

**Guideline for the assessment of the solar collector
and solar systems technical documentation.**

Standards EN 12975-1 (Clauses 7.2 and 7.3) and EN 12976-1 (Clauses 4.6.2 and 4.6.3 and 4.7) specify the minimum information that shall be included in label of the products and in “Installer Instruction Manual” (for Solar Collectors) and “Documents for the Installer and for the User” (in the case of Factory Made Systems).

Since no SK Certificate shall be issued, unless the Technical Documentation complies fully with the requirements of the applicable standard, it is important to establish a harmonized judgment of the specified requirements in the standards.

The following is proposed:

1. Evidence of check and fulfillment of the requirements shall be given either on the Laboratory test report or in an additional document issued by the Certification Body;
2. Forms given in Annex A of this document shall be used for the Collectors;
3. Forms given in Annex B of this document shall be used for the Factory Made Systems.

Annex A - Check of requirements 7.2. and 7.3 of EN 12975-1:2006+A1:2010

7.2. Labeling

Evaluation:

Collector shall carry a visible and durable label with the following data:	Check		<i>Recommendations for evaluation</i>
	Yes	No	
a) Name of manufacturer			The name on the Label is either the name of the Manufacturer or of the OEM.
b) Type of collector			The type of collector is: - Flat Plate; - Concentrating; - Evacuated Tubular Collector; - Other (to be specified by the manufacturer).
c) Serial number			
d) Year of manufacture			This may be included in the production or serial number in coded or clear form
e) Gross area of collector			Value according to test report and Technical Annex of the SK Certificate.
f) Dimensions of collector			Values according to test report and Technical Annex of the SK Certificate.
g) Maximum operation pressure			Value according to test report and Technical Annex of the SK Certificate.
h) Stagnation temperature at 1000 W/m ² and 30 °C			Value according to test report and Technical Annex of the SK Certificate.
i) Volume of heat transfer fluid			Value according to test report.
j) Weight of empty collector			Value according to test report.
k) Made in			See Decision D3.M3 of SKN.

Result: The Collector Label complies with clause 7.2 of EN 12975-1:2006+A1:2010 when all items are marked **Yes**.

7.3. Installer Instruction Manual

Evaluation:

Identification of Installer Instructions Manual that was delivered with Title, editor, number of pages, date, edition/version:

Recommendation:

This document shall only refer to collectors that are under a certification process.

Information that shall be included in the installer instructions manual	Check		Recommendations for evaluation
	Yes	No	
a) Dimensions and weight of the collector			Values according to test report and Technical Annex of the SK Certificate.
b) Instructions for transport and handling of the collector			One section of the document referring this subject.
c) Recommendations about lightning protection			One section of the document referring this subject. Shall include sentence indicating that National Regulations shall be taken in consideration by installer.
d) Instructions about the coupling of the collectors to one another and the connection of the collector field to the heat transfer circuit, including dimensions of pipe connections for collector arrays up to 20 m ²			One section of the document referring this subject. It is recommended that a Diagram is included.
e) Recommendations about the heat transfer media which may be used (also with respect to corrosion) and precautions to be taken during filling, operation and service			One section of the document referring this subject. Shall include clear reference to the heat transfer fluid used by composition and/or trade mark. Recommended percentages of anti-freeze fluid, when applicable shall be given as a function of the temperature.
f) Maximum operation pressure			Value should according to test report and Technical Annex of the SK Certificate.
g) Pressure drop			When measured by the test Laboratory should be in agreement with the values given in the test report.
h) Maximum and minimum tilt angle			It may be included in a table of collector specifications.

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i) Permissible wind and snow load		
j) Maintenance requirements		

Value shall be according to test report.
One section of the document referring this subject.

Result: The Installation Manual complies with clause 7.3 of EN 12975-1:2006+A1:2010 when all items are marked Yes.

Annex B - Check of requirements 4.6.2., 4.6.3. and 4.7. of EN 12975-1:2006

4.6.2. Documents for the installer

Evaluation:

Identification of Document for the Installer that was delivered with Title, editor, number of pages, date, edition/version:

This document shall only refer to systems that are under a certification process.

Information that shall be included in the documents for the installer.		Check			
		Yes	No	N.A.	
a) Technical data	1) Layout of the system				
	2) Location and nominal diameters of all external connections				
	3) An overview with all components to be delivered, with information on each component	Collector			
		Storage tank			
		Support structure			
Hydraulic circuit					

<i>Recommendations for evaluation</i>
The Layout of the system shall include all main components: Collectors, Storage Tank, Valves, Probes of control device and make clear reference to the circulation of the heat transfer fluid and mains water. Dimensions of the connections and connecting pipes can be added to the diagram for fulfilment of requirement 2.
See recommendations above.
Shall include all information as required by clause 7.3 of EN 12975-1:2006+A1:2010.
Shall Include information on external dimensions, nominal volume, and weight when empty.
Shall include information on all the components of the support structure and procedure to mount it.
Shall include information on all the components - pipes and diameters.

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Information that shall be included in the documents for the installer.		Check			
		Yes	No	N.A.	
	Back-up provisions				
	Control/System regulation				
	Other accessories				
	4) maximum operating pressure of all fluid circuits in the system (in Pa)	Collector circuit			
		Tap water circuit			
		Auxiliary heating circuit			
	5) Working limits	Temperatures			
6) Type of corrosion protection					
7) Type of heat transfer fluid					
b) Packing and transport of the whole system and storage conditions	Packing details	system Components			
	Transport details	system Components			
	Indication of storing conditions (indoors/outdoors) (Packed/not packed)				
c) Installation guidelines with	1) Mounting surfaces				

<i>Recommendations for evaluation</i>
Applicable to solar plus supplementary systems. Shall include layouts of connection of the Solar Thermal System to back up.
Shall include description of the control system and operation mode. Trade mark and model shall be given.
When applicable shall be described including relevant technical information.
Values shall be in agreement to the information on the test report for the pressure resistance test.
Values shall be in agreement to the information on the test report for the pressure resistance test.
Values shall be given.
Values shall be given.
Shall include description of any devices used in the storage tank for corrosion protection, e.g. anode and recommended maintenance
Shall include clear reference to the heat transfer fluid used by composition and/or trade mark. Recommended percentages of anti-freeze fluid, when applicable shall be given as a function of the temperature.
Shall include clear description of the packing used for the system and components.
Shall include clear description of precautions to be taken for transport of the system and its components.
Shall include clear description of precautions to be taken for storage of the system and its components.
Shall include general information on the correct orientation of a solar thermal system taking into account the location and possibility

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Information that shall be included in the documents for the installer.		Check		
		Yes	No	N.A.
recommendations concerning:	2) distance to walls and safety with regard to frost			
	3) the way the entrance of piping into the building shall be finished (resistance against rain and moisture)			
	4) the procedure to be followed for thermal insulation of pipes			
	5) The roof integration of the collector			
	6) for drain-back and drain-down systems, the minimal pipe slope and any other instructions necessary to ensure proper draining of the collector circuit.			
	d) Support structures	Indication of maximum values of s_k (snow load) and v_m (average wind velocity) according to EN 1993-1-1 (Steel) and prEN 1999-1-1 (Aluminum).		
Statement that the system may only be installed in places with lower values than s_k and v_m .				
e) Method for pipe work connections				
f) Types and sizes of the safety and security devices and their draining				

<i>Recommendations for evaluation</i>
to have shadows on the collector.
Value of minimum distance to walls shall be specified. Recommendation regarding thermal insulation for outdoor connecting pipes shall be included.
Shall include an example on how to introduce the hot and cold water pipes into the building without risking to have entrance of water that will cause damage to the building.
Shall include an example on how to make the thermal insulation of the pipes.
When applicable (for roof integrated collectors) the procedure and necessary components shall be described.
When applicable, all the necessary instructions for correct installation of the referred systems shall be given.
Values s_k and v_m shall be given. A declaration from the manufacturer justifying the calculated values shall be delivered to the Certification Body/Test Laboratory.
Shall have a statement indicating this warning.
Shall include an example on how to make the pipe work connections for the system.
Shall include detailed description of types and sizes of the safety and security devices. Manufacturer shall deliver the technical data sheets of safety and security devices to the Certification Body/Test Laboratory.

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Information that shall be included in the documents for the installer.		Check		
		Yes	No	N.A.
	When the system has a provision to drain an amount of drinking water as a protection against overheating, the hot water drain shall be constructed in such a way that no damage is done to the system or any other materials in the building by the drained hot water.			
g) Control and safety devices	Including the wiring diagram			
	Including the need for a thermostatic mixing valve which limits the draw-off temperature to 60°C, when this is required according to 4.1.4.2; (required for systems in which the temperature of the domestic hot water delivered to the user can exceed 60 °C. The limit for tapping temperature +/- 5 degrees)			
h) Reviewing, filling and starting up of the system				
i) Commissioning of the system				
j) A checklist for the installer to check proper functioning of the system				
k) Minimal temperature to which the system can withstand freezing.				
l) The required total solar radiation for which overheating	The requirements that the system shall not be used in climate zones with higher irradiation values than these value.			

<i>Recommendations for evaluation</i>
Shall include an example on how to make the drainage of water in order that no damage is done to the system or any other materials in the building by the drained hot water.
Shall include electrical diagrams when applicable.
Shall include reference to the use of a thermostatic mixing valve and exemplify its installation in the diagram referred in a) 1).
One section of the document referring this subject. Shall include clear procedure for the installer to follow during the referred operations.
One section of the document referring this subject. Shall include clear procedure of the information that the installer shall give to the owner during commissioning of the system.
One section of the document referring this subject.
If antifreeze fluid is used, the minimal temperature shall be given as a function of percentage of antifreeze fluid.
Shall have a table referring these values, according to test report.

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Information that shall be included in the documents for the installer.	Check		
	Yes	No	N.A.
will happen			
The requirements that the system shall not be used in climate zones with higher irradiation values than these value.			

<i>Recommendations for evaluation</i>
Shall have a statement referring this warning.

Result: The Documents for the installer comply with clause 4.6.2 of EN 12976-1:2006 when no item is marked No.

4.6.3. Documents for the user

Evaluation:

Identification of Document for the Installer that was delivered with Title, editor, number of pages, date, edition/version:

Recommendation:

This document shall only refer to systems that are under a certification process.

Information that shall be included in the documents for the user		Check		
		Yes	No	N. A.
a) Existing safety and security components and their thermostat adjustments where applicable.				
b) Implementation of the system drawing particular attention to the facts:	1) prior to putting the system in operation it shall be checked that all valves are properly working and the system is filled with water and/or antifreeze fluid completely or according to the manufacturer's instructions			
	2) in the event of any failure condition a specialist shall be called in			
c) Regular operation of safety valves.				
d) Precautions with regard to the risk of frost damage and/or overheating.				
e) The manner of avoiding failure when starting the system under frost or possible frost conditions.				
f) Decommissioning of the system.				

<i>Recommendations for evaluation</i>
Limit values for safety and security components; Adjustable parameters values of thermostat.
Should have a checklist for an easy verification of these steps.
Space reserved in document to include the contacts of a specialist, in case of any failure.
Should refer the periodicity for verification; Description of the procedure for the regular check of the safety valves.
One section of the document referring these subjects.
One section of the document referring this subject.
One section of the document referring this subject. Shall include sentence indicating that National Regulations shall

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Information that shall be included in the documents for the user		Check		
		Yes	No	N. A.
g) Maintenance of the system by a specialist	Including frequency of inspections and maintenance			
	A list of parts that need to be replaced during normal maintenance			
h) Performance data for the system	1) the recommended load range for the system (l/day) at specified temperature			
	2) The thermal performance and solar fraction of the system according to 5.9 of EN 12976-2:2006, for loads in the specified recommended load range			
	3) The annual electricity consumption for pumps, control systems and electrical valves of the system for the same conditions as specified for the thermal performance, assuming a yearly pump operating time of the collector pump of 2000h			
	4) If the system contains devices for freeze protection that cause electrical consumption, the electrical power of these devices (in W) and their characteristics (e.g. switch-on temperatures)			

<i>Recommendations for evaluation</i>
be taken in consideration by User.
Shall be referred the frequency for inspection and maintenance. It is recommended that the document includes a checklist in order to record the dates of inspections (by the user) and maintenance (by the specialist).
It is recommended that this list is according to the checklist for the maintenance, referring all items that need to be replaced during normal maintenance.
Shall have a table referring these values, according to test report.
Shall have a table referring these values, according to test report.
Only applicable for forced circulation systems. Shall have a table referring these values, according to test report.
Shall include this information.

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Information that shall be included in the documents for the user		Check		
		Yes	No	N. A.
	5) For a solar plus supplementary system, the maximum daily hot water load which can be met by the system without any contribution from solar energy, according to EN 12976-2:2006			
i) The required total solar radiation for which overheating will happen:	The required total solar radiation on the plane of the collector or the minimum solar lamp intensity at the plane of the collector for which overheating protection of the system has been tested according to 5.2. of EN 12976-2:2006.			
	The requirements that the system shall not be used in climate zones with higher irradiation values than these value.			
j) When the overheating protection of the system is dependent on electricity and/or cold water supply and/or the system being filled with drinking water the requirement to:	1) Never switch off the electricity supply.			
	2) Never switch off the mains water supply.			
	3) Never drain the system when there is high solar irradiation.			
k) The fact that drinking water may be drained from the system during high irradiation situations, if this is the method to prevent overheating.				
l) The minimal temperature to which the system can withstand freezing.				
m) Type of heat transfer fluid.				

<i>Recommendations for evaluation</i>
Shall have a table referring these values, according to test report.
Shall have a table referring these values, according to test report.
Shall have a statement referring the value according to test report.
Shall have a statement indicating this warning.
Shall have a statement indicating this warning.
Shall have a statement indicating this warning.
Shall have a statement indicating this advice.
Shall have a statement indicating this warning.
One section of the document referring this subject. Shall include clear reference to the heat transfer fluid used by composition and/or trade mark. Recommended percentages of anti-freeze fluid, when applicable shall be given as a function of the temperature.

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Information that shall be included in the documents for the user	Check		
	Yes	No	N. A.
n) In case of solar systems with emergency heaters, instructions shall be issued that this emergency heater shall only be used for emergency heater purposes.			

<i>Recommendations for evaluation</i>
Shall have a statement indicating this warning.

Result: The Documents for the user comply with clause 4.6.3 of EN 12976-1:2006 when no item is marked No.

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4.7. Labelling

Evaluation:

Information that shall be included in the marking of the system (visible)		Check	
		Yes	No
a) Name of manufacturer or responsible supplier of the system			
b) System type indication			
c) Manufacturing or serial number			
d) Year of manufacture - this may be included in the production or serial number in coded or clear form			
e) Absorber and aperture area of the collector in m ²			
f) Nominal capacity of the storage vessel in l			
g) Design pressure of the drinking water circuit in kPa			
h) Collector heat transfer medium to be used			
i) Permissible operating pressure of the collector heat transfer medium in kPa or, in case the system has an open or vented collector circuit, a statement to this effect			
j) When the overheating protection of the system is dependent on: electricity or cold water supply and/or the system being filled with drinking water	1) A warning to this effect shall be marked on the system.		
	2) In the case of dependency on the electricity supply, the mains plug of the system shall also be clearly marked to this effect		
k) Electrical power of all electrical	1) Electrical resistance of		

<i>Recommendations for evaluation</i>
The name on the Label is either the name of the Manufacturer or of the OEM.
The type of system is: - Termossyphon (pre-heat/solar only/ solar plus supplementary); - Forced circulation (pre-heat/solar only/ solar plus supplementary); - ICS (pre-heat/solar only/ solar plus supplementary);
This may be included in the production or serial number in coded or clear form.
The pressure refers to the Maximum operation pressure - Tank side. Shall be according to test report and Technical Annex of the SK Certificate.
Equal to the heat transfer medium indicated in Documents for the user.
The pressure refers to the Maximum operating pressure - Collector side. Shall be according to test report and Technical Annex of the SK Certificate.
An independent label shall have a statement with this warning.
An independent label shall have a statement with this warning.
Label shall have present the value in watt (W).

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components	the deposit		
	2) Control System		

Label shall have present the value in watt (W).

Result: The Label complies with clause 4.7. of EN 12976-1:2006 when no item is marked No.