Minutes
5. Solar Keymark Network Meeting
October 1st – 2nd, 2008 – Brussels

Item 1: Opening of the meeting

The chairman of the Solar Keymark Network, Harald Drück, opened the meeting and welcomed the participants. He thanked ESTIF for providing the meeting room and the catering. As introduction he gave a short explanation about the Solar Keymark Network. The main task of the SK-Network is to agree on uniform procedures between the different institutions (accredited solar thermal test labs, certifiers, inspectors and manufacturers) working according to the Solar Keymark scheme rules as well as the further development of Solar Keymark certification.

The meeting took place from Wednesday, Oct. 1st, 2008, 12.15 hrs till Thursday Oct. 2nd, 2008, 13:15 hrs in the Renewable Energy House at Brussels.

The first invitation and the draft agenda of the meeting was sent out by email dated September 18th, 2008. In the following weeks updated versions of the agenda were send out. The latest version of the agenda was send out by email on September 30th, 2008 and named "3. Draft Agenda" (File: SK_NW_AG5C 30/09/2008). Based on remarks from the participants minor modifications were performed, especially with regard to the extension of item 17.
The final agenda that was agreed on is included as Annex B.

Item 2: Introduction of participants

The participants introduced themselves. The list of participants is attached as Annex A.

Item 3: Approval of the minutes of the 4. meeting

Harald Drück mentioned that the minutes of the 4th Solar Keymark Network meeting (File: SK_NW_MIN4A.PDF 03/09/2008) were sent out by email dated September 3rd , 2008 .

Except an email from Barry Johnston dated September 19th, 2008 related to the wording of item 14 no comments were received.

Barry Johnston proposed to change the following text of the minutes of the 4th meeting

The participants present discussed if it is possible to certify such a collector according to the Solar Keymark scheme rules even if not all tests required for Solar Keymark certification were successfully passed. The discussion did not result in a consensus.

In the following way:

During lively discussion it was clarified that passing an EN 12975 durability test for evacuated tubes had already been exempted by earlier Solar Keymark Network Meeting Minutes, and that past minutes note that this exemption was specifically because test was not relevant. The meeting delegated further decisions on the relevance, or otherwise, of tests, and the possibility of substitution of relevant tests, to the specific test houses and certifying agencies involved.

The 5. Solar Keymark Network Meeting did (with six negative votes) not accept this change of the minutes.

The minutes of the 4th Solar Keymark Network meeting (File: SK_NW_MIN4A.PDF 03/09/2008, send out by email dated September 3rd , 2008) were approved with one negative vote.

Item 4: Terms and conditions for the Solar Keymark Network Meetings

All the experts present at the meeting did see the need for working procedures of the Solar Keymark Network meetings. It was agreed to establish a group for the preparation of draft working rules. The members of this group are:

Sören Scholz (Chairman), Andreas Bohren, Joao Santos

The group will prepare a first draft of the Solar Keymark Network meeting working procedures and send this out to the Solar Keymark Network for comments until the end of January 2009.
Written input to the working procedures is welcomed and should be send to Sören Scholz (Email: soeren.scholz@dincertco.de) before the end of November 2008.

It is intend to make a final decision related to the working rules at the next meeting.

In order to have some basic working procedures for the Solar Keymark Meetings it was agreed on the following procedures:

Approval of the minutes:

The minutes of the Solar Keymark Network are considered as approved if there are no comments send out to the Solar Keymark Network within 30 days after sending out the minutes.

Participation in the Solar Keymark Network meetings:

Representatives from the following groups shall participate:
- empowered certification bodies
– accredited testing laboratories
– inspection bodies
- Solar Keymark secretariat (ESTIF)

Note: The number of participants of the above mentioned institutions should not exceed two representatives per individual institution

In addition representatives from the following groups are allowed to participate:
– certification bodies in the process of empowerment
– testing laboratories in the process of accreditation
– inspection bodies in the process of accreditation
– one official representative from CEN
– the chairman of CEN TC 312
– the chairman of ISO TC 180
– one representative of each national trade association that is a member of ESTIF
– industry participants raising important issues being discussed at the meeting.

Voting rights in the Solar Keymark Network meetings

In cases where a decision is required all efforts to reach a consensus based on a broad range of opinions shall be undertaken.

In cases where a consensus can not be reached decisions shall be made based on voting.

Voting is only possible related to items mentioned on the agenda that is send out at least seven days before the meeting. In addition to this, voting is possible in cases where all representatives of the meeting holding voting rights agree on a vote.

In case of voting a simple majority of the votes are required to make a decision. Abstentions shall not be counted as a vote.

Representatives from the following groups have **one** vote if personally present at the meeting:
– each empowered certification body
– each accredited testing laboratory
– each inspection body
– Solar Keymark secretariat (ESTIF)´
– representative of each national trade association that is a member of ESTIF. In cases where no national trade association is a member of ESTIF a participation is possible provided that the representative is nominated by the national CEN TC 312 or ISO TC 180 mirror committee.

Level of confidentiality of the Solar Keymark Network meeting minutes

The approved minutes of the Solar Keymark Network will be put in the public assessable area of www.solarkeymark.org for download.

Item 5: Level of confidentiality of the Solar Keymark Network minutes

This aspect was already discussed and decided within item 4.

Item 6: Fees for the Solar Keymark Network and Secretariat

Jan Erik Nielsen mentioned that CCB (CEN certification board) accepted at its meeting on Sep. 24th, 2008 the revised version of the Solar Keymark Scheme rules. In this context it is now possible to collect fees for the operation of the Solar Keymark Secretariat and the Solar Keymark Network via the national certification bodies.

The fees and tasks of the Solar Keymark Network as stated in Annex C of the revised version of the Solar Keymark Scheme rules that were presented by Jan Erik Nielsen.

The tasks of the Solar Keymark Secretariat were discussed and extended with regard to a newsletter that should be send out by the Solar Keymark Secretariat to everybody who subscribes on the Solar Keymark homepage (wwww.solarkeymark.org).

The participants present agreed for the coming year 2009 to an annual fee of 70 € per product type (license) and calendar-year. This fee shall be collected by the Solar Keymark certification bodies and transferred, based on invoices, to ESTIF.

By the end of June 2009 the fee has to be paid for certificates already existing at January 1st , 2009. As a basis for the invoices send out by ESTIF the certification bodies shall report to the Solar Keymark Secretariat the number of issued licences at January 1st, 2009.

The fee for the licenses issued during the year 2009 will be transferred to ESTIF based on invoices send out at the beginning of 2010. As a basis for this invoices prepared by ESTIF the certification bodies shall report to the Solar Keymark Secretariat the number of issued licenses during the year 2009.

It was agreed that Jan Erik Nielsen will inform about the additional fee for the Solar Keymark Network and Secretariat on the Solar Keymark website and propose to distribute this information also via an ESTIF Newsletter.

It was agreed to decide about the amount of the annual fee for the following year based on the updated budget of the actual year and the expected income and expenses of the following year. This yearly decision shall be made before the end of October of the previous year. In cases of no decision is made the fee remains the same.

Item 7: Test reference years

With regard to the performance prediction according to EN 12976 it is essential that all labs use the same weather data. In order to ensure this a common procedure was agreed on during the 1st Solar Keymark Network Meeting in June 2006.

Weather data:

It was agreed that with regard to the weather data for specific countries the persons listed below will act as a contact point. On request these persons shall supply weather data that are not protected with any copyright.

Sweden:	Ulrik Petterson (SP)
Germany:	Henner Kerskes (ITW)
Denmark:	Jan Erik Nielsen (SolarKey)

Spain:	Pilar Navarro Rivero (ITC)
Austria:	Josef Buchinger (arsenal)
Greece:	Emmanouil Mathioulakis, Giorgos Panaras (Demokritos)
Italy:	Giacobbe Braccio (ENEA)
Poland:	Stanisław Gołębiowski (ECBREC)
Portugal:	Maria Carvalho (INETI)
France:	Dominique Caccavelli (CSTB)
Switzerland:	Sebastian Laipple (SPF)

Up to September 2008 check-sum figures for the weather data of at least one location in all the above mentioned countries have been sent to Harald Drück. In total check sums for the following locations are available:

Austria:	Vienna, Graz
Greece:	Athens
Poland:	Warsaw
Germany:	Würzburg
Portugal:	Porto, Lisboa, Faro
Italy:	Rome, Catania
Denmark:	Copenhagen
Spain:	Las Palmas, Madrid
Sweden:	Stockholm 1996-2005
France:	Agen, Trappes, Nice
Switzerland:	Davos

Note: The complete list with the check sum figures is attached as Annex C.

Since the requested weather data check sums are now all available this activity can be considered as completed.

Item 8: Flexible Solar Keymark certification

Jan Erik Nielsen reported about the investigations made within the Solar Keymark II project related to a method allowing for the determination of the performance parameters of factory made thermal solar systems by means of a calculation procedure based on a physical performance test of only one system.

This method is based on the calculation procedure for thermal solar systems specified in EN 15316-4-3 (the EBPD method). An approach based on this method is also included in the French certification scheme.

This approach was in principle accepted for thermosiphon systems by the meeting of the CCB (CEN certification board) on Sep. 24th, 2008.

Andreas Bohren reported about the application of the method on different systems with different tank volumes and same collectors and vice versa. The results obtained with this procedure showed significant differences compared to the results determined by measurements. At present it is not clear if the deviation is due to the extrapolation procedure itself or due to an incorrect application of the procedure.

It was decided that these differences should be discussed and investigated by SPF (Sebastian Laipple) and CST B (Bouzid Khebchache).

Korbinian Kramer (ISE) reported about the application of the extrapolation procedure on two systems with different collector areas and tank volumes. The deviations he observed between the results determined by measurements and the extrapolation procure were below 4 %.

Bouzid Khebchache (CSTB) reported about the application of the extrapolation procedure on two systems with different collector areas and tank volumes. The deviations he observed between the results determined by measurements and the extrapolation procure were below 8 %.

It was agreed that Jan Erik Nielsen and Bouzid Khebchache will further elaborate the procedure and include it in the revised version of the Solar Keymark Scheme rules as Annex D (Determination of performance indicators for systems within a system “family”). It is intended to send out a final draft version of the procedure to the Solar Keymark Network until November 2008. In this context also the already existing report related to the validation of the procedure will be extended and distributed.

Persons that are interested in receiving this information should send an email to Jan Erik Nielsen (Email: jen@solarkey.dk) before the end of October 2008.

In case no major comments and objection are received within 20 days after sending out the above mentioned documents the procedure will be considered as approved by the Solar Keymark Network.

After the modified version of the revised Solar Keymark scheme rules are available they are expected to be accepted by CCB within one month based on a vote by correspondence.

Item 9: Revised scheme rules

The main issues related to the revision of the Solar Keymark Scheme rules were

- flexible Solar Keymark certification of factory made systems
- fees for the Solar Keymark Network and Secretariat

This topics were already discussed within previous items.

Jan Erik Nielsen reported about the comment from a Spanish certification body requesting bi-annual re-testing of solar thermal products. During the meeting of the CCB (CEN certification board) on Sep. 24th, 2008 Jan Erik managed to convince CCB not to insist on biannual re-testing. Due to this there is no need to change the Solar Keymark scheme rules with regard to this aspect.

Translation of the Solar Keymark Scheme rules:
It was decided that national certification bodies can translate the Solar Keymark Scheme rules to different languages. In case of differences the English version of the Solar Keymark Scheme rules is valid.

Picking of test samples:
It was agreed to mention in the introduction of the Solar Keymark scheme rules that picking of the test samples by an independent body is a key element of Solar Keymark Certification.

Item 10: Presentation of the energy output calculation tool for collectors

Peter Kovacs presented a modified version of the output calculation tool for collectors Ulrik Petterson presented already at the last meeting. He mentioned that this tool will be used in Sweden as a basis for subsidies. The tool was especially improved with regard to the calculation procedures for vacuum tubular collectors.

The presentation is attached as Annex D.

The tool was discussed at the meeting and the participants expressed the wish to have only one calculation tool for the calculation of the collector output independent if the collector performance parameters are determined by the steady-state or the quasi-dynamic method. Furthermore the calculations shall be possible based on the parameters stated in the already standardised collector data sheet.

The participants expressed the wish to extend the tool to the calculation of the collector output of uncovered collectors.

It was agreed that Peter Kovacs will send out the tool (including a manual) to the Solar Keymark Network for further evaluation and commenting.

It was agreed to establish a **working group for the further elaboration of the tool**. The members are:

> Peter Kovacs (chairman), Andreas Bohren, Stephan Fischer, Korbinian Kramer, Maria Carvalho.

This group should present a final draft tool for the next Solar Keymark Network meeting.

It was agreed that after a successful validation (e.g. against TRNSYS simulations) the tool should be integrated in the Solar Keymark scheme rules.

It is intended to decide about the validation of the tool and its integration in the Solar Keymark scheme rules at the next Solar Keymark meeting.

Item 11: Valdity of Solar Keymark certificates in case of absorbers selective coated by different manufacturers are used

Costas Travasaros raised the question under which conditions Solar Keymark certificates are valid with regard to the use of absorbers selective coated by different manufactures.

Jan Erik Nielsen mentioned that this questions is also of relevance for a lot of other solar collector manufacturers.

Stephan Fischer reported about the procedure of the German TkTSuB (Experience exchange circle related to solar thermal products and components) with regard to this aspect. There it was agreed to consider different coatings as equal if the equality is proven based on a performance test and durability and reliability tests of the same collector with an absorber with different coatings and if the positive result of this proving procedure is accepted by the TkTSuB. In addition to this the so-called IEA Task 10 test has to be performed successfully.

At present the German TkTSuB considers following selective absorber coatings as equivalent:

> Brand names: Tinox classic, Blutec etaplus CU, Sunselect

Decision – Valdity of Solar Keymark certificates in case of absorbers selective coated by different manufacturers are used

The experts present decided to apply the following procedure in order to consider different coatings as equivalent:

Different coatings are considered as equivalent provided that

- the absorptance and emittance of the different coatings under question was measured by the same recognised lab and
- the durability and reliability tests according to EN 12975-2 (being relevant with regard to the absorber) of the same collector with an absorber with different coatings performed by an accredited test lab are successfully passed and
- the power curves determined by an accredited test lab for the same collector with an absorber with different coatings do not differ by more than 2% at a reduced temperature difference of 0 K and not more than 2% at a reduced temperature difference of 50 K and
- the equality is accepted by the Solar Keymark Network

Coatings on copper absorbers with the following brand names are already considered as equivalent:

Tinox classic, Blutec etaplus CU, Sunselect

This decision was taken unanimously.

Item 12: IEA SH&C Task on “Rating and Certification Procedures”

Harald Drück reported about a new IEA SH&C Task (International Energy Agency, Solar Heating and Cooling) on “Rating and Certification Procedures”. This US driven task is at present in the task definition phase and a task definition meeting is taking place on October 2nd and 3rd, 2008 at Lisbon.

The Solar Keymark Network in principle appreciates the initiative and expresses its wish to participate actively in this activity. In order to provide a basis for this the Solar Keymark Network expresses the wish to establish a communication basis in the way that one contact person form the “Rating and certification task” definition group is nominated. The name of this person should be communicated to Harald Drück (Email: drueck@itw.uni-stuttgart.de) as the chairman of the Solar Keymark Network and to Jan Erik Nielsen (Email: jen@solarkey.dk) as the Solar Keymark secretary.

Additionally relevant information related to the task and its definition should be send to Jan Erik Nielsen as the Solar Keymark secretary (Email: jen@solarkey.dk) in order to be distributed via the Solar Keymark website.

Furthermore the Solar Keymark Network invites representatives from the “Rating and Certification Task” to present their activity at the next Solar Keymark Network Meeting held on March 23rd and 24th, 2009 at Pamplona, Spain.

In order to co-ordinate the date and place for the next task definition meeting for the “Rating and Certification Task” with the Solar Keymark Network its chairman Harald Drück (Email: drueck@itw.uni-stuttgart.de) should be contacted.

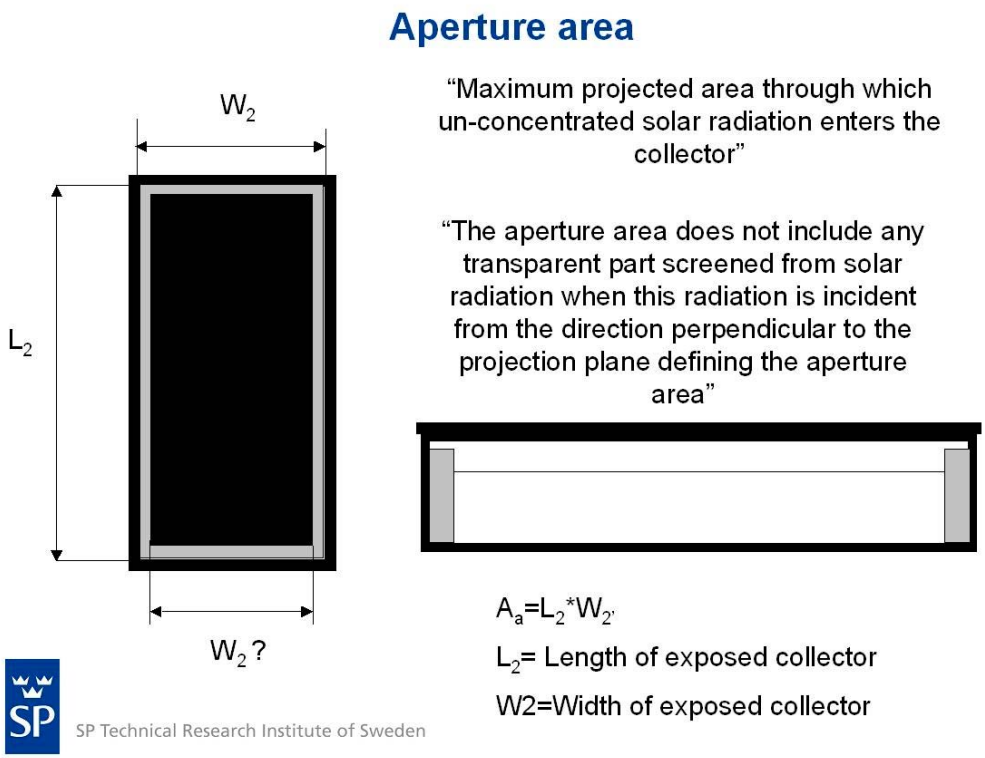
Maria Carvalho will attend the task definition meeting on October 3rd, 2008 at Lisbon and will inform about the Solar Keymark Network and the wishes expressed above.

Note: *Maria Carvalho reported by email dated Oct. 6th, 2008 to Harald Drück that she attended the meeting and transmitted the position mentioned above. The position was very well accepted and further contacts will be established*

Item 13: Measurements of aperture area on ETCs

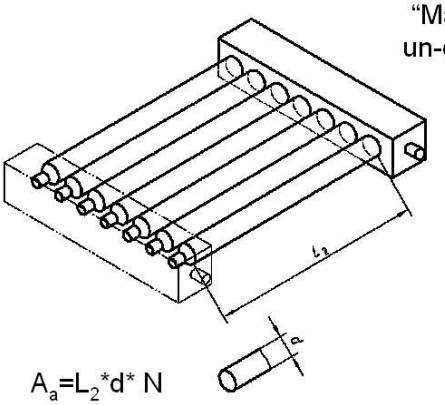
Peter Kovacs reported about the aspect of the measurement of the aperture area of evacuated tubular collectors (ETCs) and flat plate collectors (FP).

With regard **to flat plate collectors** it was decided that the length of the value W_2 (see figure below) has to be determined without the width of the grey element if the grey element is not in contact with the glass.



With regard **to vacuum tubular collectors** the length of the value L_2 has to be determined as shown in the figures below (Note: This approach is totally in line with the corresponding standard)
In cases where parts of the tube are covered at one end by a gatter the length of the tube covered by the gatter is not included in the length of the value L_2.

Aperture area



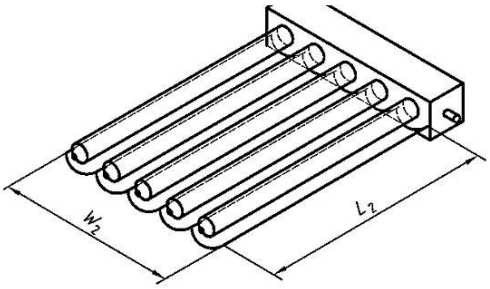
$A_a = L_2 * d * N$

L_2 = Length of unscreened, parallel and transparent section of tube

d =Transparent (*outer*) tube inside diameter

N= Number of tubes

“Maximum projected area through which un-concentrated solar radiation enters the collector”



$A_a = L_2 * W_2$

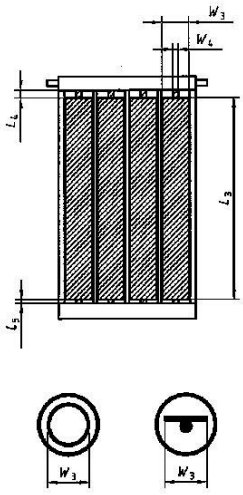
L_2= Length of exposed collector

W2=Width of exposed collector

SP Technical Research Institute of Sweden

The **absorber area** of concentrating collectors has to be determined as shown in the figure below (Note: This approach is totally in line with the corresponding standard).
It was mentioned that with regard to the example on the right hand side there is a need for redrafting the standard.

Absorber area



$A_A = N*(L_3*W_3)+N*(L_4+L_5)$

L_3= Length of absorber

W_3=Width or diameter of absorber

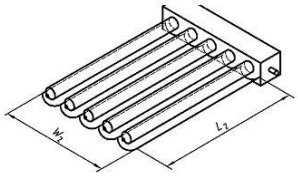
W_4, L_4, L_5 according to figure

“Maximum projected area of an absorber…at normal incidence”

For concentrating collector: “Surface area of the absorber which is designed to absorb solar radiation”

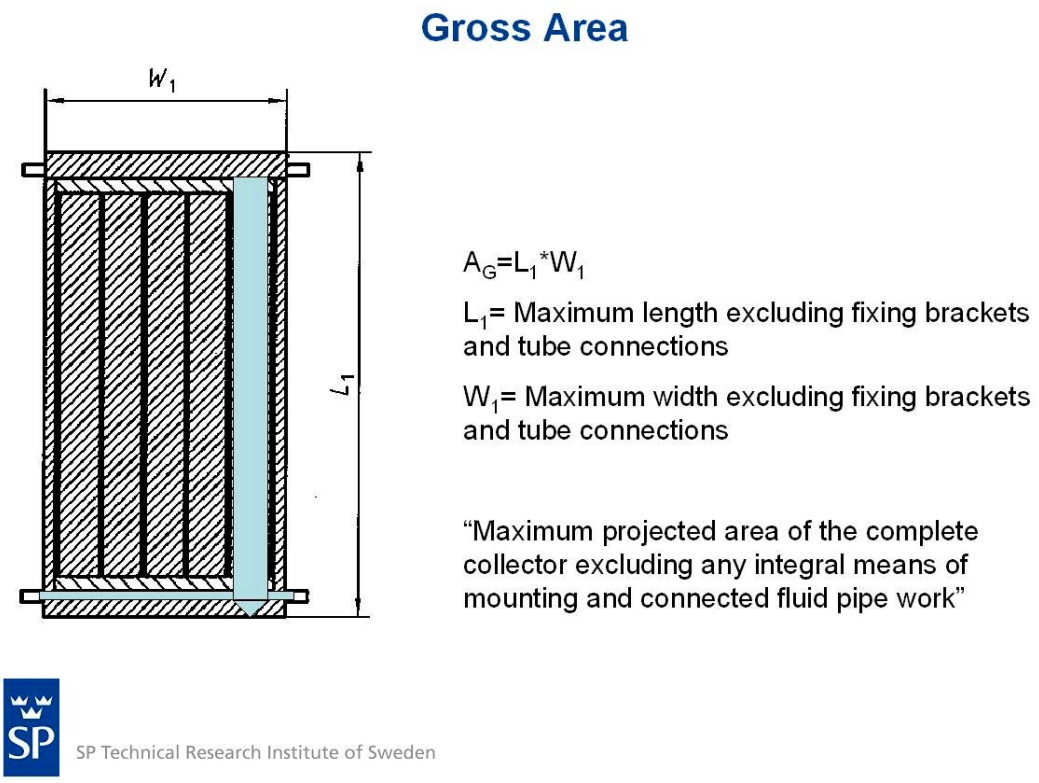
“The absorber area does not include any absorbing part permanently screened from solar radiation”

“The absorber area of (below) is equal to that of the corresponding non concentrating collectors obtained by removing the respective mirrors. Accordingly, it is calculated as in (left). However, in the case of a tubular collector with a tubular absorber, its projected area has to be replaced by the whole tube area”



SP Technical Research Institute of Sweden

The **gross area** is determined as shown in the picture below (Note: This approach is totally in line with the corresponding standard)



Item 14: Difference between nominal & actual store volume / capacity

Rob Meesters raised the question what maximum difference between the nominal store volume stated on the store or its documentation and the actual volume of the store is allowed for Solar Keymarked systems.

Decision – Difference between nominal and effective store volume

The experts present decided that the difference between the nominal store volume stated on the system identification label shall not differ by more than 10 % form the effective store volume determined from the measured thermal capacity. The calculation of the percentage of the difference between the two volumes is based on the value of the effective volume.

The effective store volume shall be mentioned in the test report.

This decision was taken unanimously.

Item 15: Issuing of OEM certificates

With regard to the issuing of OEM certificates Peter Kovacs raised the following questions:

- Who can issue OEM certificates?
- How should the OEM certificates be coupled to the original certificates?
- What are the formal requirements on e.g. control visits and sampling?

In this context the following decision were made:

Decision – Issuing of OEM certificates

The present experts decided that OEM certificates shall be issued by the certifier who issued the original certificate.

This decision was taken with three negative and 12 positive votes.

The coupling for the OEM certificates to the original certificates has to be ensured by the certifier issuing the certificates.

It is in the responsibility of the certifiers to ensure that the formal requirements e.g. with regard to control visits and sampling are fulfilled.
With regard to this it was decided that the certification bodies should agree on a common procedure.

Item 16: Eco-design and energy labelling

Jan Erik Nielsen reported about this subject on the basis of the document entitled "ANNEX IV on Eco-design implementing measures for dedicated water heaters" which was sent out by him via email dated September 29th, 2008.

He mentioned that the term “dedicated water heater” means systems that produce hot water and nothing else. Systems labelled on the basis of this document have to cover the load during the whole year. Due to this labelling of solar only or solar preheat systems is not possible.

Additionally he reported about the one day test included in this document for the determination of the system performance.

The procedures stated in the document are not appropriate for the performance assessment of solar thermal systems. Due to this action should be taken via the national energy agencies in order to influence the document in such a way that alternatively to the measurements a calculation procedure will be implemented and that also the energy labelling of solar only and solar preheat systems is possible.

Jan Erik Nielsen will prepare a draft ESTIF position paper related to this document and send it to CEN TC312 and to the Solar Keymark Network.

Item 17: Any other business

Item 17.1: ESTIF standardisation and certification working group

Harald Drück mentioned that ESTIF decided on its general assembly at Ennepetal at the beginning of May 2008 to establish a working group related to standardisation and certification. As far as he is informed a participation of test lab laboratories in this working group is not desired by the chairman (Teun Bookhoven) of this working group.

Since the aim of the test labs is to further develop standardisation and certification issues in close co-operation with the solar thermal industry the Solar Keymark network expresses the wish to have more industry representatives attending the Solar Keymark network meetings. In order to make the meetings more attractive for industry topics especially relevant for industry shall treated in one block.

Furthermore the Solar Keymark Network decided to ask the chairman of the ESTIF Standardisation and Certification working group to open the group for a participation of solar thermal test labs and certifiers.

Item 17.2: CEN TC312 meeting scheduled for November 2008

The next CEN TC 312 meeting is scheduled for November 2008. Since up to now no recognisable preparation activities were started, the Solar Keymark Network doubts whether this meeting will take place. Due to this it was decided that Harald Drück as the chairman of the Solar Keymark Network should ask Mr. Emmanouil Kastanakis as the chairman of CEN TC 312 if the meeting will take place as originally planned.

In case the meeting will not take place in November 2008 the Solar Keymark Network expresses the wish to implement a convenor of CEN TC 312 WG1 as soon as possible. In this context it is mentioned that Peter Kovacs (SP) offers to take over the WG1 convenorship.

Note: *Harald Drück did send out the corresponding email (see above) on Oct. 2nd, 2008 and received on the same day the following answer from Mr. Emmanouil Kastanakis:*

Dear Dr. Harald Drueck,

I would like to inform you that unfortunately we have to rearrange the meeting at a later time.
On Wednesday 10 of September send Mrs. Drossou Vasiliki Secretary of CEN TC312 an e-mail to Mr. Ken Guthrie in that it said, that from last July and due to pregnancy and maternity leave, her duties have been suspended and it is not known yet who was going to replace her.
Due to this fact I requested from July from ELOT and CRES the replacement of Mrs. Drosou Vasiliki. Till today she wasn’t replaced.
In the next days we will appoint the new secretary
Please note that Mrs. Drosou will be available again after March 2009.

Please inform us for your proposal, about the next possible date of the meeting CEN TC312 in London.

About the new convenor for CEN/TC312 WG 1, ELOT have sent at 19/06/2008 a circular letter to all CEN/TC312 members, that supporting the nomination of Dr. Costas Voropoulos. I persume the position of the convenor WG1 has been fulfilled.

Best Regards,
E. Kastanakis
Chairman CEN TC312

Item 17.3: Review of ISO 9060, ISO 9059, ISO 9846

Josef Buchinger mentioned that the standards listed above are opened for systematic review. Note: This standards are related to the measurement of solar radiation.

Item 17.4: Handling of samples damaged during transport

In order to avoid any time delays due to samples damaged during transport Josef Buchinger mentioned that he made good experience with sampling approximately 150 % more products than needed for testing.
An other alternative would be to pick a second set of samples, seal it and deposit it at the factory in case problems occur with the first set of samples send to the test lab. In this case the second set of picked samples can be send to the test lab on demand.

Item 18: Date and place of next meeting

It was decided that the next Solar Keymark Network Meeting will take place on

March 23rd, 2009; 14:00 hrs - March 24th, 2009; 13:00 hrs
at the premises of CENER at Pamplona, Spain

The autumn 2009 meeting is scheduled September 24th 12:00 hrs to 25th 13:00 hrs at Brussels

Item 18: End of meeting

Harald Drück thanked the participants for attending the meeting and for their constructive discussions. He closed the meeting at 13:13 hrs.

The minutes were prepared by Harald Drück (Chairman of the Solar Keymark Network) Stuttgart October 7th, 2008.

Contact address:
Harald Drück
ITW, Stuttgart University
Pfaffenwaldring 6
70550 Stuttgart, Germany
Email: **drueck@itw.uni-stuttgart.de**

Annex A: List of participants

SOLAR KEYMARK NETWORK

5th MEETING, BRUSSELS OCTOBER 1TH & 2ND, 2008

NAME	ORGANISATION
Premoli Pierluigi	ICIM (Italy)
Josef Buchinger	arsenal (Austria)
Jan Erik Nielsen	SolarKey (Denmark)
Andreas Bohren	SPF (Switzerland)
Bouzid Khebchache	CSTB (France)
Maria Carvalho	INETI (Portugal)
Sören Scholz	DINCERTCO (Germany)
Vinod Sharma	ENEA (Italy)
João Santos	CERTIF (Portugal)
Peter Kovacs	SP (Sweden)

Stephan Fischer	ITW (Germany)
Harald Drück	ITW (Germany)
Hoang Liauw	CEN
Korbinian Kramer	ISE (Germany)
Fabienne Salaberry	Cener (Spain)
Nele Rumler	ISFH (Germany)
Rob Meesters	Solahart
Barry Johnston	Solar Twin (UK)
Manhalter Michal	SZU Engineering Test Institute NB
Richard Pelan	Kingspan Renewables (UK)
Ioannis Alexiou	ELOT (Greece)
Paolo Trisoglio	Modulo Uno (Italy)

Annex B: Final agenda

Solar Keymark Network

Experience exchange circle of test labs and certifiers
working according to the Solar Keymark scheme rules

5. Solar Keymark Network Meeting

Wednesday, Oct 1st, 12:00 to Thursday, Oct 2nd 2008, 13:00 hrs

Brussels, Renewable Energy House (the location of ESTIF)

for details see: http://www.erec.org/reh/ and http://www.estif.org/31.0.html

Final Agenda

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4	Terms and conditions for the Solar KEYMARK Network Meetings (Sören Scholz)
5	Level of confidentiality of the Solar Keymark Network minutes (HD)
6	Fees for the Solar Keymark Network and Secretariat (JEN)
7	Test reference years for performance prediction acc. to EN 12976 (HD)
8	Flexible Solar Keymark certification for factory made systems (JEN)
9	Revised scheme rules (JEN)
10	Presentation of the energy output calculation tool for collectors (Peter Kovacs)
11	Valdity of Solar Keymark certificates in case of absorbers selective coated by different manufacturers are used (Costas Travasaros).
12	IEA SH&C Task on “Rating and Certification Procedures” (HD)
13	Measurements of aperture area on ETCs (Peter Kovacs)
14	Difference between nominal & actual store volume / capacity (R. Meesters)
15	Issuing of OEM certificates (who, coupling to original certificates) (Peter Kovacs)
16	Eco-design and energy labelling (JEN)
17 17.1 17.2 17.3 17.4	Any other business (HD) ESTIF Standardisation and Certification working group TC312 Meeting scheduled for November 2008 Review of ISO 9060, ISO 9059, ISO 9846 Handling of samples damaged during transport
18	Date and place of next meeting(s) (HD)
19	End of meeting (HD)

JEN: Jan Erik Nielsen, PlanEnergi, ESTIF Technical Consultant

Annex C: Test reference years – check sums

In the following the check sums for specific test reference years are listed. Theses check sums were determined according the procedure agreed on during the 1st Solar Keymark Network Meeting in June 2006.

Austria **Location Vienna**	maximum value	minimum value	sum over the year
direct radiation (on 45° tilt angle) [W/m^2]	448	0.0	662919
diffuse radiation (on 45° tilt angle) [W/m^2]	730	0.0	444514
ambient temperature [°C]	31.5	-9.7	94327.2
wind speed (optional) [m/s]	13.4	0,0	27141.6
Contact: Josef Buchinger (email: Josef.Buchinger@arsenal.ac.at)			

Austria **Location Graz**	maximum value	minimum value	sum over the year
direct radiation (on 45° tilt angle) [W/m^2]	463	0.0	659403
diffuse radiation (on 45° tilt angle) [W/m^2]	806	0.0	483336
ambient temperature [°C]	29.0	-14.8	71201.3
wind speed (optional) [m/s]	14.9	0.0	13159.5
Contact: Josef Buchinger (email: Josef.Buchinger@arsenal.ac.at)			

Greece **Location Athens**	maximum value	minimum value	sum over the year
direct radiation (on 45° tilt angle) [W/m^2]	805	0.0	896210
diffuse radiation on 45° tilt angle) [W/m^2]	456	0.0	822104
ambient temperature [°C]	36.9	1.7	161979
wind speed (optional) [m/s]	19.7	0.0	40218
Contact: Giorgos Panaras (email: petpan@mail.ntua.gr)			

Poland **Location Warsaw**	maximum value	minimum value	sum over the year
direct radiation (on 45° tilt angle) [W/m^2]	503.2	0.0	308798.0
diffuse radiation on 45° tilt angle) [W/m^2]	389.8	0.0	629439.4
ambient temperature [°C]	28.0	-7.5	68109.8
wind speed (optional) [m/s]	7.8	0.0	22252.5
Contact: Stanisław Gołębiowski (email: sgolebiowski@ecbrec.pl)			

Portugal **Location Porto**	maximum value	minimum value	sum over the year
direct radiation (on 45° tilt angle) [W/m^2]	943.6	0.0	1010849.6
diffuse radiation on 45° tilt angle) [W/m^2]	423.9	0.0	586284.6
ambient temperature [°C]	32.9	-0.3	119676.7
wind speed (optional) [m/s]	-	-	-
Contact: Maria Carvalho (email: mjoao.carvalho@ineti.pt)			

Portugal **Location Lisboa**	maximum value	minimum value	sum over the year
direct radiation (on 45° tilt angle) [W/m^2]	946.8	0.0	1130822.2
diffuse radiation on 45° tilt angle) [W/m^2]	421.5	0.0	582399.5
ambient temperature [°C]	35.4	1.7	144875.8
wind speed (optional) [m/s]	-	-	-
Contact: Maria Carvalho (email: mjoao.carvalho@ineti.pt)			

Portugal **Location Faro**	maximum value	minimum value	sum over the year
direct radiation (on 45° tilt angle) [W/m^2]	961.5	0.0	1394718.7
diffuse radiation on 45° tilt angle) [W/m^2]	393.0	0.0	510632.9
ambient temperature [°C]	36.2	3.4	153112.3
wind speed (optional) [m/s]	-	-	-
Contact: Maria Carvalho (email: mjoao.carvalho@ineti.pt)			

Germany **Location Würzburg**	maximum value	minimum value	sum over the year
direct radiation (on 45° tilt angle) [W/m^2]	763	0.0	667215.1
diffuse radiation on 45° tilt angle) [W/m^2]	383	0.0	562373,1
ambient temperature [°C]	32.6	-16.9	78744.7
wind speed (optional) [m/s]	23	0,0	26824.7
Contact: Henner Kerskes (email: kerskes@itw.uni-stuttgart.de)			

Italy **Location Rome**	maximum value	minimum value	sum over the year
direct radiation (on 45° tilt angle) [W/m^2]	951	0.0	1096410.0
diffuse radiation on 45° tilt angle) [W/m^2]	486	0.0	517475.0
ambient temperature [°C]	38.2	-2.3	135506.0
wind speed (optional) [m/s]	-	-	-
Contact: Giacobbe Braccio (email: braccio@trisaia.enea.it)			

Italy **Location Catania**	maximum value	minimum value	sum over the year
direct radiation (on 45° tilt angle) [W/m^2]	1011	0.0	1306251.0
diffuse radiation on 45° tilt angle) [W/m^2]	478	0.0	490209.0
ambient temperature [°C]	39.8	2.8	159218.0
wind speed (optional) [m/s]	9.8	0.0	21133.0
Contact: Giacobbe Braccio (email: braccio@trisaia.enea.it)			

Denmark **Location Copenhagen** **(Long.:12.34°; Lat.: 55.43°; Alt.: 19 m)**	maximum value	minimum value	sum over the year
direct radiation (on 45° tilt angle) [W/m^2]	926	0.0	611375.0
diffuse radiation on 45° tilt angle) [W/m^2]	423	0.0	577580.0
ambient temperature [°C]	26.1	-10.2	69785.3
wind speed (optional) [m/s]	19.5	0.1	49889.4
Contact: Jan Erik Nielsen (email: jen@planenergi.dk)			

Spain **Location Las Palmas**	maximum value	minimum value	sum over the year
direct radiation (on 45° tilt angle) [W/m^2]	936	0.0	1416906
diffuse radiation on 45° tilt angle) [W/m^2]	459	0.0	714373
ambient temperature [°C]	31.8	10.3	179517.2
wind speed (optional) [m/s]	-	-	-
Contact: Pilar Navarro Rivero (privero@itccanarias.org)			

Spain **Location Madrid**	maximum value	minimum value	sum over the year
direct radiation (on 45° tilt angle) [W/m^2]	947	0.0	1162392
diffuse radiation on 45° tilt angle) [W/m^2]	463	0.0	659383
ambient temperature [°C]	36.0	-0.6	125545.5
wind speed (optional) [m/s]	-	-	-
Contact: Pilar Navarro Rivero (privero@itccanarias.org)			

Sweden **Location Stockholm 1996-2005**	maximum value	minimum value	sum over the year
direct radiation (on 45° tilt angle) [W/m^2]	933	0.0	693756.0
diffuse radiation on 45° tilt angle) [W/m^2]	423	0.0	534174.0
ambient temperature [°C]	30.3	-18.2	66011.0
wind speed (optional) [m/s]	-	-	-
Contact: Ulrik Pettersson (email: ulrik.pettersson@sp.se)			

France **Location Agen** **(Long.: 0.63°; Lat.: 44.18°)**	maximum value	minimum value	sum over the year
direct radiation (on 45° tilt angle) [W/m^2]	974.8	0.0	757407.9
diffuse radiation on 45° tilt angle) [W/m^2]	437.4	0.0	666806.5
ambient temperature [°C]	32.9	-6.7	108223.0
wind speed (optional) [m/s]	14.5	0.0	22696.6
Contact: Dominique Caccavelli (email : dominique.caccavelli@cstb.fr)			

France **Location Trappes** **(Long.: 2.00°; Lat.: 48.77°)**	maximum value	minimum value	sum over the year
direct radiation (on 45° tilt angle) [W/m^2]	957.7	0.0	615109.5
diffuse radiation on 45° tilt angle) [W/m^2]	423.0	0.0	592836.7
ambient temperature [°C]	30.9	-6.9	88166.5
wind speed (optional) [m/s]	13.4	0.0	28355.7
Contact: Dominique Caccavelli (email : dominique.caccavelli@cstb.fr)			

France **Location Nice** **(Long.: 7.25°; Lat.: 43.65°)**	maximum value	minimum value	sum over the year
direct radiation (on 45° tilt angle) [W/m^2]	982.4	0.0	1001893.6
diffuse radiation on 45° tilt angle) [W/m^2]	424.0	0.0	667075.4
ambient temperature [°C]	30.3	1.1	133890.0
wind speed (optional) [m/s]	17.5	0.1	34496.1
Contact: Dominique Caccavelli (email : dominique.caccavelli@cstb.fr)			

Switzerland **Location Davos**	maximum value	minimum value	sum over the year
direct radiation (on 45° tilt angle) [W/m^2]	1060	0.0	1000788
diffuse radiation on 45° tilt angle) [W/m^2]	406	0.0	682810.0
ambient temperature [°C]	27.8	-26.5	28200.5
wind speed (optional) [m/s]	10.9	0.0	20569.4
Contact: Sebastian Laipple			

Annex D:
Energy output calculation tool for collectors

Energy output calculation tool for collectors

The aim for the development of the tool was:

- Should be a part of EN 12975 as an informative annex
- Easy to perform but enough sophisticated to take into account specific features of most common collectors in the market
- Based on weather data from 4 reference locations in Europe

SP Technical Research Institute of Sweden

Energy output calculation tool for collectors

The original equations :

$Q/Aa = \eta_0 * K\theta_{b(\theta)} * G_b + \eta_0 * K\theta_d * G_d - a_1(t_m - t_a) - a_2(t_m - t_a)^2$ [kWh/m²]

Where $\eta_0 = F'(\tau\alpha)_{en} * K\theta_b(\theta=15) * 0.85 + F'(\tau\alpha)_{en} * K\theta_d * 0.15$

(compare to eq. 32 in EN 12975-2 but without c_3, c_4, c_5, c_6 i.e. no wind, sky temperature or thermal capacity)

SP Technical Research Institute of Sweden

Energy output calculation tool for collectors

- **ETC:s with high $K\theta_d$ were over estimated**
- **The revised equation:**

$Q/Aa = F'(\tau\alpha)_{en} * K\theta_{b(\theta)} * G_b + F'(\tau\alpha)_{en} * K\theta_d * G_d - a_1(t_m - t_a) - a_2(t_m - t_a)^2$ [kWh/m²]

I.E. No weighing acc. to $\eta_0 = F'(\tau\alpha)_{en} * K\theta_b(\theta=15) * 0.85 + F'(\tau\alpha)_{en} * K\theta_d * 0.15$

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Energy output calculation tool for collectors

The inputs:

- $K\theta_d$ and $F'(\tau\alpha)_{en}$ is either derived through measurements according to 6.3 (Quasi dynamic)

OR calculated from steady state parameters

For the latter case:

- First $K\theta_d$ is calculated by integrating $K\theta_{b,T,L}(\theta_{T,L,i})$ over all angles, assuming isotropic sky conditions
- Then $F'(\tau\alpha)_{en}$ is calculated from $\eta_0 = F'(\tau\alpha)_{en} * K\theta_b(\theta=0) * 0.85 + F'(\tau\alpha)_{en} * K\theta_d * 0.15$, i.e. assuming that steady state measurements has been done at normal incidence but at 15% diffuse fraction (Standard allows for up to 30%)

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Energy output calculation tool for collectors

The inputs:

IAM type: Simple, one direction (e.g. flat plate collector)
Simple, two directions (e.g. flat plate collector with dependence in two directions and some collectors with reflectors)
OR
User defined: multi axially, four directions, east-west and upper-lower side of collector, every 10 degrees (e.g. vacuum tubes and some collectors with reflectors)

- Both types of simple IAM is based on $K\theta_{b(\theta)} = 1 - b0 * (1/\cos(\theta) - 1)$ (eq. 33 in EN 12975)
- Desired collector mean temperature

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