2010 HIGHLIGHTS

SHC Task 43
Research on Solar Collector and System Testing and Certification

THE ISSUE

Solar collector and system testing and certification is performed by testing laboratories and certification bodies around the world. The criteria for testing and the resulting certifications are subject to rules and regulations established by a variety of governmental and regional entities. For example, the United States relies upon test standards promulgated by the Solar Rating & Certification Corporation, while the European Union countries rely upon the EN 12975, 12976 and 12977 testing standards developed and maintained by the European Committee for Standardization (CEN) and certified according to the Solar Keymark. Other testing and certification programs have been developed for the Australian and Canadian markets, and may also be developed for the large Asian markets.

As markets for solar thermal products and manufacturers of those products continue to expand throughout the world, product quality and consumer protection oversight through testing and certification becomes increasingly important as new product manufacturers proliferate, international harmonization and optimization of testing and certification programs becomes increasingly important.

OUR WORK

Task 43 is organized into two Subtasks:

- ***Subtask A*** is examining existing testing and certification procedures for all types of solar thermal collectors, with the objective of identifying opportunities for improvement and harmonization.
- ***Subtask B*** is performing a similar analysis of testing and certification procedures for entire solar thermal systems.

SHC Task 43 is a three-year collaborative project that is scheduled for completion in June 2012.

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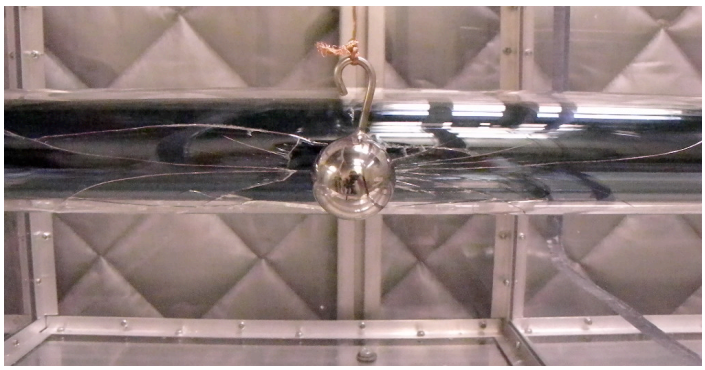
KEY RESULTS OF 2010

Collector Work

Work to update the Subtask A Roadmap first compiled by CENER in 2009, to reflect progress made in 2010, will be disseminated in first quarter 2011, including status reports on the following topics.

Impact Resistance Testing. Primarily designed to measure resistance to hail and wind-driven object impacts, Impact Testing has been changed from informative to mandatory. Work continues to evaluate the use of steel balls or artificially manufactured ice balls, or some allowance for both procedures, in order to quantify impact resistance capability. Impact resistance will also be categorized in classes and presented in a format so as to allow for specification of a certain collector impact resistance class based on the severity and frequency of weather-generated impact events in specific geographic locations.

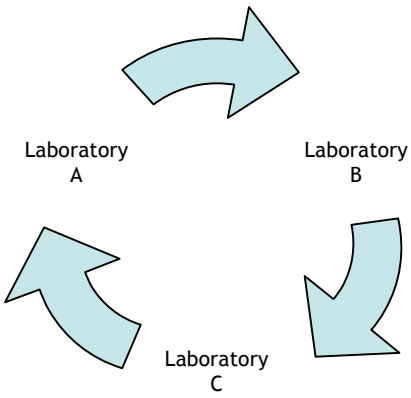


Above: Variable Speed Ice Ball "Rail Gun" (50 to 160 KPH)

Left: Steel Ball "Pendulum"

Photos Courtesy: National Renewable Energy Laboratory

"Round Robin" Collector Testing. In order to confirm the consistency of collector efficiency and durability testing performed by laboratories throughout Europe and North America, identical collectors from two single-lot purchases of both flat plate and tubular collectors are being tested by all SRCC accredited North American laboratories, and European laboratories are conducting similar identical lot testing of solar collectors.



By testing the same or identical collectors according to EN/ISO and SRCC standards, Task Experts are able to provide an important check on the reproducibility of testing. Any inconsistencies or gaps that are identified can then be addressed through the standards revision process now underway, particularly in Europe under the auspices of the European Union-funded QAiST (Quality Assurance in Solar Heating and Cooling Technology) Project.

New Collector Testing Standards Development. In 2010 SRCC Standard 600 "Test Methods and Minimum Standards for Certifying Solar Concentrating Collectors" was finalized, and concentrating collectors are currently under test in the

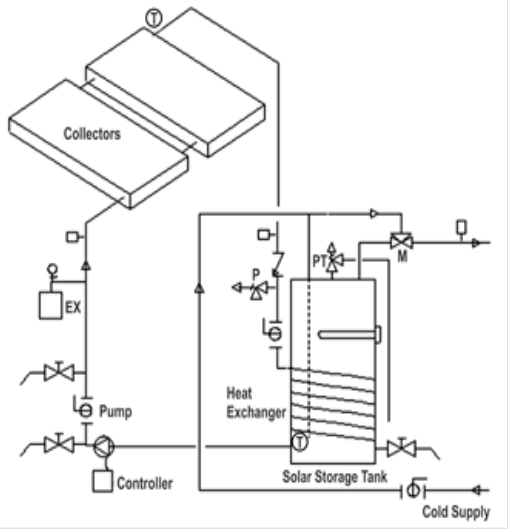
US by SRCC accredited testing laboratories. In addition, new language addressing tracking concentrating collectors is under development for EN 12975 in Europe.

The Canadian Standards Association released F378.2 for closed and open loop, as well as glazed and unglazed air-heating collectors on November 30, 2010, with a 60-day public comment period scheduled to end in early 2011. Both concentrating and air-heating Standards will contribute to the goal of testing and certification harmonization, in that they have been open to international collaboration during their development.

As in the Impact Resistance Testing work discussed above, other possible Standards revisions will examine a "classes" approach for the Exposure and Mechanical Load Tests. Finally, a test procedure for solar absorber surface durability is under discussion, and may form a part of the revised EN 12975 Standard.

Systems Work

A Roadmap for Testing and Certification Research Issues for Systems, including Improvement of Existing Systems and Harmonization of Testing and Certification was prepared by Harald Drück (ITW) in March 2010.



Component/Materials Substitution. Research continues on system component/material substitution and the extrapolation of system size changes, in regards to how these topics effect actual system performance versus predictions. Completed work will result in recommendations on how tests and standards for systems should be amended and/or adopted.

System Performance Modelling. Research continues on computer simulation and modelling tools to identify strengths, weaknesses, gaps in their capabilities, and inconsistencies in their application or interpretation. Computer modelling of system performance may yield benefits for manufacturers and end-users if it can be confirmed to yield repeatable results through correlation with actual system tests.

Global Certification Body

Discussions continue about the value of a global certification scheme, based on either the expansion of existing regional/national certification schemes, or on the development of a new global certification approach.