRUs were done in the 70's and 80's when many tax credits were available, steam regeneration, storm windows, and HRU on kitchen ventilation were all subsidized. Higher cost is an impediment with credits and a similar energy climate. Grease will cause havoc with the (enthalpy/energy recovery) wheels, and are not recommended. HRVs (heat recovery ventilators, sensible energy recovery devices) with bypass for summer ventilation and freeze protection are preferred.

Moderator: Freeze protection with VSD on exhaust for HRV is used. Can we examine through an #RTAR to determine the best defrost strategy for kitchen ventilation?

Quick Poll(s)/General Attendee Feedback: *This would be useful.*

Moderator: Often the input to the cost equation improves by eliminating the MUA unit; but is there a concern about long-term maintenance? Are there issues with clogging? What type of guidance is there?

Attendee/Designer: Many older systems did a wash down hood and a wash down unit with fully automated traversing wash down systems.

Attendee/Designer: Using glycol run-around systems with a locally built up wash down systems is not uncommon. Heat pipes and coils may be better if you can use less FPI (fins per inch) particularly for institutional cooking applications. The application would find a balance point but units that are shut down are primarily down to poor long-term maintenance.

Moderator: Better pre-filtration and even the concept of using UV to improve cleaning of surfaces are areas that can be improved. Filtration technology has improved considerably over the last 30 years. Ultimately, should there be an #RTAR to develop an application guideline for employing HRV and kitchen ventilation?

Quick Poll(s)/General Attendee Feedback: *This would be useful.*

Attendee/Designer: Many of the codes are forbidding wash down hoods to limit water consumption. It also adds an extra load on your interceptor. But wash down is needed on

the plates otherwise build-up would occur.

Attendee/Designer: A large international restaurant chain has 100s of these units and in Nordic climates what works best is typically pre-filtration before the equipment. The ERV varies, fouling up of the HX is much less frequent and UV has also cut down on the maintenance. The exact recommendations vary all over Nordic European countries.

Attendee/Designer: The work through TC 5.5 in the US has been recognized but Europe is not under the jurisdiction of UL. Having listed language, it is always easier to buy a packaged system. With liability and complexity and issues most engineers would prefer listed and labeled system

Moderator: How do they justify the cost in Europe?

Attendee/Designer: In many places it's mandated so does not need to be justified, but it is typically very cost effective with the cost of energy there and the technologies that are available (e.g. Germany uses plastic plates).

Moderator: There should be an **#ACTON ITEM** to challenge the code requirements. In order to cost justify in more areas of North America there need to be more incentives to encourage HRV use.

Attendee/Designer: CEE may be one avenue that this application can get inserted into; two diverse groups of folks that do not interact well (hoods versus HRV manufacturers)

Moderator: Is heat recovery recognized through LEED?

Attendee/Designer: You can obtain significant energy savings for energy and atmosphere; engineers are looking to reducing costs associated with ventilation; appendix G

Moderator: Would designers use HRV on kitchen ventilation but shy away from this application due to maintenance, cleaning, etc. issues?

Attendee/Designer: We accidentally adopted an ordinance that requires HRV on all ventilation; looking to lower the ventilation load. But it's not an easy compliance path; only one or two manufacturers are providing "listed" products but today. Technically with adiabatic manufacturers are still shy to fall into.

Secretary/Manufacturer: If more manufacturers are out there costs will go down

Moderator: Research can overcome grease; quantify of how to handle the grease? We need to make a business case; look at all the variables (cost, usage). Perhaps a **#SEMINAR** on case studies on successful projects implementing HRV/ERV with a look to Europe (Scandinavians, Germans, Polish) on how they handle kitchen ventilation and bring to North America.

Attendee/Designer: Wheels have the potential for contamination but wheels were not used. Not talking heat wheels.

Attendee/Designer: Might be impractical. Would it be possible to segregate your duct system; we almost need a classification/definition, anything with grease is grease-laden. Can we get a qualification of grease laden? Do the HRV manufacturers have exhaust are requirements; if you segregate the ducts you limit the heat content.

Attendee/Designer: The cooking platform is more grease laden than in Europe. A new product category emerging with a coil (air-to-water) system: De-super heaters (refrigerant recovery).

Attendee/Designer: A typical 4-5 year payback is okay for LEED but typically not in other applications; restaurants have many waste heat streams; lot's of opportunity

Moderator: Is there is a need for some research and a design application design guide?

Quick Poll(s)/General Attendee Feedback: *This would be useful.*

Moderator: Did we box ourselves in with the wording in 90.1?

Quick Poll(s)/General Attendee Feedback: Engineered is the right way to go. Listed can be installed without a stamp but "listed or engineered" is probably the best approach.

Attendee/Designer: Is there an #RTAR for classification of grease laden airstreams? Might have been mentioned in 5.10?

Quick Poll(s)/General Attendee Feedback: The majority of the group feels that it is worthwhile to have ASHRAE investigate this further. Having a #SEMINAR would increase the interest and we should look to bring European engineers. Having the compliance path in 90.1 is good, but we need to make it easier to follow that path.