# ANNEX WP1.A.A: List of incoming comments concerning EN12975

## Comments and problems EN 12975-2, TNO, the Netherlands.
## Author: Amelie Veenstra and Ric Slappendel.
Date : 24 may 2002

***Comment 1:*** *Calibrating pyranometers.*

**Accreditation:**
There is a problem with calibrating piranometers. Kipp&Zonen is not accredited. WRC - Davos is not supplying uncertainty calculations. As accredited labs we need these uncertainties. JRC Ispra is also not yet ready supplying uncertainties. What is the solution?

**Standard:**

***Comment 2:*** *The standard is not well structured.*

**General:**
The standard is not well structured. Required conditions (figures etc.) are often not in a table. This makes it not easy to work with. Also the chapters could be better structured, for instance a new chapter on a new page etc.

***Comment 3:*** *Test sequence for Exposure test.*

**5.1 General**
Test sequence requires Exposure test planned in between High temperature test and External shock test. This is inconvenient in practice, because:
- Exposure test is outdoor while other tests are indoor (at least at some labs). This means, the collector (or system) has to be installed several times, which takes unnecessary expensive time.
- Exposure test takes a relative long test period. So in between short tests, there is one long test, especially in Northern countries. This is very inconvenient with respect to planning the occupation of the test facilities. We prefer to change the sequence, especially because system testers will not do the performance test on collectors, so there is no need for this sequence in that case.
- There is a possible combination with High T, Exposure and thermal shock tests. Does this mean there is no strict sequence in this case?
- We would like to bring to discussion the option skipping the exposure test, or allowing it as last test, or allowing the exposure test to be performed on a second similar collector.

Furthermore, there is no required sequence in EN 12976. An "EN 12976 test" requires a subset of "EN 12975 tests". Therefore the required sequence in EN 12975 is not sensible in this case. We suggest simplifying the sequence, for instance first quality test (with only requirement rain test after High T, exposure and thermal shock) and last performance test.

**5.3.2 High T test/apparatus and procedure**
NOTE 2: define "special fluid'

**5.4.3 and .4. Exposure/Test conditions/Results**

The radiance levels G and H, with requirements 30 hrs and 30 days, are a little strange. First off all, the conditions are not simple to meet in Northern countries and this makes the yearly testing period small. This will frustrate planning tests, and therefore frustrate our clients.
Secondly, the 30 hrs test with level H can also be performed indoor, but this is not a real improvement, because on 14 MJ days the chance is high to fulfil the G level, 850 W/m2.

Furthermore, the visual inspection **has never giving us real substantial information**, so it has no added value.

Because of above reasons we would suggest to skip the exposure test and consider a new indoor test like the "two years California test" (for rubbers and plastics) in the future.

*Comment 4: Mechanical load test*

## 5.9 Mechanical load test

We would suggest increasing the level of pressure to the extent that the collector collapses, in order to increase the level of excitement for the tester.

*Comment 5: Rain test*

## 5.7 Rain test

Firstly, we have still doubts about the reality value of this rain penetration test. We are questioning if test result really predicts the behaviour in daily practice. For instance: the test only shows the ingress of water and not the ventilation capacity (loosing humidity).
We suggest to research new options for future use.

Why is spraying at 45 $^{\circ}$ deleted? It should be better to maintain this (the same for external thermal shock).
Conditioning the collector should be quantitatively defined (when is the collector sufficiently conditioned?).
The location of the humidity sensors should be standardised, because the humidity distribution inside the collector is not homogeneous.
The standard should be explicit about measuring relative humidity and calculating the absolute humidity.
There should be requirements on calibration and/or checks of humidity sensors in the standard.
The weighing options is on our opinion not convenient. Reasons: moving collector in and out the test rig costs too much time and fuss, some collector have wooden components, weighing instruments are expensive. We would suggest skipping this option.

# Comments and problems EN 12975-1, 2, SPF, Switzerland.
# Author: Christian Müller-Schöll

**Comment 6 and 7:** *Uncertainty of test results*

**TC312 Standards Revision Comment Sheet**

| Character of the comment<br>technical and/or editorial | | Comment reference number (edited by convenor) | |
|---|---|---|---|
| **Exact reference**<br>EN 12975-2 | **Clause**<br>various | **Quote (if necessary)**<br>"          " | |
| **Author**<br>Christian Müller-Schöll | | **E-mail**<br>collectors@solarenergy.ch | |
| **Describe the problem**<br>In many places in our standards the word "accuracy" is associated with a numerical figure. However VIM states "accuracy is a qualitative concept" and consequently NIST Technical note 1297 states (Appendix D) "one should not use it quantitatively, that is, associate numbers with it; numbers should be asociated with measures of uncertainty instead."<br>Plus, there is a mixup of the words "uncertainty" and "accuracy" which is not correct.Furthermore, ISO 17025 clause 5.4.6.2 Note 2 states that calculation of the uncertinty of the end result can be omitted if the test method standard limits the uncertainty of the major soureces of uncertainty of the end result. This is the general concept of the standard and I believe that this is the concept we should follow | | | |
| **Propose an improved text**<br>Replace various by:<br>"Required uncertainty<br>(Example:) The temperature of the heat transfer fluid at the collector inlet shall be measured with a standard uncertainty (coverage factor k=1) of 0,5 K" | | | |
| **Which points require further discussion?**<br>1. Will we refer to use a coverage factor not being 1 here? I believe that in this stage of the uncertatiny calculation process whe should work with single standard uncertainties (i.e. k=1)<br>2. We have to discuss about the values. I believe that 0,5 K is appropriate and realistic for temperature measurements.<br>I sugggest to form an expert group investigating the "major sources of uncertainty" with respect to their effects on the end result AND with respect to what is technically and economically possible (task 1: Mathioulakis and/or Müller-Schöll and others, task 2: metrology experts to be named). | | | |
| **Remarks**<br>This problem also applies to all other chapters that deal with measurements in 12975-2. (see other comments).<br>VIM = Vocabulary in metrology (by ISO). Nist Technical Note 1297 available on Internet (free download). | | | |
| **Author's personal comment reference**<br>12975-2_1 | | | |

**TC312 Standards Revision Comment Sheet**

| Character of the comment<br>purely editorial | | Comment reference number (edited by convenor) | |
|---|---|---|---|
| **Exact reference**<br>EN 12975-2 | **Clause**<br>Annex D | **Quote (if necessary)**<br>"          " | |
| **Author**<br>Christian Müller-Schöll | **E-mail**<br>Collectors@solarenergy.ch | | **Standard. Body or Country**<br>SNV |
| **Describe the problem**<br>The test reports have to be brought into accordance with the requirements of EN ISO 17025. | | | |
| **Propose an improved text**<br>☐Replace          by:<br>☐Add where          :<br>☐Delete:<br>"          " | | | |
| **Which points require further discussion?** | | | |
| **Remarks**<br>I propose to set up an expert group of those having experience with the requirements, instead of discussion it in the whole group. | | | |
| **Author's personal comment reference**<br>C12975-2_20 | | | |

*Comment 8:* *Clause 6.3.5.2*

**TC312 Standards Revision Comment Sheet**

| Character of the comment<br>technical and/or editorial | | Comment reference number (edited by convenor) | |
|---|---|---|---|
| **Exact reference**<br>EN 12975-2 | **Clause**<br>6.3.5.2 | **Quote (if necessary)**<br>"… should exceed ±0,005 K/s…" | |
| **Author**<br>Christain Müller-Schöll | | **E-mail**<br>collectors@solarenergy.ch | **Standard. Body or Country**<br>SNV |
| **Describe the problem**<br>It is not clear, for HOW LONG or for HOW MANY DATA POINTS the value should exceed ±0,005 K/s. | | | |
| **Propose an improved text**<br>☐Replace          by:<br>☐Add where          :<br>☐Delete: "          " | | | |
| **Which points require further discussion?**<br>The problem needs discussion. | | | |
| **Remarks**<br>I propose to set up an expert group of those having experience with the method, instead of discussion it in the whole group | | | |
| **Author's personal comment reference**<br>C12975-2_18 | | | |

*Comment 9:* *Clause 6.3.4.8.3*

**TC312 Standards Revision Comment Sheet**

| Character of the comment<br>technical and/or editorial | | Comment reference number (edited by convenor) | |
|---|---|---|---|
| **Exact reference**<br>EN 12975-2 | **Clause**<br>6.3.4.8.3 | **Quote (if necessary)**<br>"          " | |
| **Author**<br>Christain Müller-Schöll | | **E-mail**<br>collectors@solarenergy.ch | **Standard. Body or Country**<br>SNV |
| **Describe the problem**<br>From experience of measurements of unglazed absorbers, we know, that the parameter KTHETHABEAM can in nearly all cases be "not significant" (I.e. T-Ratio far less than 2). Same applies consequently for KTHETADIFF. | | | |
| **Propose an improved text**<br>☐Replace          by:<br>☐Add where          :<br>☒Delete: "KTHETABEAM and KTHETADIFF from the list of mandatory parameters.<br>Modify NOTE 1 accordingly.<br>Delete "For unglazed collectors the use of the foll collectors model is mandatory." | | | |
| **Author's personal comment reference**<br>C12975-2_17 | | | |

*Comment 10:* *Clause 6.1.4.4*

**TC312 Standards Revision Comment Sheet**

| Character of the comment technical and/or editorial | | Comment reference number (edited by convenor) | |
|---|---|---|---|
| **Exact reference** EN 12975-2 | **Clause** 6.1.4.4 | **Quote (if necessary)** "the maximum tmperature shall be at least around 80°C" | |
| **Author** Christian Müller-Schöll | | **E-mail** collectors@solarenergy.ch | **Standard. Body or Country** SNV |
| **Describe the problem** Having collectors tested at this maximum temperature can yield a very small span in Tm*, especially in the summer. However, simulation programs and uncertatinty calculations (identification of curvature!) require tests at higher Tm* values. | | | |
| **Propose an improved text** ☒Replace at least around 80°C by: ☐Add where        : ☐Delete: "shall be chosen so that the maximum Tm* value is at least 0.09, unless the temperature difference becomes smaller than required in 6.1.4.3" | | | |
| **Author's personal comment reference** C12975-2_08 | | | |

*Comment 11:* *Clause 5.2.2.2*

**TC312 Standards Revision Comment Sheet**

| Character of the comment technical and/or editorial | | Comment reference number (edited by convenor) | |
|---|---|---|---|
| **Exact reference** EN 12975-2 | **Clause** 5.2.2.2 | **Quote (if necessary)** "       " | |
| **Author** C. Müller-Schöll | | **E-mail** collectors@solarenergy.ch | **Standard. Body or Country** SNV |
| **Describe the problem** I cannot find out, which of the methods described in clauses 5.2.2.2.2 through 5.2.2.2.4 I have to use or I may chose to use. | | | |
| **Propose an improved text** Replace Add at the end of 5.2.2.1 by: "One of the methods described in 5.2.2.2.2 through 5.2.2.2.4 may be chosen." | | | |
| **Which points require further discussion?** DId I understand right, that the intention of describing four methods was, to give a choice? | | | |
| **Author's personal comment reference** C12975-2_02 | | | |

*Comment 12:* Clause 6.2.6.2

**TC312 Standards Revision Comment Sheet**

| Character of the comment<br>purely editorial | | Comment reference number (edited by convenor) | |
|---|---|---|---|
| **Exact reference**<br>EN 12975-2 | **Clause**<br>6.2.6.2 | **Quote (if necessary)**<br>"per square metre (occurs two times)" | |
| **Author**<br>Christian Müller-Schöll | | **E-mail**<br>collectors@solarenergy.ch | **Standard. Body or Country**<br>SNV |
| **Describe the problem**<br>Two points:<br>1. one cannot calculate a value "per square metre" without knowing which reference area to use<br>2 expressing capacity "per square metre of collector contradicts to section 4 of the same standard and is an inconsistency within the equation (29) of the named clause.<br><br>Capacity has to be expressed in Unit J/K. | | | |
| **Propose an improved text**<br>☐Replace          by:<br>☐Add where          :<br>☒Delete: "per square metre of collector" and "per square metre" " | | | |
| **Author's personal comment reference**<br>C12975-2_04 | | | |

*Comment 13:* Clause 6.1.5.2

**TC312 Standards Revision Comment Sheet**

| Character of the comment<br>technical and/or editorial | | Comment reference number (edited by convenor) | |
|---|---|---|---|
| **Exact reference**<br>EN 12975-2 | **Clause**<br>6.1.5.2 | **Quote (if necessary)**<br>"          " | |
| **Author**<br>Christian Müller-Schöll | | **E-mail**<br>collectors@solarenergy.ch | **Standard. Body or Country**<br>SNV |
| **Describe the problem**<br>It appears that it is not clear how the correction proposed in 6.1.5.2 has to be applied to the test data. This needs clarification | | | |
| **Propose an improved text**<br>☐Replace          by:<br>☒Add where          :<br>☐Delete: "Explanation" | | | |
| **Which points require further discussion?**<br>The whole process needs to be discussed. | | | |
| **Remarks**<br>I propose to establish an expert group to make a proposal. | | | |
| **Author's personal comment reference**<br>C12975-2_12 | | | |

*Comment 14: Clause 6.2.4.8.1*

**TC312 Standards Revision Comment Sheet**

| Character of the comment technical and/or editorial | Comment reference number (edited by convenor) | | |
|---|---|---|---|
| **Exact reference** EN 12975-2 | **Clause** 6.2.4.8.1 | **Quote (if necessary)** "          " | |
| **Author** Christian Müller-Schöll | | **E-mail** collectors@solarenergy.ch | **Standard. Body or Country** SNV |
| **Describe the problem** I have the feeling, that not everybody understands positive EL values to be a downward oriented irradiance onto a surface with a temperature of 0K. | | | |
| **Propose an improved text** ☐Replace          by: ☒Add where at the end of 6.2.4.8.1: ☐Delete: "NOTE: Positive EL values are a downward oriented irradiance onto a surface with a temperature of 0K." | | | |
| **Author's personal comment reference** C12975-2_15 | | | |

*Comment 15: Clause all.*

**TC312 Standards Revision Comment Sheet**

| Character of the comment technical and/or editorial | Comment reference number (edited by convenor) | | |
|---|---|---|---|
| **Exact reference** EN 12975-2 | **Clause** all | **Quote (if necessary)** "          " | |
| **Author** Christian Müller-Schöll | | **E-mail** Collectors@solarenergy.ch | **Standard. Body or Country** SNV |
| **Describe the problem** There is still a great number of inconsistencies between 12975-1 and 12975-2. For example, if EN 12975-2 sets a requirement "sharp edges shall be avoided" or "an anchorage…shall be included" then there MUST be an according clause in the test report and then there MUST be a "test" to determine the required properties. | | | |
| **Propose an improved text** ☐Replace          by: ☐Add where          : ☐Delete: "          " | | | |
| **Which points require further discussion?** Either we modify 12975-2 to include the necessary tests OR we modify 12975-1 by deleting all requirements where no test method is present. | | | |
| **Author's personal comment reference** C12975-2_21 | | | |

***Comment 16:*** *Clause 6.1.5.2*

**TC312 Standards Revision Comment Sheet**

| Character of the comment technical and/or editorial | | Comment reference number (edited by convenor) | |
|---|---|---|---|
| **Exact reference** EN 12975-2 | **Clause** 6.1.5.2 | **Quote (if necessary)** "differ by more than ± 1%, then a correction shall be applied…" | |
| **Author** Christian Müller-Schöll | | **E-mail** collectors@solarenergy.ch | **Standard. Body or Country** SNV |
| **Describe the problem** Personally, I find this value rather big. The value influences the uncertainty of measurement but is a systematic error. So why not correct it properly in any case?? | | | |
| **Propose an improved text** ☐Replace          by: ☐Add where         : ☒Delete: "The whole sentence "If …results." | | | |
| **Author's personal comment reference** C12975-2_13 | | | |
| **Connection to other comments (edited by convenor)** SNV C12975-2_01 | | | |

***Other Comments:***

**TC312 Standards Revision Comment Sheet**

| Character of the comment purely editorial | | Comment reference number (edited by convenor) | |
|---|---|---|---|
| **Exact reference** EN 12975-1 | **Clause** all | **Quote (if necessary)** "prEN" | |
| **Author** Christian Müller-Schöl | | **E-mail** collectors@solarenergy.ch | **Standard. Body or Country** SNV |
| **Describe the problem** All over the standard wrong references to a prEN instead of an EN | | | |
| **Propose an improved text** ☒Replace prEN by: ☐Add where         : ☐Delete: "EN" | | | |
| **Author's personal comment reference** C12975-1_01 | | | |

**TC312 Standards Revision Comment Sheet**

| Character of the comment purely editorial | | Comment reference number (edited by convenor) | |
|---|---|---|---|
| **Exact reference** EN 12975-2 | **Clause** 6.1.2.1.1.3 | **Quote (if necessary)** "The condition of the desiccator shall be observed prior to and following each daily measurement sequence on a regular basis." | |
| **Author** Christian Müller-Schöll | | **E-mail** collectors@solarenergy.ch | **Standard. Body or Country** SNV |
| **Describe the problem** According to discussions in WG1 during the preparation of the standard, the expression "prior to and following each daily measurement" should have been replaced by "on a regular basis". By mistake now, both expressions are in the standard. | | | |
| **Propose an improved text** ☐Replace          by: ☐Add where         :"Delete "prior to and following each daily measurement"" | | | |
| **Remarks** The present text makes no sense! | | | |
| **Author's personal comment reference** C12975-2_03 | | | |

*Other Comments:*

**TC312 Standards Revision Comment Sheet**

| Character of the comment purely editorial | | Comment reference number (edited by convenor) | |
|---|---|---|---|
| **Exact reference** EN 12975-2 | **Clause** 5.7.2.1 | **Quote (if necessary)** "sprayed on all sides from above perpendicular to the horizontal" | |
| **Author** Christian Müller-Schöll | | **E-mail** collectors@solarenergy.ch | **Standard. Body or Country** SNV |
| **Describe the problem** This is impossible. This had been discussed in WG1. The discussion was, if it was "on all sides" OR "from above perpendicular to horizontal" | | | |
| **Propose an improved text** ☒Replace sprayed on all sides from above perpendicular to the horizontal by: ☐Add where      : ☐Delete: "sprayed on all sides" | | | |
| **Remarks** As integrated collectors may have their underside protected (5.7.2.1), it is necessary and reasonable to spray "on roof"-collectors or "on stand"-collectors on all sides. | | | |
| **Author's personal comment reference** C12975-2_05 | | | |

**TC312 Standards Revision Comment Sheet**

| Character of the comment purely editorial | | Comment reference number (edited by convenor) | |
|---|---|---|---|
| **Exact reference** EN 12975-2 | **Clause** 6.1.1.8 | **Quote (if necessary)** "(artificial)" | |
| **Author** Christian Müller-Schöll | | **E-mail** collectors@solarenergy.ch | **Standard. Body or Country** SNV |
| **Describe the problem** Unnessecary. Either the collectors' backs are protected from any wind, or they are not. | | | |
| **Propose an improved text** ☐Replace          by: ☐Add where      : ☒Delete: "(artificial)" | | | |
| **Author's personal comment reference** C12975-2_06 | | | |

**TC312 Standards Revision Comment Sheet**

| Character of the comment purely editorial | | Comment reference number (edited by convenor) | |
|---|---|---|---|
| **Exact reference** EN 12975-2 | **Clause** 6.1.4.3 | **Quote (if necessary)** "The average value of the surrounding air speeds parallel to the collector aperture" | |
| **Author** Christian Müller-Schöll | | **E-mail** collectors@solarenergy.ch | **Standard. Body or Country** SNV |
| **Describe the problem** Usually, the standard makes a distinction between "surrounding" wind and "artificial" wind. "Surrounding" is used for the natural meteorological wind. In this case, ANY wind is meant. | | | |
| **Propose an improved text** ☐Replace          by: ☐Add where      : ☒Delete: "surrounding" | | | |
| **Author's personal comment reference** C12975-2_07 | | | |

*Other Comments:*

**TC312 Standards Revision Comment Sheet**

| Character of the comment purely editorial | | Comment reference number (edited by convenor) | |
|---|---|---|---|
| **Exact reference** EN 12975-2 | **Clause** 6.1.5.2 | **Quote (if necessary)** " " | |
| **Author** Christian Müller-Schöll | | **E-mail** collectors@solarenergy.ch | **Standard. Body or Country** SNV |
| **Describe the problem** The integration borders have wrong units. They should be micrometers expressed with the Greek "my" and a "m". | | | |
| **Propose an improved text** ☒Replace various by: ☐Add where         : ☐Delete: "(See above)" | | | |
| **Author's personal comment reference** C12975-2_09 | | | |

**TC312 Standards Revision Comment Sheet**

| Character of the comment purely editorial | | Comment reference number (edited by convenor) | |
|---|---|---|---|
| **Exact reference** EN 12975-2 | **Clause** 6.1.6.2 NOTE | **Quote (if necessary)** " " | |
| **Author** Christian Müller-Schöll | | **E-mail** collectors@solarenergy.ch | **Standard. Body or Country** SNV |
| **Describe the problem** The NOTE is unnecessary, because the parameter is well defined in section 4. | | | |
| **Propose an improved text** ☐Replace         by: ☐Add where         : ☒Delete: "whole NOTE" | | | |
| **Author's personal comment reference** C12975-2_10 | | | |

**TC312 Standards Revision Comment Sheet**

| Character of the comment purely editorial | | Comment reference number (edited by convenor) | |
|---|---|---|---|
| **Exact reference** EN 12975-2 | **Clause** 6.1.7.1 Figure 5 | **Quote (if necessary)** " " | |
| **Author** Christian Müller-Schöll | | **E-mail** collectors@solarenergy.ch | **Standard. Body or Country** SNV |
| **Describe the problem** Wrong picture. | | | |
| **Propose an improved text** ☒Replace Picture by: ☐Add where         : ☐Delete: "correct Picture" | | | |
| **Author's personal comment reference** C12975-2_11 | | | |

*Other Comments:*

**TC312 Standards Revision Comment Sheet**

| Character of the comment<br>purely editorial | | Comment reference number (edited by convenor) | |
|---|---|---|---|
| **Exact reference**<br>EN 12975-2 | **Clause**<br>6.2.1.8 | **Quote (if necessary)**<br>"Surrounding air speed" | |
| **Author**<br>Christian Müller-Schöll | | **E-mail**<br>collectors@solarenrgy.ch | **Standard. Body or Country**<br>SNV |
| **Describe the problem**<br>The paragraph deals with the air speed parallel to the collector and not with the surrounding air speed | | | |
| **Propose an improved text**<br>☒Replace Surrounding air speed by:<br>☐Add where      :<br>☐Delete: "Air speed" | | | |
| **Author's personal comment reference**<br>12975-2_14 | | | |

**TC312 Standards Revision Comment Sheet**

| Character of the comment<br>purely editorial | | Comment reference number (edited by convenor) | |
|---|---|---|---|
| **Exact reference**<br>EN 12975-2 | **Clause**<br>6.3.4.8.2 | **Quote (if necessary)**<br>"Equation 34" | |
| **Author**<br>Christian Müller-Schöll | | **E-mail**<br>collectors@solarenergy.ch | **Standard. Body or Country**<br>SNV |
| **Describe the problem**<br>Eqiation 4 is correct. However it would be more clear, if it was written in a form where the parameters that are being identified are more clearly visible (capitals below) | | | |
| **Propose an improved text**<br>☐Replace      by:<br>☐Add where after Eqn (34): Eqn (34a):<br>☐Delete: "Q/A = ETAZEROBEAM * Gbeam - ETAZEROBEAM*BZERO*(1/cos(theta)-1)*Gbeam + ETAZERO*KDIFF*Gdiff …" | | | |
| **Remarks**<br>Equation as quoted above is for clarification only, of course it should appear in the usual way of writing an equation | | | |
| **Author's personal comment reference**<br>C12975-2_16 | | | |

**TC312 Standards Revision Comment Sheet**

| Character of the comment<br>purely editorial | | Comment reference number (edited by convenor) | |
|---|---|---|---|
| **Exact reference**<br>EN 12975-2 | **Clause**<br>Annex B | **Quote (if necessary)**<br>"prEN" | |
| **Author**<br>Chrsistian Müller-Schöll | | **E-mail**<br>collectors@solarenergy.ch | **Standard. Body or Country**<br>SNV |
| **Describe the problem**<br>Wrong references to prEN 12975-1 instead of EN 12975-1 | | | |
| **Propose an improved text**<br>☒Replace prEN by:<br>☐Add where        :<br>☐Delete: "EN" | | | |
| **Remarks**<br>Please search the whole standard for "prEN" and replace. | | | |
| **Author's personal comment reference**<br>C12975-2_19 | | | |