

TASK 43 Subtask A – FINAL REPORT

Rating and Certification Procedures – Advanced Solar Thermal Testing and Characterization for Certification of Collectors and Systems

Les Nelson
U.S. Operating Agent

Jan-Erik Nielsen
European Operating Agent

June 14, 2013
73rd IEA-SHC Programme Executive Committee Meeting
Rome, Italy

Task 43, Subtask A Objectives

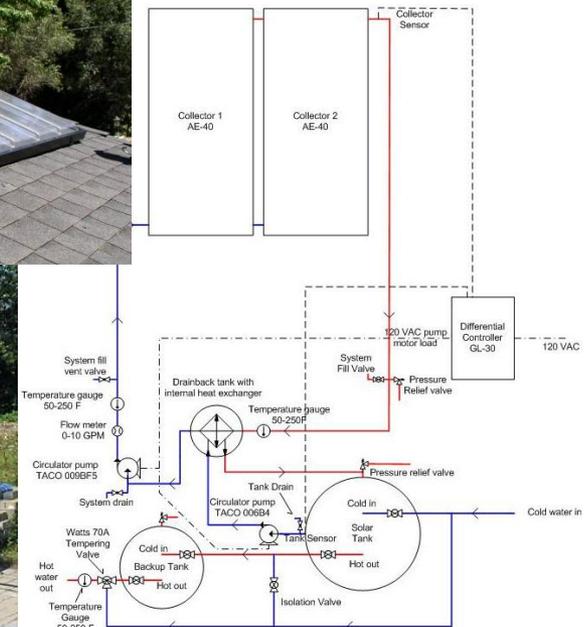
- ❑ **Evaluation of current collector testing standards and procedures**
- ❑ **Identification of inconsistencies between various test standards and product certification programs**
- ❑ **Identification of missing or inadequate test standards for various solar thermal products**
- ❑ **International harmonization of solar collector testing and certification**

Task Participants

Country	Number of Research Institutes	Number of Universities	Number of Companies	Government Representative
Australia	1	1		1
Austria	2			
Canada			1	1
Denmark			1	
Germany*	1	2	2	1
Italy	1		1	
Portugal*	1		1	
Spain*			3	
Sweden	1	1	1	
Switzerland		1		
United States	1	1	3	1

Subtasks

- A: Collectors (*CENER Lead, Enric Mateu Serrats*)
- B: Systems (*ITW Lead, Harald Drucek*)



- Accomplished:
 - **Extensive communication and cooperation between continents and countries; coordination of standards changes and development**
 - **Roadmap of collector testing issues supported by technical papers and recommendations**
 - **Participant involvement with QAI²ST project added significant content for Subtask A Final Report**
 - **Global certification scheme advancing; support building from Task participants, testing, certification and standards experts, governments**

Subtask A: Collectors - Status

Objective: To examine existing testing and certification procedures for low-temperature evacuated tube and flat-plate collectors, air heating collectors, medium- to high-temperature concentrating collectors, to identify weaknesses, inconsistencies in application, and significant gaps.

- ✓ **Activity A.1: Roadmap of collector testing and certification issues - Complete**
- ✓ **Activity A.2 – Low-to-Medium Temperature Collector Test Procedures, Standards and Simulation – Complete**
- ✓ **Activity A.3 – Air Heating Collector Test Procedures, Standards and Simulation – Complete**
- ✓ **Activity A.4 – Concentrator Collector Test Procedures, Standards and Simulation – Complete**
- ✓ **Activity A.5 – Communication and Adoption of Result**
Ongoing communication linked to Task Extension, global certification



Subtask A

Roadmap Of Collector Testing and Certification Procedures

Author: Enric Mateu-Serrats, CENER

Contributors: Korbinian Kramer, ITW; Stephan Fischer, ITW; Peter Kovacs (SP)



1. Introduction
2. Solar Thermal Market Overview
3. Solar Rating Certification Standards
4. Parameter Definitions
5. Low to Medium Temp Collector Test Procedures
6. Air Heating Collector Test Procedures
7. Concentrating Collector Test Procedures
8. PV/T Collector Test Procedures
9. Solar Fluid Test Procedures
10. Collector Test Standards Comparison

Subtask A

White Paper on Low to Medium Temperature Collectors

Authors: Stephan Fischer (ITW); Korbinian Kramer (ISE); Peter Kovacs (SP)



1. Introduction
2. FPC and ETC Durability and Reliability Requirements and Test Methods
3. FPC-ETC Collectors: Round Robin Tests
4. Polymeric Material Collectors
5. Collector Energy Output
6. Text Proposals for ISO 9806 Standard Revision
7. Subtask A Roadmap Content Related to Low to Medium Temp Collector Test Procedures

ANNEX 1. Final QAiST Report

Subtask A

White Paper on Solar Air Heating Collectors

Author: Korbinian Kramer, ISE



1. Introduction
2. Technology Overview
3. Review of Performance Models, Testing Procedures and Standards
4. Air Collector Tests
5. ANNEX I. Subtask A Roadmap Content Related to Air Heating Collectors
6. References

Subtask A

White Paper on Concentrating Collectors

Authors: Stephan Fischer, ITW; Enric Mateu, CENER; Peter Kovacs (SP); and Carsten Lampe (ISFH)



1. Summary
2. Introduction
3. Status of Standardization Work Related to Concentrating Collectors
4. Definitions and Requirements
5. Review of Performance Models, Test Procedures, and Test Conditions
6. Concentrating Collector Tests
7. Collector Component Characterization, Durability and Reliability
8. Text Proposals for Standard 9806 Revision
9. Proposals for Future Work

ANNEX 1: Working Paper on Wind Speed Effects

ANNEX 2: Working Paper on Performance Measurement at Elevated Temperatures.

- ✓ **Subtask A Work Complete**
 - **Extensive, comprehensive report complete, providing strong foundation for next steps.**
- **Subtask A Completion Vote Requested**
- **Extension of Task 43 Related Work**
 - **Additional work is required in order to achieve the goals of international collector testing and certification harmonization. This work is addressed in the proposed Task 43 Extension focused on completion of Subtask B work and initiation of global certification program development.**

Thank You

Les Nelson, IAPMO