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KATSEMEETODID

Thermal solar systems and components - Custom built  
systems - Part 4: Performance test methods for solar  
combistores

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

See Eesti standard EVS-EN 12977-4:2018 sisaldab Euroopa standardi EN 12977-4:2018 ingliskeelset teksti.	This Estonian standard EVS-EN 12977-4:2018 consists of the English text of the European standard EN 12977-4:2018.
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English Version

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

Installations solaires thermiques et leurs composants -  
Installations assemblées à façon - Partie 4 : Méthodes  
d'essai des performances pour chauffe-eau solaires et  
installations solaires combinées

Thermische Solaranlagen und ihre Bauteile -  
Kundenspezifisch gefertigte Anlagen - Teil 4:  
Leistungsprüfung von Warmwasserspeichern für  
Solaranlagen zur Trinkwassererwärmung und  
Raumheizung (Kombispeicher)

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.

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

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## European foreword

This document (EN 12977-4:2018) 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of an identical text or by endorsement, at the latest by October 2018, and conflicting national standards shall be withdrawn at the latest by October 2018.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 12977-4:2012.

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

The test methods for stores of solar heating systems as described in this document are required for the determination of the thermal performance of small custom built systems for combined domestic hot water preparation and space heating, so-called solar combisystems, as specified in EN 12977-1:2018.

These test methods deliver parameters, which are needed for the simulation of the thermal behaviour of a store being part of a small custom built system.

NOTE 1 With the test methods for stores given in EN 12897 only a few parameters are determined in order to characterize the thermal behaviour of a store. These few parameters are not sufficient for the determination of the thermal performance of small custom built systems as described in EN 12977-2:2018.

NOTE 2 The already existing test methods for stores of conventional heating systems are not sufficient with regard to solar heating systems. This is due to the fact that the performance of solar heating systems depends much more on the thermal behaviour of the store (e.g. stratification, heat losses), as conventional systems do. Hence, this separate document for the performance characterization of stores for solar heating systems is needed.

NOTE 3 For additional information about the test methods for the performance characterization of stores see EN 12977-3:2018 and [1] in Bibliography.

## 1 Scope

This European Standard specifies test methods for the performance characterization of stores which are intended for use in small custom built systems as specified in EN 12977-1:2018.

Stores tested according to this document are commonly used in solar combisystems. However, the thermal performance of all other thermal stores with water as a storage medium (e.g. for heat pump systems) can be also assessed according to the test methods specified in this document.

This document applies to combistores with a nominal volume up to 3 000 l and without integrated burner.

NOTE This document is extensively based on references to EN 12977-3:2018.

## 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 12828, *Heating systems in buildings — Design for water-based heating systems*

EN 12977-3:2018, *Thermal solar systems and components — Custom built systems — Part 3: Performance test methods for solar water heater stores*

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

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12977-3:2018 and EN ISO 9488:1999 apply.

## 4 Symbols and abbreviations

For the purposes of this document, the symbols and abbreviations given in EN 12977-3:2018 apply.

## 5 Store classification

Solar combistores are classified by distinction between different charge and discharge modes. Five groups are defined as shown in Table 1.

**Table 1 — Classification of combistores**

Group	Charge mode	Discharge mode
1	direct	direct
2	indirect	direct
3	direct	indirect
4	indirect	indirect
5	stores that cannot be assigned to groups 1 to 4	

NOTE All stores can have one or more additional electrical auxiliary heating elements.