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Toplotni sončni sistemi in sestavni deli - Neserijsko izdelani sistemi - 1. del: Splošne zahteve za solarne grelce in kombinirane sisteme

Thermal solar systems and components - Custom built systems - Part 1: General requirements for solar water heaters and combisystems

Thermische Solaranlagen und ihre Bauteile - Kundenspezifisch gefertigte Anlagen - Teil 1: Allgemeine Anforderungen

Installations solaires thermiques et leurs composants - Installations assemblées à façon - Partie 1: Exigences générales pour chauffe-eau solaires et installations mixtes

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Thermal solar systems and components - Custom built systems - Part 1: General requirements for solar water heaters and combisystems

Installations solaires thermiques et leurs composants - Installations assemblées à façon - Partie 1: Exigences générales pour chauffe-eau solaires et installations mixtes

Thermische Solaranlagen und ihre Bauteile - Kundenspezifisch gefertigte Anlagen - Teil 1: Allgemeine Anforderungen an Solaranlagen zur Trinkwassererwärmung und solare Kombianlagen

This Technical Specification (CEN/TS) was approved by CEN on 9 September 2008 for provisional application.

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Foreword

This document (CEN/TS 12977-1:2010) has been prepared by Technical Committee CEN/TC 312 “Thermal solar systems and components”, the secretariat of which is held by ELOT.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes ENV 12977-1:2001.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

a) Drinking water quality

In respect of potential adverse effects on the quality of drinking water intended for human consumption caused by the product covered by this document, it should be noted that:

1) this document provides no information as to whether the product may be used without restriction in any of the Member States of the EU or EFTA;

2) while awaiting the adoption of verifiable European criteria, existing national regulations concerning the use and/or the characteristics of this product remain in force.

a) Factory Made and Custom Built solar heating systems

EN 12976-1, EN 12976-2 and CEN/TS 12977-1 and -2, EN 12977-3, CEN/TS 12977-4 and -5 distinguish two categories of solar heating systems:

1) Factory Made solar heating systems; and

2) Custom Built solar heating systems.

The classification of a system as Factory Made or Custom Built is a choice of the final supplier, in accordance to the following definitions:

3) Factory Made solar heating systems are batch products with one trade name, sold as complete and ready to install kits, with fixed configurations. Systems of this category are considered as a single product and assessed as a whole.

If a Factory Made Solar Heating System is modified by changing its configuration or by changing one or more of its components, the modified system is considered as a new system. Requirements and test methods for Factory Made solar heating systems are given in EN 12976-1 and EN 12976-2.

4) Custom Built solar heating systems are either uniquely built, or assembled by choosing from an assortment of components. Systems of this category are regarded as a set of components. The components are separately tested and test results are integrated to an assessment of the whole system. Requirements for Custom Built solar heating systems are given in CEN/TS 12977-1, test methods are specified in CEN/TS 12977-1 and -2, EN 12977-3, CEN/TS 12977-4 and -5. Custom Built solar heating systems are subdivided into two categories:

i) Large Custom Built systems are uniquely designed for a specific situation. In general they are designed by HVAC engineers, manufacturers or other experts.

ii) Small Custom Built systems offered by a company are described in a so-called assortment file, in which all components and possible system configurations, marketed by the company, are specified. Each possible combination of a system configuration with components from the assortment is considered as one Custom Built system.

Table 1 shows the division for different system types.

Table 1 — Division for factory made and custom built solar heating systems

Factory Made solar heating systems (EN 12976-1, -2)	Custom Built solar heating systems (CEN/TS 12977-1, -2, -4, -5 and EN 12977-3)
Integral collector-storage systems for domestic hot water preparation	Forced-circulation systems for hot water preparation and/or space heating/cooling, assembled using components and configurations described in a documentation file (mostly small systems)
Thermosiphon systems for domestic hot water preparation	
Forced-circulation systems as batch product with fixed configuration for domestic hot water preparation	Uniquely designed and assembled systems for hot water preparation and/or space heating/cooling (mostly large systems)

NOTE 1 Forced circulation systems can be classified either as Factory Made or as Custom Built, depending on the market approach chosen by the final supplier.

NOTE 2 Both Factory Made and Custom Built systems for domestic hot water preparation are performance tested under the same set of basic reference conditions as specified in EN 12976-2:2006, Annex B and in CEN/TS 12977-2:2010, Annex A. In practice, the installation conditions may differ from these reference conditions.

NOTE 3 Solar heating systems for both heating and cooling can so far not be performance tested; if cooling option is not considered then the solar heating can be performance tested as a space heating system.

1 Scope

This Technical Specification specifies requirements on durability, reliability and safety of small and large custom built solar heating and cooling systems with liquid heat transfer medium in the collector loop for residential buildings and similar applications.

This document contains also requirements on the design process of large custom built systems.

2 Normative references

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

EN 253, *District heating pipes — Preinsulated bonded pipe systems for directly buried hot water networks — Pipe assembly of steel service pipe, polyurethane thermal insulation and outer casing of polyethylene*

EN 307, *Heat exchangers — Guidelines to prepare installation, operating and maintenance instructions required to maintain the performance of each type of heat exchangers*

EN 806-1, *Specifications for installations inside buildings conveying water for human consumption — Part 1: General*

EN 806-2, *Specification for installations inside buildings conveying water for human consumption — Part 2: Design*

EN 809, *Pumps and pump units for liquids — Common safety requirements*

EN 1151-1, *Pumps — Rotodynamic pumps — Circulation pumps having a rated power input not exceeding 200 W for heating installations and domestic hot water installations — Part 1: Non-automatic circulation pumps, requirements, testing, marking*

EN 1489, *Building valves — Pressure safety valves — Tests and requirements*

EN 1490, *Building valves — Combined temperature and pressure relief valves — Tests and requirements*

EN 1991-1-3, *Eurocode 1 — Actions on structures — Part 1-3: General actions — Snow loads*

EN 1991-1-4, *Eurocode 1: Actions on structures — Part 1-4: General actions — Wind actions*

EN 1993-1-1, *Eurocode 3: Design of steel structures — Part 1-1: General rules and rules for buildings*

EN 1999-1-1, *Eurocode 9: Design of aluminium structures — Part 1-1: General structural rules*

EN 12975-1:2006, *Thermal solar systems and components — Solar collectors — Part 1: General Requirements*

EN 12975-2, *Thermal solar systems and components — Solar collectors — Part 2: Test methods*

EN 12976-1:2006, *Thermal solar systems and components — Factory made systems — Part 1: General requirements*

CEN/TS 12977-2:2010, *Thermal solar systems and components — Custom built systems — Part 2: Test methods for solar water heaters and combisystems*

EN 12977-3, *Thermal solar systems and components — Custom built systems — Part 3: Performance test methods for solar water heater stores*

CEN/TS 12977-4, *Thermal solar systems and components — Custom built systems — Part 4: Performance test methods for solar combistores*

CEN/TS 12977-5, *Thermal solar systems and components — Custom built systems — Part 5: Performance test methods for control equipment*

EN 60335-1, *Household and similar electrical appliances — Safety — Part 1: General requirements (IEC 60335-1:2001, modified)*

EN 60335-2-21, *Household and similar electrical appliances — Safety — Part 2-21: Particular requirements for storage water heaters (IEC 60335-2-21:2002, modified)*

EN ISO 9488:1999, *Solar energy — Vocabulary (ISO 9488:1999)*

ISO 9459-1:1993, *Solar heating — Domestic water heating systems — Part 1: Performance rating procedure using indoor test methods*

ISO/TR 10217, *Solar energy — Water heating systems — Guide to material selection with regard to internal corrosion*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12975-1:2006, EN 12976-1:2006 and EN ISO 9488:1999 and the following apply.

3.1
assortment
complete list of components (collectors, stores, controllers, pumps, etc.) which a company offers for its solar heating systems

NOTE For the purpose of this document the assortment is restricted to components used for small custom built solar heating systems marketed by a company.

3.2
assortment file
technical documentation file for small custom built systems of a company which includes:

— the complete assortment for small custom built systems;

— the complete description of all system configurations;

— the complete description of all marketed combinations of system configurations and components including the component dimensions and number of units;

— further technical information

3.3
blow-off line
connecting line between the outlet of the safety valve and the environment (preferably an open vessel at atmospheric pressure)

3.4
collector array
group of collectors that are closely connected in series, in parallel or in combination of both modes, with one hydraulic input and one hydraulic output

3.5
control equipment
controllers, sensors, pumps, actuators, etc. used for controlling a solar heating systems including optional auxiliary heaters and other parts of the heating generating and distribution system

NOTE Requirements and test methods for control equipment are given in CEN/TS 12977-5.

3.6
solar combisystem
solar heating system providing both hot water and space heating

3.7
expansion line
<systems with closed expansion vessels> connecting line between the collectors and the pressure expansion vessel

<systems with open expansion vessels> connecting line between the collector array and the open expansion vessel

3.8
flow rate
circulation rate

3.9
large custom built system
solar heating system for the purpose of hot water preparation and/or space heating/cooling, which is designed for a specific situation by combining various components to a unique system

NOTE In general the collector area is greater than 30 m^2 and the store volume is greater than 3 m^3.

3.10
safety line
<systems with closed expansion vessels> connecting line between the collector array and the safety valve

<systems with open expansion vessels> connecting line between the collector array and the open expansion vessel

3.11
safe valve
pressure limiting valve

3.12
small custom built system
modular solar heating system of the remote storage type for the purpose of hot water preparation and/or space heating and/or cooling

NOTE 1 The system has a well identified configuration (see 3.8). It is assembled from components chosen from the market and described in an assortment file prepared by a company.

NOTE 2 In general the assortment file includes the possible system configurations, the assortment of components and their possible combinations and dimensions. The "company" may be the manufacturer of all or of parts of the components in the assortment; this company may also be only a consulting engineer who just produces the technical documentation and purchases the components from suppliers.