

First edition  
2010-02-13

---

---

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

ICS 27.160

This national standard is the identical implementation of **EN 12976-1:2006** and is adopted with permission of CEN, Rue de Stassart 36, B-1050 Brussels



Mauritius Standards Bureau  
Moka

Gr 8



**COPYRIGHT PROTECTED DOCUMENT**

© MSB 2010

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from Mauritius Standards Bureau at the address below

*Mauritius Standards Bureau  
Villa Road  
Moka  
Mauritius*

*Telephone           + (230) 433 3648  
Fax                   + (230) 433 5051/ 433 5150  
E-mail               msb@intnet.mu*

## National foreword

This Mauritian Standard is identical with **EN 12976-1:2006(E)**, *Thermal solar systems and components – Factory made systems – Part 1: General requirements*. It was adopted in 2010 by the Mauritius Standards Bureau on the recommendation of the **Mechanical Engineering Standards Committee (MESC)** through its **Subcommittee on Solar Water Heater**. It was approved by the Standards Council on 15 January 2010 and was notified in the Government Gazette on 13 February 2010\*.

This Mauritian Standard cancels and replaces the Mauritian Standard MS 96:2008 which has been technically revised.

For the purpose of this standard the following changes should be made:

- throughout the text of this standard, read “...*this European Standard*...” to mean “...*this Mauritian Standard*...”.
- the ‘*decimal comma*’ should be replaced by the ‘*decimal point*’.

Clauses in the standard referring to requirements on ‘*snow; snow load/s; freeze; freeze resistance and freezing*’ are optional as they are not applicable to our tropical climate.

\* General Notice No. 296 of 2010

**Contents**

Page

Foreword .....	3
Introduction .....	4
1 Scope .....	6
2 Normative references .....	6
3 Terms and definitions .....	6
3.1 expansion line .....	6
3.2 safety line .....	7
3.3 blow-off line .....	7
3.4 factory-made solar system .....	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 .....	8
4.1.4 Overtemperature protection .....	8
4.1.5 Reverse flow protection .....	9
4.1.6 Pressure resistance .....	9
4.1.7 Electrical safety .....	9
4.2 Materials .....	9
4.3 Components and pipework .....	10
4.3.1 Collector .....	10
4.3.2 Supporting frame .....	10
4.3.3 Piping .....	10
4.3.4 Heat Exchangers .....	10
4.3.5 Control system .....	10
4.4 Safety equipment .....	11
4.4.1 Safety valves .....	11
4.4.2 Safety lines and expansion lines .....	11
4.4.3 Blow-off lines .....	11
4.5 Resistance to external influences .....	11
4.6 Documentation .....	11
4.6.1 General .....	11
4.6.2 Documents for the installer .....	12
4.6.3 Documents for the user .....	13
4.7 Labeling .....	14
4.8 System performance .....	14
Annex A (informative) Conformity assessment .....	15
Bibliography .....	16

## Foreword

This European Standard (EN 12976-1:2006) 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 July 2006, and conflicting national standards shall be withdrawn at the latest by July 2006.

This European Standard supersedes EN 12976-1:2000.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, 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 United Kingdom.

PREVIEW

## 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 as well as EN 12976-2 and the prestandards ENV 12977-1 to ENV 12977-3 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 and EN 12976-2.

**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 ENV 12977-1; test methods are specified in ENV 12977-2 and ENV 12977-3. 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 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 (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 12976-2:2006 and Annex A of ENV 12977-2:2001. 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.

PREVIEW

## 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 4.6).

## 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 806-1, *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 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*
- prEN 1999-1-1, *Eurocode 9: Design of Aluminium Structures - Part 1-1: General rules*
- prEN 12975-1, *Thermal solar systems and components — Solar collectors — Part 1: General requirements*
- prEN 12975-2, *Thermal solar systems and components — Solar collectors — Part 2: Test methods*
- EN 12976-2:2006, *Thermal solar systems and components — Factory made systems — Part 2: Test methods*
- EN ISO 9488:1999, *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 European Standard, the terms and definitions given in EN ISO 9488:1999 and the following apply.

### 3.1 expansion line

for systems with closed expansion vessels, the connecting line between the collectors and the pressure expansion vessel