SLOVENSKI STANDARD
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Toplotni sončni sistemi in sestavni deli - Sprejemniki sončne energije - 1. del: Splošne zahteve

Thermal solar systems and components - Solar collectors - Part 1: General requirements

Thermische Solaranlagen und ihre Bauteile - Kollektoren - Teil 1: Allgemeine Anforderungen

Installations solaires thermiques et leurs composants - Capteurs solaires - Partie 1: Exigences générales

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Thermische Solaranlagen und ihre Bauteile - Kollektoren - Teil 1: Allgemeine Anforderungen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 312.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Foreword

This document (prEN 12975-1:2011) has been prepared by Technical Committee CEN/TC 312 “Thermal solar systems and components”, the secretariat of which is held by ELOT.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 12975-1:2006+A1:2010.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive, see informative Annex ZA, which is an integral part of this document.

Introduction

In respect of potential adverse effects on the quality of water intended for human consumption, caused by the product covered by this standard, it is pointed out that:

a) This standard provides no information as to whether the product may be used without restriction in any of the Member States of the EU or EFTA;

b) It should be noted that, while awaiting the adoption of verifiable European criteria, existing national regulations concerning the use and/or the characteristics of this product remain in force.

1 Scope

This European Standard specifies requirements on durability (including mechanical strength), reliability and safety for fluid heating solar collectors. It also includes provisions for evaluation of conformity to these requirements.

It is not applicable to those collectors, in which the thermal storage unit is an integral part of the collector to such an extent, that the collection process cannot be separated from the storage process for the purpose of making measurements of these two processes.

It is also applicable to thermal-electrical hybrid collectors, so called PVT collectors; however it does not cover electrical safety or other specific properties related to the PV part of these collectors.Collectors that are custom-built (built in, roof integrated collectors that do not comprise factory made modules and are assembled directly on the place of installation) cannot be tested in their actual form for durability, reliability and thermal performance according to this standard. Instead, a module with the same structure as the ready collector is tested. The module gross area in the case of custom built collectors should be at least 2 m^2. The test is valid only for larger collectors, than the tested module.

For collectors the national and European Guidelines for Structural Planning and overhead glazing are not valid. Therefore this standard should be applied for the design of the static of the collector.

2 Normative references

The following referenced documents are indispensable for the application of this European Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN ISO 9488	Solar energy – Vocabulary (ISO 9488:1999)
EN 12975-2,	Thermal solar systems and components – Solar collectors – Part 2: Test methods
EN 13501-1	Fire classification of construction products and building elements — Part 1: Classification using test data from reaction to fire tests
EN 13501-5	Fire classification of construction products and building elements — Part 5: Classification using test data from external fire exposure to roof tests
EN 1027	Windows and doors. Water tightness. Test method

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN ISO 9488

and EN 12975-2 apply.

4 Symbols and units

For the purposes of this European Standard, the symbols and units given in EN ISO 9488 and EN 12975-2:2006 apply.

5 Durability and reliability

5.1 Materials and design

Information about the materials and manufacture of solar collectors, including the materials they are manufactured of and their resistance to all influences which they might meet in service, retaining their operational ability are given in Annex A.

5.2 Required tests

The collector shall be subjected to the following series of tests:

a) Internal pressure for fluid channels (see 5.2 of EN 12975-2:2006);

b) High temperature resistance (see 5.4 of EN 12975-2:2006);

c) Exposure (see 5.5 of EN 12975-2:2006);

d) External thermal shock. May be combined with the high temperature resistance or exposure test (see 5.6 of EN 12975-2:2006);

e) Internal thermal shock. May be combined with the high temperature resistance or exposure test (see 5.7 of EN 12975-2:2006);

f) Rain penetration, only for glazed collectors (see 5.8 of EN 12975-2:2006);

g) Mechanical load (see 5.10 of EN 12975-2:2006);

h) Thermal performance (see Clause 6 of EN 12975-2:2006);

i) Freeze resistance, only in the cases specified in 5.9 of EN 12975-2:2006;

j) Stagnation temperature (see Annex C of EN 12975-2:2006). May be combined with the high temperature resistance or exposure test.

k) Pressure drop (mandatory for air heating collectors)

l) Leakage test (mandatory for air heating collectors)

m) Impact resistance test (see 5.11 of EN 12975-2:2006);

n) Reaction to fire (see 5.5.1 of EN 12975-1:2006+A1:2010);

o) External fire performance (see 5.5.2 of EN 12975-1:2006+A1:2010);

p) Weather tightness (see 5.6 of EN 12975-1:2006+A1:2010);

q) Final inspection (see 5.12 of EN 12975-2:2006).

For several of the tests a) to j) special considerations are required when applying them to tracking concentrating collectors. For guidance in this matter, please refer to informative Annex M of EN 12975-2.

Table 5.1 Sequence of tests in EN 12975

Test list	Variations/ Comments	Required test sequence(s) before test
a) Internal pressure	Metallic	None
	Polymeric	Full exposure, see 5.3.4
b) High temperature resistance test	may be combined with c, d, e , j	none
c) exposure	may be combined with b, d, e , j	none
d) external shock	may be combined with c, b, e , j	None
e) internal shock	May be combined with c, d, b , j	None
f) rain penetration		Pre-conditioning or full exposure, see 5.3.4
g) mechanical load		Pre-conditioning or full exposure, see 5.3.4
h) thermal performance	New collector shall be used but it is also allowed to perform it after additional sequences like exposure have been carried out	5 h exposure
i) freeze resistance		Pre-conditioning or full exposure, see 5.3.4
j) Stagnation temperature	**A.1.1.1.1** may be	**A.1.1.1.2** None

	combined with b) or c)	
k) Pressure drop		Pre-conditioning or full exposure, see 5.3.4
l) Leakage test		Pre-conditioning or full exposure, see 5.3.4
m) Impact test		Pre-conditioning or full exposure if polymer cover, see 5.3.4
n) Reaction to fire		
o) External fire performance		
p) Weather tightness		Pre-conditioning or full exposure, see 5.3.4
q) Final inspection	Always after the full exposure (after any tests the exposure may have been combined with). After rain test if weighing is not applied or gives a “fail” judgement.	

The requested tests and assessments before and after testing are equal for initial testing and for re-testing.

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

5.3 Pass criteria

5.3.1 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:

- Fluid channel leakage (in case of liquid heating collectors only) 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 shall be classified 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. In case of an open loop air heating collector for limited periods of time this criterion maybe exceeded.

NOTE The evaluation of accumulation of humidity for application of the pass criteria should be applied only on the following tests :

- External Thermal Shock

5.3.2 Internal pressure test for fluid channels

The test pressure shall be as specified in 5.2 of EN 12975-2:2006. In the case of fluid channels made of organic materials, climate conditions according to Table 2 of EN 12975-2:2006 shall be applied. After the internal pressure test, the collector shall not show any major failure as defined in 5.3.1.

5.3.3 High temperature resistance

When tested in accordance with 5.4 of EN 12975-2:2006, the collector shall not show any major failure as defined in 5.3.1.

5.3.4 Exposure

When tested in accordance with 5.5 of EN 12975-2:2006, 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 12975-2:2006.

5.3.5 External thermal shock

When tested in accordance with 5.6 of EN 12975-2:2006, the collector shall not show any major failure as defined in 5.3.1.

5.3.6 Internal thermal shock

When tested in accordance with 5.6 of EN 12975-2:2006, the collector shall not show any major failure as defined in 5.3.1.

5.3.7 Rain penetration

NOTE This test is applicable only for glazed collectors.

When tested in accordance with 5.8 of EN 12975-2:2006, the collector shall not show any major failure as defined in 5.3.1.