

Report on ISO 15099 and ISO 12567 meeting in Vienna, Austria.

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May 8-12, 200

ISO/WG2 meeting was held in Vienna, Austria at the Testing Institute (?)

During the first day of the meeting we had joint meeting with CEN group, and discussed examples for CEN 10077-2. Mr. Feldmier presented results from all the laboratories, and pointed out that fairly good agreement was achieved. He pointed to problems with some assumptions and asked participating laboratories to resubmit their results after this meeting.

THERM models done at the University of Massachusetts had very good agreement with the average of all labs, except for skylight which had somewhat higher difference. It turned out that orientation of the frame cavity for skylight was wrong (we modeled it as per dxf drawing but actual orientation was 90° off, which for CEN method made a large difference. After this fix, all of the 10 models were within 3% (heat flow rates).

Most of the rest of the meeting was devoted to issues about ISO 15099. We recognized that no changes can be made at this time, but that we are using the opportunity to discuss all potentially dividing issues. Several people presented materials that were submitted prior to the meeting:

- Svend Svendsen presented results of simulation of six fenestration systems and comparison to test results. He also presented results of a study that looked at 3-D effects of a wood window and compared lineal transmittance vs. area based method for U-factor calculation. He mentioned the work was preliminary and needed more investigation. He also discussed the differences between ISO and CEN method when calculating large gap width. For lower gap width the agreement is good. CEN 673 giving optimistic value for glazing. He also discussed issues of air cavity connected by throat for which you need proper guideline how to break it up, and contact resistance for extrusion snap in.
- Bill Goss presented revised gas properties equations, revised text on geometric representation, revised outdoor surface heat transfer coefficient formulas, and some handwritten notes that were supposedly proving that lineal transmittance is better method than area based method for U-factor calculations. In addition he proposed that ISO should adopt the linear transmittance method for the ISO standard 15099 and eliminate area based method.
- John Wright presented results of calculations for IGU cavities using CEN 10077 and ISO 15099 methods. He noted that his paper on simplified

radiation calculations was submitted and he encouraged careful review of the method

- Dragan Curcija presented 8 points from ASHRAE SPC142 meeting and asked for input. He also noted 3 papers that were submitted in support of his detailed radiation method, and also encouraged members to carefully review them. He also pointed out that revised gas properties equations contain an error, and that correct equations exist for more than two years and were submitted by Hartwig Roth at the meeting in Amherst in 1998.
 - a) Change wording in geometric representation section:
 - On page 20, Sentence that starts with “More specifically, those segments...”; create a new paragraph and delete More specifically, so that it starts with “Those segments...”
 - Add 5th criteria: The endpoints of the segment preserve their relative position \pm manufacturing tolerances. Each change in slope or radius shall be considered a new segment subject to the requirements in this paragraph.
 - b) Gas properties: Clarification on the source of this data, and why is there discrepancy for some data.
 - c) Radiation calculation to the indoors: New alternative method proposed by John Wright.
 - d) Outdoor convective surface heat transfer coefficient: New correlations proposed, but they were derived from field conditions, not laboratory conditions.
 - e) Frame cavities: add language for partially ventilated cavities.
 - f) Conductivity values: Find original CEN list.
 - g) Treatment of sloped boundaries: Formula gives values that are artificially lower near thermal bridges.
 - h) Complete alternative method for calculating SHGC of frames.

Finally, D. Curcija presented graph showing local heat flux distribution on indoor side of IGU (part of Velux skylight), with detailed radiation model and without. The graph showed that after approximately 100 mm, 2-D effects completely diminish.

Observations:

One major issue remain in completing ISO 15099; detailed radiation model, and one new very important issue had emerged; lineal vs. area based calculation of U-factors. Several minor issues still need to be addressed, like outdoor surface heat transfer coefficient, gas properties, material properties, emissivities, vertical frame cavities, ventilated and slightly ventilated frame cavities.

Detailed radiation model: Due to potential problems and difficulties that detailed radiation model may present to Canadian side, it could be beneficial to try to reach some agreement and possibly push for inclusion of both methods. Also, it is necessary to complete technical background in support of detailed radiation method, as a defense of the method and potentially if no agreement can be made to push for detailed method to be the only one. For more details on the work plan for detailed radiation model see attached memo to Sam Taylor.

Lineal vs. area based calculation of U-factors: Bipin Shah and Dragan Curcija from the US strongly objected to the method in which Bill Goss proposal was presented to the group and mentioned to the group that the work was preliminary in nature and that no detail work was done to prove which method works the best for all cases. In addition, the paper presented by Svend it was shown that the area weighted procedure was closer to the 3D solution. Mr. Shah commented that currently NFRC uses area weighted procedure and that if ISO made changes to the procedure NFRC program will be affected in a major way. Therefore ISO group should provide good reasons, backed up with solid evidence in order to make a change at this point. In the future no US representative shall present material which will adversely affect the NFRC program or the industry without prior consultation. This is probably ground for dismissal from the committee.

Action Items:

- 1) Coordinate with Bill Edmunds a US response to ISO 15099 inquiry. Sam Taylor and others to address the newly emerged issue (proposed by Bill Goss) of lineal transmittance method for U-factor calculations. Make both technical and political arguments that this change is premature and that both methods should stay in (All).
- 2) Revise gas properties material from Hartwig Roth (Dragan)
- 3) Continue research in 3-D heat transfer and expand the list of test specimens in support of discussion of linear transmittance vs. area weighted method . (Dragan, Bipin, LBNL, ORNL, selected NFRC test lab). As a first step, analyze NFRC Round Robins using both methods (Bipin, Dragan)
- 4) Comparison between ISO 15099 and ISO 10077 run several frame cross sections. (Dragan).
- 5) Prepare material with supporting documents to discuss the radiation model vs. Alternate 3d procedure (Dragan, Bipin, also see memo),
- 6) Determine edge of glass length by expanding the list of products and glazing options and by plotting local heat fluxes. (D. Curcija),
- 7) Recommend emissivity of aluminum in frame cavities (Bipin, NFRC).
- 8) U-Value for non-standard radiant condition? (Netherlands?).

May 10-11, 2000

ISO/WG14 meeting Was held at ...Vienna, Austria

WG14 met to discuss the test procedure ISO 12567-2 the roof window document.

The group discussed the negatives of the roof window document. US group discussed their two negative. Both negatives were accepted. Also during the discussion Mr Shah brought up the issue of Roof window installation in a test lab. The issue was differed for next meeting.

The group also discussed the ISO 8990. Raay Williams had distributed a document which listed all the items that needed to be addressed. Group will discuss these issue in the next ISO meeting.

Mr. Bipin Shah asked the group if they will be willing to do a Round Robin on a commercial casement with metal l frame. The group informed Mr. Shah that it can happen only if the size was 1m by 1m. Mr. Shah agreed to coordinate the project with Frank Thomas.

Action Items:

- 1) Go through the roof window document.
- 2) Look at the installation guideline by the skylight manufacturers.
Put negative on the document to address the installation problem.
- 3) Look at the documents and make comparision on requirements listed in ASTM 1363 and 8990-1994. Look for in formation about uncertainty requirements.
- 4) Send Lone an email reminding her to send information about window terminology.
- 5) Distribute the 12567-1 and 2 to the NFRC labs for comments.