



**SLOVENSKI STANDARD
SIST EN 12976-1:2002**

01-november-2002

**Hcd`cHb]`gcb b]`g]ghYa]]b`gYghUj b]`XY]!`bXi gh]`g_c`]nXYUb]`g]ghYa]!`%`XY.
Gd`cýbY`nU` hYj Y**

Thermal solar systems and components - Factory made systems - Part 1: General requirements

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

**iTeh STANDARD PREVIEW
(standards.iteh.ai)**

Installations solaires thermiques et leurs composants -Installations préfabriquées en usine - Partie 1: Exigences générales

<https://standards.iteh.ai/catalog/standards/sist/3c49f58b-5a40-4623-955f-108456ce57d5/sist-en-12976-1-2002>

Ta slovenski standard je istoveten z: EN 12976-1:2000

ICS:

27.160 Ú[} } æ } ^i* ãæ Solar energy engineering

SIST EN 12976-1:2002 en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 12976-1:2002

<https://standards.iteh.ai/catalog/standards/sist/3c49f58b-5a40-4623-955f-108456ee57d5/sist-en-12976-1-2002>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 12976-1

December 2000

ICS 27.160

English version

Thermal solar systems and components - Factory made systems - Part 1: General requirements

Installations solaires thermiques et leurs composants -
Installations préfabriquées en usine - Partie 1: Exigences
générales

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

This European Standard was approved by CEN on 24 November 2000.

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 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

[SIST EN 12976-1:2002](https://standards.iteh.ai/catalog/standards/sist/3c49f58b-5a40-4623-955f-108456ee57d5/sist-en-12976-1-2002)

<https://standards.iteh.ai/catalog/standards/sist/3c49f58b-5a40-4623-955f-108456ee57d5/sist-en-12976-1-2002>



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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Contents

	Page
Foreword	3
Introduction	4
1 Scope	6
2 Normative references	6
3 Terms and definitions	7
4 Requirements	7
4.1 General	7
4.1.1 Suitability for drinking water	7
4.1.2 Water contamination	7
4.1.3 Freeze resistance	7
4.1.4 Overtemperature protection	8
4.1.5 Reverse flow protection	8
4.1.6 Pressure resistance	8
4.2 Materials	9
4.3 Components and pipework	9
4.3.1 Collector	9
4.3.2 Supporting frame	9
4.3.3 Piping	9
4.3.4 Circulation pump	10
4.3.5 Heat Exchangers	10
4.3.6 Store	10
4.3.7 Control system	10
4.4 Safety equipment	10
4.4.1 Safety valves	10
4.4.2 Safety lines and expansion lines	10
4.4.3 Blow-off lines	10
4.5 Resistance to external influences	11
4.6 Documentation	11
4.6.1 General	11
4.6.2 Documents for the installer	11
4.6.3 Documents for the user	12
4.7 Marking	13
4.8 System performance	13
Annex A (informative) Conformity assessment	14
Bibliography	16

Foreword

This European Standard 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 June 2001, and conflicting national standards shall be withdrawn at the latest by June 2001.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Annex A is informative.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 12976-1:2002](https://standards.iteh.ai/catalog/standards/sist/3c49f58b-5a40-4623-955f-108456ee57d5/sist-en-12976-1-2002)

<https://standards.iteh.ai/catalog/standards/sist/3c49f58b-5a40-4623-955f-108456ee57d5/sist-en-12976-1-2002>

Introduction

Drinking water quality

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

- 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.

Factory Made and Custom Built solar heating systems

The standards EN 12976-1:2000 as well as EN 12976-2:2000 and the prestandards prENV 12977-1:2000 to prENV 12977-3:2000 distinguish two categories of solar heating systems: **Factory Made** solar heating systems and **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.

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 for which a new test report is necessary. Requirements and test methods for Factory Made solar heating systems are given in EN 12976-1:2000 and EN 12976-2:2000.

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 prENV 12977-1:2000, test methods are specified in prENV 12977-2:2000 and prENV 12977-3:2000. Custom Built solar heating systems are subdivided into two categories:

- **Large Custom Built systems** are uniquely designed for a specific situation. In general HVAC engineers, manufacturers or other experts design them.
- **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 (ENV 12977-1, -2, -3)
Integral collector-storage systems for domestic hot water preparation	Forced-circulation systems for hot water preparation and/or space heating, assembled using components
Thermosiphon systems for domestic hot water preparation	and configurations described in a documentation file (mostly small systems)
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 (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 are performance tested under the same set of reference conditions as specified in annex B of EN 12976-2:2000 and annex A of prENV 12977-2:2000. In practice, the installation conditions may differ from these reference conditions.

NOTE 3 A Factory Made system for domestic hot water preparation may have an option for space heating, however this option should not be used or considered during testing as a Factory Made system.

iTeh STANDARD PREVIEW **(standards.iteh.ai)**

SIST EN 12976-1:2002

<https://standards.iteh.ai/catalog/standards/sist/3c49f58b-5a40-4623-955f-108456ee57d5/sist-en-12976-1-2002>

1 Scope

This European Standard specifies requirements on durability, reliability and safety for Factory Made thermal solar heating systems. The standard also includes provisions for evaluation of conformity to these requirements.

The requirements in this standard apply to Factory Made solar systems as products. The installation of these systems itself is not considered, but requirements are given for the documentation for the installer and the user which is delivered with the system (see also the clause 3).

2 Normative references

This European Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

- EN 307, *Heat exchangers — Guidelines to prepare installation, operating and maintenance instructions required to maintain the performance of each type of heat exchanger*
- prEN 806-1:1999, *Specifications for installations inside buildings conveying water for human consumption — Part 1: General*
- EN 809, *Pumps and pump units for liquids — General safety requirements*
- EN 1151, *Pumps — Rotodynamic pumps — Circulation pumps having an electrical effect not exceeding 200 W for heating installations and domestic hot water installations — Requirements, testing, marking*
- EN 1489, *Building valves — Pressure safety valve — Tests and requirements*
- EN 1490, *Building valves — Combined temperature and pressure relief valves — Tests and requirements*
- prEN 1717:1999, *Protection against pollution of potable water in drinking water installations and general requirements of devices to prevent pollution by backflow*
- ENV 1991-2-3, *Eurocode 1 — Basis of design and actions on structures — Part 2 - 3: Action on structures - Snow loads*
- ENV 1991-2-4, *Eurocode 1: Basis of design and actions on structures — Part 2 - 4: Action on structures - Wind loads*
- prEN 12897:1997, *Water supply — Specification for indirectly heated unvented (closed) hot water storage systems*
- EN 12975-1:2000, *Thermal solar systems and components — Solar collectors — Part 1: General requirements*
- prEN 12975-2:2000, *Thermal solar systems and components — Solar collectors — Part 2: Test methods*
- EN 12976-2:2000, *Thermal solar systems and components — Factory made systems — Part 2: Test methods*
- EN 60335-1, *Safety of household and similar electrical appliances — Part 1: General requirements (IEC 60335-1:1991 modified)*
- EN 60335-2-21, *Safety of household and similar electrical appliances — Part 2: Particular requirements for storage water heaters (IEC 60335-2-21:1997 + Corrigendum 1998, modified)*
- ENV 61024-1, *Protection of structures against lightning — Part 1: General principles (IEC 61024-1:1990, modified)*
- EN ISO 9488, *Solar energy — Vocabulary (ISO 9488:1999)*
- 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 standard, the terms and definitions given in EN ISO 9488 apply, together with the following additional definition:

Factory Made solar system

A packaged solar energy system for the purpose of hot water preparation only, either of the close-coupled or remote-store type. The system consists of either one integral component or of a uniform set and configuration of components. It is produced under conditions, which are presumed uniform, and offered for sale under the same trade name.

NOTE 1 A single system can be tested as a whole in a test laboratory, leading to representative results for all systems with the same trade name, configuration, components and dimensions (see also the Introduction).

NOTE 2 External auxiliary water heating devices that are placed in series with the Factory Made system are not considered to be part of the system.

Cold water piping from the cold water grid to the system as well as piping from the system to an external auxiliary heater or to tapping points is not considered to be part of the system.

Piping between components of the Factory Made system is considered to be part of the system.

Any integrated heat exchanger or piping for space heating option (see Introduction, NOTE 3) is not considered to be part of the system.

4 Requirements

4.1 General

The system shall fulfil general safety requirements, e.g. care shall be taken to avoid protruding sharp edges on the outside of the system.

4.1.1 Suitability for drinking water

The system shall conform to prEN 806-1:1999 (see also Introduction).

4.1.2 Water contamination

The system shall conform to prEN 1717:1999.

4.1.3 Freeze resistance

4.1.3.1 General

The manufacturer shall state a minimal allowed temperature for the system. The parts of the system that are exposed to the outdoors shall be able to withstand freezing to this specified temperature without any permanent damage.

The manufacturer shall describe the method of freeze protection used for the system.

Any indoor components that are to be installed in places where temperatures can drop below 0 °C, shall be protected against freezing.

The freezing mechanism shall be tested in accordance with 5.1 of EN 12976-2:2000.

4.1.3.2 Freeze protection by means of antifreeze fluid

The manufacturer shall define the composition of the heat transfer fluid, including additives, allowed for the system.

Precautions shall be taken to prevent the antifreeze fluid from deterioration as a result of high temperature conditions. These precautions shall be checked in accordance with 5.2 of EN 12976-2:2000.