

**AMERICAN SOCIETY OF HEATING, REFRIGERATING, AND
AIR CONDITIONING ENGINEERS, INC.**
1791 Tullie Circle, NE / Atlanta, GA 30329
(404) 636-8400

TC/TG/TRG MINUTES COVER SHEET

(Minutes of all TC/TG/TRG Meetings are to be distributed to all persons listed below within 60 days following the meeting.)

TC/TG/TRG NO.:	4.5	TC/TG/TRG TITLE:	Fenestration
DATE OF MEETING:	Jan 26, 2015	LOCATION:	Chicago IL
DATE ISSUED:	Jan 28, 2015	RECORDED BY:	Thanos Tzempelikos

Name	Affiliation	E-Mail	Member (VM, CM, Guest)	YEA Member
<i>Anil Parekh (Chair)</i>	Natural Resources Canada	Anil.Parekh@NRCan.gc.ca	VM	
<i>Thanos Tzempelikos (Vice Chair/Programs)</i>	Purdue University	ttzempel@purdue.edu	VM	
<i>William DuPont (Research)</i>	Sunergy	waupi@msn.com	VM	
<i>John Hogan (Standards)</i>	Consultant	John.hogan@iqc.org	VM	
<i>Peter Lyons (Handbook)</i>	Peter Lyons and Associates	peter.lyons@fenestralia.com	VM	
<i>Charlie Curcija (Calculation Methods)</i>	LBNL	ccurcija@lbl.gov	VM	
<i>Michael Collins</i>	Univ. of Waterloo	Mike.collins@uwaterloo.ca	CM	
<i>Joe Hetzel</i>	DASMA	jhetzel@thomasamc.com	CM	
<i>Robert Hart</i>	LBNL	rghart@lbl.gov	CM	
<i>Josue Cavazos</i>	EFCO	jcavazos@efcocorp.com	CM	
<i>Ying-Chieh Chan</i>	Purdue University	ychan@purdue.edu	CM	Y
<i>Iason Konstantzos</i>	Purdue University	ikonsta@putdue.edu	Student/ CM	Y
Mike Builderbeck (TAC Liason)		mbuilderbeck@pickeringfirm.com	G	
Total voting members: 6 Voting members present: 5				

SCOPE:

TC 4.5 is concerned with the identification and evaluation of all physical properties of (1) glasses and other glazing materials, (2) shading and shielding materials and devices, and (3) control devices and strategies which influence the radiant, conduction, and convection transfer of both heat and light through fenestration systems. It is also concerned with the development of procedures for calculating and measuring solar heat gain, daylight admission, and heat transfer through fenestration systems.

COMMITTEE AND MEETING INFORMATION

Subcommittee Meetings:

Calculation Methods	Sunday, January 25 – meeting notes attached
Research:	Sunday, January 25 – meeting notes attached
Program:	January 25 – meeting notes attached
Handbook:	January 25 – meeting notes attached

TC Web Site: <http://tc45.ashraetcs.org>

APPROVE AGENDA

Agenda was approved unanimously.

APPROVE MINUTES FROM PREVIOUS MEETING

Minutes from previous meeting were not approved –missing information.

ANNOUNCEMENTS (TC Chair)

- Roster changes – Updated roster was submitted to Mike Bilderbeck –confirmation from Anil about voting members
- TC/TG/TRG Chairs announcements
 - New Multi-disciplinary Task Group (MTG)
 - ASHRAE can assist in conference calls and web-meetings. Contact mvaughn@ashrae.org
 - Upcoming program dates
 - Ethics

TC LEADERSHIP

Thanos Tzempelikos will serve as the new Chair from July 2015. Joe Hetzel will be Vice Chair. Anil Parekh will be Secretary. John Hogan is the Standards representative. TC is inviting new members to join the committee.

LIAISON REPORTS

Technical Activities Committee (TAC)

Mike Bilderbeck provided the TAC information.

- Discussions on program submissions to CEC. There were some concerns reported about rejected seminar proposals/conference paper submissions without a specific justification.
- Encourage TC Members to participate in local chapters and regional groups.
- TC activity report was submitted on Tuesday Jan. 27, 2015.

Standards

Jim Aswegan asked about the status of Standard 74-1988, based on the work of GPC 25 which was disbanded in 2014. The committee voted to withdraw the Standard. Willie DuPont moved; John Hogan seconded- approved to withdraw 4-0-0.

Research Administration Council (RAC)

No liaison present

Conferences and Expositions Committee (CEC)

No liaison present

Handbook Committee

No liaison present

Chapter Technology Transfer Committee

No liaison present

ASHRAE Learning Institute (ALI) / Professional Development Committee (PDC) –

No liaison present

Special Publications

No liaison present

SUBCOMMITTEE REPORTS

Calculation Methods (Charlie Curcija)

- Discussions on the status of calculation procedures for different fenestration related products and attachments.
- File sharing using the DROP BOX – committee members and other interested researchers are given access. Charlie explained the DROP BOX file structure.
- Charlie will start a baseline document based on SPC 142 that the committee members can work on, to develop a new document potentially substituting ISO 15099 for North America.

Research (William DuPont)

Research Projects:

- TC 4.7, RP 1588-Procedure to create hypothetical layer-by-layer fenestration descriptions when only the bulk properties such as U-factor and SHGC have been defined". Peter Lyons reported that progress has been made and the project is expected to finish before summer 2015.

Work Statements:

- TC 4.5 WS-1710: "Effects of Dynamic Shading Devices on Daylighting and Energy Performance of Perimeter Zones." (Anil Parekh/National Resources Canada). Reply to comments was submitted to the research liaison in October. The WS is being reviewed by RAC in the 2015 winter meeting for final approval.
- TC 4.5 WS-1414: "Update of U-factors, Solar Heat Gain Coefficients and Visible Transmittances of Standard Fenestration Units made from Representative Fenestration Frame and Glazing Systems in the Fenestration Chapter of the Handbook of Fundamentals." William C. duPont/Sunergy Consulting, Charlie Curcija/LBNL and Bipin Shaw/WinBuild. William DuPont reported that he has received additional comments from RAC and will try to address these and resubmit as soon as possible.

RTARs:

- TC 4.5 RTAR Proposal: "Numerical Quantification of Convective Heat Transfer Coefficients for Indoor Shading Attachments." John Wright/University of Waterloo, Charlie Curcija/LBNL, Peter Lyons/Peter Lyons & Associates and Thanos Tzempelikos/Purdue University. Copies of this RTAR were distributed in the previous meeting. Charlie wanted to add language to include the airflow around the outer edges of shading systems given that the gaps between the edge of the shade and the window frame may be different for various shades and

installations. Comments are due to John Wright, the initial author of the RTAR, before the end of July. The revised RTAR will be distributed to the voting members as a mail ballot.

- TC 4.5 RTAR Proposal: “*Develop Reference Representative Solar Spectra for Solar Heat Gain Calculations to Rate Fenestration in North America*,” William C. duPont/Sunergy Consulting, Chris Gueymard/Solar Consulting Services, Charlie Curcija/LBNL, and Peter Lyons/Peter Lyons & Associates. William duPont will work on this RTAR writing (in progress). Charlie Curcija and Peter Lyons asked to be added to the review group.

Long range research plan:

- “Characterizing Thermal and Optical Properties of PV Film Coated Glazing Systems,” Anil Parekh/National Resources Canada & Aziz Laouadi/National Research Council Canada. Charlie Curcija suggested that this project be dropped from the list as LBNL is currently performing research on this topic. More details are needed to decide on this topic.
- “Develop and Validate the Methodology to Calculate the Thermal Performance of Exterior Roller Shutters, Fixed Louvered Exterior Shutters and Interior Roman Shades,” Charlie Curcija/LBNL and William C. duPont/Sunergy Consulting. Some fenestration systems were currently excluded from WINDOW as there is no simulation methodology to calculate their performance. Future research is needed in this direction, as well as on commercial experimental validation of existing models for different attachment types.

Conferences and Expositions (Thanos Tzempelikos)

CHICAGO PROGRAM, JANUARY 24-28, 2015

Conference Paper Session 13: Energy associated with building envelopes.

Wednesday Jan 28, 11:00am-12:30pm, Crystal Room. Chair: Thanos Tzempelikos/Purdue

1. “Assessing Convective Heat Transfer Coefficients Associated with Indoor Shading Attachments using a New Numerical Technique”, S.M. Froushani, J.L. Wright, D. Naylor, M.R. Collins/Waterloo, Ryerson Univ.
2. “Rethinking Energy Design Guidelines for Building Form Articulation”, S. Nagpal, R. Manudhane, S. Bhawe/Atelier Ten, Transsolar
3. “Daylight glare probability measurements in offices with dynamic facades”, I. Konstantzos, A. Tzempelikos/Purdue University

ATLANTA PROGRAM, JUNE 27-JULY 1, 2015

Deadlines:

Conference Papers due January 5, 2015;

Seminar & Forums Session Proposals due February 9, 2015;

Revised conference papers/final technical papers due February 13, 2015

All Presentations due June 5, 2015.

Conference paper submitted:

1. “Impact of Solar Optical Properties of Roller Shades on Energy, Daylighting and Comfort”, Y-C. Chan, A. Tzempelikos & B. Protzman/Purdue University

Seminar/Workshop: “Thermal performance of fenestration,” Chair: John Hogan/Consultant

1. “Determination of Garage Door and Rolling Door U-Factors,” Michael Thoman/Architectural Testing, Inc. & Joseph Hetzel/DASMA
2. “Dynamic Thermal Performance of a High Performance Door”, Joseph Hetzel/DASMA

Seminar: “Daylighting of commercial spaces with tubular daylighting devices” Charlie Curcija/LBL

1. “Visible Transmittance Measurements of Tubular Daylighting Devices,” Charlie Curcija/LBNL
2. “State of the Art Thermal Modeling of Tubular Daylighting Devices,” Aziz Laouadi/NRC
3. “A Tubular Daylighting Manufacturer’s Perspective,” Neil Digert /Solartube

ORLANDO PROGRAM, JAN 23-27, 2016

Conference paper abstracts due March 2015

Technical papers due April 2015

Seminars/forum proposals due August 2015

Transactions Session: "NFRC Research Projects," *Chair: ?*

1. "Window Awning Rating Feasibility Assessment," *W. Ross McCluney/Sun Pine Consulting, William C. duPont/Sunergy Consulting & John Gant/Glen Raven Custom Fabrics*
2. "Results from NFRC WINDOW6/THERM6 validation projects", *William duPont*

Transactions Session: "Computer Simulation Methodologies to Predict the Performance of Blinds and Shading Systems," *Chair: ?*

1. "Modeling the Performance of Honeycomb and Cellular Shading Systems," *Charlie Curcija, Jacob Jonsson & Robert Hart/LBNL*
2. "Modeling the Performance of Pleated Shading Systems," *Charlie Curcija, Jacob Jonsson & Robert Hart/LBNL*

Other papers planned:

"Validation of pleated shade model/Keyes chart modification", *Michael Collins/Waterloo*

"An experimental study and model of a window with STPV", *A. Athienitis, K. Kapsis/Concordia*

2015 ASHRAE ENERGY MODELING CONFERENCE

September 30-October 2, Atlanta

Abstracts due: March 2, 2015

Notification of abstract decisions: March 16, 2015

Accepted speaker forms due: March 30, 2015

Presentations due: Sept. 8, 2015

Submitted abstracts:

1. "Optimal design and control of multi-sectional dynamic facades for office perimeter zones", *Chan and Tzempelikos/Purdue University*
2. "An integrated thermal and lighting simulation tool for perimeter zones with dynamic façade systems", *Shen and Tzempelikos/Purdue University*
3. LBNL?

Handbook (Peter Lyons)

- ASHRAE Handbook of Fundamentals Chapter 15 is complete and was published in June 2013.
- It was noted the last round of changes (minor) were not included in the final version of the published chapter. These will be included in the new revision.
- Peter Lyons started the process of assigning tasks to the committee members for potential revisions. A google document was shared with initial draft assignments, which will be edited by the committee. Alternatively files will be shared using dropbox. The assignments will be accepted by the end of February, with a target of the summer meeting to discuss first changes in the handbook chapter 15.
- There are some problems with file formatting of the chapter (equations appear as images etc). We need to have a clean word document that can be edited appropriately.
- In the new edition, Fenestration Chapter is included in the Load Calculations group. Committee members felt that this chapter belongs to the Building Envelope group. This will be further discussed with the Handbook Committee.
- There was discussion about the online version and how much it will be used.

Standards (John Hogan)

John Hogan presenting:

- Std 90.1: There are proposed changes in fenestration U-factor in the prescriptive Building Envelope tables. There will be a public review in the spring of 2015.
- Std 90.2: The next public review draft is scheduled for August 2016 (18 months from now.)
- Std 189.1: This group is currently waiting to see where 90.1 ends up. 189.1 currently uses multipliers on 90.1 criteria. 189.1-2014 was published with these multipliers.

OLD BUSINESS

None.

NEW BUSINESS

Review of Current Schedule Timings of Meetings

- TC 4.5 members explored more suitable schedule for meeting. The main reason is to avoid conflict with relevant TCs and also enable others from various TC and Standard participants to attend the TC 4.5. The following schedule changes are proposed:
 - Meetings be held on Monday and Tuesday.
 - Monday – from 2:15 to 5:30 PM – will cover Research (2:15 to 3:15), Program (3:15 to 4:15) and Handbook (4:15 to 5:30) subcommittees.
 - Tuesday – from 1:00 to 4:00 PM – will cover Main Meeting (1:00 to 3:00 PM) and Calculation Methods (3:00 to 4:00 PM)

Anil will approach TC 4.0 Section Head and ASHRAE HQ to request for the above changes. **(ACTION)**

ADJOURN

Approximately 4:20 pm

*Respectfully submitted by Thanos Tzempelikos (TC 4.5 Vice Chair)
January 18, 2015*