

Solar Q Mark



Global Certification Scheme for Solar Thermal Collectors

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Preface

This is the very first attempt to draft certification scheme rules for solar thermal collectors which could be used globally to be discussed within the IEA-SHC Task 43 and elsewhere.

Basis for the certification scheme will be the upcoming common EN ISO Standard for collector testing, which is in this document named EN 12975-2 / ISO 9806.

The successful European certification scheme "Solar Keymark" and the connected framework "Solar Keymark Network" has given inspiration to this draft.

The name Solar Q Mark is arbitrarily chosen and just used as a "dummy name". The logo used is the logo of EC IEE QAiST project, which has co-financed the work done here.

This document is kind of a starting point for the process which could lead to a globally valid certification scheme for solar thermal collectors.

It is expected that significant changes and further elaboration are needed before this document can have status as "final draft".

The final draft is supposed to be presented to the people/organisation who will decide on the rules for such certification scheme. A proposal for such organisation is drafted in Annex A of this document - but of course also wide open for discussion.

In parallel it is necessary to develop the common EN ISO Standard for collectors - this process has just been initiated by ISO TC 180 and CEN TC 312.

Hoping for an open and constructive discussion

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PlanEnergi, 2011-05-12*



Task 43 Solar Rating and Certification Procedure

Advanced Solar Thermal Testing and Characterization for Certification of Collectors and Systems



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1 Introduction

The *Solar Q Mark* is a voluntary third-party certification mark, demonstrating compliance of products with the requirements of the ISO 9806 / EN 12975-2 and in the Solar Q Mark certification scheme described here.

This document defines the certification scheme specifying the requirements for the product to be certified and marked plus the requirements for performing the process of granting to a supplier the licence to use the Solar Q Mark on its product.

In short the certification is done using:

- Initial inspection of factory production control and quality management system of the supplier
- 3rd party type testing of 3rd party sampled test sample
- 3rd party annual surveillance of the factory production control

2 Ownership of the Solar Q Mark

The certification trade mark is property of the *Solar Q Group* with representatives from the involved certification bodies, test laboratories, inspectors, product suppliers and industry associations. In Annex A the constitution of the Solar Q Group is given.

The Solar Q Mark is registered and legally protected by the Solar Q Group. The Keymark is registered internationally and in individual countries where such registration is necessary to assure its protection.

3 Fees

A fee for the right to use the Solar Q Mark may be applied. The level of this fee is determined by the Solar Q Group. Income from this fee could pay costs for trademark registrations and actions needed to protect the mark - and other purposes determined by the Solar Q Group.

4 Design of the Solar Q Mark

A graphic representation of the Keymark logo is shown in Annex B.

5 Scope

Within the scope of Solar Q Mark are products within the scope of ISO 9806 / EN 12975-2.

6 Direct actors in the scheme

Actors in the Solar Q Mark certification scheme are:

- Accreditation bodies
- Certification bodies
- Test laboratories
- Inspectors

7 Requirements for the direct actors

7.1 Requirements for accreditation bodies

Accreditation bodies shall be members of the IAF MLA Group:

(http://www.iafdev.com/articles/IAF_MLA/14).

7.2 Certification bodies

Certification bodies shall be accredited in accordance with ISO/IEC 17011. The empowerment to grant licences to use the Solar Q Mark is granted by the Solar Q Group.

7.3 Test laboratories

Test laboratories shall be accredited in accordance with ISO/IEC 17025 and be recognised by one or more certification bodies.

7.4 Inspectors

Inspectors shall be recognised by the certification body.

8 Product requirements

Editors note: The following requirements for testing and for the pass criteria are taken from the current valid EN 12975-1 section 5.

This has of course to be updated according to the ongoing revision - and it has to be adapted for used in these scheme rules - including the introduction of classes (see Annex C).

The idea is, that it will be the “Solar Q Group”(see Annex A on the organisation) who will in the end take decisions on these requirements - and in the scheme rules in general. Our aim should be to have a good draft ready to present to the”Solar Q Group” or whoever the decision makers will be in the end.

8.1 Testing

The product shall be tested and test results reported according to EN 12975-2. The required tests are:

- a) Internal pressure for absorber (see 5.2 of EN 12975-2);*
- b) High temperature resistance (see 5.3 of EN 12975-2);*
- c) Exposure (see 5.4 of EN 12975-2);*
- d) External thermal shock. May be combined with the high temperature resistance or exposure test (see 5.5 of EN 12975-2);*
- e) Internal thermal shock. May be combined with the high temperature resistance or exposure test (see 5.6 of EN 12975-2);*
- f) Rain penetration, only for glazed collectors (see 5.7 of EN 12975-2);*
- g) Mechanical load (see 5.9 of EN 12975-2);*
- h) Thermal performance (see clause 6 of EN 12975-2);*
- i) Freeze resistance, only in the cases specified in 5.8 of EN 12975-2);*
- j) Stagnation temperature (see Annex C of EN 12975-2). May be combined with the high temperature resistance or exposure test.*
- k) Final inspection (see 5.11 of EN 12975-2).*

The optional test for impact resistance (see 5.10 of EN 12975-2) shall be carried out if requested. The result shall be recorded.

NOTE Regarding the durability and reliability of elastic materials refer to ISO 9808:1990 Solar water heaters-Elastomeric materials for absorbers, connecting pipes and fittings-Method of assessment and ISO 9553:1997 Solar energy-Methods of testing preformed rubber seals and sealing compounds used in collectors

8.2 Pass criteria

8.2.1 General

The pass criteria for the reliability tests are given for each test in 5.3.2 to 5.3.10. The term "no major failure", denotes that none of the following occurs:

- *Absorber leakage or such deformation that permanent contact between absorber and cover is established;*
- *Breaking or permanent deformation of cover or cover fixing;*
- *Breaking or permanent deformation of collector fixing points or collector box;*
- *Vacuum loss, such that vacuum or subatmospheric collectors may no more be classified as such, according to the definition in EN ISO 9488 (only applicable for vacuum and subatmospheric collectors);*
- *Accumulation of humidity in form of condensate on the inside of the transparent cover of the collector exceeding 10% of the aperture area.*

NOTE The evaluation of accumulation of humidity for application of the pass criteria shall be applied only on the following tests - external Thermal Shock - Rain Penetration Test

8.2.2 Internal pressure for absorber

The test pressure shall be as specified in 5.2 of EN 12975-2. In the case of absorbers made of organic materials, climate conditions according to Table 2 of EN 12975-2 shall be applied. After the internal pressure test, the collector shall not show any major failure as defined in 5.3.1.

8.2.3 High temperature resistance

When tested in accordance with 5.3 of EN12975-2, the collector shall not show any major failure as defined in 5.3.1.

8.2.4 Exposure

When tested in accordance with 5.4 of EN 12975-2, the collector shall not show any major failure according to 5.3.1 and none of each potential problems of their components shall be graded 2 on the scale given in B.5.5 of EN 12975-2.

8.2.5 External thermal shock

When tested in accordance with 5.5 of EN 12975-2, the collector shall not show any major failure as defined in 5.3.1.

8.2.6 Internal thermal shock

When tested in accordance with 5.6 of EN 12975-2, the collector shall not show any major failure as defined in 5.3.1.

8.2.7 Rain penetration

NOTE This test is applicable only for glazed collectors.

A visual check shall not show any water trace. Moreover, at least one of the following shall be fulfilled:

- a) *by weighing the collector the determined water quantity shall be less than 30 gr/m² or*
- b) *by measuring the humidity inside the collector, any visible droplets inside the collector or humidity that exceeds 20 g/kg at any time during the test or humidity that doubles from the value measured after stabilisation shall yields to “major failure” or*
- c) *the measured condensation level shall be less than 10 % of the transparent cover and the quantity of the water that come out of the collector when tipping it shall be less than 30 gr/m².*

8.2.8 Mechanical load test

When tested in accordance with 5.9 of EN 12975-2 the cover, the collector box and the fixings between collector box and mounting system shall not show any major failure as defined in 5.3.1 and 5.9.1.3 EN12975-2. The permissible and the maximum positive and negative pressure shall be recorded in the installer manual.

NOTE Individual country's safety requirements may prevail.

8.2.9 Thermal performance

When tested in accordance with 6 of EN12975-2, the collector shall not show any major failure as defined in 5.3.1. Thermal performance shall be reported.

8.2.10 Freeze resistance test

This test shall be carried out only in the cases specified in 5.8.1 of EN 12975-2. The pass criterion is no major failure as defined in 5.3.1 after three freeze-thaw cycles.

8.2.11 Procedure

The required number of collectors shall be available for testing. The collector shall be tested in accordance with 5.2. The collector conforms to this standard, only if all pass criteria are fulfilled.

Freeze resistance shall be tested, for collectors which the manufacturer claims can withstand freezing and freeze/thaw cycling and which are not intended to be filled with antifreeze fluids.

9 Specification of the manufacturer's application file

The manufacturer and/or applicant shall supply the certification body with the information as required in the application form of the certification body. The application form is available from the certification body.

10 Collector families

If a manufacturer produces the “same” collector in different lengths and/or widths (i.e. the only difference between two collectors is the length and/or the width) the collector is considered the same subtype (within the same collector “family”). In this case only one sample of the smallest and one sample of the largest module shall be taken and tested². The largest module shall be subject to all the tests required in EN 12975-1 clause 5.2, and the smallest shall be subject to a thermal performance test (clause 6 of EN 12975-2). The performance figures used for this type shall be the performance figures corresponding to the measured instantaneous efficiency having the lowest integral in the interval of the reduced temperature³ from 0 – 0.1 K/(W/m²). In other words, the efficiency curve used for this subtype shall be the one embracing the smallest area.

Note: The module sizes are compared based on aperture area. Aperture area is defined in EN 12975-2. The inspector shall inspect all the different sizes of the type to verify conformity.

11 Custom built collectors

Custom built collectors (built in, roof integrated collectors that do not comprise factory made modules and are assembled directly on the place of installation) are handled the following way:

A module with the same structure as the ready collector is tested. The module gross area in the case of custom built collectors shall be at least 2 m². The manufacturer has to explain the conformity of the test module with the normal production and must provide a detailed description of the components. Very large collector modules may be treated as the custom built ones, see above, if testing of the full size module is not possible.

12 Selection/sampling of type test samples

The selection of products for initial type testing is made under the responsibility of the certification body. The test samples for initial type testing are taken out of the current production or from the stock of the manufacturer. The inspector points out the test samples and records their serial numbers. The manufacturer shall prove through his factory production control and quality management system conformity of the test sample with the series production.

The inspector:

- either takes with him the test samples and delivers them to the testing laboratory
- or he marks them with a permanent mark (alternatively seals their packing) and instructs the manufacturer to deliver them to the testing laboratory.

13 Type testing

The test samples shall be testing according to ISO 9806 / EN 12975-2 by recognised test lab.

14 Initial inspection of the manufacturing site and the factory production control

The manufacturer shall operate a quality system according to EN ISO 9001 covering the production line of the product for which the licence to use the Solar Q Mark is granted.

The quality management system shall cover the production line according to inspector's criteria.

15 Annual surveillance

The factory inspections/assessments shall include the checking of the documentation of the related factory production control at least once a year.

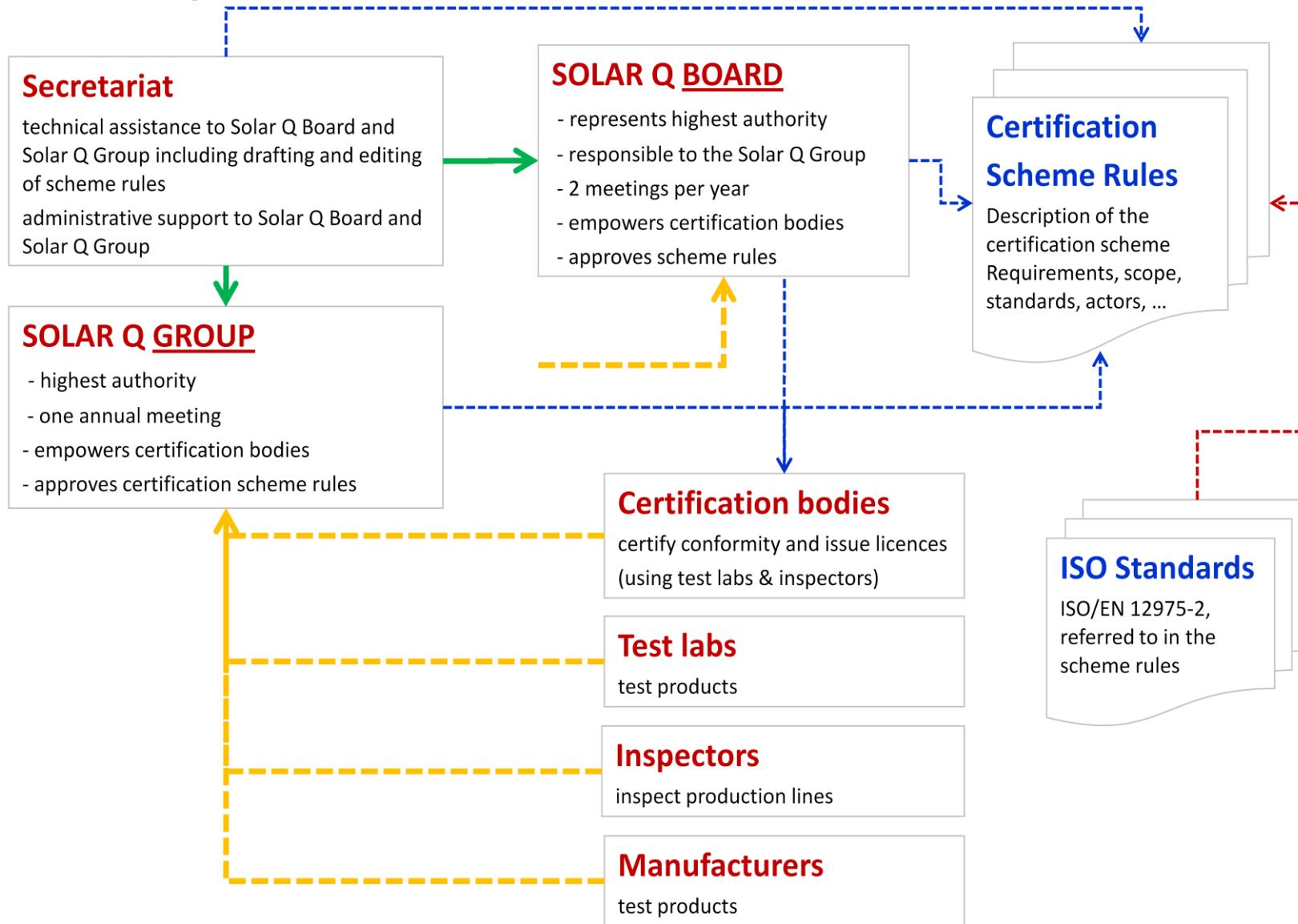
16 Marking

When requirements are fulfilled the products can be marked as prescribed in Annex C

17 Complaints and appeals

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Annex A Organisation behind Solar Q Mark



Annex B The Solar Q Mark - the graphics - *example*



Colours:

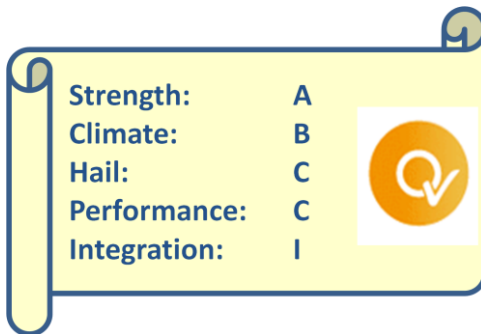
Minimum / maximum sizes:

Annex C Requirements for specifications in the mark/label.

At the Solar Q Mark label the classes corresponding to the ISO 9806 / EN 12975-2 test results shall be given.

The label (or attached fiche) shall contain the information specified in the ISO 9806 / EN 12975-2 - including specifications of classes for performance, structural strength, hail resistance, applicable climate, etc..

Preliminary example of classification:



Example of classification criteria (to be discussed):

| | |
|----------------------|--------------------------|
| Performance | η |
| Performance F | 0.25 |
| Performance E | 0.30 |
| Performance D | 0.35 |
| Performance C | 0.40 |
| Performance B | 0.45 |
| Performance A | 0.50 |

| Strength | P [Pa] |
|-----------------|---------------|
| Load C | 1000 |
| Load B | 2000 |
| Load A | 3000 |

| Hail | Size [mm] |
|---------------|------------------|
| Hail C | 0 |
| Hail B | 20 |
| Hail A | 40 |

| Climate | G [W/m²] | Ta [°C] |
|------------------|----------------------------|----------------|
| Climate C | 900 | 20 |
| Climate B | 1000 | 30 |
| Climate A | 1100 | 40 |

| Roof integration | |
|-------------------------|----------------|
| O | On roof |
| I | In roof |
| B | Both |

Annex D Schematics of the Solar Q Mark certification process and the involved bodies and actors

