Minutes of the 5th Solar Keymark meeting
WP1D
Lisbon, Wednesday 5th of March 2003

The current status of the database was presented to the project participants (see Annex). Furthermore a draft version of a CD containing the “Databases for computer models and test sequences for solar collectors and hot water stores” was distributed to the participants of the meeting.

Details concerning the contents of the database, especially with regard to solar collectors (measured data and model validation) were presented and discussed.

In the present stage the database contains, as specified by the project description, two computer models (1 collector model and 2 storage models). Furthermore the database contains validation criteria and measured data for different types of collectors and stores. Since the input of measured data by the project participants was not that intensive, there is still room for a further extension of the database. ITW as the responsible institution for the database offers to take care for the database also after the termination of the present Solar Keymark project.

Harald Drück
Stuttgart, 24/03/2003

Annex: Presentation of database, Lisbon, (8 Pages)
Databases for computer models and test sequences

Solar Keymark Subtask 1.D
Lisbon 05/03/2003

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Dipl.- Ing. Stephan Fischer
Which computer models?

**Collector model:**
- model acc. EN 12975 (TRNSYS Type 132)

**Store models:**
- TRNSYS Type 60?
  (1 in- and outlet, 2 heat exchangers)
- MULTIPORT (TRNSYS Type 140)
  (10 in and outlets, 4 heat exchangers etc..)
- other models?
  Maybe from Simon Furbo
Types of collectors included up to now

- Flat plate collector with non selective coating

- Two Flat plate collectors with selective coating

- Evacuated tube collector

- CPC collector
Types of stores included up to now

- „Standard“ DHW store
Validation

how can this be done?

1. Comparision with results of analytical calculations ('analytical validation')

Examples:
- Temperature in the store during stand-by
  (ENV 12977-3, Annex B.2, store model benchmark tests)

- Store considered as heat exchanger
  (ENV 12977-3, Annex B.3, store model benchmark tests)

2. Comparision with measured data

Problem:
Result calculated by a model depends on:
- the model itself (numerical equations ..)
  \( \longrightarrow \) define model clearly
- model parameters
  \( \longrightarrow \) specify determination of parameters
- input data
  \( \longrightarrow \) define validation sequences
Validation

Comparison of calculated results with measured data

Criteria for acceptance:

1. Difference in transferred energy

\[
\varepsilon_{x,Q} = \frac{Q_{x,p} - Q_{x,m}}{Q_{x,m}} \cdot 100%
\]

\[p = \text{predicted} \quad m = \text{measured}\]

2. Difference in transferred power

\[
\Delta P_x = P_{x,p} - P_{x,m}
\]

The mean difference in transferred power shall be calculated by

\[
\Delta \overline{P} = \frac{\int \sum \Delta P_x \, dt}{\sum t_{x,t}}
\]

The mean transferred power shall be calculated by

\[
\overline{P} = \frac{\int \sum P_x \, dt}{\sum t_{x,t}}
\]

The relative error in mean transferred power \(\varepsilon_p\) shall be calculated by

\[
\varepsilon_p = \frac{\Delta \overline{P}}{\overline{P}} \cdot 100\%
\]
Databases on a CD

Altener Project
Solar Keymark

Databases for computer models and test sequences for solar collectors and hot water stores
Draft Version 0.1, March 2003
Deliverable of WP 1.D
With input from: Arsenal, SP, ITW

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