QAiST

Quality Assurance in Solar Heating and Cooling Technology

Solar Keymark Network meeting

Paris, France

5-6 October 2011

INTELLIGENT ENERGY EUROPE

Work in Progress

WP2: Solar thermal collectors

WP3: Solar thermal systems

WP4: Quality assurance of testing

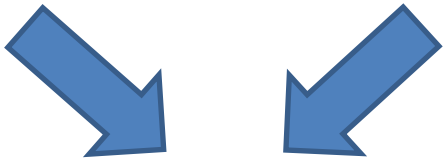
WP5: New areas for quality assurance systems

Update on status of the Work Packages

WP2:
Solar thermal collectors

D 2.1 Performance of mid temperature collectors (CENER lead)

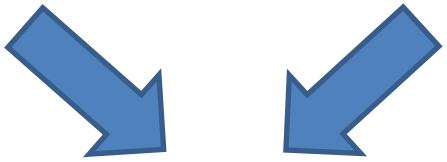
D 2.2 Durability of collectors and materials (ISE lead)



- First step
  - EC request for CE marking / revision of the ISO 9806
  - Two drafts are now out on CEN inquiry (EN 12975 parts -1 and -3-1) and one is ready for ISO CEN parallel inquiry (ISO EN 9806) in November 2011
  - All three are planned to be implemented by the end of 2012
  - Contents are e.g. harmonized annex ZA, tracking collectors in the scope, improved durability tests, Task X method on selective coatings integrated, air collectors included, etc...

D 2.1 Performance of mid temperature collectors (CENER lead)

D 2.2 Durability of collectors and materials (ISE lead)



- Second step
  - Further work on the ISO EN standards
  - Draft for public inquiry in 2012
  - Contents are e.g. focusing on ETC:s and further on collector materials

D 2.3 Guide to EN 12975 (SP lead, Due December 2012)

- Five main partners have been working on two deliverables, one targeted at test labs (new and existing...appr. 50 pages), one at manufacturers (brief introduction....5-10 pages) →

- All remaining partners and industry provide additional input and review

- Available by the end of 2011

D 2.4 Performance calculation tool

- Extension to unglazed and tracking/concentrating collectors and some minor improvements implemented as proposed by reviewers

- Checking and validation carried out by several partners was recently concluded (No major remarks)

- To be included in Scheme Rules and in ISO EN 9806 asap

Results from the Energy Output Calculator

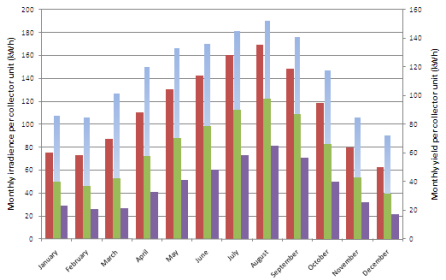
Version 3.6 (TRIAL VERSION THAT HAS NOT BEEN VALIDATED, Feb, 2011)

Identification label for the solar collector: Not specified

Date of evaluation: 18 March, 2011

Monthly irradiance and yield per collector unit (kWh)

	Irradiance	Yield (three collector mean temperatures)		
		25°C	50°C	75°C
January	107	60	40	23
February	106	58	37	21
March	127	70	43	21
April	150	88	58	33
May	166	105	71	41
June	170	114	79	48
July	161	108	90	58
August	150	105	98	65
September	126	119	87	57
October	147	95	66	40
November	106	64	43	25
December	90	50	31	17
Year	**1 718**	**1 086**	**742**	**451**



Location: Athens
Longitude: -23,73
Latitude: 38,00
Climate data, time period: 1996-2005

Collector information (all inputs are based on aperture)
Aperture area: 1 m²
Evaluation method: Steady state
η_0 0,700
$F'(\tau\alpha)_n$ 0,710
$K_{\theta,d}$ 0,908
a_1 3,6 W/m² K
a_2 0,015 W/m² K²
Type of tracking: No tracking
IAM Type: Simple, one-direction
b_0 = 0,1

Update on status of the Work Packages

WP3:
Solar thermal systems

WP 3: Solar thermal systems

Improvement of the standards:

- Factory Made Systems / Custom Built Systems
  (EN 12976 Part 1 and 2) / (CEN/TS 12977 Part 1,2,4 and 5 and EN 12977 Part 3)
  - **Outcomes:**
    - Revised version of EN 12976 presented in CEN TC 312 WG2/WG3 Meeting in Kassel (September 2010);
    - **Deliverables:**
      - Clarification of requirements in both standards – Final version available until end of year;
      - Guide for EN 12976 on reliability tests.

WP 3: Solar thermal systems

Development of an extrapolation procedure

- that proves to be valid for different types of systems allowing for flexibility in the definition of families of systems and reducing test costs for the manufacturers

- **Outcomes:**
  - Two different methodologies now available in Solar Keymark Scheme Rules
  - Proposals for revision presented and approved at 10th SKN meeting;
  - Application of these methodologies by Labs – exchange of experience.

WP 3: Solar thermal systems

Development of a procedure for converting the test result into results valid for the “EU reference tapping cycles”

- necessary for Labeling of systems according to European Directive for Eco-Design
  - How to apply this procedure to tests performed with DST/CSTG test methodologies?

Outcomes:

- First application with DST for Factory Made and TRNSYS for Custom Built Systems
- First proposal for application with CSTG test results – to be validated.

WP 3: Solar thermal systems

Definition of concept: Hot Water Comfort (STS)

- **Outcomes:**
  - First document with the revision of the existing test methods for assessment of Hot Water Comfort was prepared
  - Work on going on final proposal from QAiST for access of Hot Water Comfort.

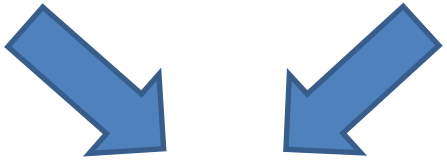
Update on status of the Work Packages

WP4:
Quality assurance of testing

WP 4: Quality assurance of testing

T 4.2 Round Robin Collector

T 4.3 Round Robin Systems



- Organization, managing and evaluation by independent body (IfEP GmbH)
- Rotation in winter 2010/2011 (completed)
- Midterm results have be presented by IfEP March 23rd and have been considered as very good by IfEP
- Final results expected October 2011

WP 4: Quality assurance of testing

- T 4.2 Round Robin Collector
  - 3 flat plate and 13 evacuated tubular collectors with CPC collectors
  - Each participant test 2 collectors of both types (4 tests)
  - Participants: ***CENER, CSTB, DEMOKRITOS, AIT, LNEG, IPIEO, ISE, ISFH, ITC, IZES, SP TÜV, ITW***
- T 4.3 Round Robin Systems
  - 9 thermosyphon and 9 forced circulation systems
  - Each participant will test 2 systems (4 tests)
  - Participants: ***CENER, CSTB, DEMOKRITOS, LNEG, ISE, ISFH, IZES, TÜV, ITW***

WP 4: Quality assurance of testing

- T 4.2 Round Robin Collectors
  - Additional participants
    - ASIC
    - Bosch Solarthermie GmbH
    - 6 North american test labs
  - Collectors, transport, evaluation and all other expenses caused by the Round Robin will be covered by the additional participants
  - In order not to influence the result of the QAiST Round Robin the evaluation will be done in parallel by IfEP

Update on status of the Work Packages

WP5:
New areas for
quality assurance systems

WP 5: New areas for quality assurance systems

Objectives

- **To develop a basic set of requirements and test methods for emerging areas of solar thermal energy**

Application is already on the market => need for quality assurance measures not covered by any standards so far e.g. large solar thermal systems, solar cooling

OR

Application is new on the market => no quality assurance measures existent yet e.g. combined solar & heat pump systems

WP 5: New areas for quality assurance systems

– To develop a basic set of requirements and test methods for emerging areas of solar thermal energy

WP 5: New areas for quality assurance systems
Leader: Ivan Malenkovic, AIT

Task 5.1	Task 5.2	Task 5.3
Performance references and test methods for HP+ST	Function and yield controlling of large solar thermal systems	Quality requirements for solar cooling systems
Leader: Ivan Malenkovic, AIT	Leader: Klaus Vanoli, ISFH	Leader: Pilar Navarro, ITC

WP 5: New areas for quality assurance systems

– Status and outlook Task 5.1

- Overview of present HP+ST systems in cooperation with Task 44/Annex 38 ongoing.
- ST and HP relevant standards collected and analysed
  - extension possibilities regarding combined systems
  - development of transparent and consistent performance evaluation system

WP 5: New areas for quality assurance systems

– Status and outlook Task 5.1

- Proposal for system classification with the focus on testing and performance evaluation requirements
- Unified concept of performance evaluation figures
  - taking into account the comparability of these systems to other technologies
  - proposed, jointly with Task 44 / Annex 38
  - Further discussion needed before finalisation until the end of 2011.

WP 5: New areas for quality assurance systems

Status and outlook Task 5.2

- Currently available function and yield control concepts have been collected and reviewed
- Workshop to discuss new VDI 2169 guideline with all relevant stakeholders being prepared
- Initial goal revised
  - harmonized technical approach on F&YC cannot be reached
  - new task objective: setting the basis for the strategic roadmap for the development and implementation of F&YC

WP 5: New areas for quality assurance systems

Status and outlook Task 5.3

- Data collected on running solar cooling systems
- Results from the collected data, including qualitative assessment of the installations in terms of performance and quality, available
- Based on the results, additional in-depth questionnaire was defined and experts' interviews are ongoing

WP 5: New areas for quality assurance systems

Status and outlook Task 5.3

- The collection of relevant standards and other normative documents was carried out. The documents will be analysed and used as a starting point for the development of test method proposals.
- A definition of best practice and lessons learned will be published on the project intranet

Update on status of the Work Packages

WP6&7:

Communication and Dissemination

WP 6&7: Communication and Dissemination

T6.1 Distr. dissemination of project results

- Prepare initial info-release for 2011
- Inform on CE marking mandate & planned revisions
- Previously: update of national reports from SK II
  - AT , CZ, DK, ES, FR, DE, GR, IT, MK, PL, PT, SE
- Several presentations at international level
  - ISES conference:
    - Midterm result of the Round Robin test of solar collectors and solar thermal system
    - Global certification of solar collectors
    - Energy output calculation tool for Solar thermal collector
    - Test methods for solar thermal collectors

WP 6&7: Communication and Dissemination

T6.1 Distr. dissemination of project results

- Several presentations at international level
  - ESTEC 2011 - 5th European Solar Thermal Energy Conference, Marseille:
    - Interim results of QAiST project
    - Performance evaluation of solar thermal and heat pump hybrid systems
  - April 2012
    - Meeting of CEN/TC 312/WG1, location to be confirmed
    - Discussion on comments from public review
  - June 2012
    - Meeting of CEN/TC 312/WG1 and CEN/TC 312, Borås Sweden
    - Approval of final draft and submission to final vote on EN 12975
  - Several presentations at National level

WP 6&7: Communication and Dissemination

T6.5 WP6/ International harmonization

- Broad European participation in IEA SH&C Task 43 on global standards and certification--> Harmonization in practice!
- Presentations at ISO/TC 180, CEN TC 312 and IEA-SHC Task 43
- Agreed with ISO/TC 180 to have the ISO 9806 revision follow closely that of EN 12975

WP 6&7: Communication and Dissemination

T6.5 SK implementation in CEE NMS

- Workshop Northern Europe
  - First scheduled for Spring 2010
  - Proposal from PIMOT: 14 Dec 2011
  - Organise jointly with project meeting – 15-16 December
  - Content being finalised

WP 6&7: Communication and Dissemination

- T6.5 SK implementation in CEE NMS
  - Information package for CEE new members states produced
    - Brochure produced
    - Information package being developed
  - Participation of NMS partners at SKN Meetings (T4.2)

    Cyprus / Slovakia / Czech Republic

    Macedonia (fYRO) / Albania

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