ICS 27.160, 91.140.10, 91.140.65

SLOVENSKÁ TECHNICKÁ NORMA

Október 2018

| STN | **Tepelné solárne systémy a komponenty<br>Systémy stavané na zákazku<br>Časť 1: Všeobecné požiadavky na solárne ohrievače vody a kombinované systémy** | **STN<br>EN 12977-1<br><br>74 7203** |
|---|---|---|

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

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 09/18

Obsahuje: EN 12977-1:2018

Oznámením tejto normy sa od 31.10.2018 ruší
STN EN 12977-1 (74 7203) z októbra 2012

# EUROPEAN STANDARD
# NORME EUROPÉENNE
# EUROPÄISCHE NORM

# EN 12977-1

April 2018

ICS 27.160; 91.140.10; 91.140.65 Supersedes EN 12977-1:2012

English Version

# 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 solaires combinées

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

This European Standard was approved by CEN on 29 October 2017.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**



Ref. No. EN 12977-1:2018 E

# Contents

Page

# European foreword

This document (EN 12977-1:2018) has been prepared by Technical Committee CEN/TC 312 “Thermal solar systems and components”, the secretariat of which is held by ELOT.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2018, and conflicting national standards shall be withdrawn at the latest by October 2018.

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

This document supersedes EN 12977-1:2012.

This document has been prepared under the Mandate M/534 “Standardisation request to the European standardisation organisations pursuant to Article 10(1) of Regulation (EU) No 1025/2012 of the European Parliament and of the Council in support of implementation of Commission Regulation (EU) No 814/2013 of 2 August 2013 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for water heaters and hot water storage tanks and Commission Delegated Regulation (EU) No 812/2013 of 18 February 2013 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to the energy labelling of water heaters, hot water storage tanks and packages of water heater and solar device” which was given to CEN by the European Commission and the European Free Trade Association.

For relationship with EU Directive(s), see informative Annex ZA, ZB and ZC, which are integral parts of this document.

EN 12977 is currently composed with the following parts:

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

— *Thermal solar systems and components — Custom built systems — Part 2: Test methods for solar water heaters and combisystems*;

— *Thermal solar systems and components — Custom built systems — Part 3: Performance test methods for solar water heater stores*;

— *Thermal solar systems and components — Custom built systems — Part 4: Performance test methods for solar combistores*;

— *Thermal solar systems and components — Custom built systems — Part 5: Performance test methods for control equipment*.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey 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.

b) Factory made and custom built solar heating systems

EN 12976-1, EN 12976-2, FprEN 12977-1, EN 12977-2, EN 12977-3, EN 12977-4 and EN 12977-5 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 with 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 EN 12977-1, test methods are specified in EN 12977-1, EN 12977-2, EN 12977-3, EN 12977-4 and EN 12977-5. 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 and EN 12976-2) | Custom built solar heating systems (EN 12977-1, EN 12977-2, EN 12977-3, EN 12977-4 and EN 12977-5) |
|---|---|
| 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 12976-2:2017, Annex B and in EN 12977-2:2018, 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 the cooling option is not considered, then the solar heating system can be performance tested as a space heating system.

# 1 Scope

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

# 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 16297-1, *Pumps - Rotodynamic pumps - Glandless circulators - Part 1: General requirements and procedures for testing and calculation of energy efficiency index (EEI)*

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+A1:2010, *Thermal solar systems and components - Solar collectors - Part 1: General requirements*

EN 12976-1:2017, *Thermal solar systems and components - Factory made systems - Part 1: General requirements*

EN 12977-2:2018, *Thermal solar systems and components — Custom built systems — Part 2: Test methods for solar water heaters and combisystems*

EN 12977-5:2018, *Thermal solar systems and components — Custom built systems — Part 5: Performance test methods for control equipment*

**EN 12977-1:2018 (E)**

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

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

EN ISO 9806:2017, *Solar energy - Solar thermal collectors - Test methods (ISO 9806:2017)*

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*