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LabelPack A+

Solar thermal solutions within the Energy Labelling Context

How to calculate and edit a package label

Lieu, Date

Package label calculation

Each package gathering a water-heater, a space-heater, or a combination heater, with a solar thermal device has a dedicated energy efficiency label.

Those calculation methods are detailled inside delegated regulations:

- Package of water-heater:
  - Delegated regulation 812-2013, annex IV, 4. PACKAGES OF WATER HEATER AND SOLAR DEVICE
- Package of space-heater:
  - Delegated regulation 811-2013, annex IV, 5. PACKAGES OF SPACE HEATER, TEMPERATURE CONTROL AND SOLAR DEVICE
    - Package could be based on preferential Boiler, Cogeneration heater or Heat pump.
- Package of combination heater:
  - Delegated regulation 811-2013, annex IV, 6. PACKAGES OF COMBINATION HEATER, TEMPERATURE CONTROL AND SOLAR DEVICE
    - Package could be based on preferential Boiler or Heat pump.

Energy efficiency of water-heater package in a nutshell

Water-heater package energy efficiency is based on:

- the value of the water heating energy efficiency of the water heater, expressed in %, taken from the water-heater product fiche.
- the value of a mathematical expression combining the reference energy volume (Qref) associated to each load profile, and the annual non-solar heat contribution (Qnonsol) corresponding to annual contribution of electricity and/or fuels to the useful heat output of a solar water heater or a package of water heater and solar device, taking into account the annual amount of heat captured by the solar collector and the heat losses of the solar hot water storage tank.
- the value of the mathematical expression (in %) combining the auxiliary electricity consumption (Qaux) of a solar water heater or a solar-only system that is due to the pump power consumption and the standby power consumption, expressed in kWh in terms of final energy, and the reference energy volume (Qref) associated to each load profile (taken from product fiche).

Calculations have to be made for colder, average and warmer climate.

Energy efficiency of space heater package in a nutshell

Space heater package energy efficiency is based on:

- the value of the seasonal space heating energy efficiency of the preferential space heater (in %, taken from product fiche)
- the factor for weighting the heat output of preferential and supplementary heaters of a package (see tables 5 and 6 of 811-2013 Annex 4)
- values of 2 mathematical expressions based on the rated output of the preferential space heater

In addition, for preferential heat pump space heaters:

- the value of the difference between the seasonal space heating energy efficiencies under average and colder climate conditions (in %);
- the value of the difference between the seasonal space heating energy efficiencies under warmer and average climate conditions (in %)

Data regarding solar thermal device is taken from the product fiche: collector size, tank volume, collector efficiency.

Energy efficiency of combination heater package in a nutshell

Combination heater package energy efficiency is divided into space heater efficiency and water heater efficiency.

Space heating efficiency:

- Values are the same than the ones calculated and used for Space heater package energy efficiency.

Water heating efficiency:

- Values are the same than the ones calculated and used for Water-heater package energy efficiency.

How to apply those calculations?

Calculate package energy efficiency is quite complex, and need, on one hand, some values taken from different fiches corresponding to products that composed the package, and on the other hand values direcly calculated.

One simply and conform to regulation solution exists:

The Label Pack A+ online calculation tool!

Freely available on the LPA+ website

Allows to:

- Calculate energy efficiency
- Obtain the efficiency class
- Edit the package label

Tutorial for the online calculation tool

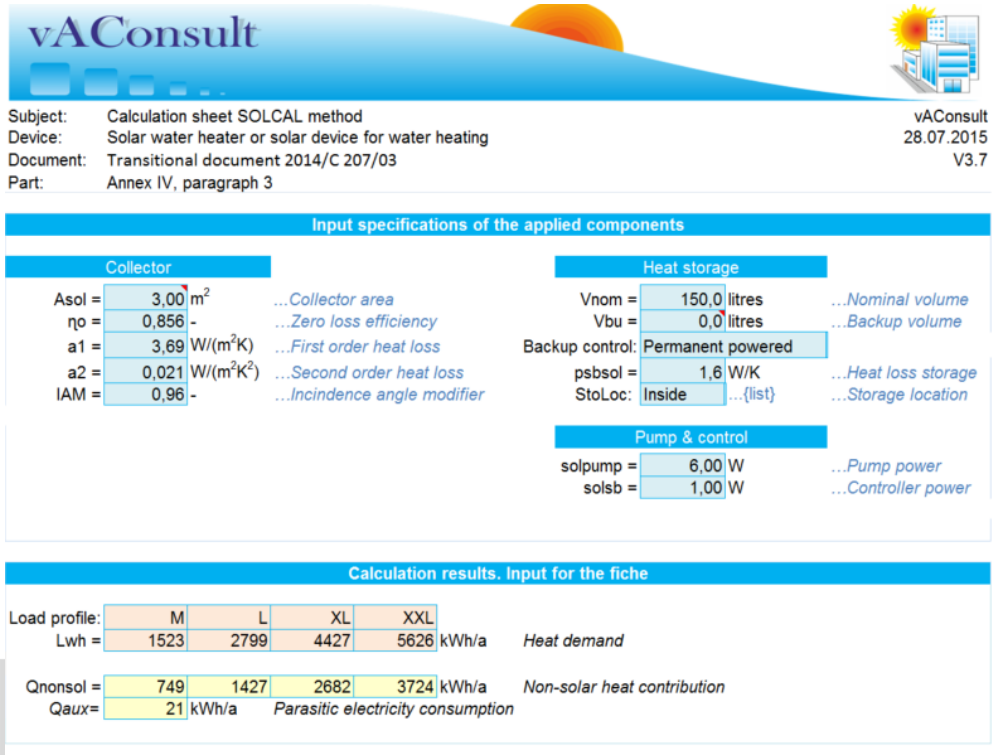
Prior entering the online tool, you should determine the Qnonsol and the Qaux, based on the solar system data you will use.

These 2 values can be calculated by using the SOLCAL methodology.

You can use the tool available on the LPA+ website [insert URL], or better, ask your manufacturer, supplier or dealer to help you with this.

Using the tool available on the LPA+ website, based on SOLCAL methodology, to calculate:

Qnonsol
Qaux.



vAConsult

Subject:	Calculation sheet SOLCAL method	vAConsult
Device:	Solar water heater or solar device for water heating	28.07.2015
Document:	Transitional document 2014/C 207/03	V3.7
Part:	Annex IV, paragraph 3	

Input specifications of the applied components

Collector

Asol =	3,00	m^2	...Collector area
η0 =	0,856	-	...Zero loss efficiency
a1 =	3,69	$W/(m^2K)$	...First order heat loss
a2 =	0,021	$W/(m^2K^2)$	...Second order heat loss
IAM =	0,96	-	...Incidence angle modifier

Heat storage

Vnom =	150,0	litres	...Nominal volume
Vbu =	0,0	litres	...Backup volume
Backup control:	Permanent powered		
psbsol =	1,6	W/K	...Heat loss storage
StoLoc:	Inside	...{list}	...Storage location

Pump & control

solpump =	6,00	W	...Pump power
solsb =	1,00	W	...Controller power

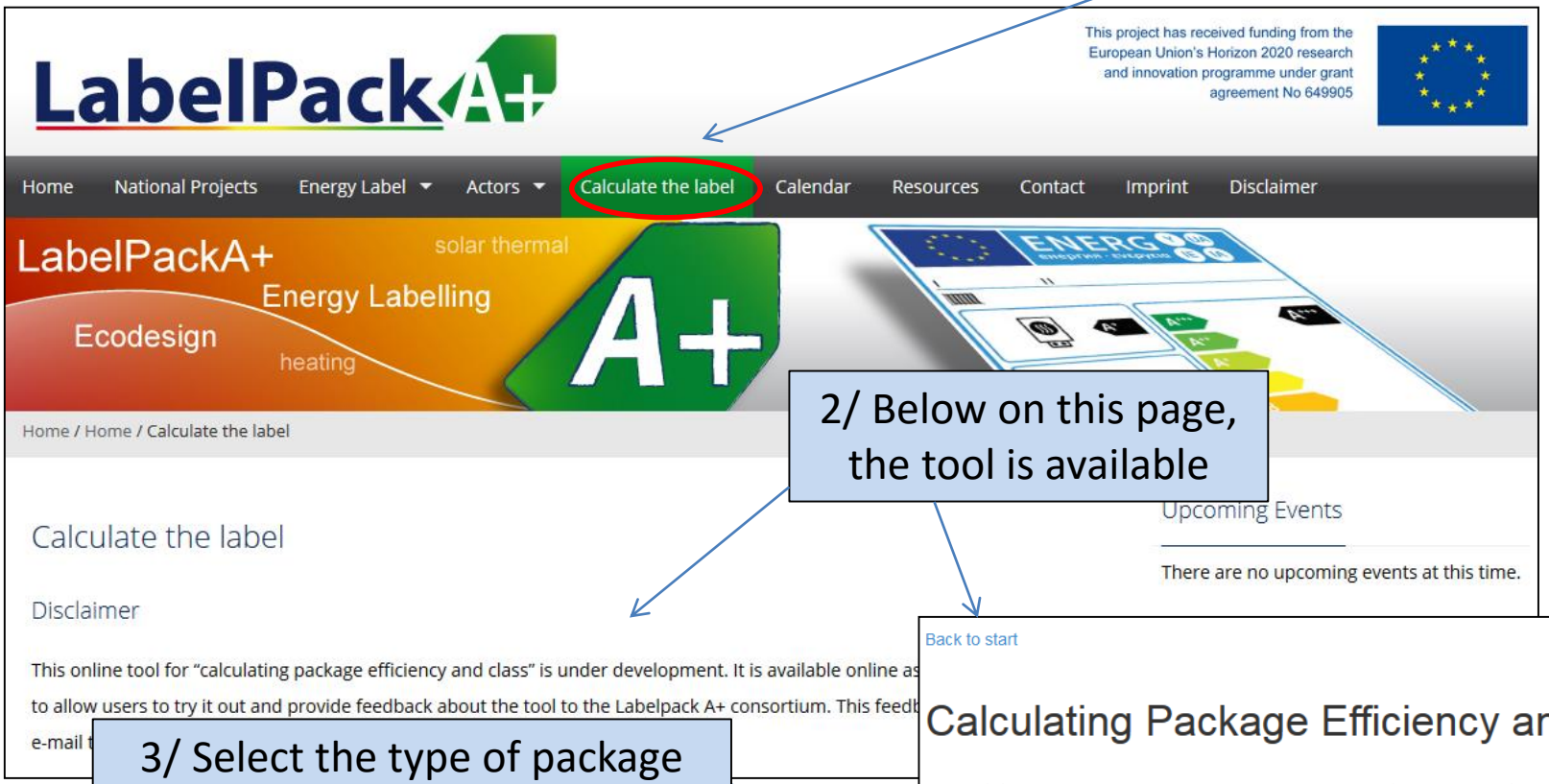
Calculation results. Input for the fiche

Load profile:	M	L	XL	XXL		
Lwh =	1523	2799	4427	5626	kWh/a	*Heat demand*
Qnonsol =	749	1427	2682	3724	kWh/a	*Non-solar heat contribution*
Qaux=	21	kWh/a	*Parasitic electricity consumption*			

Tutorial for the online calculation tool

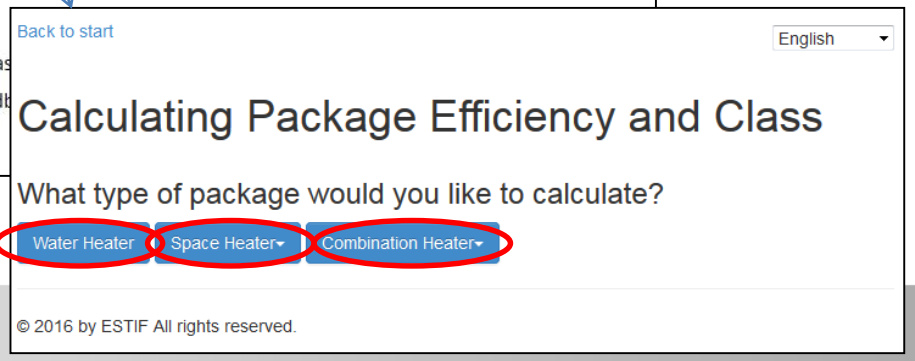
Online tool home page: first steps

1/ Direct link to the tool



2/ Below on this page, the tool is available

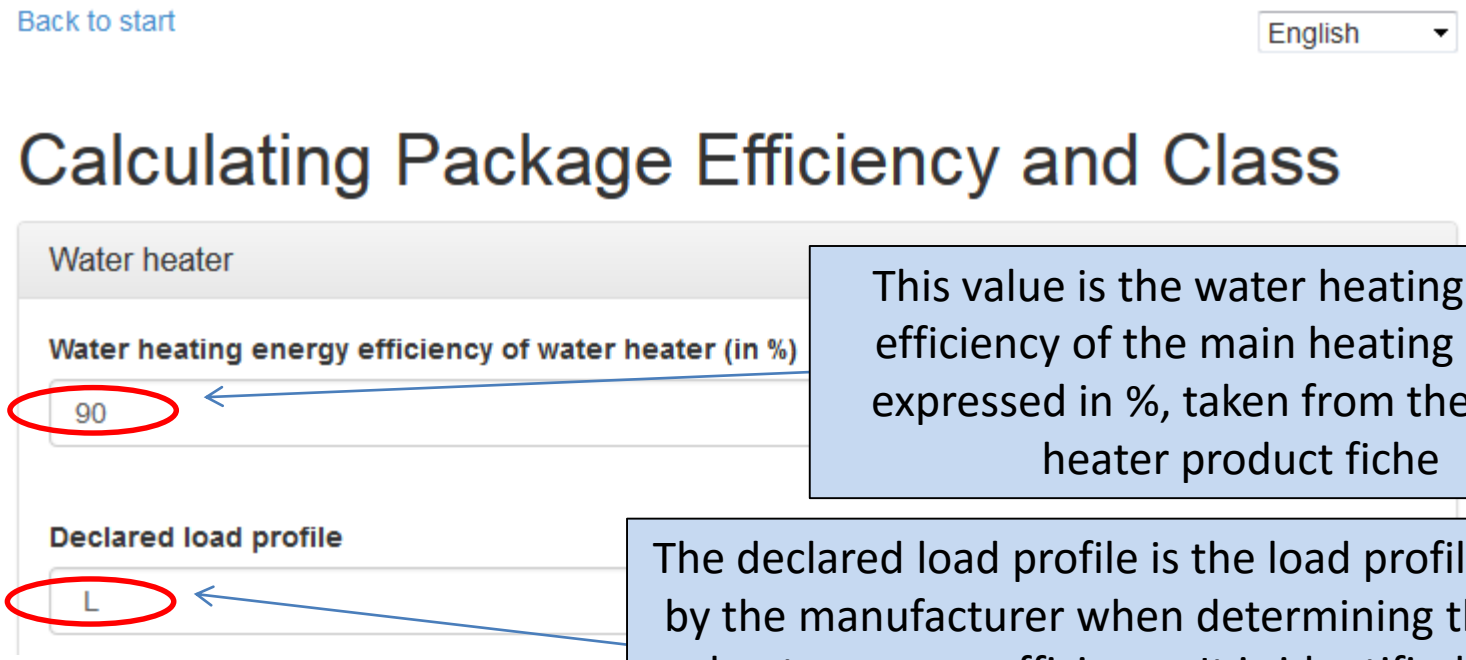
3/ Select the type of package you want to calculate



Tutorial for the online calculation tool

Water-heater package

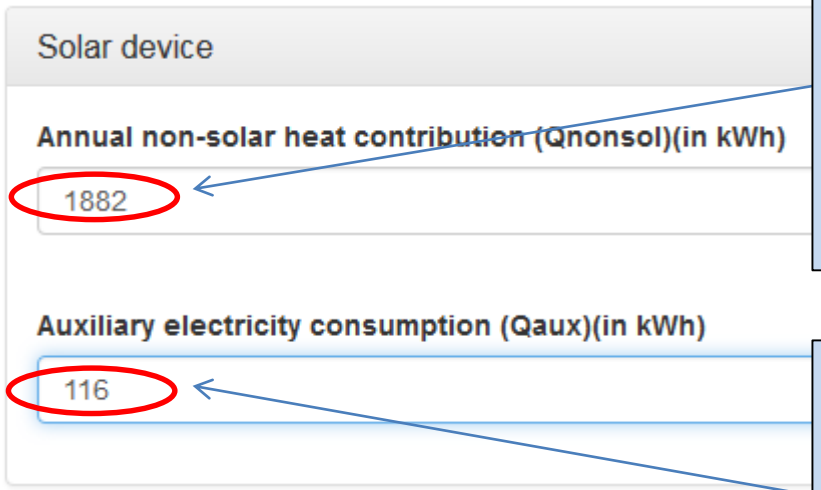
First step: water heater specifications



Tutorial for the online calculation tool

Water-heater package

Second step: solar device specifications



This value is the annual non-solar (i.e. electricity or/and fuel) heat contribution. This value has to be calculated independently, i.e. with the SOLCAL method (which use collector and heat storage data to determine this value)

This value (expressed in final energy) correspond to the electricity consumed by the pump and the standby mode of the water heater. This value value is also calculated with the SOLCAL methodology.

For SOLCAL methodology, please refer to your manufacturer, supplier or dealer to help you on this. Or download the tool developped by vAConsult

Tutorial for the online calculation tool

Water-heater package

Third step: heat storage tank or not?

Indicate if a storage tank is part of the heater

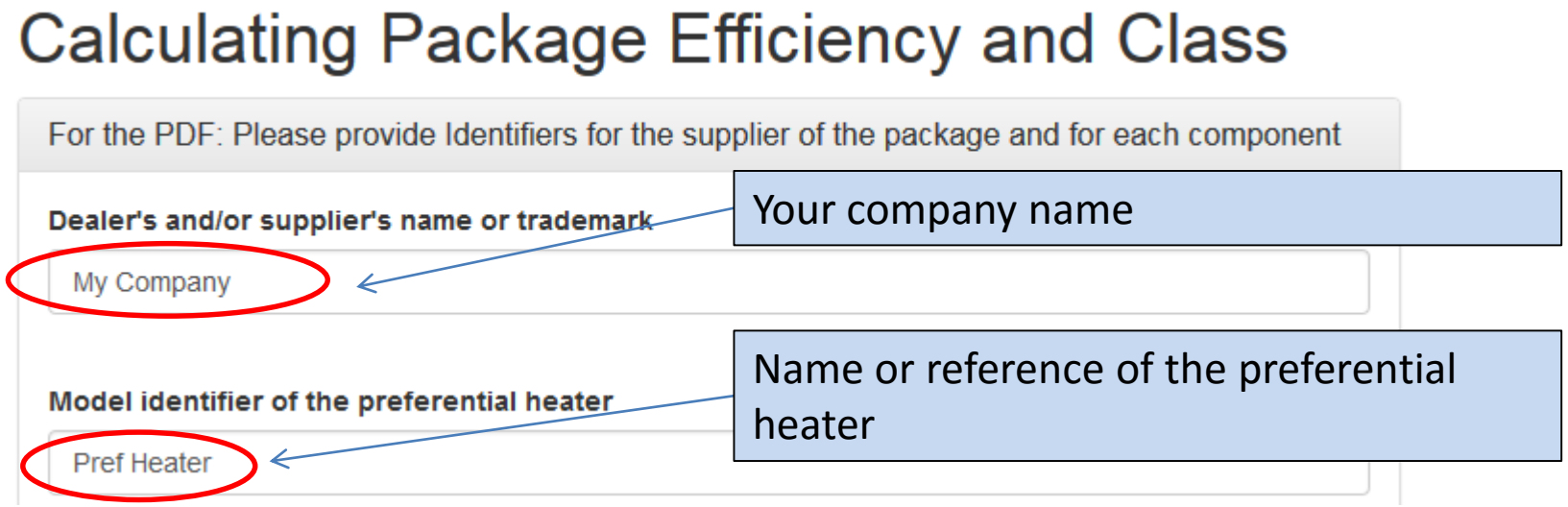
« Calculate » allows to have a preview of the label and the possibility to modify the data previously entered.

« PDF » leads to a new page, where you will have to enter data about the water heater package and the supplier.

Tutorial for the online calculation tool

Water-heater package

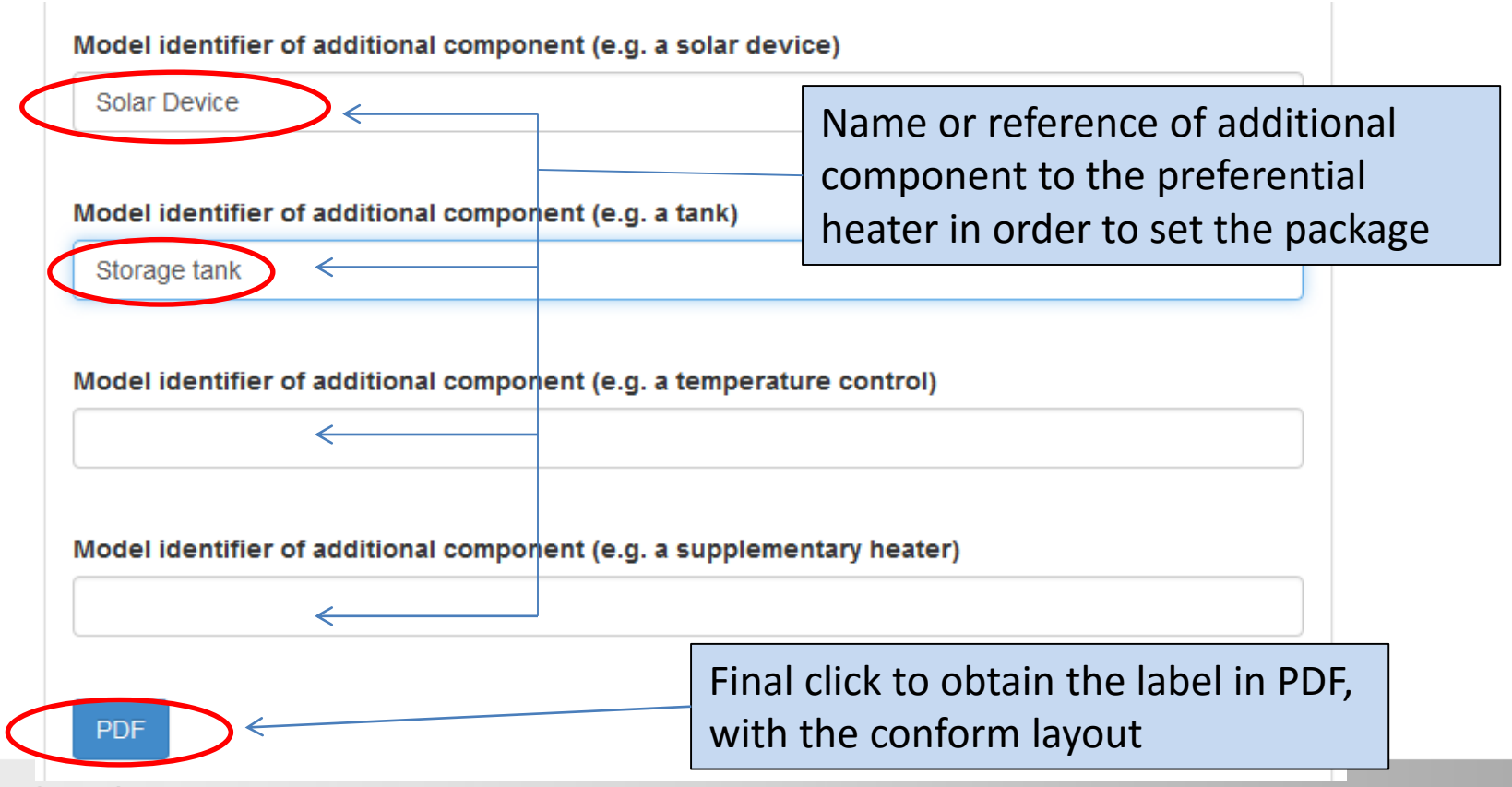
Fourth step: Preparing the label in PDF 1/2



Tutorial for the online calculation tool

Water-heater package

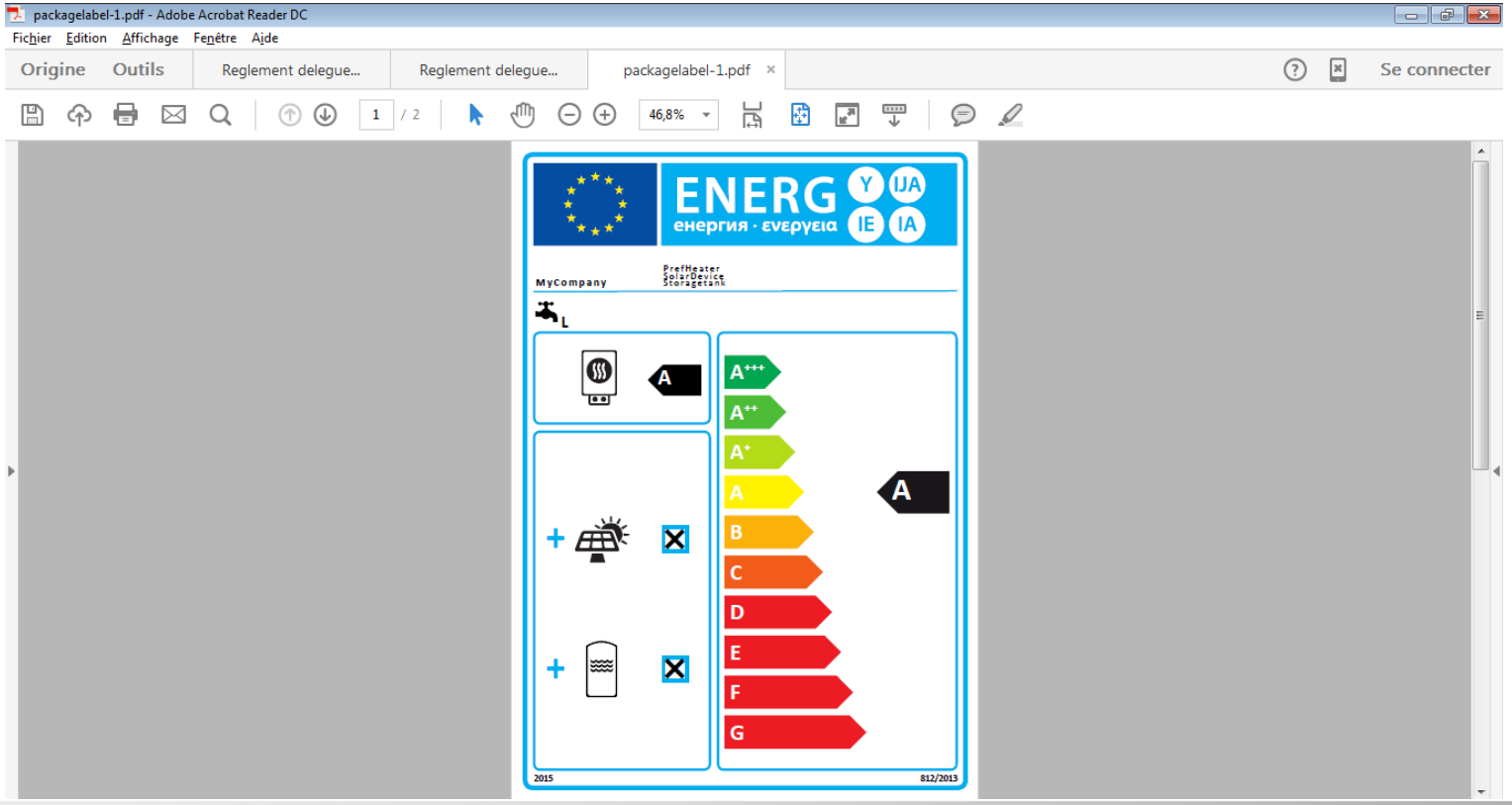
Fourth step: Preparing the label in PDF 2/2



Tutorial for the online calculation tool

Water-heater package

Final step: Opening and saving the energy label in PDF



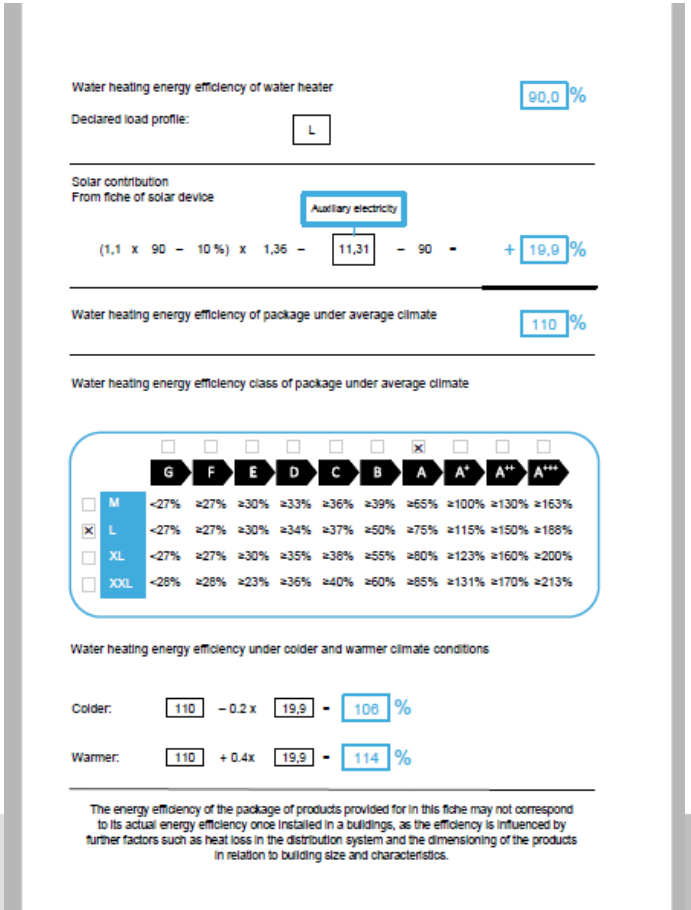
Tutorial for the online calculation tool

Water heater package

Final step: Opening and saving the energy label in PDF

Please note that the PDF contains 2 pages:

- **Energy efficiency label**
- **Package fiche for water heating system**



Water heating energy efficiency of water heater 90,0 %

Declared load profile: L

Solar contribution
From fiche of solar device

Auxiliary electricity

(1,1 x 90 – 10 %) x 1,36 – 11,31 – 90 = + 19,9 %

Water heating energy efficiency of package under average climate 110 %

Water heating energy efficiency class of package under average climate

	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%	≥23%	≥36%	≥40%	≥60%	≥85%	≥131%	≥170%	≥213%

Water heating energy efficiency under colder and warmer climate conditions

Colder: 110 – 0.2 x 19,9 = 106 %

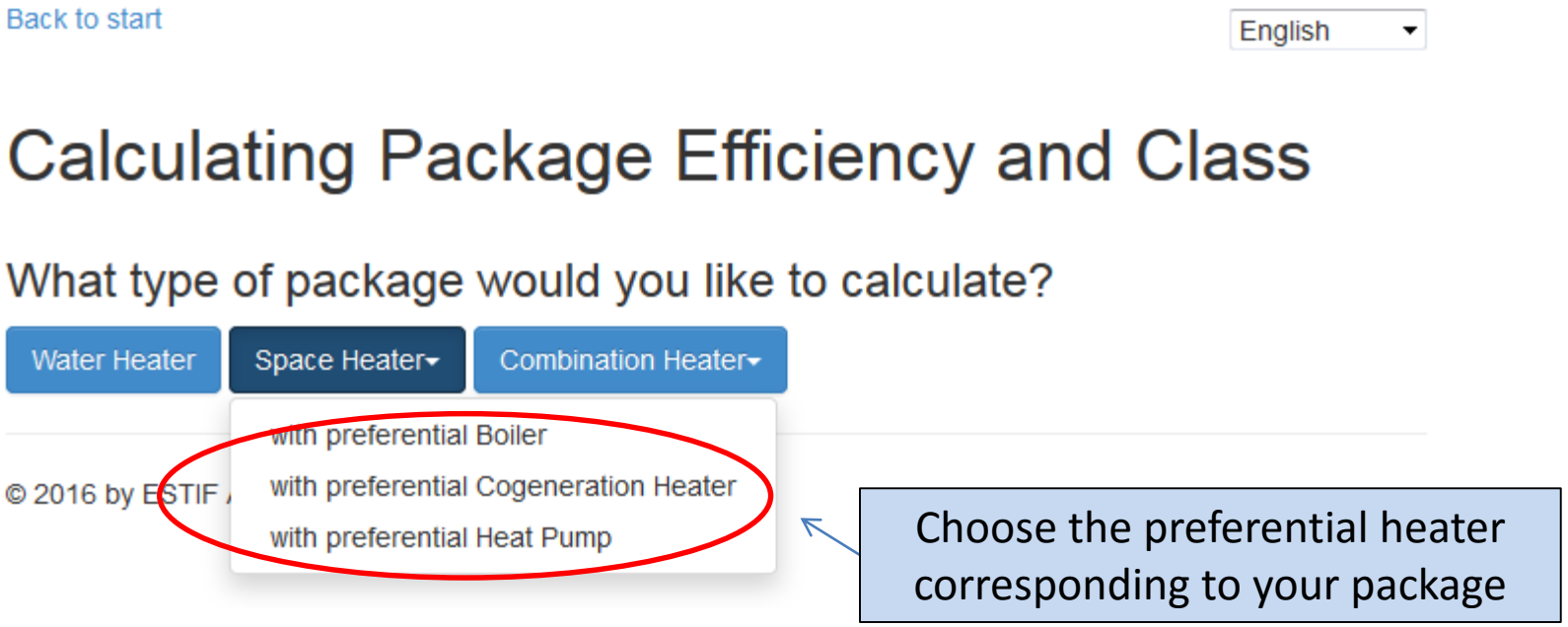
Warmer: 110 + 0.4x 19,9 = 114 %

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 buildings, as the efficiency is influenced by further factors such as heat loss in the distribution system and the dimensioning of the products in relation to building size and characteristics.

Tutorial for the online calculation tool

Space heater package

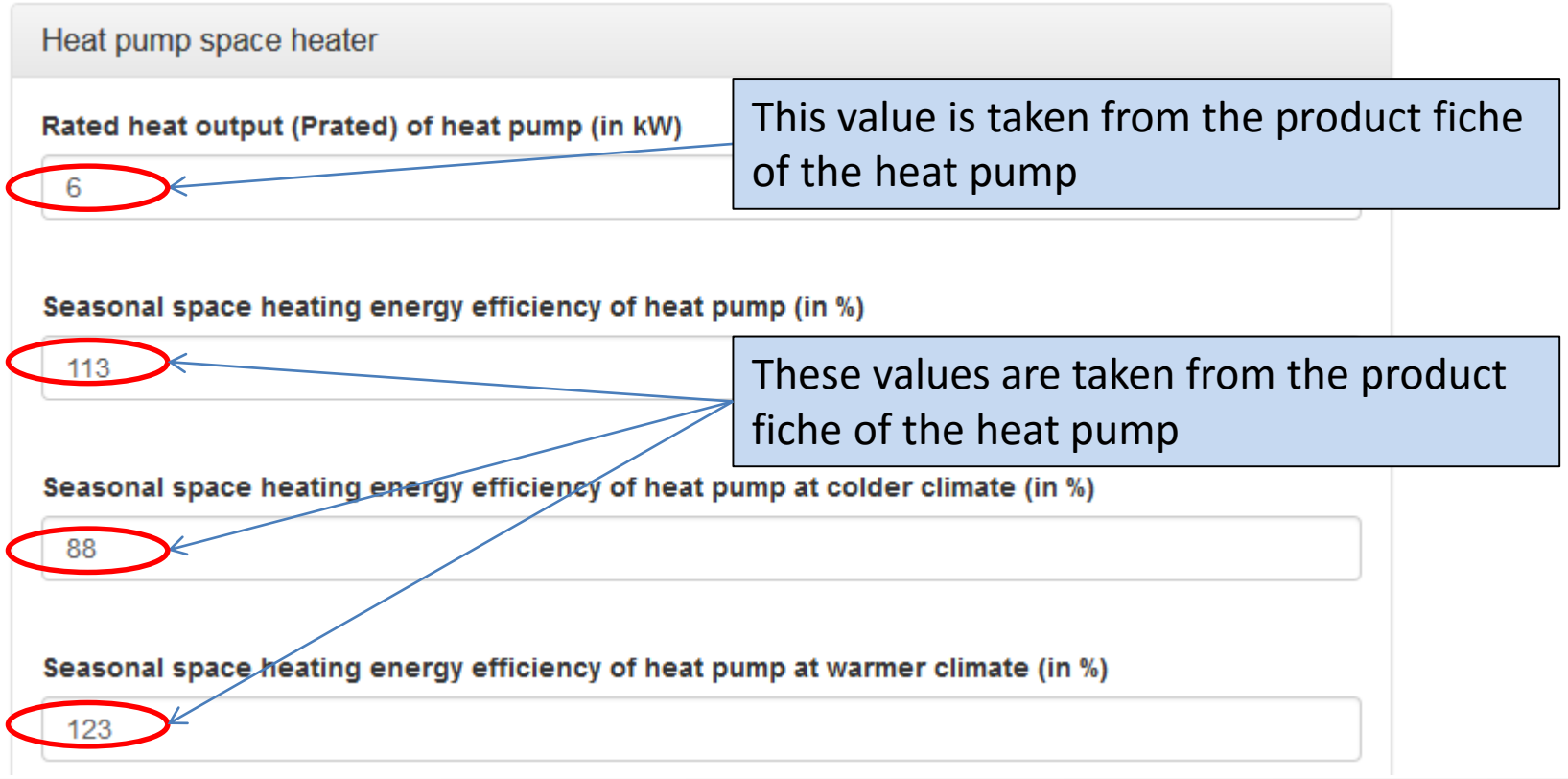
First step: preferential heater choice



Tutorial for the online calculation tool

Space heater package, i.e. with preferential Heat pump

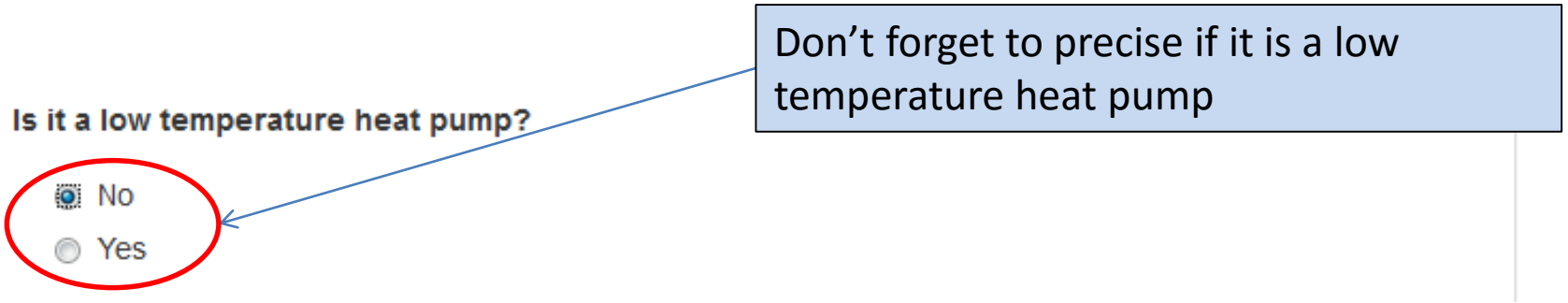
Second step: heat pump specifications for space heating 1/2



Tutorial for the online calculation tool

Space heater package, i.e. with preferential Heat pump

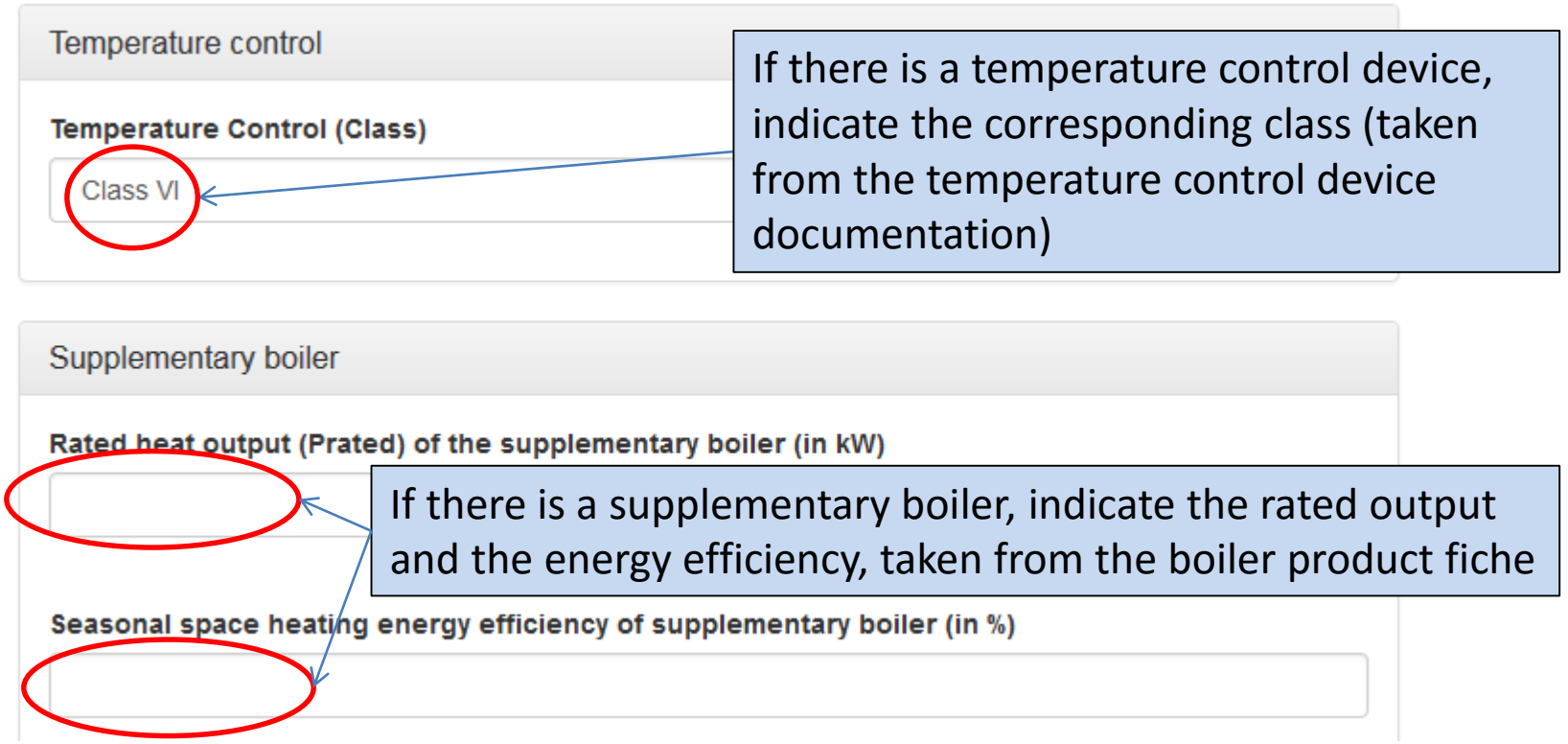
Second step: heat pump specifications for space heating 2/2



Tutorial for the online calculation tool

Space heater package, i.e. with preferential Heat pump

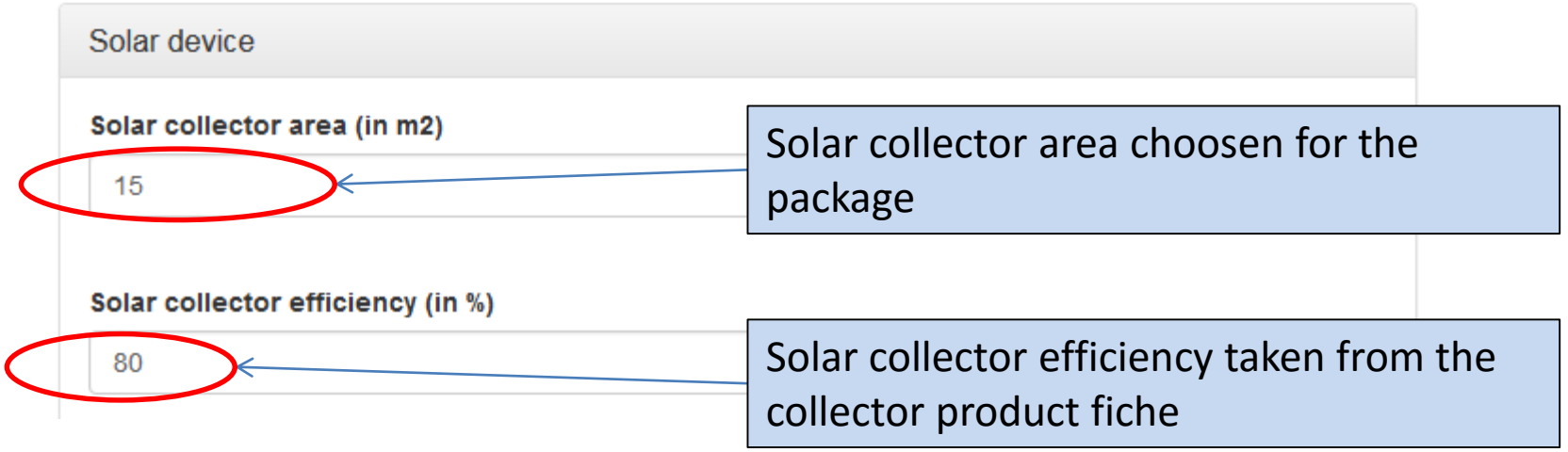
Third step: Temperature control device and supplementary boiler?



Tutorial for the online calculation tool

Space heater package, i.e. with preferential Heat pump

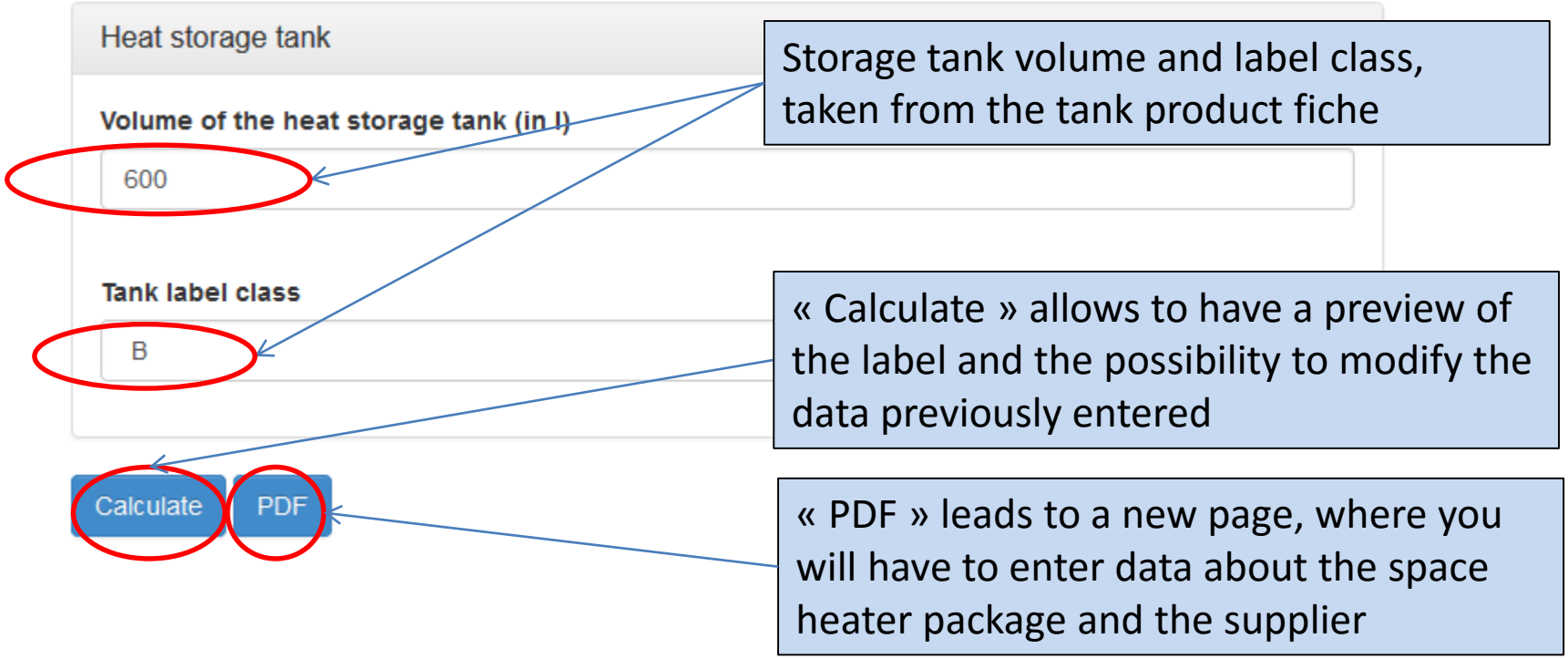
Fourth step: solar device specifications



Tutorial for the online calculation tool

Space heater package, i.e. with preferential Heat pump

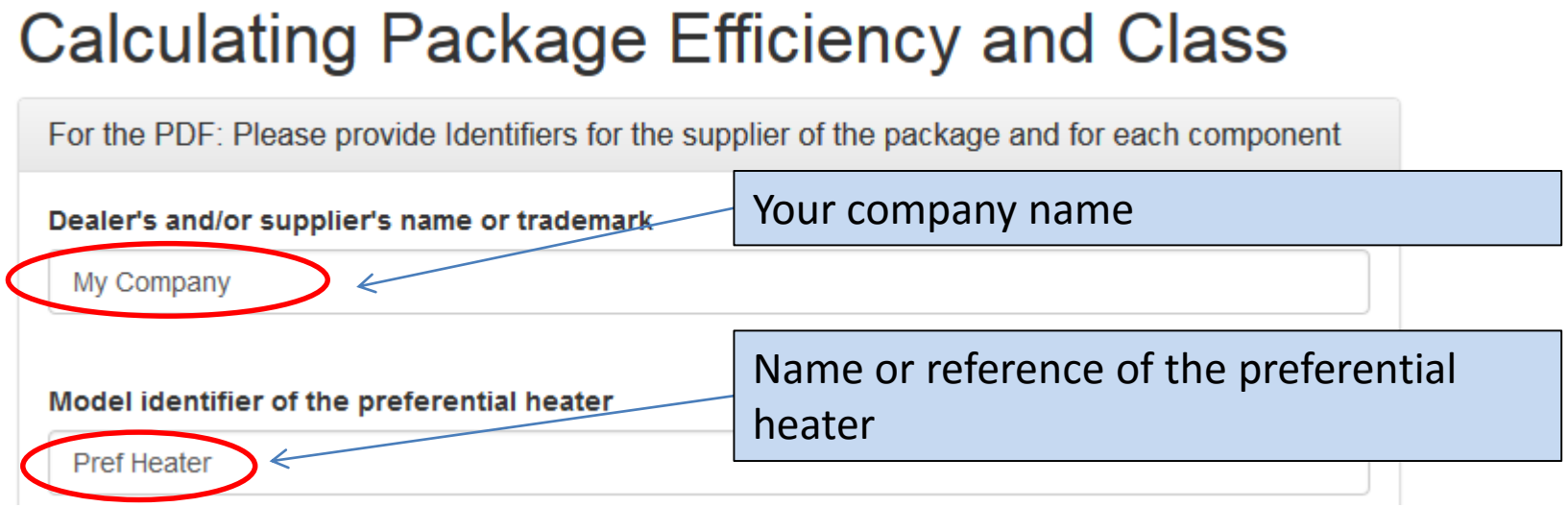
Fifth step: storage tank specifications



Tutorial for the online calculation tool

Space heater package, i.e. with preferential Heat pump

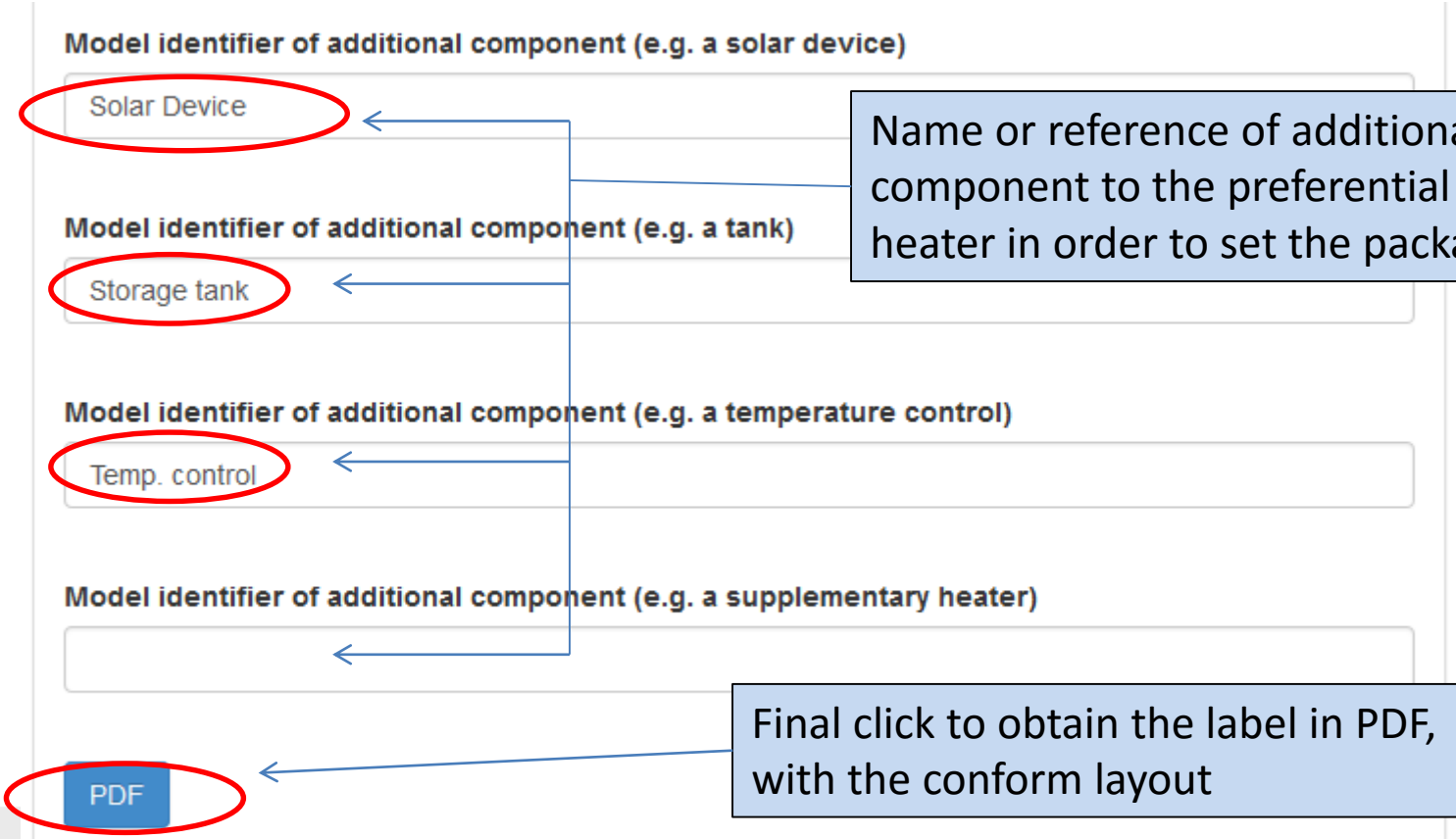
Sixth step: Preparing the label in PDF 1/2



Tutorial for the online calculation tool

Space heater package, i.e. with preferential Heat pump

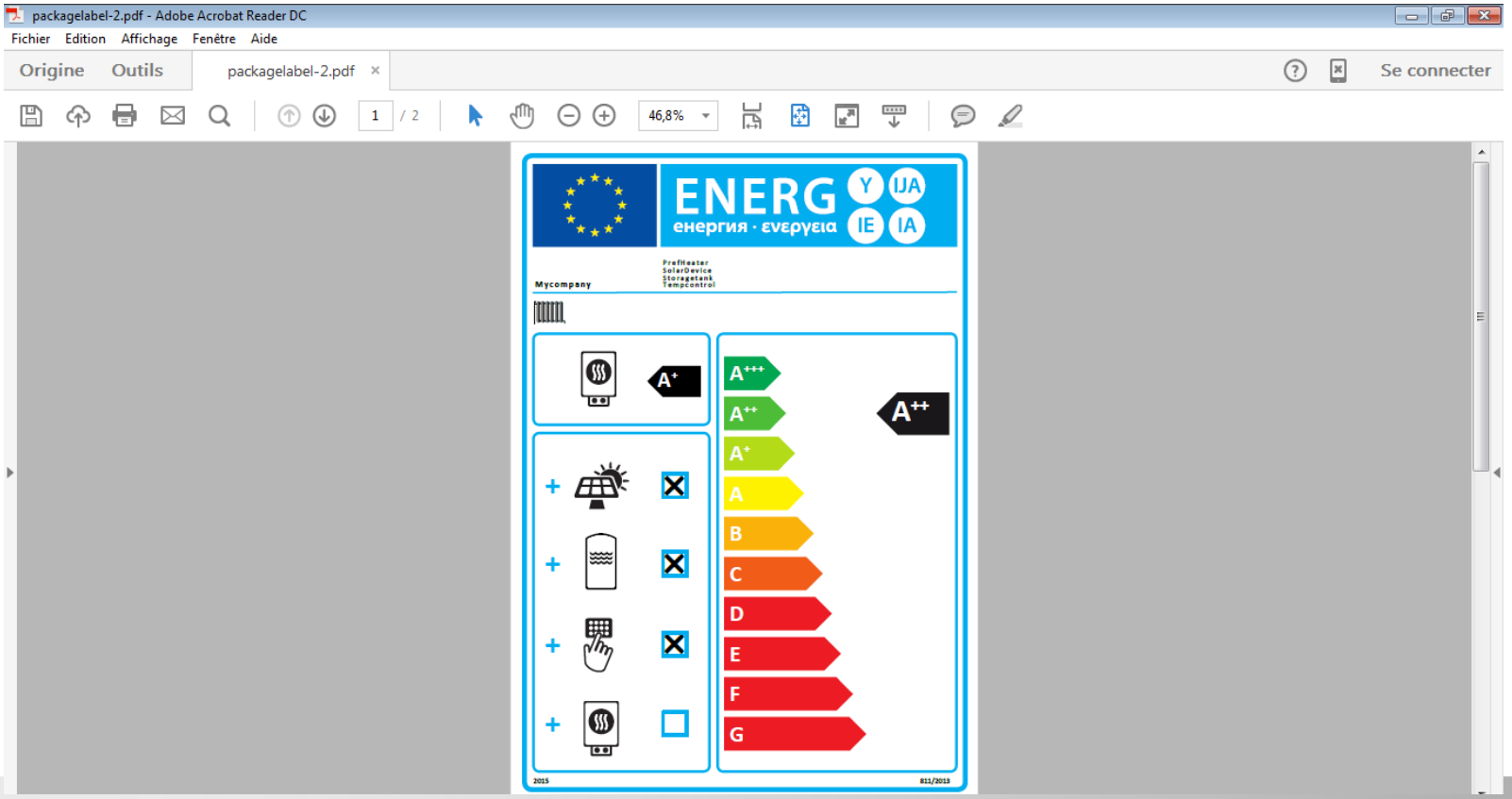
Sixth step: Preparing the label in PDF 2/2



Tutorial for the online calculation tool

Space heater package, i.e. with preferential Heat pump

Final step: Opening and saving the energy label in PDF



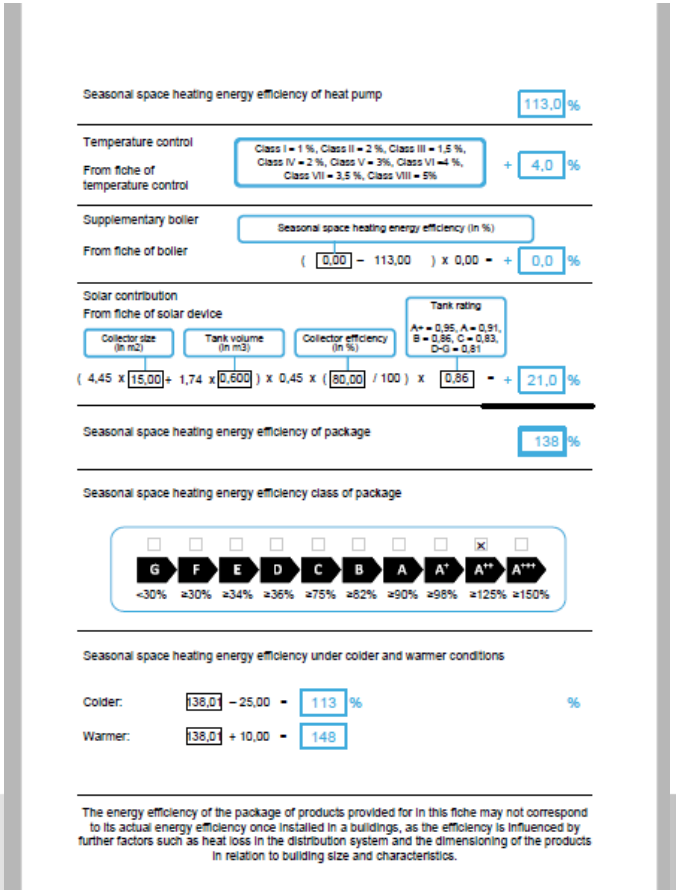
Tutorial for the online calculation tool

Space heater package, i.e. with preferential Heat pump

Final step: Opening and saving the energy label in PDF

Please note that the PDF contains 2 pages:

- **Energy efficiency label**
- **Package fiche for space heating system**



Seasonal space heating energy efficiency of heat pump 113,0 %

Temperature control
From fiche of temperature control
Class I = 1 %, Class II = 2 %, Class III = 1,5 %, Class IV = 2 %, Class V = 3%, Class VI =4 %, Class VII = 3,5 %, Class VIII = 5% + 4,0 %

Supplementary boiler
From fiche of boiler
Seasonal space heating energy efficiency (in %)
(0,00 – 113,00) x 0,00 = + 0,0 %

Solar contribution
From fiche of solar device
Collector size (in m2) | Tank volume (in m3) | Collector efficiency (in %) | Tank rating A+ = 0,95, A = 0,91, B = 0,86, C = 0,83, D-G = 0,81
(4,45 x 15,00 + 1,74 x 0,600) x 0,45 x (80,00 / 100) x 0,86 = + 21,0 %

Seasonal space heating energy efficiency of package 138 %

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 conditions

Colder: 138,0 – 25,00 = 113 %
Warmer: 138,0 + 10,00 = 148

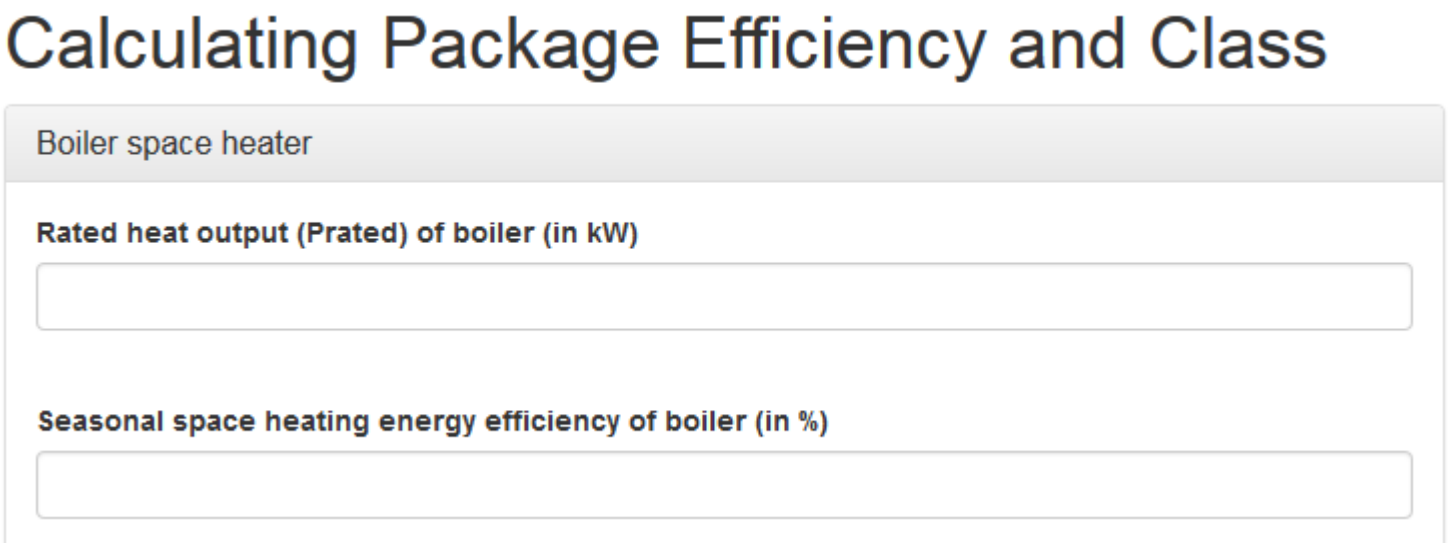
The energy efficiency of the package of products provided for in this fiche may not correspond to its actual energy efficiency once installed in a buildings, as the efficiency is influenced by further factors such as heat loss in the distribution system and the dimensioning of the products in relation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

Tutorial for the online calculation tool

Space heater package, with preferential Boiler

Same steps are required. Only the data asked for preferential heater will be different.

It has to be taken from the boiler product fiche.

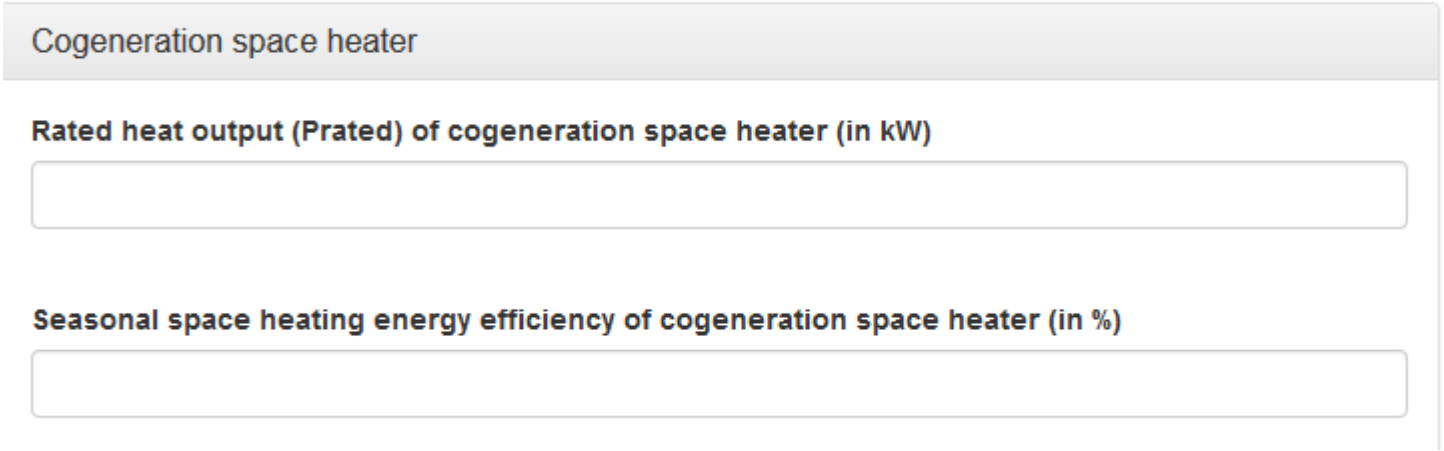


Tutorial for the online calculation tool

Space heater package, with preferential Cogeneration heater

Same steps are required. Only the data asked for preferential heater will be different.

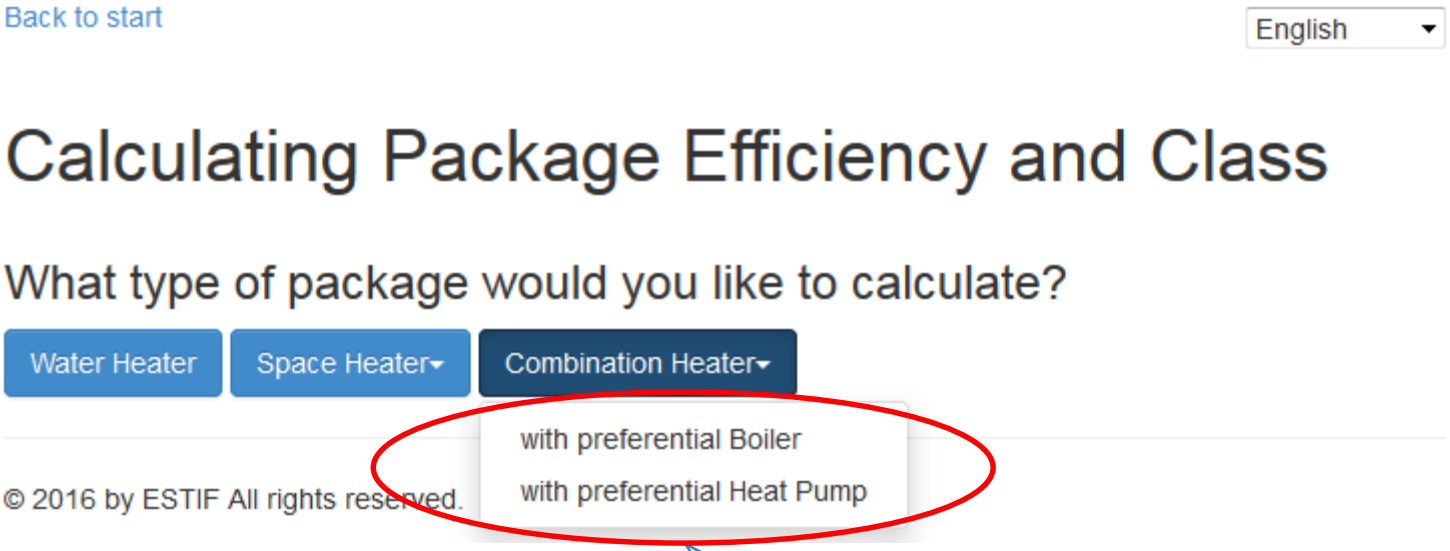
It has to be taken from the cogeneration heater product fiche.



Tutorial for the online calculation tool

Combination heater package

First step: preferential heater choice.

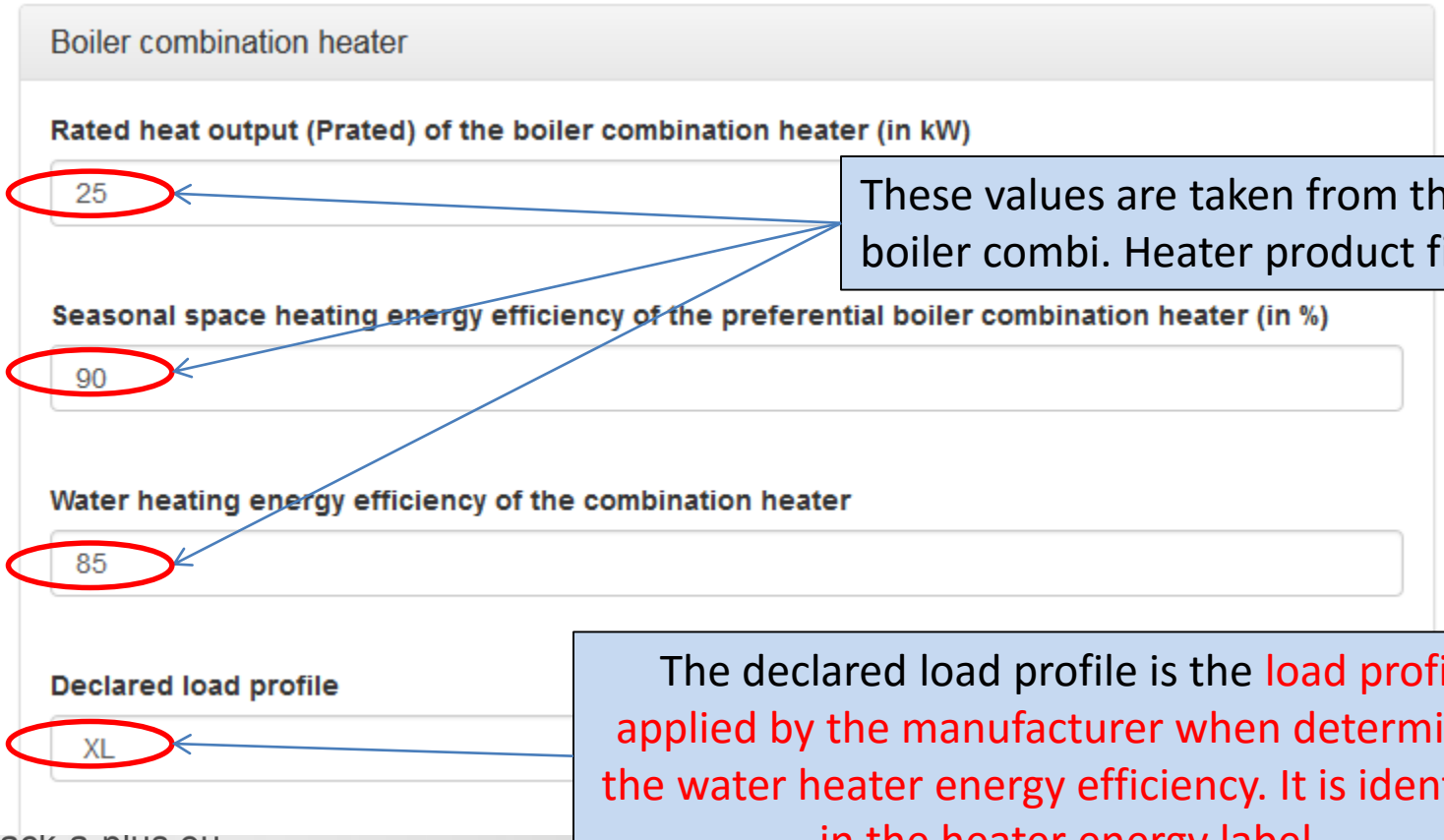


Choose the preferential heater corresponding to your package

Tutorial for the online calculation tool

Combination heater package, i.e. with preferential Boiler

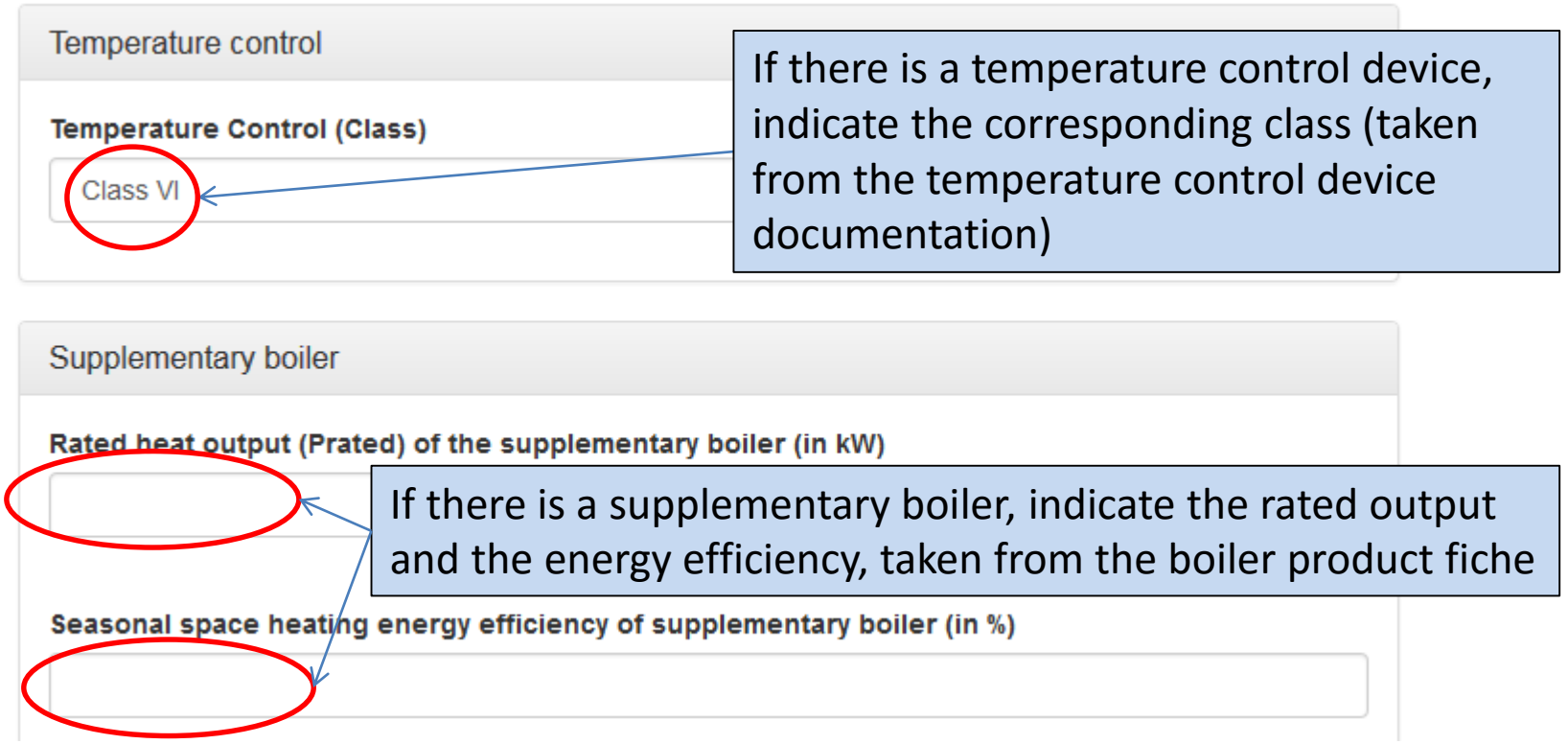
Second step: boiler specifications for space and water heating



Tutorial for the online calculation tool

Combination heater package, i.e. with preferential Boiler

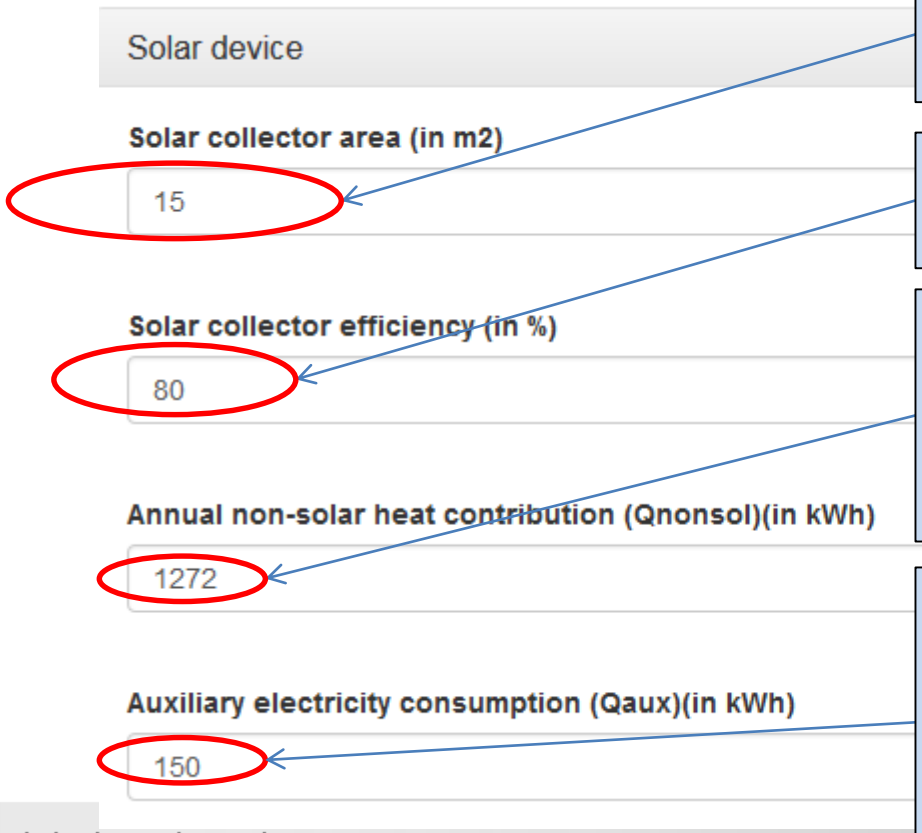
Third step: Temperature control device and supplementary boiler?



Tutorial for the online calculation tool

Combination heater package, i.e. with preferential Boiler

Fourth step: solar device spececifications



Solar collector area choosen for the package

Solar collector efficiency taken from the collector product fiche

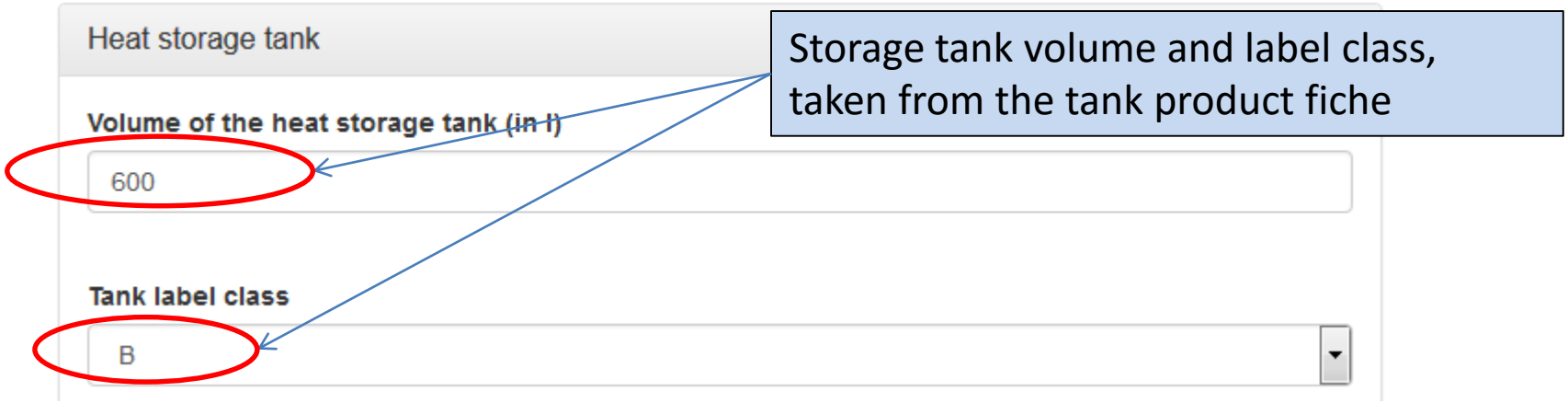
This value has to be calculated independently, i.e. with the SOLCAL method (which uses collector and heat storage data to determine this value)

This value (expressed in final energy) correspond to the electricity consumed by the pump and the standby. This value is is also calculated in the SOLCAL method (refer to your supplier or vAConsult).

Tutorial for the online calculation tool

Combination heater package, i.e. with preferential Boiler

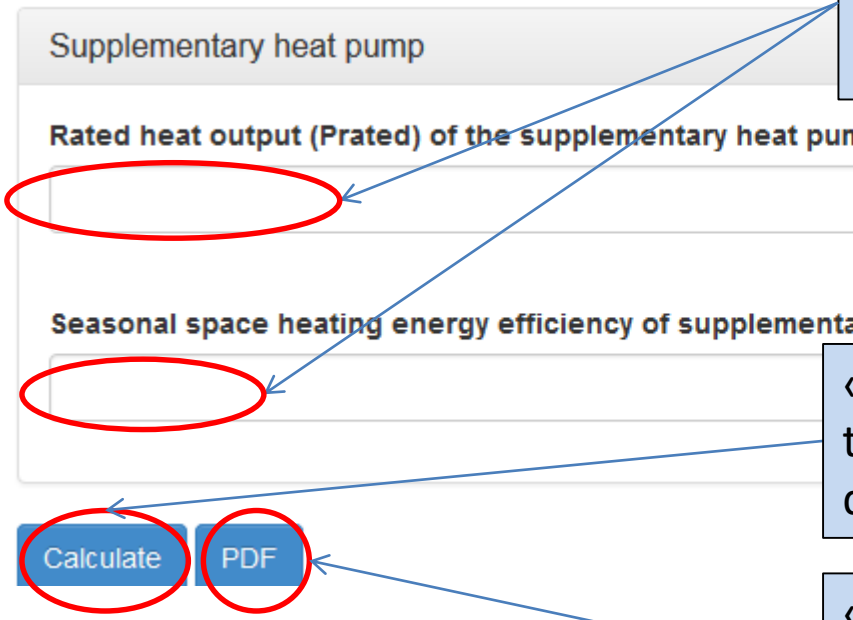
Fifth step: storage tank specifications



Tutorial for the online calculation tool

Combination heater package, i.e. with preferential Boiler

Sixth step: supplementary heat pump?



If applicable, specification of the supplementary heat pump, taken from the product fiche

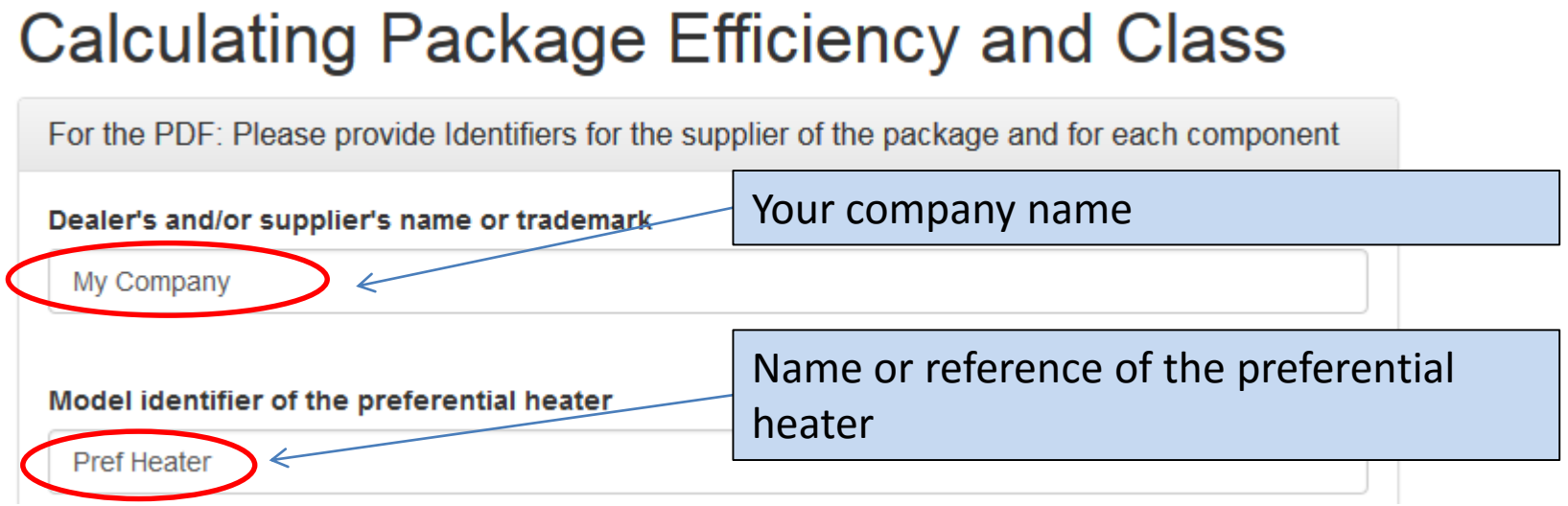
« Calculate » allows to have a preview of the label and the possibility to modify the data previously entered.

« PDF » leads to a new page, where you will have to enter data about the combi heater package and the supplier.

Tutorial for the online calculation tool

Combination heater package, i.e. with preferential Boiler

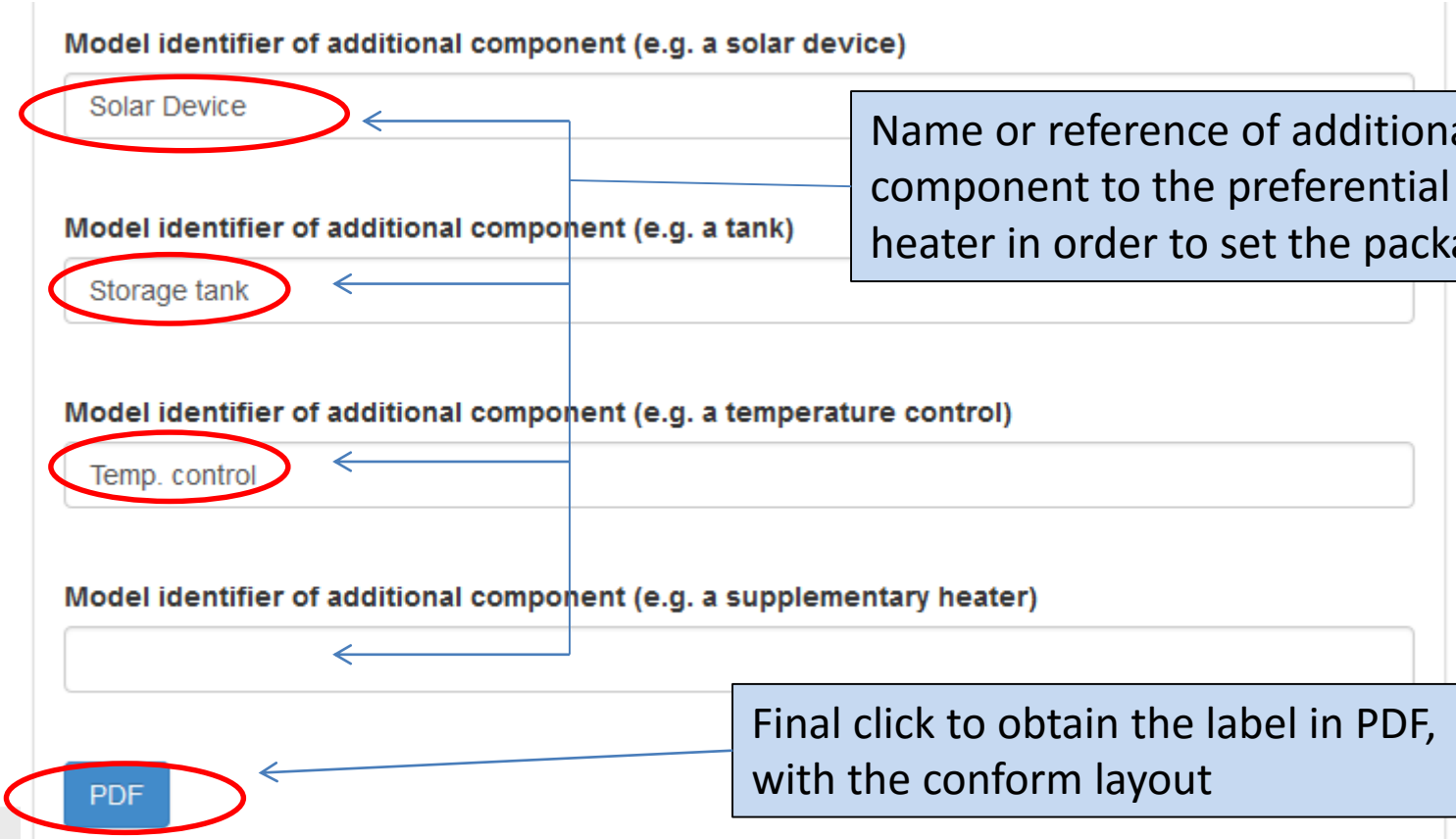
Seventh step: Preparing the label in PDF 1/2



Tutorial for the online calculation tool

Combination heater package, i.e. with preferential Boiler

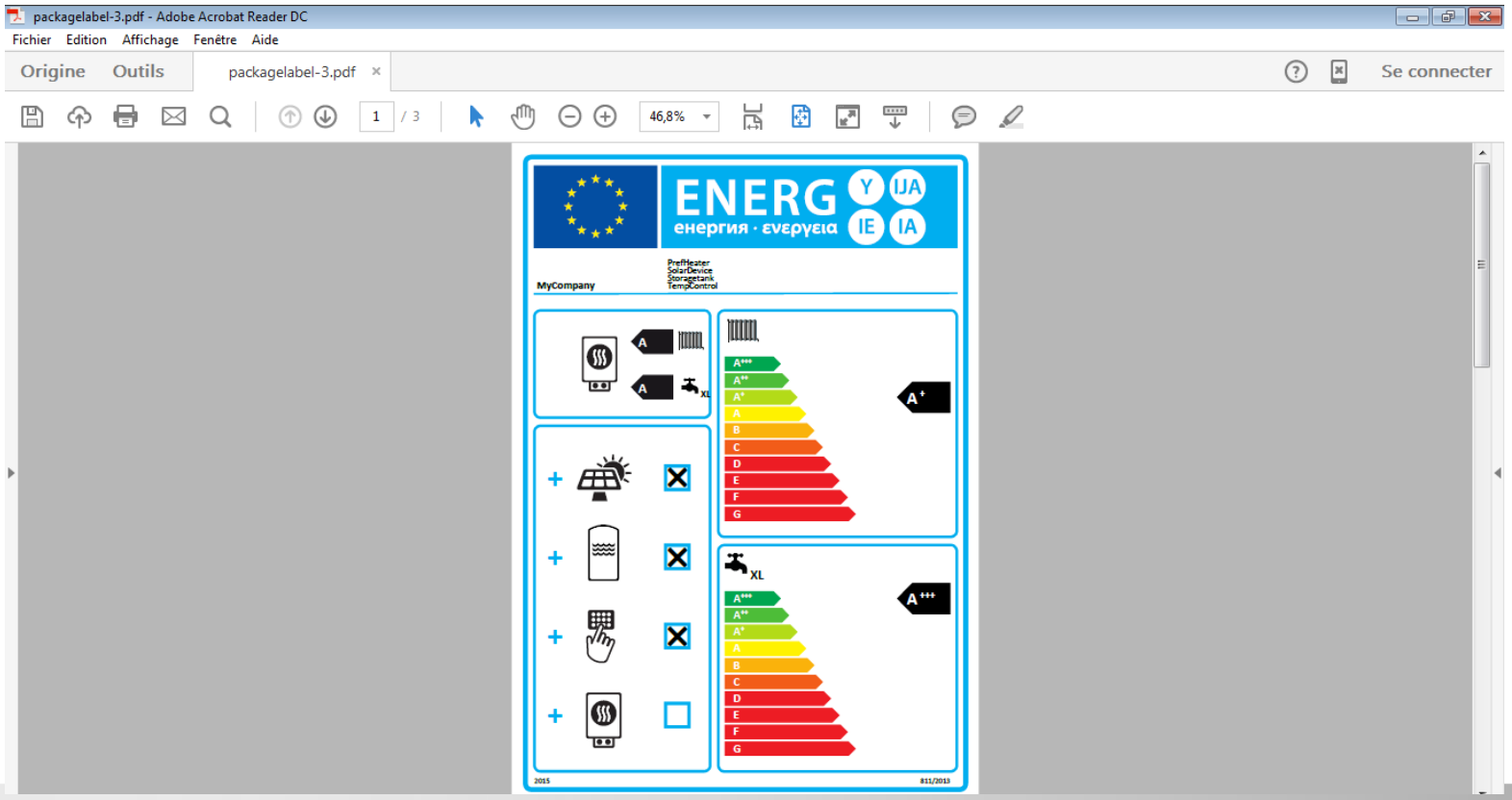
Seventh step: Preparing the label in PDF 2/2



Tutorial for the online calculation tool

Combination heater package, i.e. with preferential Boiler

Final step: Opening and saving the energy label in PDF



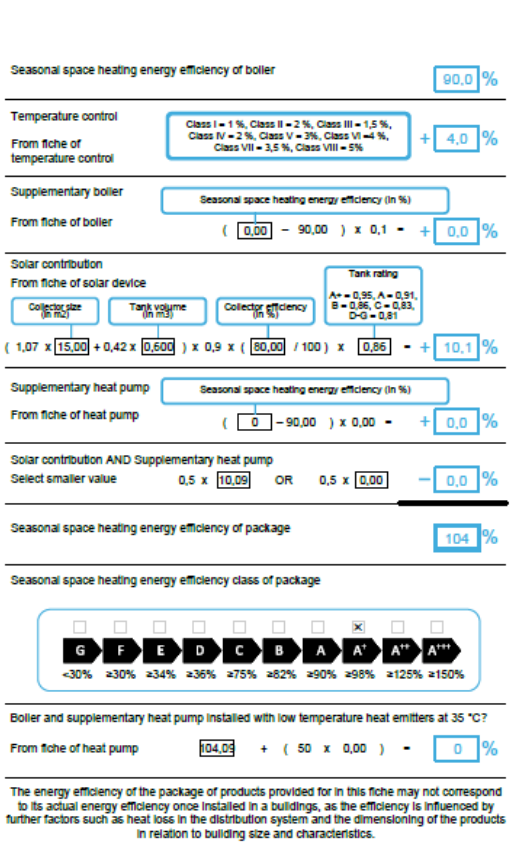
Tutorial for the online calculation tool

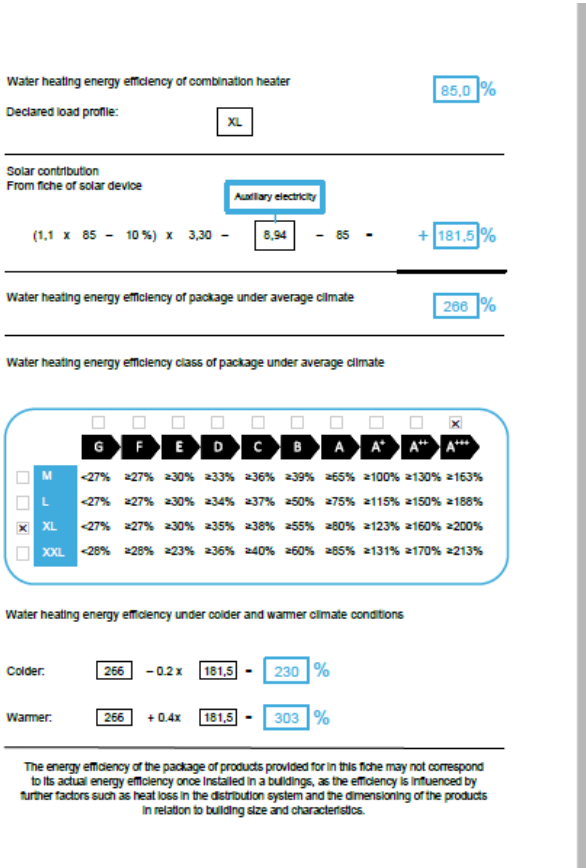
Combination heater package, i.e. with preferential Boiler

Final step: Opening and saving the energy label in PDF

Please note that the PDF contains 3 pages:

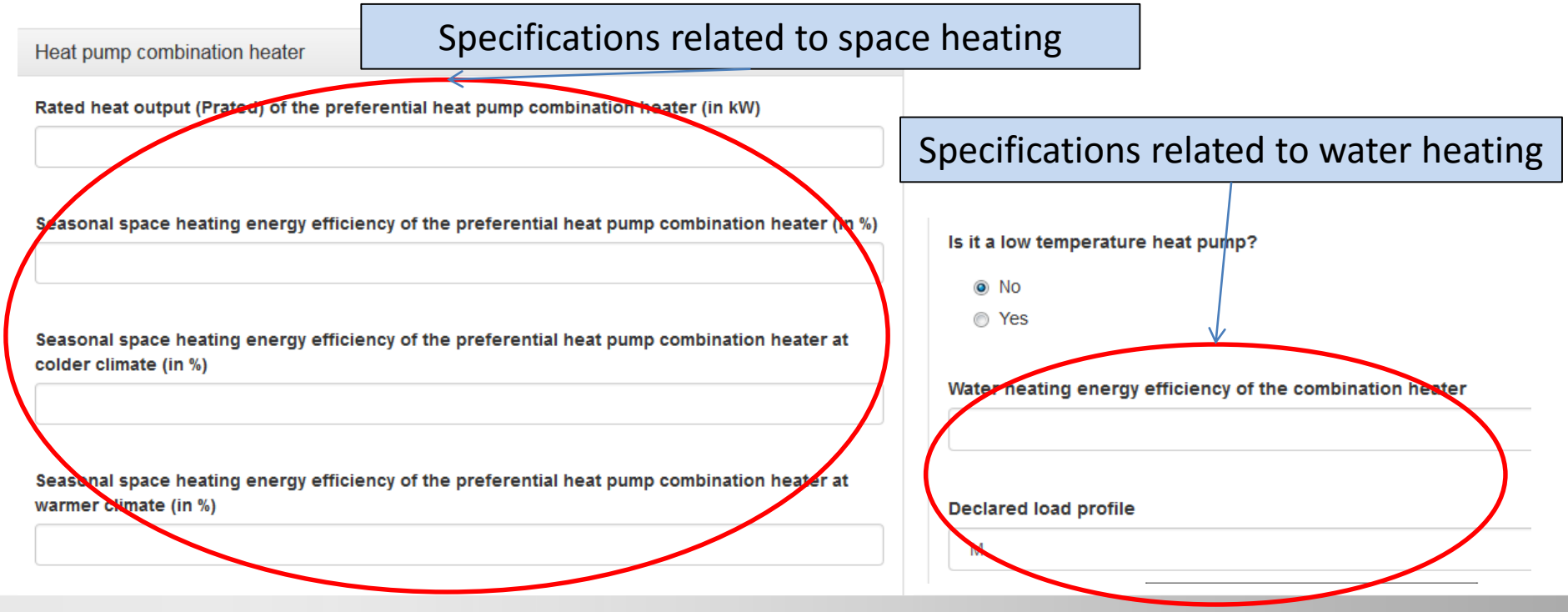
- **Energy efficiency label**
- **Package fiche for space heating**
- **Package fiche for water heating**





Tutorial for the online calculation tool

Combination heater package, with preferential Heat pump

Same steps are required. Only the data asked for preferential heater will be different.

It has to be taken from the heat pump product fiche.