9. TEST REPORT

9.1 Reported Data

Report results per NFRC 701.05 [9].

~~Report the following information, where applicable, for the period in which the solar calorimeter is in steady-state conditions as defined by Section 7.4:~~

~~A. The test specimen size, design drawing(s) and a detailed description of all the test specimen components (i.e., frame, glazing, hardware weather-stripping, etc.) shall be reported. Any non-standard test specimen size and non-standard test conditions used shall be explained.~~

~~B. Description of surround panel and installation of test specimen.~~

~~C. Date and the Local Time of the beginning and end of the test period.~~

~~D. Description of the location of the solar calorimeter(s); and the foreground in view of the test specimen~~

~~E. Previous date of each calibration test specified in Section 5; including the wall heat flux calibration test, surround panel flanking loss calibration test, calibration transfer standard test, fluid flow rate instrumentation, pyranometer and fluid temperature difference instrumentation.~~

~~F. The average Solar Heat Gain Coefficient, SHGC, over a constant incident or profile angle; and the average incident angle, θ_E or average profile angle, ψ_E, of the incident solar irradiation (i.e., SHGC of 0.56 at a profile angle of 30^{o}).~~

~~G. A graph of the measured Solar Heat Gain Coefficient, SHGC in relation to the incident angle, θ_E or profile angle, ψ_E, of the incident solar irradiation.~~

~~H. Range of solar calorimeter tilt and azimuth for the duration of the test; if the solar calorimeter moves over the duration of the test, describe the tracking system and strategy.~~

~~I. Average ambient barometric pressure.~~

~~J. Average and extremes of exterior wind velocity and direction; and average and range of exterior surface heat transfer coefficient, $h_{h\text{-}sun}$, during the test~~

~~K. Diagrams documenting all surface temperature locations (i.e., absorber plate, surround panel, etc.) and corresponding temperatures at each location at the time of greatest solar irradiation. If the test specimen surface temperatures are measured, include the average surface temperature of the test specimen on the weather side, t_2 and calorimeter side, t_1.~~

L. Diagrams documenting all air temperature locations (i.e., inside, t_h and outside, t_c, of solar calorimeter) and corresponding temperatures at each location at the time of greatest solar irradiation.

M. The average interior air temperature, t_c and exterior air temperature, t_h, measured during the test.

N. Inlet fluid temperature, outlet fluid temperature, flow rate of the fluid, f and heat extracted by the fluid heat extraction system, Q_{fluid}, measured at the time of greatest solar irradiation.

O. Temperature difference across solar calorimeter walls and the heat flow associated with that temperature difference, Q_{walls}, at the time of maximum solar irradiation.

P. The average standardized thermal transmittance, U_s; a description of the method used to determine the average standardized thermal transmittance; including the heat flow due to thermal transmittance effects, $Q_{U\text{-}Factor}$, at the time of maximum solar irradiation.

Q. The temperature of the interior surface, t_{sp1} and the exterior surface of the surround panel, t_{sp2}, measured at the time of maximum solar irradiation; including the heat flow through the surround panel, Q_{sp}.

R. The heat added to the interior of the solar calorimeter by heaters, fans or pumps, Q_{AUX}, at the time of maximum solar irradiation.

S. The calculated heat flow through the test specimen, Q_S, measured that the time of maximum solar irradiation.

T. The maximum, minimum and average solar irradiation, E_S, measured over the duration of the test.

U. The procedures used to estimate the uncertainties shall also be documented as an Annex to the report.

V. The following statement from Note 2 shall be included in the test report directly after the above results are reported.

> "This test method does not include separate procedures to determine the heat flows due to either air movement or nighttime U-factor effects. As a consequence, the SHGC results obtained do not reflect the overall performance which may be found in field installations due to temperature differences, wind, shading, air leakage effects and the thermal bridge effects specific to the design and construction of the fenestration system opening. Since there are a wide variety of fenestration system openings in residential, commercial and industrial buildings, it is not feasible to select a "typical" surround panel construction in which to mount the fenestration test specimen. The selection of a relatively high thermal resistance surround panel places the focus of the test on the thermal performance of the fenestration system alone. Therefore, it should be recognized that the thermal transmittance results obtained from this test method, for ideal laboratory conditions in a highly insulating surround panel, should only be used for fenestration product comparisons or

~~as input to thermal performance analyses which also include thermal, air leakage and thermal bridge effects due to the surrounding building structure. To determine air leakage effects for windows and doors, refer to ASTM E 283. For thermal transmittance refer to ASTM C 1199."~~

~~W. For Dynamic Glazing Products, reported data shall include ratings achieved at both the full ON and OFF or the full OPEN and CLOSED positions.~~

9.2 Uncertainty Estimation [*Unchanged*]

REFERENCES

1) Arasthe, D.K, Fnilayson, E., Mitchell, R., Huizenga, C., & Curcija, D., "THERM 2.1 – A PC Program for Analyzing Two-Dimensional Heat Transfer Through Building Products"; LBNL, 1999.

2) Arasthe, D.K., Finlayson, E.U. and Hizenga, C, "WINDOW 4.1: A PC Program for Analyzing Window Thermal Performance"; LBNL 1994.

3) Enermodal Engineering, Ltd. "FRAME – A computer Program to Evaluate the Thermal Performance of Window Frame Systems"; Version 3.0, Enermodal Engineering, Ltd.

4) Langmuir, I., Adams E. Q. and Meikle F. S., "Flow of Heat Through Furnace Walls" *Transactions American Electrochemical Society*, Vol. 24, 1913, pp. 53-84.

5) McCluney, R. "Sensitivity of Optical Properties and Solar Gain of Spectrally Selective Glazing Systems to Changes in Solar Spectrum," *Proceedings of the 22nd Annual Solar Conference*, Washington, DC: American Solar Energy Society, 1995.

6) McCluney, R., "Sensitivity of Fenestration Solar Gain to Source Spectrum and Angle of Incidence," *ASHRAE Transactions* 10 (June 1996).

7) Schenck, H., *Theory of Engineering Experimentation*, McGraw Hill, New York, N.Y., Third Edition, 1979, Chapter 3, p. 53.

8) Wilcox, S. and Al-Abbadi, N., "Using Irradiance and Temperature to Determine the Need for Radiometer Calibrations," *Forum 2001: Proceedings of the ASES Annual Conference*, Washington, DC, April 2001.

~~8)~~9) *NFRC 701.05: NFRC 201 Solar Calorimeter Test Reporting Requirements.* National Fenestration Rating Council: Greenbelt, MD; 2010. www.nfrc.org.