Ecodesign and Energy label for solar thermal related products

Part 2: Details on the procedures

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Contents

1 Introduction

This publication completes the publication "Ecodesign and Energy labelling for solar thermal related products – Part 1: Introduction to the methodology". This Part 2 focuses on providing details about the procedures laid out in the requirements.

For each relevant component or product the required documentation is discussed. If applicable, formats for the documentation are included.

1.1 The status of this document

This document is based on the regulations as published in February and August of 2013 and the transitional document, describing the details of the measurements and calculations, as published in July 2014. This set of documentation is the first official and broadly distributed version of the extensive methodology.

This document describes in detail how to use the regulations for solar thermal applications. However, one should be aware that the official documentation of the regulations is ultimately always the reference.

Although the author is well informed, because of his contributions to the process of developing the regulations, the interpretations in the document are merely his opinion and mistaken interpretations may have been made. In case of doubt always refer to the text of the regulations.

The draft document has been published for comments by ESTIF[1] members during the period November and December 2014. Moreover the main points have been presented and discussed during an ESTIF workshop in Brussels attended by representatives of ESTIF and ESTESC[2].

It should be noted that there are:

- many errors in this official regulation and related documents already identified and communicated to the European Commission (this is the case for all technologies and also for solar thermal applications).
- many ambiguous issues are expected to arise, in particular in the period preceding the entry into force of the regulations, as market operators implement the regulation (the regulation will meet everyday reality on a large scale and people will find issues that do not fit).
- the transitional documents must be 'transcribed into harmonized standards. Considering the time required, the harmonized standards may not be published before the implementation date of September 2015 and the transitional documents will remain as *de facto* 'legislation.

We may assume that we are now entering a period of uncertainty in the interpretation of the requirements and this document will not be the last interpretation of the regulation.

Since we cannot explain how to work with the regulation when there are errors and ambiguous issues, we have opted for providing a preferred interpretation and marking it clearly as such in the document.

1.2 General

Each product that is part of the Ecodesign or energy labelling regulations needs a *technical document* that specifies the product, shows the source of the specifications and indicates the energy performance.

Each product covered by the energy labelling regulation also needs a *product fiche* that shows a selection of the specifications and the energy label class. Each product within the scope of the energy labelling regulation needs an ***energy label***.

Some products are not in the scope of the regulation as products but are considered **components of a package** and are therefore only relevant for the 'package label'. The following components of a package do not require an energy label:

- a solar device for space and combination heating;

[1] European Solar Thermal Industry Federation (ESTIF)

[2] Solar Thermal Energy Standardisation & Certification Working Group is a collaboration of ESTIF and the Association of the European Heating Industry (=EHI).

- a solar device for water heating as part of a package;
- a temperature control.

For packages the rules are similar. A package needs a technical document, a product fiche and an energy label. This could mean that a package needs a label, while components may have their own product label.

In the following sections, the elements for an energy label are further discussed.

1.2.1 Technical documents

The technical document is a formal document laying down a broad spectrum of the relevant product specifications and the source of that information. Normally tests and calculations are required to draft the technical document.

The items that must be included in the technical document are specified in the regulation. However, the format of the technical document is not defined.

Main elements of the technical document are:

- identification of the product;
- identification of the supplier;
- identification of the responsible person;
- technical parameters;
- advice for assembly

For packages, the technical document is usually a collection of the technical documents for its components. The technical documents of the components of a package may not always be available. In those cases the data from a product fiche can be used to complete the technical document of a package.

The supplier or dealer must draft the technical document and provide it on request to the authorities of the member states and to the commission. The technical document is not a publicly available document.

1.2.2 Product fiche

A product fiche is a formal document laying down a relevant selection of the product specifications, its energy performance and the label class. As such, the product fiche can be seen as a 'bridge' between the technical document and the label.

The items that must be in the fiche, and their order sequence, are specified in the regulation. Other aspects of the format of the product fiche are not mandatory.

For packages the product fiche is designed as a spread sheet to simplify the calculation procedure for a dealer.

The supplier or dealer must draft the product fiche and provide it on request. The product fiche is a publicly available document.

Specific to backup heaters, intended for use in a package, the supplier of that heater should also provide the product fiche for the package.

1.2.3 Label

The label presents to the public of the main data on the product fiche. The format of a label is strictly specified. The label is drafted based on the information of the corresponding product fiche.

If the technical documents of one or more components of the package are not available, you can use the product fiche to enter the data in the technical document. Enter in the reference to that technical document: 'not available'.

2 Known issues

Despite all the formal documents published by the commission, unclear issues are still known, but not solved. In the following chapters, for each product or component, the known issues and a proposal for a solution are summarized. The issues and proposals have been brought before the industry for comment during November and December 2014. Moreover, during a workshop organized by ESTIF (Brussels, 4/12/2014) the issues have been discussed with stakeholders from industry. Nevertheless, the proposals will have no status other than a common view of industry on the matter.

1.1 General

Issue 1.1.a:	*Relevancy:*
The referenced standards are not yet harmonized. The current versions of the standards cannot be decisive in the way that the methods are to be applied. The description of the methods in the Transitional methods is in general not very extensively detailed.	all elements of the regulations related to solar thermal.
Recommended solution:	
• CEN-EN 12975 It is assumed that the EN 12975-2 is in conformity with the transitional document. As such it is a minor risk to use the parameters from an EN 12975-2 test report. • CEN-EN 12976 The standard needs to be revised to include the Ecodesign energy labelling reference conditions. Moreover, currently the standard is referring to the ISO 9459 and not to the CEN-EN 12976. There is no current solution for this issue. • CEN-EN 12977-3 It is assumed that the EN 12977-3 is in conformity with the transitional document. As such it is a minor risk to use the parameters from an EN 12977-3 test report. • CEN-EN 15316-4-3 The description of SOLCAL in the Transitional document can be used. The, to be harmonized, prEN15316-4-3, method 2 may differ in some details from the SOLCAL description.	

Issue 1.1.b:	*Relevancy:*
The method to determine the standby power consumption (='solstandby') is not defined.	• solar device for space and combination heaters; • solar device for water heaters.
Recommended solution:	
Assume the standby power consumption is the nominal power consumption of the pump control, excluding the power consumption of the pump. This value should be part of the controller's product specifications.	

Issue 1.1.c:	*Relevancy:*
PUB 2014/C 207/03, point 4.10 defines the pump power (='solpump') determination differently from the EN 16297-1:2012.	– solar device for space and combination heaters; – solar device for water heaters.
Recommended solution:	
Use the definition in PUB 2014/C 207/03, point 4.10. Find the best fitting definition of 'nominal' in the pump specifications.	

Issue 1.1.d:	*Relevancy:*

The technical documents of the elements of the package are a required part of the package technical document, but are not required to be publicly available.	– package for space heating – package for water heating
Recommended solution:	
Make an ultimate effort to get the technical document from your supplier. If all fails, use the relevant information from the product fiche that is required to be made available. As a result the technical document for that package cannot be fully completed. Although this practical workaround is not fully according to the requirements, the (draft) Guidelines often suggests using the values from the component fiches.	

Issue 1.1.e:	*Relevancy:*
The Solar Keymark uses a procedure for 'product families' to avoid multiple tests on equivalent products for both collectors, factory built systems and hot water storage tanks. This option is not offered by the regulations.	– solar device for space heating; – solar device for combination heating; – solar device for water heating; – hot water storage tank.
Recommended solution:	
As it is now, all members of a product family need to be tested. In order to accept results for a product family the corresponding standards need to be revised to include this option: CEN-EN 12975, CEN-EN 12976 and CEN-EN 12977-3. The latter already contains an informative annex for product families, that should be made normative. For the moment, it seems a practical solution to assume that the procedures for product families in the Solar Keymark are accurate and the results can be used in the regulations. Doing so you can refer to CDR 811/2013, point (11) and CDR 812/2013, point (9) stating: "or using other reliable, accurate and reproducible measurement methods that take into account the generally recognized state-of-the-art methods".	

1.2 Collector

Issue 1.2.a:	*Relevancy:*
The CEN-EN 12975-2 no longer exists and is replaced by EN-ISO 9806:2013.	• solar device for space and combination heaters; • solar device for water heaters;
Recommended solution:	
Use CEN-EN 12975-2 for existing tests and use EN-ISO 9806:2013 for new test results. Be careful! EN 12975-2 is based on aperture area and EN-ISO 9806:2013 on gross area. In case of a test according to EN-ISO 9806:2013, use the 'gross' area instead of the aperture area together with the complete dataset according to this new standard.	

1.3 Hot water storage tank

Issue 1.3.a:	*Relevancy:*
The transitional document (2014/C 207/03) offers a choice between several standards for the determination of the required parameters for the hot water storage tank. This can result in different results for the same tank. However, the SOLCAL method requires the 'psbsol', which is referred to in EN 12977-3 only.	– hot water storage tank.

Recommended solution:
The preferred standard is the CEN-EN 12977-3 that will give you a value for 'psbsol' and by multiplication with 45 K the value for 'S'. Be careful in using one of the alternative standards. The end result should comply with the required accuracy for S, being 5%.

Issue 1.3.b:	*Relevancy:*
More complex solar hot water storage tanks may fall outside the scope of the CEN-EN 12977-3 and within the scope of the, not referred to, CEN-EN12977-4.	– hot water storage tank.
Recommended solution:	
The simplest solution would be to test according to CEN-EN 12977-3 and not establishing all parameters that CEN-EN 1297-4 would result in. Alternatively, you can use the CE-EN 12977-4 and refer to the exception in CDR 811/2013, point (11) and CDR 812/2013, point (9) stating: "or using other reliable, accurate and reproducible measurement methods that take into account the generally recognized state-of-the-art methods".	

Issue 1.3.c:	*Relevancy:*
The value for the backup heating part of the solar hot water storage tank (= V_{bu}) is not referenced in the regulations.	– hot water storage tank.
Recommended solution:	
The missing value for the non-solar heat storage volume (='V_{bu}') should be extracted from the tank drawings as being the volume above the lowest part of the heat exchanger. For typical Mediterranean solar systems (see 5.2) the backup heating volume may extend to (almost) the complete volume of the tank.	

1.4 Space and combination heating

Issue 1.4.a:	*Relevancy:*
The package label for space heaters requires a label class for the hot water storage tank. However, if the solar device is equipped with a tank with a volume larger than 500 litres, a label on the tank is not required and as such not available.	– package for space heaters; – package for combination heaters.
Recommended solution:	
Follow the procedures for the labelling of the tank up to the level of the product fiche. The label class is indicated as a technical parameter on that fiche. This procedure has been agreed by the European Commission.	

Issue 1.4.b:	*Relevancy:*
If the solar device is only intended for space heating and not for water heating (in case of a combination heater), the technical parameters reflecting the water heating performance are not relevant and often cannot be determined.	– package for space heating.
Recommended solution:	
Mark the specifications on the product fiche (Q_{nonsol}, solpump, solstandby and Q_{aux}) with "n.a." (=not applicable).	

Issue 1.4.c:	*Relevancy:*
The information on the technical document for a space	technical document for a package

heating package is not always relevant for one of the four types of product fiches.	for space heating.
Recommended solution:	
Not relevant information can be marked with “n.a.” (= not applicable).	

Issue 1.4.d:	*Relevancy:*
For a package combination heater the water heater efficiency of the backup heater is needed. In case of the application of an external boiler, heating the backup heating part of the solar hot water tank, this parameter is not known.	package for combination heaters.
Recommended solution:	
In 5.1 a method is described to calculate the water heating efficiency from the boiler efficiency. This method was described in the draft Guidelines for the implementation and was agreed upon with the commission	

1.5 Water heating

Issue 1.5.a:	*Relevancy:*
Currently the transitional document references for the SOLICS method to ISO 9495-5 while all current European systems are tested in conformity with EN 12976-2.	– solar device for water heaters.
Recommended solution:	
No solution is currently available. This issue is handled within the harmonization of EN 12976 in the framework of the CEN mandate 495 by TC312 WG2. It is a reasonable expectation that the existing test results according to CEN-EN 1297-2, with an additional long term performance calculation will comply to the requirements in due time.	

Issue 1.5.b:	*Relevancy:*
The transitional document references for the SOLICS method to ISO 9495-5, without specify the reference conditions (climate and heat demand) in terms of this standard.	– solar device for water heaters.
Recommended solution:	
No solution is currently available. The TC312 WG2 will revise the prEN12976-2 as to comply with the requirements of the SOLICS method in due time. See also the previous issue. The QAiST project anticipated on this issue and proposes a reference to the climates and an interpretation of the load profiles (deliverable D3.4 and D3.5). It is noted that these propose have no legal foundation. Moreover, the proposed interpretation of the load profile do not correspond to the SOLCAL method.	

Issue 1.5.c:	*Relevancy:*
The applicability of either SOLICS or SOLCAL is not explicitly defined.	– solar device for space and combination heaters; – solar device for water heaters.
Recommended solution:	
The SOLICS method is based on ISO 9459 with a scope limited to solar water heaters only. As a consequence combination heaters are excluded from SOLICS.	

For solar devices for water heating, where the collector or storage tank cannot be tested separately, the SOLICS is the only option.

In all other cases we may assume that a free choice between both is possible.

Issue 1.5.d:	*Relevancy:*
For the solar device for water heaters, the regulation assumes the SOLCAL method. If the SOLICS method is applied, the values of the technical parameters 3.1.(c) → 3.1.(h) are not known and cannot be determined.	– solar device for water heating.
Recommended solution:	
In this case the values should be marked with 'n.a.' (not applicable).	

Issue 1.5.e:	*Relevancy:*
The method to determine the non-solar heat storage volume (='V_{bu}') is not explicitly defined in the regulation, but needed for the SOLCAL method. Moreover, this parameter is not included in the Technical document or Product fiche of the hot water storage tank.	– solar device for water heating.
Recommended solution:	
The volume of the backup heating designated part of the storage (=V_{bu}), is defined as the volume above the lowest part of the heat exchanger. In case of no integrated backup heating V_{bu} is set at zero. The parameter should be determined from the tank drawings.	

Issue 1.5.f:	*Relevancy:*
In case of a solar water heater or a package for water heating, with an integrated backup heating, the heat losses of the backup heating part of the solar hot water tank is counted twice; once for the non-solar backup heater efficiency and once for solar thermal performance.	– solar water heater; – package water heater.
Recommended solution:	
No current solution available. The energy efficiency of those systems will be significantly too low.	

Issue 1.5.g:	*Relevancy:*
In case of a solar water heater or a package for water heating, with an integrated *electrical* backup heating, the test for the non-solar water heating efficiency is redundant. Using the default efficiency for the production of electricity of 40% and the solar methods for the determination of the system efficiency is an adequate way to determine the system efficiency.	– solar water heater; – package water heater.
Recommended solution:	
No current solution available. The extra test should be performed and the overall system energy efficiency will be significantly too low (see issue 1.4.d).	

Issue 1.5.h:	*Relevancy:*
The term: "1,1 x $\eta_{wh,nonsol,lp}$ – 0,1" for the water heater method is not correct and can sometimes lower the results significantly.	– solar water heater; – package water heater; – package for combination heater.
Recommended solution:	

No current solution available.

Issue 1.5.i:	*Relevancy:*
The product fiche for a solar water heater offers the option to include the performance for a maximum of 4 load profiles. However, the resulting energy label class is only included for the first load profile.	– solar water heater.
Recommended solution:	
Draft a product fiche for each load profile. The majority of the information will be the same.	

Issue 1.5.j:	*Relevancy:*
In case of a solar system type that does not allow for separate testing of the hot water storage tank, the storage still needs to be labelled.	hot water storage tank.
Recommended solution:	
The storage tank needs to be labelled. If the results fall below the minimum performance of the Ecodesign regulation the product cannot enter the European market.	

Issue 1.5.k:	*Relevancy:*
The solar thermal output of a water heater is determined for an annual heat demand that is derived from the selected load profile of the (backup) water heater. The thus obtained annual heat demand does not need to be an accurate forecast of the actual heat demand for a client.	– solar water heater; – package for water heater.
Recommended solution:	
Inform your dealer and customer and explain this situation.	

Issue 1.5.l:	*Relevancy:*
The typical Mediterranean solar water heaters [3] need excessive testing. This may cause a dramatic influence on the market prospects of these types of systems	– solar water heater
Recommended solution:	
No solution available. Referencing the regulation CDR 812/2013: – The electrical heater is according to article 2, (10) a 'back-up immersion heater'. As a result, the heat storage tank is according to article 2, (9) a 'hot water storage tank' and needs to be labelled accordingly. – The system needs to be labelled as a 'solar water heater' according to annex I, (2); its function is that of a 'water heater' article 1, (e) and article 2, (1) and the electrical heater is a 'heat generator' according to article 2, (2). In 5.2 this issue is discussed in more detail.	

[3] A typical Mediterranean solar system consists of a collector, heat storage tank and electrical immersion backup heater (manually switched) and is intended for domestic hot water production. The backup heater provides for heat in periods with insufficient solar energy. The collector loop can be of type thermo syphon or pumped. Optionally the tank is equipped with a frost protection control.

3 Procedures for suppliers of products

3.1 Product label for a hot water storage tank

A hot water storage tank is a vessel for storing hot water for water heating and/or space heating purposes, which is not equipped with any heat generator except possibly one or more backup immersion heaters. Typically, most solar hot water tanks fall within this definition and need to be labelled.

The energy label is required for a nominal volume ≤ 500 litres and the Ecodesign regulation is applicable for a nominal volume ≤ 2 000 litres.

A hot water storage tank is part of a solar thermal system.

Required documentation:

☒ Technical document ☒ Product fiche ☒ Energy label

Inputs:

– Test results of the hot water storage tank according to CEN EN 12977-3.

Procedure:

The procedure is illustrated in figure 1. An example of the format of the technical document of the package (TD-HWST) and the product fiche (PF-HWST) is included below.

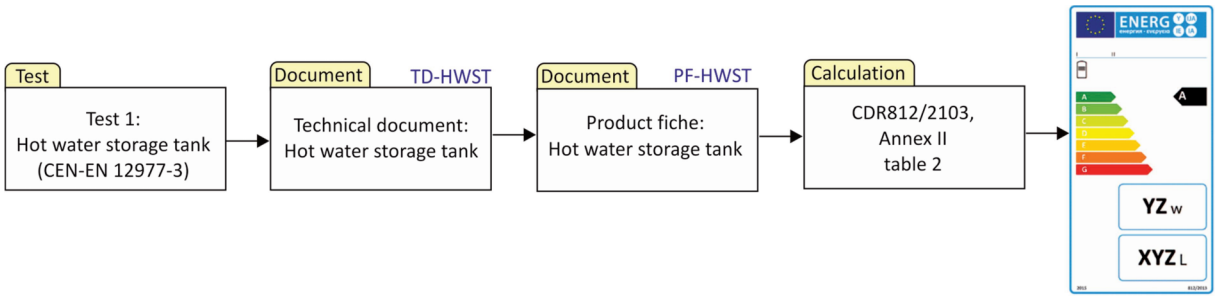


Figure 1- Procedure for hot water storage tanks. The 'blue' codes are referring to one of the following tables and worksheets in the accompanying example workbooks.

Remarks:

– In both the technical document and the product fiche the volume of the backup heating part of the hot water storage tank (=V_{bu}) should be added. This value is needed for the SOLCAL method (PUB 2014/C 207/03, point 4.8, (b)). This value can be set to zero when no integrated backup heating in the storage is applied.

Technical document: CDR 812/2013, Annex V, point2.

Required input documents:

Hot water storage tank	test report according to EN 12977-3
Hot water storage tank	Technical drawings with details of the inside of the tank and dimensions

Processing of the input data:

The technical document is specified by required contents in CDR 812/2013, Annex V, point 2.

A template for this technical document (TD-HWST), which is in conformity with the regulation, is shown in table 1. The template is self-explanatory.

Table 1 - Illustration of the technical document of a hot water storage tank

TD-HWST

Technical documentation

From technical document
Add these values
Calculated value

Group: Water heaters and hot water storage tanks
Section: Hot water storage tanks
Reference: CDR 812/2013, annex V, point 2 Date: 30/07/2014 *...Enter date of signature*

V.2.(b) **Description of the device:**

Brand:	vAConsult	*...Enter accordingly*
Type:	SolarHotStore	*...Enter accordingly*
Model:	Mark VI	*...Enter accordingly*

V.2.(f) **Technical parameters:**

	Description:	Symbol:	Value:	Unit:	Determined according to: Status: [1]	Reference:	
VII.8.(a)	*Storage total volume*	V_{nom} =	150	litres	HS	EN12977-3 (V_n)	*...Enter from test report*
	Backup heating part of volume	V_{bu} =	10	litres	?	Tank drawing	*...Enter from test report*
	Heat loss capacity rate	*psbsol*	1.30	W/K	HS	EN12977-3 $(UA)_{s,a}$	*...Enter from test report*
VII.8.(b)	*Standing losses*	*S* =	58.5	W	$(UA)_{s,a}$ x 45		*...Calculation*

1) HS= Harmonized standard. If not available, specify method according to PUB 2014/C 207/02 or /03 and specify subsection.

V.2.(g) **Precautions to be taken when assembling:**

V.2.(a) **Supplier (name and address):**

V.2.(e) **Empowered person:**

Name:
Position:

Signature:

Compliments: Solar Certification Fund (4C16-EcoDes-12) vAConsult 2014

Product fiche: **CDR 812/2013, Annex IV, point 2.**

Required input documents:

Hot water storage tank:	Technical document.

Processing of the input data:

The relevant items from the input documents are summarized in CDR 812/2013, Annex IV, point 2.

A template for this product fiche (PF-HWST), which is in conformity with the regulation, is included in table 2 and is self-explaining.

Table 2 - Illustration of the product fiche for a hot water storage tank

PF-HWST

Product fiche

From technical document
Add these values
Calculated value

Group: Water heaters & storage tanks
Section: Hot water storage tank
Reference: CDR 812/2013, Annex IV, point 2 Date: 30/07/2014 *...Copy from technical document (TD-HWST)*

3.1(a) **Supliers name or trademark:**

...Enter accordingly

3.1(b) **Suppliers model identifier:**

Brand:	vAConsult	*...from TD-HWST*
Type:	SolarHotStore	*...from TD-HWST*
Model:	Mark VI	*...from TD-HWST*

Technical parameters:

	Description:	Symbol:	Value:	Unit:	
3.1(c)	*Energy efficiency class:*		C	-	*...Read from CDR812/2013, annex II, table 2*
3.1(d)	*Standing losses:*	*S* =	59	W	*...from TD-HWST*
	Heat loss capacity rate	*psbsol* =	1.30	W/K	*...from TD-HWST*
3.1(e)	*Storage total volume*	V =	150	litres	*...from TD-HWST*
	Backup heating part of volume	*Vbu* =	10	litres	*...from TD-HWST*

Compliments: Solar Certification Fund (4C16-EcoDes-12) vAConsult 2014

3.2 Solar device for space heating and combination heating

The 'solar device' consists of the solar thermal part of a space heating or combination heating system. The main components are a collector and heat storage. Additionally, a collector pump and pump control can be part of the device. The solar device is meant to contribute to the space heating heat generation and, if applied in a combination heater, to the water heating heat generation.

Required documentation:

☒ Technical document ☒ Product fiche ⊡ Energy label

Inputs:

- product fiche for the hot water storage tank;
  The documentation is obtained from the supplier of the storage tank or is compiled according to the procedure described in 3.1
- collector test report according to CEN-EN 12975-2.

Procedure:

The procedure is illustrated in figure 2. An example of the format of the technical document (TD-SH-SD) and the product fiche (PF-SH-SD) is included below.

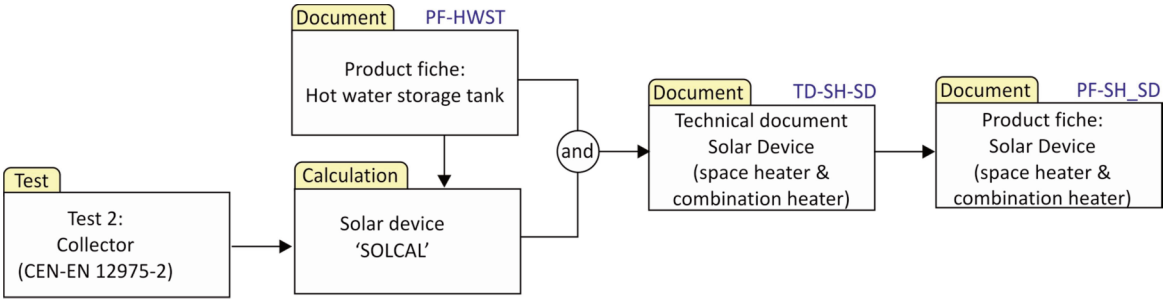


Figure 2 - Procedure for solar device for space and combination heaters. The 'blue' codes are referring to one of the following tables and worksheets in the accompanying example workbooks.

Remarks:

- In both the technical document and the product fiche the volume of the backup heating part of the hot water storage tank (=V_{bu}) should be added. This value is needed for the SOLCAL method. This value can be set to zero, when no integrated backup heating in the storage is applied.

Technical document: CDR 811/2013, Annex V, point 4.

Required input documents:

Hot water storage tank	Product fiche
Collector	test report according to CEN-EN 12975-2
Collector pump:	product specifications according to EN 16297-1:2012,
Pump control:	product specifications

Processing of the input data:

The technical document is specified by required contents in CDR 811/2013, Annex V, point 4.

A template for this technical document (TD-SH-SD), which is in conformity with the regulation, is shown in table 3. The template is self-explanatory.

The water heating performance data should be calculated for all four load profiles according PUB 2014/C 207/03, point 4.8, (b) (SOLCAL method).

Table 3 - Illustration of the technical document of a solar device for space and combination heater

TD-SH-SD

Technical documentation

From technical document
Add these values
Calculated value

Group: Space heaters and combination heaters
Section: Solar device
Reference: CDR 811/2013, annex V, point 4 Date: 29/07/2014 *...Enter date of signature*

V.4.(b) **Supliers model identifier:**

Brand:	vAConsult	*...Enter accordingly*
Type:	Turbo SL	*...Enter accordingly*
Model:	V250	*...Enter accordingly*

V.4.(f) **Technical parameters:**

Description:	Symbol:	Value:	Unit:	Determined according to: Status: [1]	Reference:	
Collector aperture area:	A_{sol} =	5.00	m^2	HS	EN12975-2	*...from test report*
Col. efficiency (40K, 1 000 W/m²)	η_{col} =	60	%	HS	EN12975-2	*...from test report*
Storage tank label	class	C	-	Other	CDR 811/2013, annex III.3	*...from TD-HWST*
Storage tank standing losses	*S* =	59	W	HS	EN12977-3	*...from TD-HWST*
Storage tank volume	*V* =	0.150	m^3	HS	EN12977-3/4	*...from TD-HWST*
Storage tank volume	V_{bu} =	0.100	m^3	HS	EN12977-3/4	*...from TD-HWST*

Load profile:	M	L	XL	XXL		
$Q_{nonsolar}$ =	631	1170	2326	3322	kWh/a	*...Result of SOLCAL*
Pump power consumption	*Solpump* =	20	W	HS	PUB 2014/C 207/03, point 4.10	*...From pump specifications*
Standby power consumption	*Solstandby* =	5.00	W	Other	product documentation	*...From specifications controller*
Auxiliary electricity consumption	*Qaux* =	84	kWh			*...calculation SOLCAL*

1) HS= Harmonized standard. If not available, specify method according to PUB 2014/C 207/02 or /03 and specify subsection.

V.4.(g) **Precautions to be taken when assembling:**

V.4.(a) **Supplier (name and address):**

V.4.(e) **Empowered person:**
Name:
Position:

Signature:

Product fiche: CDR 811/2013, Annex IV, point 4.

Required input documents:

Solar device (space heater) Technical document

Processing of the input data:

The relevant items from the input documents are summarized in CDR 811/2013, Annex IV, point 4.

A template for this product fiche (PF-SH-SD), which is in conformity with the regulation, is included in table 4 and is self-explanatory.

Table 4 - Illustration of the product fiche of a solar device for space and combination heater

PF-SH-SD

From technical document
Add these values
Calculated value

Product fiche

Group: Space and combination heaters
Section: Solar devices
Reference: CDR 811/2013, annex IV, point 4 Date: 29/07/2014 *...fromTD-SH-SD*

IV.4.1.(a) **Supliers name or trademark:** *...Enter accordingly*

IV.4.1.(b) **Suppliers model identifier:**

Brand: *...fromTD-SH-SD*
Type: *...fromTD-SH-SD*
Model:

Technical parameters:

	Description:	Symbol:	Value:	Unit:					
IV.4.1.(c)	*Collector aperture area:*	A_{sol} =	5.00	m^2					*...fromTD-SH-SD*
IV.4.1.(d)	*Collector efficiency:*	η_{col} =	60	%	*...(40 K, 1 000 W/m2)*				*...fromTD-SH-SD*
IV.4.1.(e)	*Energy efficiency class storage:*		C	-					*...fromTD-SH-SD*
IV.4.1.(f)	*Standing losses storage:*	S =	59	%					*...fromTD-SH-SD*
IV.4.1.(g)	*Storage nominal volume:*	V =	0.150	m^3					*...fromTD-SH-SD*
	Backup designated part of storage:	*Vbu* =	0.100	m^3					*...fromTD-SH-SD*
		Load profile:	**M**	**L**	**XL**	**XXL**			
IV.4.1.(h)	*Annual non-solar heat contribution*	Q_{nonsol} =	631	1170	2326	3322	kWh		*...from SOLCAL*
IV.4.1.(i)	*Pump power consumption:*	*solpump* =	20	W					*...fromTD-SH-SD*
IV.4.1.(j)	*Standby power consumption:*	*Solstandby* =	5.00	W					*...fromTD-SH-SD*
IV.4.1.(k)	*Annual auxilary electricity consumption:*	*Qaux* =	84	kWh					*...fromTD-SH-SD*

Compliments: Solar Certification Fund (4C16-EcoDes-12) vAConsult 2014

3.3 Solar device for water heating

The 'solar device' consists of the solar thermal part of a water heating system. The main components are a collector and heat storage. Additionally, a collector pump and pump control can be part of the device. The solar device is meant to contribute to the heat generation for water heating.

Required documentation:

☒ Technical document ☒ Product fiche ☐ Energy label

Inputs:

- product fiche for the hot water storage tank;
  The documentation is obtained from the supplier of the storage tank or is compiled according to the procedure described in 3.1
- collector test report according to CEN-EN 12975-2.

Procedure:

The procedure is illustrated in figure 3. An example of the format of the technical document (TD-WH-SD) and the product fiche (PF-WH-SD) is included below.

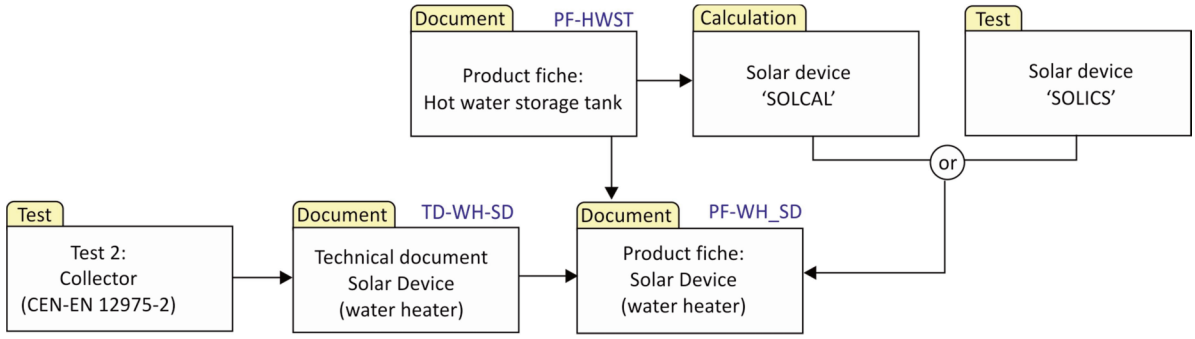


Figure 3- Procedure for solar device for water heaters. The 'blue' codes are referring to one of the following tables and worksheets in the accompanying example workbooks.

Remarks:

- In both the technical document and the product fiche the volume of the backup heating part of the hot water storage tank (=V_{bu}) should be added. This value is needed for the SOLCAL method. This value can be set to zero, when no integrated backup heating in the storage is applied, or set at 'n.a.' if the SOLICS method is applied.

Technical document: CDR 812/2013, Annex V, point 3.

Required input documents:

Collector:	test report according to EN 12975-2,
Collector pump:	product specifications according to EN 16297-1:2012,
Pump control:	product specifications.

Processing of the input data:

The relevant items from the input documents are summarized in CDR 812/2013, Annex V, point 3.

A template for this technical document (TD-WH-SD), which is in conformity with the regulation, is included in table 5. The template is self-explanatory.

It is noted that the water heating performance parameters are not included in this Technical document.

Table 5 - Illustration of the technical document of a solar device for a water heater

TD-WH-SD

Technical documentation

Input from technical document
Add these values
Calculated value

Group: Water heaters and hot water storage tanks
Section: Solar devices
Reference: CDR 812/2013, annex V, point 3 Date: 29/07/2014 ...Enter date of signature

V.3.(b) **Description of the device:**

Brand:	vAConsult	...Enter accordingly
Type:	Turbo SL	...Enter accordingly
Model:	V250	...Enter accordingly

V.3.(f) **Technical parameters:**

	Description	Symbol:	Value:	Unit:	V.3.(c) Determined according to: Status: [1]	V.3.(d) Reference:	
VII.9.(a)	*Collector aperture area:*	(A_{sol}) =	4.00	m^2	HS	EN12975-2	...In case of SOLICS '0'
VII.9.(b)	*Zero loss collector efficiency:*	(η_o) =	0.800	-	HS	EN12975-2	...In case of SOLICS '0'
VII.9.(c)	First order heat loss coefficient:	(a_{1}) =	3.50	$W/(K.m^2)$	HS	EN12975-2	...In case of SOLICS '0'
VII.9.(d)	*Second order heat loss coefficient:*	(a_{2}) =	0.000	$W/(K^2.m^2)$	HS	EN12975-2	...In case of SOLICS '0'
VII.9.(e)	*Incidence angle modifier:*	(IAM) =	0.94	-	HS	EN12975-2	...In case of SOLICS '0'
VII.9.(f)	*Pump power consumption:*	(solpump) =	20.00	W	Other	PUB 2014/C 207/03, point 4.	...From pump specifications
VII.9.(g)	*Standby power consumption:*	(Solstandby) =	5.00	W	?	Product documentation	...From specifications controller

1) HS= Harmonized standard. If not available, specify method according to PUB 2014/C 207/02 or /03 and specify subsection.

V.3.(g) **Precautions to be taken when assembling:**

V.3.(a) **Supplier (name and address):**

V.3.(e) **Empowered person:**

Name:
Position:

Signature:

Compliments: Solar Certification Fund (4C16-EcoDes-12) vAConsult 2014

Product fiche: CDR 812/2013, Annex IV, point 3.

Required input documents:

Hot water storage tank	Product fiche
Solar device:	Calculation according to SOLCAL or test according to SOLICS
Solar device:	Technical document

Processing of the input data:

The relevant items from the input documents are summarized in CDR 812/2013, Annex IV, point 3.

A template for this product fiche (PF-WH-SD), which is in conformity with the regulation, is included in table 6 and is self-explanatory.

The water heating performance data is calculated for four load profiles according PUB 2014/C 207/03, point 4.8, (b) and the 'average' climate.

Table 6 - Illustration of the product fiche of a solar device for a water heater

PF-WH-SD

Product fiche

Input from technical document
Add these values
Calculated value

Group: Water heaters & storage tanks
Section: Solar devices
Reference: CDR 812/2013, annex IV, point 3 Date: 29/07/2014 ...from TD-WH-SD

3.1(a) **Supliers name or trademark:** ...Enter accordingly

3.1(b) **Suppliers model identifier:**

Brand:	vAConsult	...from TD-WH-SD
Type:	Turbo SL	...from TD-WH-SD
Model:	V250	...from TD-WH-SD

3.1(c-l) **Technical parameters:**

	Description:	Symbol:	Value:	Unit:				
3.1(c)	*Collector aperture area:*	A_{sol} =	4.00	m^2				...from TD-WH-SD
3.1(d)	*Zero loss collector efficiency:*	η_o =	0.800	-				...from TD-WH-SD
3.1(e)	*First order heat loss coefficient:*	a_1 =	3.50	$W/(K.m^2)$				...from TD-WH-SD
3.1(f)	*Second order heat loss coefficient:*	a_2 =	0.000	$W/(K^2.m^2)$				...from TD-WH-SD
3.1(g)	*Incidence angle modifier:*	*IAM* =	0.94	-				...from TD-WH-SD
3.1(h)	*Storage nominal volume:*	*V* =	150	litres				...from TD-HWST
	Backup designated part of storage:	*Vbu* =	0	litres				...from TD-HWST
		Load profile:	**M**	**L**	**XL**	**XXL**		
3.1(i)	*Annual non-solar heat contribution*	Q_{nonsol} =	631	1170	2326	3322	kWh	...fromt SOLICS or SOLCAL
3.1(j)	*Pump power consumption:*	*solpump* =	20	W				...from TD-WH-SD
3.1(k)	*Standby power consumption:*	*Solstandby* =	5.00	W				...from TD-WH-SD
3.1(l)	*Annual auxilary electricity consumption:*	*Qaux* =	84	kWh				...Calculation SOLCAL/SOLICS

Compliments: Solar Certification Fund (4C16-EcoDes-12) vAConsult 2014

3.4 Product label for a solar water heater

A solar water heater is a water heater equipped with one or more solar collectors, solar hot water storage tanks, heat generators and possibly pumps in the collector loop and other parts, a solar water heater is placed on the market as one unit.

The energy label is required for a preferred heater with a rated heat output ≤ 70 kW and the Ecodesign regulation is applicable for a rated heat output ≤ 400 kW.

Usually, a solar water heater is equipped with an integrated electrical backup heater and a thermosyphon collector loop, although other types can also be included within this definition.

Required documentation:

☒ Technical document ☒ Product fiche ☒ Energy label

Inputs:

- test report water heater (backup)
- test report solar device (SOLICS)

Procedure:

The procedure is illustrated in figure 4. An example of the format of the technical document (TD-SWH) and the product fiche (PF-SWH) is included below.

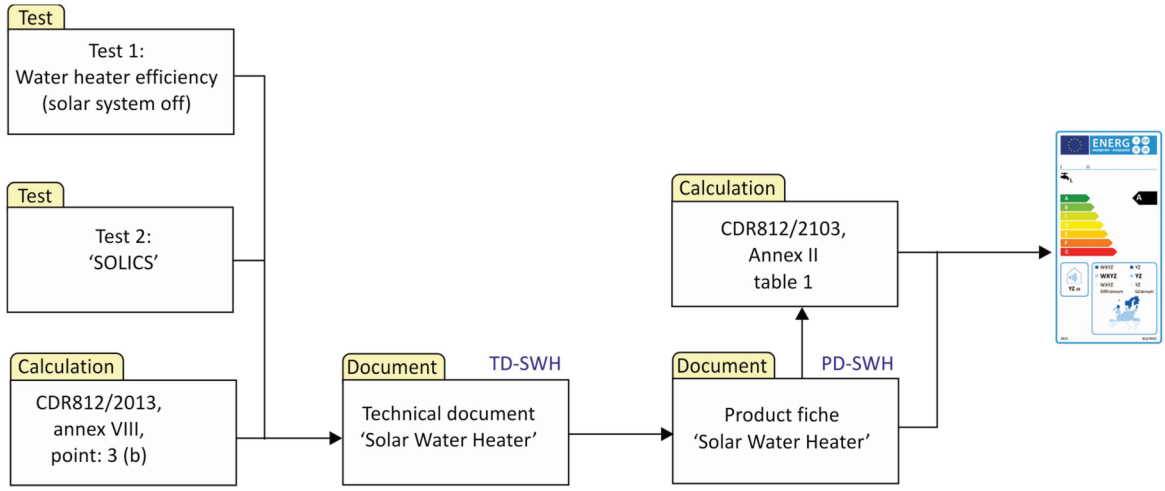


Figure 4 - Procedure for solar water heaters. The 'blue' codes are referring to one of the following tables and worksheets in the accompanying example workbooks.

Technical document: CDR 812/2013, Annex V, point 1.

Required input documents:

Water heater (backup)	test report according to CDR 812/2013, annex VII, point 2
Collector pump	test report according to EN 16297-1:2012
Pump control	According to product specifications
Solar device (SOLICS)	test report according to publication PUB 2014/C 207/03, point 4.8, (c)

Processing of the input data:

The technical document is specified by required contents in CDR 812/2013, Annex V, point 1.

A template for this technical document (TD-SWH), which is in conformity with the regulation, is included in table 7. The template is self-explanatory.

A solar water heater needs a test for the water heater part (no solar input) and a test for the determination of the solar device performance parameters.

The performance of the (integrated) water heater is determined by testing and calculation (CDR 812/13, annex VII, point 2). For this purpose several references are given in PUB 2014/C 207/03, point 4.3 to 4.6. The performance of the non-solar backup heater are determined for the load profiles: M, L, XL and XXL, if applicable.

The solar device performance parameters are determined in according to the SOLICS method 2014/C 207/03, point 4.8, (c). The solar thermal performance is determined for three climatic regions and the load profile from the water heater test. For other load profiles a new technical document must be drafted.

Combining the results of both characterizations, the system performance is calculated according to CDR 812/2013, annex VII.

Table 7 - Illustration of the technical document of a solar water heater

TD-SWH

From technical document
Add these values
Calculated value

Technical documentation

Group: Water heaters and hot water storage tanks
Section: (Solar) water heater
Reference: CDR 812/2013, annex V, point 1 Date: 31/12/2013

V.1(b) **Description of the device:**

Brand: vAConsult
Type: Solar Water
Model: Mark IX

Ref.:	Description:	Symbol	Value	Unit	Determined according to: Status *)	Reference
V.1(f)	**From annex VII:**					
VII.7.(a)	*Daily electricty consumption:*	Q_{elec} =	0.100	kWh	HS	PUB 2014/C 207/03
VII.7.(b)	*Declared load profile:*		L	-		CDR 812/2013 annex VII, table 7
VII.7.(c)	*Sound power level:*		15	dB	Reg	Defaut. No moving parts
VII.7.(d)	*Daily fuel consumption:*	Q_{fuel} =	6.000	kWh (GCV)	HS	PUB 2014/C 207/03
VII.7.(e)	*Weekly fuel consumption:*	$Q_{fuel,week,smart}$	n.a.	kWh (GCV)	HS	PUB 2014/C 207/04
VII.7.(f)	*Weekly electricity consumption:*	$Q_{elec,week,smart}$ =	n.a.	kWh (GCV)	HS	PUB 2014/C 207/05
VII.7.(g)	*Weekly fuel consumption:*	$Q_{fuel,week}$ =	n.a.	kWh (GCV)	HS	PUB 2014/C 207/06
VII.7.(h)	*Weekly electricity consumption:*	$Q_{elec,week}$ =	n.a.	kWh (GCV)	HS	PUB 2014/C 207/07
	Water heater eff. (nonsolar):	$\eta_{wh,nonsol}$ =	0.90	-	HS	PUB 2014/C 207/07
VII.7.(i)	*Collector aperture area:*	A_{sol} =	5.00	m^2	HS	EN12975-2
VII.7.(j)	*Zero loss collector efficiency:*	η_o =	0.800	%	HS	EN12975-2
VII.7.(k)	First order heat loss coefficient:	a_1 =	3.50	$W/(K.m^2)$	HS	EN12975-2
VII.7.(l)	*Second order heat loss coefficient:*	a_2 =	0.000	$W/(k^2.m^2)$	HS	EN12975-2
VII.7.(m)	*Incidence angle modifier:*	*IAM* =	0.94	-	HS	EN12975-2
	Storage nominal volume:	*V* =	150	litres		
	Backup designated part of storage:	*Vbu* =	0	litres		
VII.7.(n)	*Pump power consumption:*	*solpump* =	30.00	W	Reg	PUB 2014/C 207/03, point 4.10
VII.7.(o)	*Standby power consumption:*	*solstandby* =	5.00	W	?	Product specifications
VIII.2.(e)	*Annual auxiliary energy consumption:*	*Qaux* =	103.8	kWh		Calculation

V.1(g) **From annex VIII:**

			Average	Colder	Warmer			
VIII.2.(a)	*Water heating energy efficiency:*	η_{wh} =	163	149	178	%	CDR 812/2013 annex VIII	point 3.(b)
VIII.2.(b)	*Annual electricity consumption:*	*AEC* =	25	28	23	kWh	CDR 812/2013 annex VIII	point 4.(b)
VIII.2.(c)	*Annual fuel consumption:*	*AFC* =	1511	1651	1382	kWh	CDR 812/2013 annex VIII	point 4.(b)
VIII.2.(g)	*Annual non solar heat contribution:*	Q_{nonsol} =	1170	1300	1050	kWh	HS EN 12976	

1) HS= Harmonized standard. If not available, specify method according to PUB 2014/C 207/02 or /03 and specify subsection.

V.1(h) **Precautions to be taken when assembling:**

Supplier (name and address):

V.1(a)

V.1(e) **Empowered person:**

Name:
Position:

Signature:

Product fiche: **CDR 812/2013, Annex IV, point 1.**

Required input documents:

Solar water heater Technical document

Processing of the input data:

The relevant items from the input documents are summarized in CDR 812/2013, Annex IV, point 1.

A template for the product fiche (PF-SWH), which is in conformity with the regulation, is included and should be self-explanatory. Some elements have been added for simplicity of calculations. Since the format is not specified, these elements can be added to the fiche.

Table 8 - Illustration of the product fiche of a solar water heater

PF-SWH

Product fiche

From technical document
Add these values
Calculated value

Group: Water heaters & storage tanks
Section: Solar devices
Date: 31/12/2013
Reference: CDR 812/2013, annex IV, point 1

1.1 (a) **Supliers name or trademark:** *Informative section*

1.1 (b) **Suppliers model identifier:**

Brand:	vAConsult
Type:	Solar Water
Model:	Mark IX

Technical parameters:

	Description:	Symbol:	Value:	Unit:		
						Load profiles:
1.1. (c)	*Declared load profile:*		L	-	Annex VII, table 3	M
1.1. (d)	*Water heating efficiency class (average climate):*		0	-	Annex II, point 1	L
1.1. (e)	*Water heating energy efficiency (average climate)*	η_{wh} =	163	%	Annex VIII, point 3	XL
1.1 (f)	*Annual electricity consumption (average climate)*	AEC =	25	kWh	Annex VIII, point 4	XXL
1/1 (g)	*not implemented*					
1.1 (h)	*Thermostat temperature setting:*		n.a.	°C		
1.1 (i)	*Sound power level:*	*Lwa* =	15	dB	Technical doc	
1.1 (j)	*Only off-peak hours operation:*		n.a.	Yes/No		
1.1 (k)	*Special precautions:*					
1.1 (l)	*Only applicable with smart control enabled:*		n.a.	Yes/No		Label classes:
1.1 (m)	*Water heating energy efficiency (colder climate):*		149	%	Annex VIII, point 3	A
	Water heating energy efficiency (warmer climate):		178	%	Annex VIII, point 3	B
	Annual electricity consumption (colder climate):		28	kWh	Annex VIII, point 4	C
	Annual electricity consumption (warmte climate):		23	kWh	Annex VIII, point 4	D
1.1 (o)	*Collector aperture area:*	A_{sol} =	5.00	m^2	Technical doc	E
1.1 (p)	*Zero loss collector efficiency:*	η_o =	0.800	-	Technical doc	F
1.1 (q)	*First order heat loss coefficient:*	a_1 =	3.50	$W/(K.m^2)$	Technical doc	G
1.1 (r)	*Second order heat loss coefficient:*	a_2 =	0.000	$W/(K^2.m^2)$	Technical doc	
1.1 (s)	*Incidence angle modifier:*	*IAM* =	0.94	-	Technical doc	
1.1 (t)	*Storage nominal volume:*	*V* =	150	litres	Technical doc	
	Backup designated part of storage:	*Vbu* =	0	litres	Technical doc	
1.1 (u)	*Pump power consumption:*	*solpump* =	30	W	Technical doc	
1.1 (v)	*Standby power consumption:*	*Solstandby* =	5.00	W	Technical doc	

Compliments: Solar Certification Fund (4C16-EcoDes-12) vAConsult 2014

4 Procedures for packages

4.1 Package label for space heating

The package for space heating is a combination of a space heater and added elements.

The energy label is required for a preferred heater with a rated heat output ≤ 70 kW and the Ecodesign regulation is applicable for a rated heat output ≤ 400 kW.

Required documentation:

☒ Technical document ☒ Product fiche (4 types) ☒ Energy label

Inputs:

- Product fiches of the package components;
  The documentations are obtained from the supplier of the components
- product fiche solar device for space and combination heater.
  The documentation is obtained from the supplier of the solar device or is compiled according to the procedure described in 3.2.

Procedure:

The procedure is illustrated in figure 5. An example of the format of the technical document of the package (TD-SH-PA) and the product fiche (PF-SH-PA) is included below.

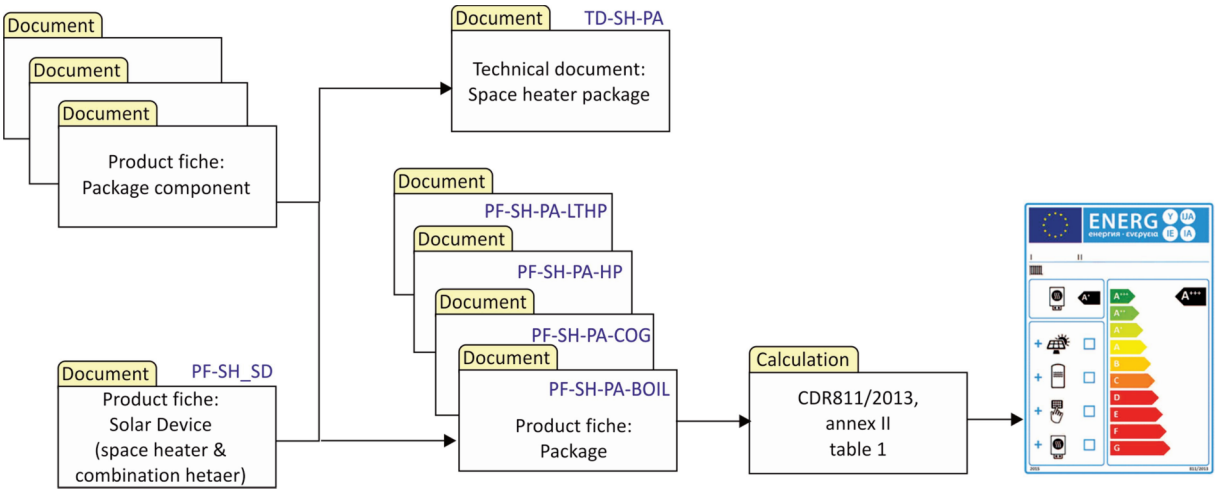


Figure 5 - Procedure for package space heaters. The 'blue' codes are referring to one of the following tables and worksheets in the accompanying example workbooks.

Technical document: CDR 811/2013, Annex V, point 5.

Required input documents:

Space heater (backup)	Product fiche (and package fiche) from supplier
Components of package	Product fiches
Solar device (space heater)	Product fiche

Processing of the input data:

The technical document is specified by required contents in CDR 811/2013, Annex V, point 5.

The technical document of the package is a compilation of the technical document of its components. The supporting technical documents is be added as an annex to this technical document, if available.

A template for this technical document (TD-SH-PA), which is in conformity with the regulation, is included in table 9. The template is self-explanatory. The technical document template explicitly includes certain key parameters that should be extracted from the supporting technical documents of the elements in the package.

According to the regulation, the elements of all needed technical documents should be included in the package technical document. However, the format of the technical document is not specified. Therefore, it is a free choice to copy the elements from the other technical documents in one new technical document or to add these technical documents as an attachment as is suggested in the template TD-SH-PA.

If one or more technical documents cannot be made available, the data on the product fiche should be used. The key data should than be added to the package technical document.

One of the technical parameters is the seasonable space heating energy efficiency. This parameter is a result of the calculations in the product fiche of the package.

Table 9 - Illustration of the technical document of a package space heater

TD-SH-PA

Technical documentation

From technical document
Add these values
Calculated value

Group: Space heaters and combination heaters
Section: Package space heater
Reference: CDR 811/2013, annex V, point 5 Date: 31/12/2013 *...Enter date of signature*

V.5.(b) **Description of the device:**

Brand:	vAConsult	*...Enter accordingly*
Type:	Solar space heater	*...Enter accordingly*
Model:	Mark VI	*...Enter accordingly*

	Subject:	Symbol:	Value:	Unit:	Description:	
V.5.(f)	Package space heater:					
	Seasonable space heating eff.:	η_{ssh} =	120	%	*...calculation result from product fiche*	*...from product fiche (PF-SH-PA-x*
					Brand, type, model (include in annex):	
V.1	Preferential space heater:	Type:	Boiler			*...Select accordingly*
		η_{ssh} =	98	%	*Seasonal space heating energy efficiency*	*...From Product fiche*
		Prated =	20	kW		*...From Product fiche*
		$\eta_{ssh;colder}$ =	80	%	*...heat pumps only*	*...From Product fiche*
		$\eta_{ssh;warmer}$ =	95	%	*...heat pumps only*	*...From Product fiche*
					Brand, type, model (include in annex):	
V.3	Temperature control:		Yes	Yes/No		*...From product documentation*
		Class:	VIII			*...From product documentation*
					Brand, type, model (include in annex):	
V.1	Supplementary boiler:		Yes	Yes/No		*...From Product fiche*
		η_{ssh} =	85	%	*Seasonal space heating energy efficiency:*	*...From Product fiche*
		Prated =	15	kW		*...From Product fiche*
		Storage applied ?	Yes	Yes/No	*...all except preferential boilers*	*...From Product fiche*
					Brand, type, model (include in annex):	
V.4	Solar device:		Yes	Yes/No	, ,	*...From product fiche (PD-SH-SD)*
		A_{sol} =	15.00	m^2	*Collector size:*	*...From product fiche (PD-SH-SD)*
		η_{col} =	60	%	(at 40K and 1 000 W/m^2)	*...From product fiche (PD-SH-SD)*
		V_{nom} =	0.5	m^3	*Tank nominal volume*	*...From product fiche (PD-HWST)*
		Storage class:	C	-		*...From product fiche (PD-HWST)*
					Brand, type, model (include in annex):	
V.1	Supplementary heat pump:		Yes	Yes/No		*...From Product fiche*
	(preferential boilers only)	η_{ssh} =	115	%	*Seasonal space heating energy efficiency*	*...From Product fiche*
		$Prated_{sup}$ =	10	kW		*...From Product fiche*
		Storage applied ?	No	Yes/No		*...From Product fiche*
	Low temperature heat emittors at 25 °C ?		Yes	Yes/No		*...From Product fiche*

V.5.(g) **Precautions to be taken when assembling:**

V.5.(a) **Supplier (name and address):**

V.5.(e) **Empowered person:**
Name:
Position:
Signature:

η_{ssh}: seasonable space heating energy efficiency for preferential (pref) or supplementary (sup) heater

The applied technical documentation of the applied package components shall be an integral part of this technical documentation.

Package fiche: **CDR 811/2013, Annex IV, point 5.**

Required input documents:

Package space heater (backup)	Product fiche
Package components	Product fiches

Processing of the input data:

The product fiche of the package is defined as a spread sheet to be completed with the data on the technical document of the package.

Templates for the product fiches, which are in conformity with the regulation, are included in table 11 to table 14 and are self-explanatory.

- PF-SH-PA-BOIL: preferential boiler,
- PF-SH-COG: preferential cogenerator,
- PF-SH-PA-HP: preferential heat pump,
- PF-SH-PA-LTHP.: preferential low temperature heat pump.

In the templates some elements have been added for simplicity of calculations. Since the format is not specified these additions can be added to the fiche.

Be careful to choose the correct product fiche model. The differences are in the detail!

The allowed combinations of preferential heaters and added elements are according to table 10.

		Preferential space heater of type:			
		Boiler	Cogenerator	Heat pump	Low temperature heat pump
Package elements	Solar device (space heater)	Yes	Yes	Yes	Yes
	Temperature control	Yes	Yes	Yes	Yes
	Supplementary boiler	Yes	Yes	Yes	Yes
	Supplementary heat pump	Yes	No	No	No

Table 10 allowed combinations of components for four types space heater packages.

Table 11 - Illustration of the product fiche for a package space heater with preferential boiler

PF-SH-PA-BOIL

Product fiche

Group: Space and combination heaters
Section: Preferential boiler or combi
Reference: CDR 811/2013, Annex IV, point

Date: 31/12/2013

Suppliers model identifier:

Brand:	vAConsult
Type:	Solar space heater
Model:	Mark VI

X Preferential boiler (data from fiche)

$Prated_{pref}$ ⑩ = 20 kW η_{ssh}('I'): 98.0 % (1)

X Temperature control (data from fiche)

Class ⑪: VIII → + 5.0 % (2)

X Supplementary boiler (data from fiche)

η_{ssh} in %: (85.0 - 98.0)x 0.1 = ± -1.3 % (3)

X Solar contribution (data from fiche)

Collector size in m^2: 'III': 1.34 x 10.00 + Tank volume in m^3: 'IV' 0.52 x 0.5) x 0.9 x Collector efficiency in %: 66.0 /100 x Tank rating ⑭: C ⑮ 0.83 = + 6.7 % (4)

X Supplementary heat pump (data from fiche)

$Prated_{sup}$ ⑫ = 10 kW
Storage applied ⑬: No
η_{ssh} in %: (115 - 98.0)x 'I' 98.0 'II' 0.78 = + 13.3 % (5)

Solar contribution AND supplementary heat pump
Select smaller value: 0.5 x (4) 6.7 OR 0.5 x (5) 13.3 - 3.4 % (6)
+

Seasonal space heating energy efficiency of package $\eta_{ssh,pa}$ %: 118.4 % (7)

Seasonal space heating energy efficiency class of package

G	F	E	D	C	B	A	A+	A++	A+++
<30%	≥ 30%	≥ 34%	≥ 36%	≥ 75%	≥ 82%	≥ 90%	≥ 98%	≥ 125%	≥ 150%

Boiler & supplementary heat pump installed with low temperature heat emitters at 35 oC? Yes

(7) 118.4 + (50 x 'II' 0.78) = 118.4

The energy efficiency of the package of products provided for in this fiche may not correspond to its actual energy efficiency once installed in a building, as this efficiency is influenced by further factors such as heat losses in the distribution system and the dimensioning of the products in relation to the building size and characteristics.

Compliments: Solar Certification Fund (4C16-EcoDes-12) vAConsult 2014

Informative section

η_{sys} ('I'): Seasonal space heating energy efficiency
'III': 294/(11x$Prated_{pref}$)
IV' = 115/(11x$Prated_{pref}$)
Collector efficiency at: 40 K and 1 000 W/m2

Temp. control

⑪	(2)
I	1.0
II	2.0
III	1.5
IV	2.0
V	3.0
VI	4.0
VII	3.5
VIII	5.0

'II' *(Annex IV, table 5)*

⑫ ⑩+⑫	⑬=No 'II'	⑬=Yes 'II'
0.0	0.00	0.00
0.1	0.30	0.37
0.2	0.55	0.70
0.3	0.75	0.85
0.4	0.85	0.94
0.5	0.95	0.98
0.6	0.98	1.00
0.7	1.00	1.00

Heat storage tank

⑭	⑮
A+	0.95
A	0.91
B	0.86
C	0.83
D	0.81
E	0.81
F	0.81
G	0.81

enter a value
select value
Red auto filled in
calculated value

Table 12 - Illustration of the product fiche for a package space heater with preferential cogenerator

PF-SH-PA-COG

Product fiche

Group: Space and combination heaters
Section: Preferential cogenerator
Reference: CDR 811/2013, Annex IV, point 5, fig 2
Date: 31/12/2013

Suppliers model identifier:

Brand:	vAConsult
Type:	Solar space heater
Model:	Mark VI

X Preferential cogenerator (data from fiche)
Prated ⑩ = 20 kW
η_{ssh}('I'): 98.0 % ①

X Temperature control (data from fiche)
Class ⑪: VIII ⇨ + 5.0 % ②

X Supplementary boiler (data from fiche)
η_{ssh} in %:
$Prated_{sup}$ ⑫ = 15 kW
Storage applied ⑬: Yes
(85 - 98.0) x 0.01 = ± -0.1 % ③

X Solar contribution (data from fiche)
Collector size in m^2: 'III': 1.34
Tank volume in m^3: 'IV': 10.00
0.52 x 0.5) x
Collector efficiency in %: 0.7 x 66.0 /100 x
Tank rating ⑭: C ⑮ 0.83 = + 5.2 % ④
+

Seasonal space heating energy efficiency of package
$\eta_{ssh,pa}$ %: 108.2 % ⑤

Seasonal space heating energy efficiency class of package

G	F	E	D	C	B	A	A+	A++	A+++
<30%	≥ 30%	≥ 34%	≥ 36%	≥ 75%	≥ 82%	≥ 90%	≥ 98%	≥ 125%	≥ 150%

The energy efficiency of the package of products provided for in this fiche may not correspond to its actual energy efficiency once installed in a building, as this efficiency is influenced by further factors such as heat losses in the distribution system and the dimensioning of the products in relation to the building size and characteristics.

Informative section

η_{sys} ('I'): Seasonal space heating energy efficiency
'III': $294/(11 \times Prated_{pref})$
IV' = $115/(11 \times Prated_{pref})$
Collector efficiency at: 40 K and 1 000 W/m2

Temp. control

⑪	②
I	1.0
II	2.0
III	1.5
IV	2.0
V	3.0
VI	4.0
VII	3.5
VIII	5.0

Annex IV, table 6

⑩	⑬=No	⑬=Yes
⑩+⑫	'II'	'II'
0.0	1.00	1.00
0.1	0.70	0.63
0.2	0.45	0.30
0.3	0.25	0.15
0.4	0.15	0.06
0.5	0.05	0.02
0.6	0.02	0.00
0.7	0.00	0.00

Heat storage tank

⑭	⑮
A+	0.95
A	0.91
B	0.86
C	0.83
D	0.81
E	0.81
F	0.81
G	0.81

enter a value
select value
Red auto filled in
calculated value

Compliments: Solar Certification Fund (4C16-EcoDes-12) vAConsult 2014

Table 13 - Illustration of the product fiche for a package space heater with preferential heat pump

PF-SH-PA-HP

Product fiche

Group: Space and combination heaters
Section: Preferential heat pump
Reference: CDR 811/2013, Annex IV, point 5, fig 3
Date: 31/12/2013

Suppliers model identifier:

Brand:	vAConsult
Type:	Solar space heater
Model:	Mark VI

X Preferential heat pump (data from fiche)

$Prated_{pref}$ ⑩ = 20 kW η_{ssh}('I'): 98.0 % (1)

X Temperature control (data from fiche)

Class ⑪: VIII ⇨ + 5.0 % (2)

X Supplementary boiler (data from fiche)

$Prated_{sup}$ ⑫ = 15 kW Storage applied ⑬: Yes

η_{ssh} in %: (85 - 98.0) x 0.01 = ± -0.1 % (3)

X Solar contribution (data from fiche)

Collector size in m^2: 'III': 1.34 x 10.00 + Tank volume in m^3: 'IV' 0.52 x 0.500) x

Collector efficiency in %: 0.45 x 66.0 /100 x

Tank rating ⑭: C ⑮ 0.83 = + 3.4 % (4)

+

Seasonal space heating energy efficiency of package (average climate)

$\eta_{ssh,pa}$ %: 106.3 % (5)

Seasonal space heating energy efficiency class of package

G	F	E	D	C	B	A	A+	A++	A+++
<30%	≥ 30%	≥ 34%	≥ 36%	≥ 75%	≥ 82%	≥ 90%	≥ 98%	≥ 125%	≥ 150%

Seasonal space heating energy efficiency under colder and warmer climate conditions

Colder: (5) 106.3 - 'V' 18 = 88.3 % Warmer: (5) 106.3 + 'VI' -3 = 103.3 %

The energy efficiency of the package of products provided for in this fiche may not correspond to its actual energy efficiency once installed in a building, as this efficiency is influenced by further factors such as heat losses in the distribution system and the dimensioning of the products in relation to the building size and characteristics.

Informative section

η_{sys} ('I'): Seasonal space heating energy efficiency
'III': $294/(11 \times Prated_{pref})$
'IV' = $115/(11 \times Prated_{pref})$
'V' = $\eta_{sys;avg} - \eta_{sys;colder}$ in %
'VI' = $\eta_{sys;warmer} - \eta_{sys;avg}$ in %
Collector efficiency at: 40 K and 1 000 W/m2

Temp. control

⑪	②
I	1.0
II	2.0
III	1.5
IV	2.0
V	3.0
VI	4.0
VII	3.5
VIII	5.0

Annex IV, table 6

⑩ ⑩+⑫	⑬=No 'II'	⑬=Yes 'II'
0.0	1.00	1.00
0.1	0.70	0.63
0.2	0.45	0.30
0.3	0.25	0.15
0.4	0.15	0.06
0.5	0.05	0.02
0.6	0.02	0.00
0.7	0.00	0.00

Heat storage tank

⑭	⑮
A+	0.95
A	0.91
B	0.86
C	0.83
D	0.81
E	0.81
F	0.81
G	0.81

enter a value
select value
Red auto filled in
calculated value

Compliments: Solar Certification Fund (4C16-EcoDes-12) vAConsult 2014

Table 14 - Illustration of the product fiche for a package space heater with preferential low temperature heat pump

PF-SH-PA-LTHP

Product fiche

Group: Space and combination heaters
Section: Preferential LT heat pump
Reference: CDR 811/2013, Annex IV, poir

Date: 31/12/2013

Suppliers model identifier:

Brand:	vAConsult
Type:	Solar space heater
Model:	Mark VI

X Preferential low temperature heat pump (data from fiche)

$Prated_{pref}$ ⑩ = 20 kW η_{sys}('I'): 98.0 % (1)

X Temperature control (data from fiche)

Class ⑪: VIII + 5.0 % (2)

X Supplementary boiler (data from fiche)

$Prated_{sup}$ ⑫ = 15 kW
Storage applied ⑬: Yes

η_{sys} in %: (85 - 'I' 98.0) x 'II' 0.01 =± -0.1 % (3)

X Solar contribution (data from fiche)

Collector size in m^2: 'III': 1.34 x Tank volume in m^3: 'IV' 10.00 + 0.52 x 0.5) x 0.45 x Collector efficiency in %: 66.0 /100 x Tank rating ⑭: C ⑮ 0.83 =+ 3.4 % (4)

+

Seasonal space heating energy efficiency of package (average climate)

$\eta_{ssh,pa}$ %: 106.3 % (5)

Seasonal space heating energy efficiency class of package

G	F	E	D	C	B	A	A+	A++	A+++
<55%	≥ 55%	≥ 59%	≥ 61%	≥ 100%	≥ 107%	≥ 115%	≥ 123%	≥ 150%	≥ 175%

Seasonal space heating energy efficiency under colder and warmer climate conditions

Colder: (5) 106.3 - 'V' 18 = 88.3 % Warmer: (5) 106.3 + 'VI' -3 = 103.3 %

The energy efficiency of the package of products provided for in this fiche may not correspond to its actual energy efficiency once installed in a building, as this efficiency is influenced by further factors such as heat losses in the distribution system and the dimensioning of the products in relation to the building size and characteristics.

Informative section

η_{sys} ('I'): Seasonal space heating energy efficiency
'III': $294/(11 \times Prated_{pref})$
IV' = $115/(11 \times Prated_{pref})$
'V' = $\eta_{sys;avg} - \eta_{sys;colder}$ in %
'VI' = $\eta_{sys;warmer} - \eta_{sys;avg}$ in %
Collector efficiency at: 40 K and 1 000 W/m2

Temp. control

⑪	(2)
I	1.0
II	2.0
III	1.5
IV	2.0
V	3.0
VI	4.0
VII	3.5
VIII	5.0

Annex IV, table 6

⑩ ⑩+⑫	⑬=No 'II'	⑬=Yes 'II'
0.0	1.00	1.00
0.1	0.70	0.63
0.2	0.45	0.30
0.3	0.25	0.15
0.4	0.15	0.06
0.5	0.05	0.02
0.6	0.02	0.00
0.7	0.00	0.00

Heat storage tank

⑭	⑮
A+	0.95
A	0.91
B	0.86
C	0.83
D	0.81
E	0.81
F	0.81
G	0.81

	enter a value
	select value
Red	auto filled in
	calculated value

Compliments: Solar Certification Fund (4C16-EcoDes-12) vAConsult 2014

4.2 Package label for a water heater

A package water heater is a combination of a water heater with a solar device. The energy label is required for a water heater with a rated heat output ≤ 70 kW and the Ecodesign regulation is applicable for a rated heat output ≤ 400 kW.

Required documentation:

☒ Technical document ☒ Product fiche ☒ Energy label

Inputs:

- technical document and product fiche water heater (backup);
  The documentation is obtained from the water heater supplier.
- technical document and product fiche hot water storage tank;
  The documentation is obtained from the supplier of the tank or is compiled according to the procedure described in 3.1.
- technical document and product fiche solar device for water heater.
  The documentation is obtained from the supplier of the solar device or is compiled according to the procedure described in 3.3.

If one or more of the technical documents are not available, the product fiches should be sufficient to complete the required procedures.

Procedure:

The procedure is illustrated in figure 6. An example of the format of the technical document of the package (TD-WH-PA) and the product fiche (PF-WH-PA) is included below.

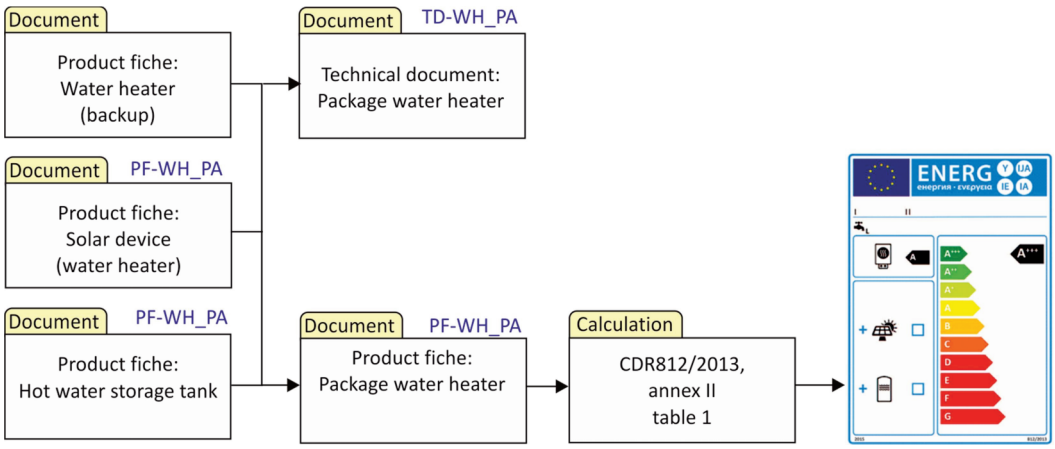


Figure 6 - Procedure for package water heaters. The 'blue' codes are referring to one of the following tables and worksheets in the accompanying example workbooks.

Technical document: CDR 812/2013, Annex V, point 4.

Required input documents:

water heater (backup)	Product fiche (and package fiche)
Solar device (water heater)	Product fiche
Hot water storage tank	Product fiche

Processing of the input data:

The technical document is specified by required contents in CDR 812/2013, Annex V, point 4.

The technical document of the package is a compilation of the technical document of its components. The supporting technical documents should be added as an annex to this technical document, if available.

A template for this technical document (TD-WH-PA), which is in conformity with the regulation, is included in table 15. The template is self-explanatory.

According to the regulation, the elements of all needed technical documents should be included in the package technical document. However, the format of the technical document is not specified. Therefore, it is a free decision to copy the elements from the other technical documents into one new technical document or to add these technical documents as an attachment as is suggested in TD-WH-PA.

If one or more technical documents cannot be made available, the data on the product fiche should be used. The key data should than be added to the package technical document.

The technical documents require the water heater efficiency of the package. This value is to be calculated according to the product fiche for this package and then added to the technical document of the package.

Table 15 - Illustration of the technical document of a package water heater

TD-WH-PA

Technical documentation

Group: Water heaters and hot water storage tanks
Section: Package water heater and solar device
Reference: CDR 812/2013, annex V, point 4 Date: ########## ...Enter date o

V.4.(b) **Description of the device:**

Brand:		...Enter accor
Type:		...Enter accor
Model:		...Enter accor

Description:	**Symbol:**	**Value:**	**Unit:**	**Reference:**	
V.4.(f) *Water heating energy efficiency of package:*					
	$\eta_{wh,pa}$ =	195	%	*from product fiche calcualtion*	...From produ

Technical documents:	Brand, type, model (include in annex):	
backup water heater:		...Enter accor
hot water storage tank:	vAConsult, SolarHotStore, Mark VI	...From techni
solar device:	vAConsult, Turbo SL, V250	...From techni

V.4.(g) **Precautions to be taken when assembling:**

V.4.(a) **Supplier (name and address):**

V.4.(e) **Empowered person:**

Name:
Position:

Signature:

The applied technical documentation of the applied package components shall be an integral part of this technical documentation.

Compliments: Solar Certification Fund (4C16-EcoDes-12) vAConsult 2014

Product fiche: **CDR 812/2013, Annex IV, point 4.**

Required input documents:

Water heater (backup)	Product fiche
Solar device for water heater	Product fiche
Hot water storage tank	Product fiche

Processing of the input data:

The product fiche of the package is defined as a spread sheet that needs input from the product fiches of the elements that make up the package.

A template for the product fiche (PF-SH-PA), which is in conformity with the regulation, is included in table 16 and should be self-explanatory. Some elements have been added for simplicity of calculations. Since the format is not specified, these additions can be added to the fiche.

The performance data of the solar device is determined for the same load profile of the (backup) water heater.

Table 16 - Illustration of the product fiche for a package water heater

PF-WH-PA

Product fiche

Group: Water heaters & storage tanks
Section: Water heaters
Reference: CDR 812/2013, Annex IV, point 4, fig.1

Date: 31/12/2013

Supliers name or trademark:

Suppliers model identifier:

Brand:	{undefined}
Type:	{undefined}
Model:	{undefined}

Informative section

Annex VII, table 3

Load profile:	Q_{ref} kWh
M	5.845
L	11.655
XL	19.070
XXL	24.530

Q_{ref}: annex VII, table 3

from PF Solar device:

Q_{aux} = 84 kWh
Q_{nonsol} = 1263 kWh

'II' = $(220 \times Q_{ref})/Q_{nonsol}$
'III' = $(Q_{aux} \times 2{,}5)/(220 \times Q_{ref})$
Q_{nonsol}: result of method
Q_{aux}: result of method

Water heating efficiency of water heater (data from fiche)

Declared load profile: L
Qref = 11.7 kWh
η_{wh} ('I'): (1) 90.0 %

Solar contribution (data from fiche)

		'I'		'II'		'III'		'I'		(2)
(	1.1 x	90.0	-	10) x	2.03	-	0.08	-	90.0	=+ 90.7 %

+

Water heating energy efficiency of package (average climate)

$\eta_{wh,pa}$ %: (3) 180.7 %

Water heating energy efficiency class of package

	G	F	E	D	C	B	A	A+	A++	A+++
☐ M	<27%	≥ 27%	≥ 30%	≥ 33%	≥ 36%	≥ 39%	≥ 65%	≥ 100%	≥ 130%	≥ 163%
☐ L	<27%	≥ 27%	≥ 30%	≥ 34%	≥ 37%	≥ 50%	≥ 75%	≥ 115%	≥ 150%	≥ 188%
☐ XL	<27%	≥ 27%	≥ 30%	≥ 35%	≥ 38%	≥ 55%	≥ 80%	≥ 123%	≥ 160%	≥ 200%
☐ XXL	<28%	≥ 28%	≥ 32%	≥ 36%	≥ 40%	≥ 60%	≥ 85%	≥ 131%	≥ 170%	≥ 213%

Water heating energy efficiency under colder and warmer climate conditions

	(3)			(2)		
Colder:	180.7	-	0.2 x	90.7	=	162.5 %
Warmer:	180.7	+	0.4 x	90.7	=	217.0 %

The energy efficiency of the package of products provided for in this fiche may not correspond to its actual energy efficiency once installed in a building, as this efficiency is influenced by further factors such as heat losses in the distribution system and the dimensioning of the products in relation to the building size and characteristics.

	enter a value
	select value
Red	auto filled in
	calculated value

Compliments: Solar Certification Fund (4C16-EcoDes-12) vAConsult 2014

4.3 Package label for combination heaters

A package combination heater is a combination of a combi boiler with a solar device meant for space and water heating. The energy label is required for a combination heater with a rated heat output ≤ 70 kW and the Ecodesign regulation is applicable for a rated heat output ≤ 400 kW.

Required documentation:

☒ Technical document ☒ Product fiche (2x) ☒ Energy label

Inputs:

- technical document and product fiche for the combination heater (backup);
  The documentation is obtained from the water heater supplier.
- technical documents and product fiches of the other package components;
  The documentations are obtained from the supplier of the components.
- technical document and product fiche solar device for space and combination heater.
  The documentation is obtained from the supplier of the solar device or is compiled according to the procedure described in 3.2.

Procedure:

The procedure is illustrated in figure 7. An example of the format of the technical document of the package (TD-CMB-PA) and the product fiche (PF-CMB-PA) is included below.

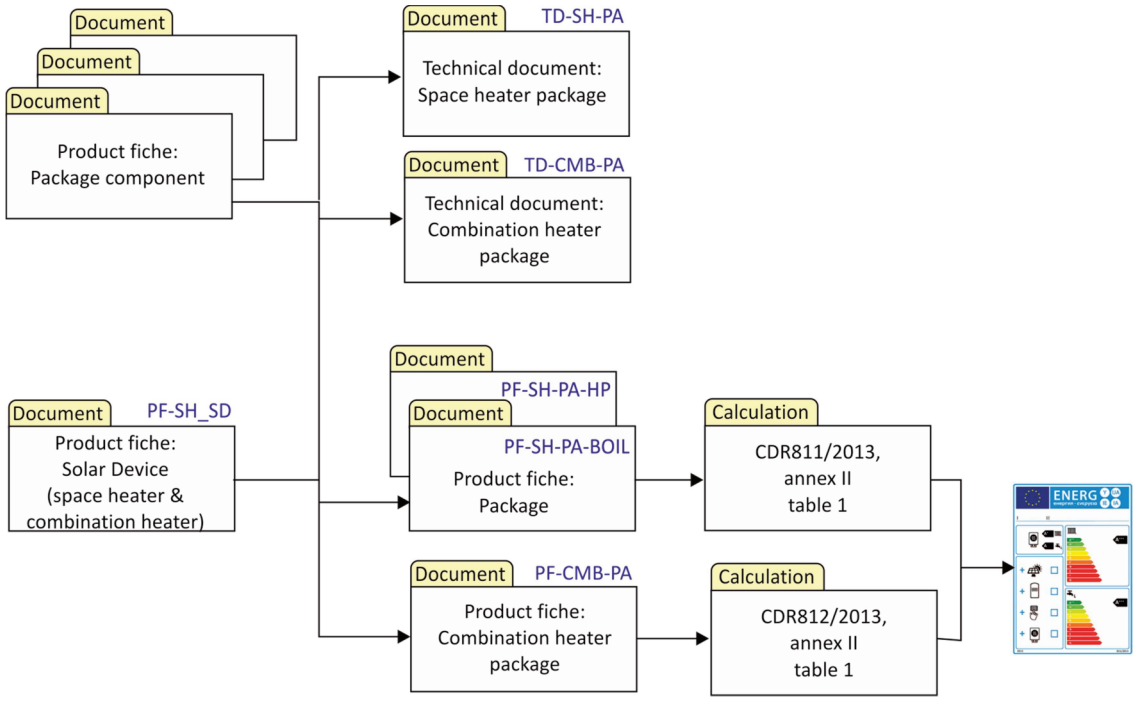


Figure 7- Procedure for package combination heaters. The 'blue' codes are referring to one of the following tables and worksheets in the accompanying example workbooks.

Remarks:

- The label for a combination heater package consists of the procedure for (1) the space heater part and (2) the procedure for the water heater part. The water heater part is defined in the product fiche for the combination heater package. For the space heater part the procedures for a space hater package needs to be followed (see 4.1).
- The preferential combination heater can be of type 'boiler' and of type 'heat pump' only.

Technical document: CDR 811/2013, Annex V, point 6.

Required input documents:

Combination heater(s)	Product fiche (and package fiche)
Solar device (space heater)	Product fiche
Components of package	Product fiches

Processing of the input data:

The technical document is specified by required contents in CDR 811/2013, Annex V, point 6.

The technical document of the package is a compilation of the technical document of its components. These technical documents should be added as an annex to this technical document, if available.

A template for this technical document (TD-CMB-PA), which is in conformity with the regulation, is included in table 17. The template is self-explanatory. The technical document template explicitly includes certain key parameters that should be extracted from the supporting technical documents of the elements of the package.

According to the regulation, the elements of all needed technical documents should be included in the package technical document. However, the format of the technical document is not specified. Therefore, it is a free decision to copy the elements from the other technical documents in one new technical document or to add these technical documents as an attachment.

If one or more technical documents cannot be made available, the data on the product fiche should be used. The key data should than be added to the package technical document.

The technical document requires the space heater efficiency and the water heater efficiency of the package. These values are to be calculated according to both product fiches for this package.

Table 17 - Illustration of the technical document of a package combination heater

TD-CMB-PA

Technical documentation

From technical document
Add these values
Calculated value

Group: Space heaters and combination heaters
Section: Package space heater with combination heater — Date: 31/12/2013
Reference: CDR 811/2013, annex V, point 6

V.6.(b) **Description of the device:**

Brand:	vAConsult
Type:	Combi-SR
Model:	Turbo VII

Subject:	Symbol:	Value:	Unit:	Description:	
V.6.(f) Package combination heater:					
	$\eta_{ssh,pa}$ =	117	%	*Seasonable space heating efficiency package*	*...PG-SH-xxxx*
	$\eta_{wh,pa}$ =	164	%	*Water heater efficiency of combination heater*	*...PF-CMB-PA*
	Load profile:	XL	-		
V.2 Combination heater				Brand, type, model (include in annex):	
Technical documentation space heater:					
	η_{ssh} =	98	%	*Seasonable space heating efficiency package*	
				Brand, type, model (include in annex):	
Technical documentation water heater:					
	η_{wh} =	92	%	*Water heater efficiency of combination heater*	
				Brand, type, model (include in annex):	
V.3 Temperature control					
				Brand, type, model (include in annex):	
V.6.(c) **Solar device**					
V.6.(d)					

V.4	Load profile:	M	L	XL	XXL		
	Nonsolar heat contribution ($Q_{nonsolar}$) =	631	1170	2326	3322	kWh/a	*...PF-SH-PA*
	Auxiliary electricity consumption (Qaux) =	84	kWh/a				*...PF-SH-PA*

V.6.(g) **Precautions to be taken when assembling:**

Supplier (name and address):
V.6.(a)

Empowered person:
V.6.(e)
Name:
Position:

Signature:

The applied technical documentation of the applied package components shall be an integral part of this technical documentation.

Package fiche: CDR 811/2013, Annex IV, point 6.

Required input documents:

Combination heater	Product fiche
Temperature control	Product fiche
Solar device (space heating)	Product fiche
Hot water storage tank	Product fiche

Processing of the input data:

The product fiche of the package is defined as a spread sheet that needs input from the product fiches of the elements that make up the package.

For combination heaters two product fiches are required: one for the package space heating function (according to chapter 4) and one for the water heating function.

The calculations are self-explanatory as indicated in the example: PF-CMB-PA (see table 18). In these examples some elements have been added to allow for performing the calculations using the required component fiches. Since the format is not specified, these additions can be added to the fiche.

Be careful to choose the correct package fiche model for the space heating. The differences are in the detail!

The product fiches of all applied components, together with the added information on the right in the examples of annex B, should be sufficient to complete the product fiche of the package.

Table 18 - Illustration of the product fiche for a package combination heater

PF-CMB-PA

Product fiche

Group: Space and combination heaters
Section: Combination heaters
Reference: CDR 811/2013, Annex IV, point 5, fig. 5

Date: 31/12/2013

Supliers name or trademark:

Suppliers model identifier:

Brand:	vAConsult
Type:	Combi-SR
Model:	Turbo VII

Informative section

η_{sys} ('I'): Water heating energy efficiency
'II': $(220 \times Q_{ref})/Q_{nonsol}$
III' = $(Q_{aux} \times 2{,}5)/(220 \times Q_{ref})$

Annex VII, table 15

Load profile:	Q_{ref} kWh
M	5.845
L	11.655
XL	19.070
XXL	24.530

Q_{nonsol} = 1005 kWh
Q_{aux} = 84 kWh

Water heating efficiency of combination heater (data from fiche)

Declared load profile: L ηwh('I'): (1) 92.0 %

Solar contribution (data from fiche)

(1.1 x 'I' 92.0 - 10) x 'II' 2.55 - 'III' 0.08 - 'I' 92.0 = + (2) 140.7 %

+

Water heating energy efficiency of package (average climate)

$\eta_{wh,pa}$ %: (3) 232.7 %

Water heating energy efficiency class of package

	G	F	E	D	C	B	A	A+	A++	A+++
M	<27%	≥ 27%	≥ 30%	≥ 33%	≥ 36%	≥ 39%	≥ 65%	≥ 100%	≥ 130%	≥ 163%
L	<27%	≥ 27%	≥ 30%	≥ 34%	≥ 37%	≥ 50%	≥ 75%	≥ 115%	≥ 150%	≥ 188%
XL	<27%	≥ 27%	≥ 30%	≥ 35%	≥ 38%	≥ 55%	≥ 80%	≥ 123%	≥ 160%	≥ 200%
XXL	<28%	≥ 28%	≥ 32%	≥ 36%	≥ 40%	≥ 60%	≥ 85%	≥ 131%	≥ 170%	≥ 213%

Water heating energy efficiency under colder and warmer climate conditions

Colder: (3) 232.7 - 0.2 x (2) 140.7 = 204.5 %

Warmer: (3) 232.7 + 0.4 x (2) 140.7 = 289.0 %

	enter a value
	select value
Red	auto filled in
	calculated value

The energy efficiency of the package of products provided for in this fiche may not correspond to its actual energy efficiency once installed in a building, as this efficiency is influenced by further factors such as heat losses in the distribution system and the

Compliments: Solar Certification Fund (4C16-EcoDes-12)

5 Additional information

5.1 How to define the water heater efficiency for a boiler (patch)

In the case of packages providing domestic hot water using a space heater the water heating energy efficiency might not be available, or might only be available for a combination of the space heater with a specific hot water storage tank.

In this case, the dealer would not be able to provide the package label unless certain assumptions are made to estimate ηwh of a standard boilers used in solar packages.

The following calculation method is proposed in the (draft) Guidelines.

$$\eta_{wh,nonsolar} = 0{,}95 \cdot \frac{Q_{ref}}{Q_{fuel} + CC \cdot Q_{elec} \cdot + Q_{cor}} \quad (1)$$

$$Q_{fuel} = \left(Q_{ref} + \left(24 - \frac{Q_{ref}}{P_4}\right) \cdot P_{stby}\right) \cdot \frac{100}{\eta_4} \quad (2)$$

$$Q_{elec} = Q_{elec,On} + Q_{elec,Stby} = (24 - t_{on}) \cdot PSB + t_{on} * el_{max} \quad (3)$$

where

$$t_{on} = \left(Q_{ref} + \left(24 - \frac{Q_{ref}}{P_4}\right) \cdot P_{stby}\right) \cdot \frac{1}{P_4}$$

P_4	[kW]	maximum power of the boiler (publication 2014/C 207/02)
η_4	[%]	Efficiency of the boiler at P_4 (publication 2014/C 207/02)
P_{stby}	[kWh]	standby losses of the boiler only (publication 2014/C 207/02)
P_{stby}	[kWh]	standby electrical consumption (publication 2014/C 207/02)
Q_{ref}	[kWh]	daily heat demand for hot water (regulation: 812/2013)

All the necessary data can be found in the relevant Annexes of the Regulations or in the data sheet of the boiler.

This method makes a series of simplifications:

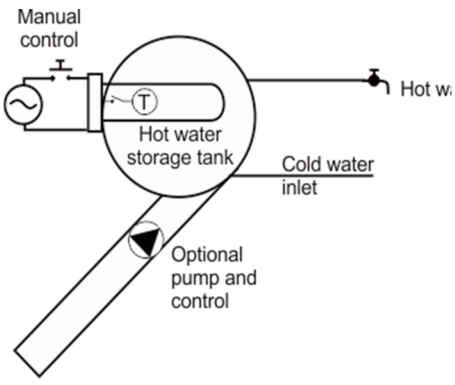
- The smart control factor is not used as it does not apply in this context;
- The tank losses are set to 0 as they are already considered in the SOLCAL method.

This method is only applicable to packages with a load profile M, L, XL and XXL.

5.2 Typical Mediterranean solar system type

The solar system consists of a collector, heat storage tank and electrical immersion backup heater and is intended for domestic hot water production. The backup heater provides for heat in periods with insufficient solar energy.

- The backup heater can be manually switched on or off.
- The collector loop can be of type thermo syphon or pumped.
- Optionally the tank is equipped with a frost protection control.



These types of solar systems are designed specifically to fulfill the major part of the heat demand with solar energy. That is realistic in this climate zone and when designing the solar system large enough. As a result only a minor part of the heat needed is generated by the backup heater.

Consequently, the storage tank design is as such that when the backup heater is in operation it decreases the available volume for solar heat. For that reason the backup heater should be switch on only when it is strictly necessary. A manual control by the user is an accepted solution for that.

The requirements for those types of systems within the regulations are described in the following.

5.2.1 The hot water heat storage tank

Straightforward interpretation:

The electrical heater is according to CDR 812/2013, article 2, (10) a '*back-up immersion heater*'.

As a result, the heat storage tank is according to CDR 812/2013, article 2, (9) a '*hot water storage tank*'.

Requirements for the tank:

- Heat storage test & technical document
- Product fiche
- Product label

Alternative view:

Due to the manual control, one may argue that the electrical heater only 'satisfy required comfort levels' in case of a deficiency of solar heat and an user intervention. As such it is not always acting as a '*back-up immersion heater*'.

This argumentation could lead to the conclusion that the electrical heater is not a '*back-up immersion heater*', but an undefined '*heat generator*'. As a consequence the storage tank is not a '*hot water storage tank*' within the scope of the regulations {article 2, (9), exclusion 'any heat generator'} and no testing or labelling is required.

CDR 812/2013, article 2 Definitions:

(10) '*back-up immersion heater*' means a Joule effect electric resistance heater that is part of a hot water storage tank and generates heat only when the external heat source is disrupted (including during maintenance periods) or out of order, or that is part of a solar hot water storage tank *and provides heat when the solar heat source is not sufficient to satisfy required comfort levels*;

(9) ' '*hot water storage tank*' means a vessel for storing hot water for water and/or space heating purposes, including any additives, which is not equipped with any *heat generator* except possibly one or more *back-up immersion heaters*;

(2) '*heat generator*' means the part of a water heater that generates the heat using one or more of the following processes:

a) combustion of fossil fuels and/or biomass fuels;
b) use of the Joule effect in electric resistance heating elements;
c) capture of ambient heat from an air source, water source or ground source, and/or waste heat;

5.2.2 The system as a whole

Straightforward interpretation:

The system is a '*solar water heater*' {annex I, (2)}; the function is that of a '*water heater*' {article 1, (e) and article 2, (1)} and the electrical heater is a '*heat generator*' {article 2, (2)}.

The requirements for the system are:

- Test as a (non-solar) water heater
- Test as a solar device
- Technical document, product fiche and label.

Alternative view:

CDR 812/2013, article 1, subject, matter and scope

(e) water heaters which do not meet at least the load profile with the smallest reference energy, as specified in Annex VII, table 3.

CDR 812/2013, article 2 Definitions:

(1) '*water heater*' means a device that:

(a) is connected to an external supply of drinking or sanitary water;

(b) generates and transfers heat to deliver drinking or sanitary hot water at given temperature levels, quantities and flow rates during given intervals; and

One possible escape from this classification is the exception article 1, (e). Assuming that the smallest reference energy is in the case of a solar water heater the ' M' load profile, and by arguing that the manual control prevents the electrical heater to meet that load profile under all possible circumstances, it may be excluded. In that case the system does not need any requirements from the regulations.

(c) is equipped with one or more heat generators;

(11) '*solar device*' means a *solar-only system*, a solar collector, a solar hot water storage tank or a pump in the collector loop, which are placed on the market separately;

(12) '*solar-only system*' means a device that is equipped with one or more solar collectors and solar hot water storage tanks and possibly pumps in the collector loop and other parts, which is placed on the market as one unit and is not equipped with any heat generator except possibly one or more back-up immersion heaters;

(13) '*package of water heater and solar device*' means a package offered to the end-user containing one or more water heaters and one or more solar devices;

CDR 812/2013, annex I:

(2) ' '*solar water heater*' means a water heater equipped with one or more solar collectors, solar hot water storage tanks, *heat generators* and possibly pumps in the collector loop and other parts, a solar water heater is placed on the market as one unit;

5.3 References

Referenced in the text as:	Description:
CDR 811/2013	Commission delegated regulation (EU) No 811/2013, published 18-02-2013 on energy labelling of space heaters and combination heaters. and Commission delegated regulation (EU) No 813/2013, published 02-08-2013 on Ecodesign requirements of space heaters and combination heaters.
CDR 812/2013	Commission delegated regulation (EU) No 812/2013, published 18-02-2013 on energy labelling of water heaters and hot water storage tanks. and Commission delegated regulation (EU) No 813/2013, published 02-08-2013 on Ecodesign requirements of space heaters and combination heaters
PUB 2014/C 207/02	Commission communication (EU), referenced as 2014/C 207/02, published 03-07-2014 on space heaters and combination heaters (Lot 1).
PUB 2014/C 207/03	Commission communication (EU), referenced as 2014/C 207/03, published 03-07-2014 on water heaters and hot water storage tanks (Lot 2).
Guidelines	European Commission Directorate-General For Energy, Directorate C - Renewables, Research and Innovation, Energy Efficiency, C.3 - Energy efficiency. Guidelines accompanying CDR 811, 812, 813 and 814 /2013
EN 12975-2	EN 12975-2:2006, Thermal solar systems and components – solar collectors – part 2: test methods.
ISO 9459-5	Solar heating -- Domestic water heating systems -- Part 4: System performance characterization by means of component tests and computer simulation

EN 12977-3	EN 12977-3:2012, Thermal solar systems and components – custom build systems – part 3: performance test methods for solar water heater stores.
EN 15316-4-3	Heating systems in buildings. Method for calculation of system energy requirements and system efficiencies. Heat generation systems, thermal solar systems