

**Laboratory Method of Test of Fault Detection and Diagnostics
Applied to Commercial Air-Cooled Packaged Systems
Standards Project Committee 207P
Meeting Minutes**

Monday, June 26, 2017, 8am-10am – Long Beach

These draft minutes must be approved by this committee to be the official approved record.

Note: For votes concerning standards actions all members must be given an opportunity to vote. In the event all members are not present at the meeting a letter ballot will be sent to the absent members to vote, that will include all negative votes at the meeting and a Chair's response. In the event negative votes are received during the continuation ballot a recirculation ballot will be conducted.

Negative voters with comment on publication public review votes will be given an opportunity to appeal once the Board of Directors has approved the document for publication. Negative voters who do not comment **will not** be offered a right to appeal.

ATTENDEES

VOTING MEMBERS

Adrienne Thomle	x
Amr Gado, Pentair	
Brent Eubanks, Integral Group	
Christopher Benson, Total Bldg Cx	
Dale Rossi, FDSI	
Daniel Sullivan, Target	
David Shipley, ICF	x
David Yuill, University of Nebraska	x
Dick Lord, Carrier	
Glenn Remington, Consumers Energy	
Jan Peterson, XCSpec	
Jay Enck, CxGBS	
Jon Douglas, Lennox	x
Klas Berglof, ClimaCheck	
Kristin Heinemeier, UC Davis - EEC	x
Liping Wang, University of Wyoming	x
Mike Brambley, PNNL	x
Mikhail Gorbounov, UTC	x
Robert Mowris, Verified	
Sean Gouw, SCE	x
Vance Payne, NIST	x
Vern Smith, Smith Energy Engineers	x
Wayne Guelfo, Johnson Controls	

LIAISONS, NON-VOTING MEMBERS, VISITORS

Anuj Mistry, Daikin
Edwin Huestis, PG&E
Grant Wheeler, NREL
Heila Zandi, ORNL
Jasim Maudi, SIU
Jia Huang, PG&E
Jim Braun, Purdue University
Jon Winkler, NREL
Lee Millies, SPLS Liaison
Mark Alatorre, CEC
Mark Modera, UC Davis
Robert Davis, PG&E

FULL COMMITTEE MEETING

- Called the meeting to order: Monday, June 26th, 2017 8 a.m., Long Beach

AGENDA

- 8:00 Self Introductions, Membership and Roll Call, Approve Minutes, Action Register
- 8:20 Roadmap for Completion
- 8:30 Working Groups
 - 8:30 Title/Purpose/Scope
 - 9:00 Usability Verification
 - 9:30 Draft Development
- 10:00 Adjourn

SELF INTRODUCTIONS, MEMBERSHIP, ROLL CALL, APPROVE MINUTES

- Liaison report: Lee Millies from Standards joined us and provided some advice on the drafting of the new title, purpose, and scope.
- Membership has been stable, quite a few members. There are some new members coming onto the committee, specifically...
- Roll Call: 11 voting members present, 12 required for a quorum. No quorum
- No quorum, so did not review Las Vegas minutes.

DISCUSSION OF PROPOSED CHANGES TO TITLE/PURPOSE/SCOPE

- David Yuill presented the draft change developed by the working group.
- Main reason for the change is to limit the scope to the economizer section of the system.
- There was a discussion of whether the title should specify the type of system the air-side economizer is part of. Straw poll result was to use the title "Laboratory Methods of Test of Fault Detection and Diagnostics for Air-side Economizers."
- Mike Brambley proposed a number of changes to the wording of the Purpose. Straw poll result supported these changes.
- The scope was changed to limit the applicability of the standard to economizers in air conditioning systems.
- Other proposed scope changes, including the proposal to list categories of test methods included in the standard, were discussed in the meeting, but we did not reach consensus. The Title/Purpose/Scope working group will reconvene during the 6:30 time slot at this meeting to try to finalize a proposed set of changes for the committee to vote on by letter ballot.

VALIDATION/INFORMAL REVIEW DISCUSSION

- Sean described the problem of finding funding to conduct laboratory verification of the method of test.

- Kristin described the intent behind the draft survey that would be sent to likely users of the standard.
- Three levels of verification seem to be options:
 - Review of the draft standard and provision of comments
 - Development of a test plan using the draft standard
 - Development of a test plan and conduction of the tests in a laboratory, using the standard. The third one would require funding, probably through the RTAR process.

MEETING TRANSITION

- The main meeting was adjourned at 10:30 to transition to a discussion of the validation process.
- Called the meeting to order: Monday, June 26th, 2017 10:45a.m., Long Beach

CONTINUATION OF VALIDATION/INFORMAL REVIEW DISCUSSION

- Mark Modera (formerly on Standards) pointed out that the draft standard cannot actually be provided to people not on the committee until it goes out for public review, which would preclude putting a research project out to bid for independent third parties to review it.
- The committee then worked on a plan to develop an internal test that several members of the committee can use to develop a testing plan in response to a specific application of the draft standard.
- The participants in this discussion reached consensus around the idea that the draft standard needs some kind of external review before it undergoes physical testing.
- The advisory public review process seems like the best approach.
- The committee will undertake some further improvements to the draft, to clarify some sections and add some missing instructions. This includes review of the usability of the draft by members of the committee who can assess its use in practice.
- Schedule suggested is as follows:
 1. Clean up draft
 2. Internal committee review
 3. Finalize TPS
 4. Peer review (advisory public review)
 5. Public review
 6. Publication

ADJOURNED AT 12:00

ADDENDUM – ACTION AFTER MEETING

(added January 2018)

A letter ballot was circulated on July 25 (see attached), requesting a change to the Title-Purpose-Scope of the standard.

- Email letter ballot July 25, 2017 – August 8, 2017. Votes: 18 yeas, 3 nays, 1 abstention, 3 votes not returned.
- Since there were three negative votes, the reasons for the negative votes were circulated to the full committee, with responses from the TPS working group (see below).
- From August 15 to August 22, 2017, all members were given an opportunity to change their votes. No vote changes were requested.
- The motion passed 18-3-1-3.
- The recommendation was referred to the Standards committee. The recommendation was considered at their Tech Weekend meeting, and approved.

LETTER BALLOT

From: Kristin Heinemeier

Sent: Tuesday, July 25, 2017 12:51 PM

To: (voting members)

Cc: Lee@milliesengineeringgroup.com; standards.section@ashrae.org; mweber@ashrae.org; sreyniche@ashrae.org

Subject: Official Letter Ballot of ASHRAE SPC 207P. Your reply is required by August 8, 5pm

Dear SPC 207P voting members,

This is an official letter ballot of ASHRAE SPC 207P. Please review it carefully and respond promptly with an affirmative or negative vote, or an abstention (along with an explanation for any negative votes or abstentions).

Please reply with your vote (do not REPLY ALL!) by August 8, 2017 at 5:00 PM PDT.

At our SPC 207 meetings in Long Beach last month, we discussed possible changes to the Title/Purpose/Scope of our standard. It was a good discussion that covered a lot of territory, since the TPS is such a significant part of the standard.

David Yuill, chair of the TPS Working Group has conferred with his members, and they have proposed a revised TPS that, I think, addresses all the issues that were discussed. A little more background is provided near the end of this email.

MOTION

Revise the Title, Purpose, and Scope of ASHRAE Standard 207P as follows:

Title:

Laboratory Method of Test of Fault Detection and Diagnostics for Air-side Economizers Applied to Commercial Air-Cooled Packaged Systems

Purpose:

The purpose of this standard is to provide methods for laboratory testing of fault detection and diagnostic (FDD) systems to determine whether they perform as specified.

~~This standard provides a method to define an FDD tool's function. This standard also provides a method of laboratory test for the performance of Fault Detection and Diagnostic (FDD) tools on commercial air-cooled packaged equipment.~~

Scope:

1. This standard applies to the FDD systems that are intended to detect or diagnose faults that affect the performance of the air-side economizers of air conditioning equipment.
2. This standard defines laboratory tests for four categories of economizer faults.
3. This standard only applies to those FDD systems designed to detect or diagnose faults by evaluating instantaneous or short-term conditions and parameters.

- ~~1. This standard applies to commercial air-cooled packaged air conditioning systems.~~
- ~~2. The test is a physical laboratory test on a particular combination of diagnostic tool for each model of a unitary system.~~
- ~~3. This standard applies to any on-board, after-market or hand-held hardware and/or software functionality that detects and/or diagnoses problems that lead to degraded performance such as, energy efficiency, capacity, increased maintenance costs or shortened equipment life.~~

REASONS FOR NEGATIVE VOTES AND RESPONSES FROM TPS WORKING GROUP

COMMENT 1

I would have preferred / advised a qualifier for limiting scope to roof top equipment (traditional RTU). As written it includes built up air handling units and inherently embedded FDD tools within building automation systems or 3rd party cloud based tools (which would be impossible to test in laboratory setting).

Response: *We discussed this and deliberately included air handlers, since their economizer diagnostics are no different. Also we, believe that it IS possible to test those types of diagnostics approaches in the lab, unless they require time-series data analysis.*

COMMENT 2

I know the committee wants to get this standard out, but knowing the difficulty scope and the fact that we really should cover more than diagnostics I would rather see the standard be left more open and allow future revisions to include other diagnostics as they are developed. If we were to structure the standard as an overall diagnostics standards and then include addendum for each diagnostic procedure as it is developed I think in the long run we would be better off. I do support getting the standard out with just the economizer but then continue to work to complete the other diagnostic test procedures.

Response: *We have considered a large range of possibilities. It was felt by many that limiting it to economizers in the TPS at this point most accurately described the current standard, minimizing confusion for users of this standard. When we do develop tests for FDD applied to other systems, we will have the option at that time to propose and write other standards, or to request Standing Standards Project Committee status and to change the TPS of 207 to be more inclusive.*

COMMENT 3

I will approve if item 2 is revised as follows: "This standard defines laboratory tests for four categories of economizer faults: communication, sensor, damper/actuator and outdoor air fraction quantity." "Quantity" is impossible to determine from an economizer FDD system. This word needs to be replaced by the word "fraction" which can be estimated but not determined exactly.

Response: *Outdoor air quantity is a category of fault. It doesn't imply that outdoor air quantity can be measured, and the word "fraction" is no better, since fraction also can't be measured.*