



Development of Solar Heating and Cooling Performance Standard

Jeremy Osborne

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Timeline

Project: June 2011 - October 2012

We have had two meetings and have one planned for April 2012.

We have considerable work to be undertaken to get it done by later this year.

Aim and Purpose

Aim:

To develop a standard method for the calculation of the performance and energy consumption of solar heating and cooling systems.

Purpose:

To enable a standardised method of comparing the performance of solar heating and cooling systems.

This gives policy makers the tools to devise incentive programs and minimum performance standards for these systems.

Scope

At this stage of development, the scope is limited to the following applications.

- Packaged systems (solar cooling kits)
- Desiccant and sorption systems
- Possible inclusion: Monitoring procedure for custom engineered systems.

However it will be written to include other technologies in the future.

Method

Component Testing System Simulation - CTSS

- The simulation package will be TRNSYS
- The Australian industry has considerable experience with the CTSS method for the performance assessment of solar water heaters: AS4234:2008 Heated water systems— Calculation of energy consumption
- AS4234:2008 has been adopted by the Office of the Renewable Energy Regulator and Sustainability Victoria for performance based incentive programs for solar hot water systems.

Method - Component Testing

Provide the method of laboratory testing or reference/adopt appropriate international standards for the major components.

Testing procedures considered by the committee to date:

Desiccant

- ANSI/ASHRAE Standard 174-2009, Method of Test for Rating Desiccant-Based Dehumidification Equipment
- ANSI/ASHRAE Standard 139-2007 Method of Testing for Rating Desiccant Dehumidifiers Utilizing Heat for the Regeneration Process
- ARI 940-98, Desiccant Dehumidification Components

Absorption chiller

- ANSI/ARI Standard 560: 2000 Standard for Absorption Water Chilling And Water Heating Packages.

Method - Component Testing

Absorption chillers - characteristic curves

WORK IN PROGRESS

Multi-linear regression of test data to re-produce the performance within a given range of temperature inputs.

$$Q = C_1 * T_{evaporator} + C_2 * T_{generator} + C_3 * T_{cooling} + C_4$$
$$COP = D_1 * T_{evaporator} + D_2 * T_{generator} + D_3 * T_{cooling} + D_4$$

Important:

1. The number of testing points selected
2. where these points sit on the range of operation.

Method – System Simulation

The selected simulation tool is TRNSYS

- Australia has considerable experience using TRNSYS for the calculation of performance for solar water heaters and heat pumps (AS4234:2008)
- The standard will incorporate the development of template TRNSYS files to assist in its implementation.
- It has been decided a building load will be simulated as part of the assessment to allow interaction between solar cooling system and the building.



Thank You

Solem Consulting
Mobile: +61-(0)421 914 516
Email: jeremy.osborne@solem-consulting.com
Web: www.solem-consulting.com
Skype: [jeremy.osborne@solem-consulting.com](https://www.skype.com/people/jeremy.osborne@solem-consulting.com)
Network via Skype during the meeting

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