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Meeting Minutes
SPC 84-1991R - Method of Test for Rating Air-to-Air Energy Recovery Ventilators

Room 411, Philadelphia Marriot Hotel
2:15 PM, Monday, January 27, 1997

Chairman Kirk Mescher opened the meeting by circulating minutes of last meeting, followed by table introductions. He then reviewed the committee's objectives and membership status. The committee has three work groups. These are:

1. Group 1 - data reduction, calculations and presentation of data, prepare data sheets (revise sections 6 and 8 of existing standard)
   Members - Parkask Damshala, Ben Elkin, Bob Lamuro, Bert Phillips
2. Group 2 - define the testing equipment and quality of instrumentation and prepare data sheets (revise section 5 of existing standard)
   Members - Lawrence Ambs, Don Fisher, Peter Grinbergs, Kirk Mescher, Stephanie Starzec
3. Group 3 - write basic procedure and define apparatus (revise part of section 4 and section 7 of existing standard)
   Members - Larry Hoagland, Byron Horak, Gerry Martin, Dale Rammien, Maury Wayryk

The planned work method is for all committee members to meet at the beginning of each meeting to discuss general issues, then to break off into work the three specific groups, where members will work on their specific topics. Between meetings, the committees are to continue work, and submit developments to Captain Kirk who will incorporate them into a working draft. For Boston, all committee members are to review their sections and submit comments to Kirk.

Gerry Martin reviewed a draft of a recent European standard related to heat exchangers, prEN308:96. Features of this standard are:

- it specifies three categories of equipment, heat wheel, flat plate, coil loop.
- it requires balanced airflows and pressures. This minimizes leakage. Leakage can distort the test data and thus the performance calculated for the heat recovery device.
- mass flow must be measured within "3%.
- thermal and mass balance not required (not in Standard 84 either).
- heat balance must be within "5%.

- it differentiates between internal and external leakage (tests for each separately).
- tests are done to determine the impact of supply side to exhaust side pressure differentials on static pressure drop (i.e., the increase in static pressures due to plates bulging or collapsing into the lower pressure airstream). This test is done using a constant mass flow rate through the "collapsing" side of the heat exchanger.

This final point prompted some discussion. The consensus was that this is a worthwhile procedure.

Bob Besant reviewed the University of Saskatchewan/ASHRAE research project and the relevance of project results to the needs of Standard 84. His major conclusion is that uncertainty related to test results needs to be reported with performance data. Depending on the measuring equipment used, the configuration of the test setup and the test conditions, the uncertainty bands around predicted equipment performance can be very high. ASHRAE has a standard method for determining uncertainty related to each test condition.

If uncertainty analyses are done, the test method does not have to be restricted to a laboratory set-up. Field testing should be acceptable, provided uncertainty analysis is done. This is beneficial, because lab testing of large equipment is cost prohibitive, so it doesn't get done.

Besant observed that calibration of flow and RH equipment is critical and that testing (and preparation for testing) requires a lot of time.

Effectiveness is a function of mass flow rate, mass flow ratio and the temperature and humidity conditions of the two airstreams. As a rule, heat exchanger performance can't be defined in simple fashion by a single test point, straight line or simple curve. He sees a need for performance mapping, similar to engine mapping. University of Saskatchewan project team has found that heat transfer equations and computer models can be used to predict performance at various operating conditions. The model has predicted heat exchanger performance well within error bounds. From this, Besant has concluded that it may be possible to do limited lab testing on heat exchange equipment and then use a numerical model to reasonably predict performance at other operating conditions or for similar equipment scaled up or scaled down.

In summary, his recommendations were:

- allow any degree of uncertainty and measuring equipment accuracy, but require uncertainty analysis.
- make field testing acceptable.
- specify methods to extrapolate effectiveness.

Moved by Ben Elkin, seconded Dale Rammien that thermosyphon and spray towers not be included in the methods of test covered in Standard 84. Spray towers in particular

represent a difficult challenge for testing. This is a very small segment of the market which is not represented on the committee.

Moved by Larry Hoagland, seconded Maury Wawryk that the motion be amended to not drop thermosyphon system. Amendment carried (9,0,0). Motion as amended carried (9,0,0).

Maury Wawryk sits on the ARI committee on air-to-air heat recovery equipment. Kirk is to contact ASHRAE to request that Maury be appointed as a liaison with the ARI committee.

The meeting then dissolved into task groups to work on specific sections of the standard.

- TC5.5 - off in June (Martin, McGuinness, Rammien) 11 voting/13 possible
- MBR slip - requested
- program - DR - 2 programs tomorrow
- symposium for San Francisco - Bob Besant, me - Harry Boody, smoke - Maury Wawryk - Don, Bede Wellford, Harry Cohen, me, has a friend with a ???, tech Phillip Morris - Georgia Tech, John Fischer - Don
- Bede would like to be considered for TC5.5 member Tom James
- Moisture Design Handbook by Joe Lstribok
- submit concepts to Anton