

# SYRIUS

Comfort by nature



## INSTALLATIONS INSTRUCTIONS

### TS 304 ECO & INOX - THERMOSYPHON SOLAR WATER HEATER



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# CHARACTERISTICS

Thank you for choosing our thermosyphon water heater. This system is a high-quality product based on the transmission of solar energy through an absorber with an ultra-selective surface. The robustness of the system is ensured by the tempered safety glass, the internal enamelled treatment of the hot water tank and the Magnelis® steel of the structures.

System	TS-304ECO	TS-304INOX
Certificate number OG300	30004356	
Type of system	Thermosyphon, direct circulation, without heat exchanger	
Net volume	279 l (61.37 gal)	
Solar circuit volume	19 l (4.18 gal)	
System weight empty	166 kg (365.97 lb)	137 kg (302.03 lb)
System weight filled	445 kg (981.06 lb)	416 kg (917.12 lb)
Collectors	2x C2000 D12c	
Certificate number OG100	10002117	
Type	Flat collector	
Gross surface area	4.10 m <sup>2</sup>	
Absorber type	Aluminium sheet absorber at Arpa 8 : Ø12 mm pipes and two Ø22 mm pipes	
Absorber coating	Mirotherm highly selective coating with welded copper tubes	
Dimensions	2033 x 2076 x 98 mm	
Weight	62 kg (136.69 lb)	
Volume of liquid	4.26 l (0.94 gal)	
Transparent cover	Tempered glass, 3.2mm, transmission 91%.	
Stagnation temperature	204°C	
Storage tank	BHE300	BHX300
Material	steel enamel / stainless steel 316L	
Dimensions	2010 mm, Ø 550 mm	
Weight empty	84 kg (185.19 lb)	55 kg (121.25 lb)
Heat transfer	Direct circuit, without exchanger	
Solar circuit fluid	10 l (2.2 gal)	
Insulation	50mm PU	
Maximum pressure	10 bar (145 psi)	
Corrosion protection	Enamel coated magnesium anod	316 stainless steel L
Water inlet	¾" M	
Hot water outlet	¾" M	
Hydraulic kit		
Solar circuit fluid	Water	
Pipe	Copper pipe, Ø 18mm	
Pipe insulation	20 mm thick synthetic rubber with outer protective sleeve (factory fitted)	
Pipe weight	1.8 kg (3.97 lb)	
Maximum pressure	10 bar (145 psi)	
Structure		
Material	Magnelis® steel	
Weight	20 kg (44.1 lb)	
Allowable load	Maximum snow load (pressure) 3 kN/m <sup>2</sup> (0.61 psf)	

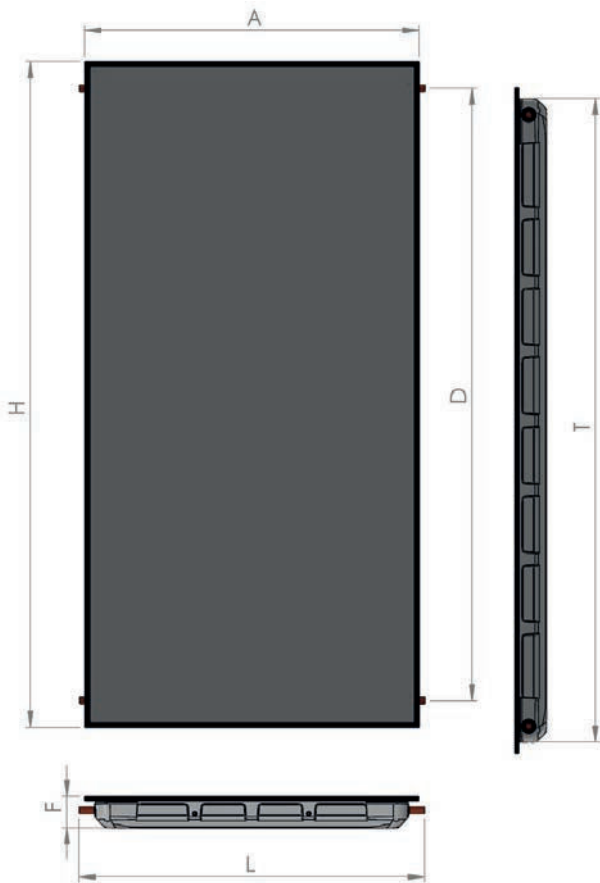


# CODING

N°	Description	Manufacturer	TS-304ECO	TS-304INOX
1	Enamelled steel storage tank BHE300	Syrius Solar Industry	1	
2	Stainless steel storage tank BHX300	Syrius Solar Industry		1
3	Flat plate solar collector C2000 D12c	Syrius Solar Industry	2	2
4	Structure -STO TS	Syrius Solar Industry		
4.1	Right TS collector support		1	1
4.2	Left TS Collector support		1	1
4.3	TS 304 collector crosspiece		2	2
4.5	TS 304 storage tank crosspiece		2	2
4.7	Base right TS		1	1
4.8	TS left base		1	1
4.9	Rear leg TS		2	2
4.10	Reinforcement TS		2	2
4.11	TS Cross brace		2	2
5	Structure, Screws	DP Stainless steel		
5.1	Hexagon socket head cap screw M8x16		24	24
5.2	Nut M8		8	8
5.3	Flat washer M8		24	24
5.4	Lock washer M8		8	8
5.5	Anchor bolt M8		6	6
6	Hydraulic circuit			
6.1	Hydraulic flow inlet pipe	Syrius Solar Industry	1	
6.2	Hydraulic return pipe (with insulation)	Syrius Solar Industry	1	
6.3	Brass Compression Elbow 22x18	Comisa SPA	2	
6.4	Brass compression elbow F $\frac{3}{4}$ "x18	Comisa SPA	2	
6.5	Brass Compression Fitting Straight 22x18	Comisa SPA		
6.6	Brass compression fitting straight 22x22	Comisa SPA	2	
6.7	Brass compression plug 22	Comisa SPA	2	
6.8	Brass nut 18x $\frac{3}{4}$ "x18	Comisa SPA	2	
6.9	$\frac{3}{4}$ " HT fibre gasket	Coditherm	4	
6.10	Safety group Mod. 889	Comap	1	
7	Optional extras			
7.1	Thermostatic mixing valve Mod. 605S	Comap	1	1
7.2	Pressure reducing valve Mod. R533	Thermador	1	1
7.3	Electric heater DN34-1800W (230V)	Beaumont	1	1
7.4	Anti-freeze valve Mod.871020	Potermic	1	1
7.5	Vacuum prevention valve Mod. 795	VYC	1	1

# SYSTEM COMPONENTS AND DIMENSIONS

## SOLAR COLLECTOR

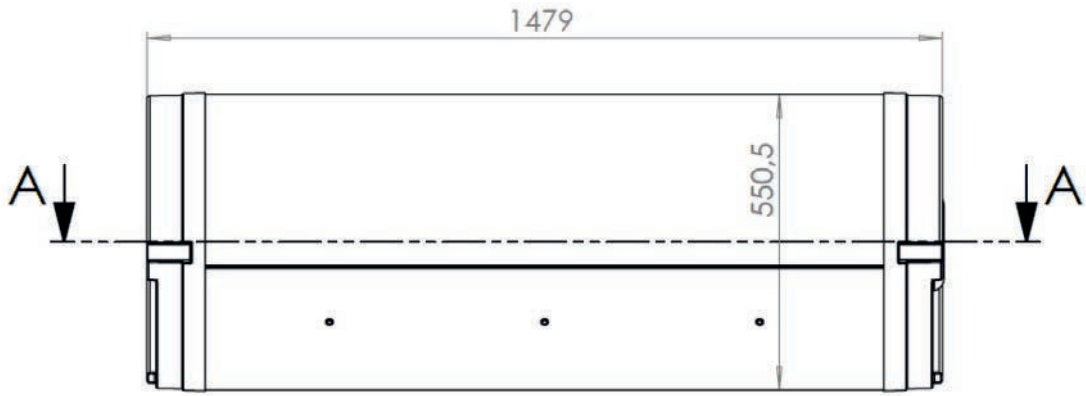


Model	C2000D12c
Case Dimensions (mm)	
Height (H)	2033
Width (A)	1015
Depth (F)	102
Rear height (T)	
Absorber dimensions (mm)	
Collector pipe length (L)	1060
Collector pipe distance (D)	1880
Reference surfaces (m2)	
Gross surface	2.03
Net surface	1.81
Other dimensions	
Total weight (kg)	31
Liquid volume (litres)	2.13
Connections (mm)	4 outlets Ø 22
Insulation thickness (mm)	40

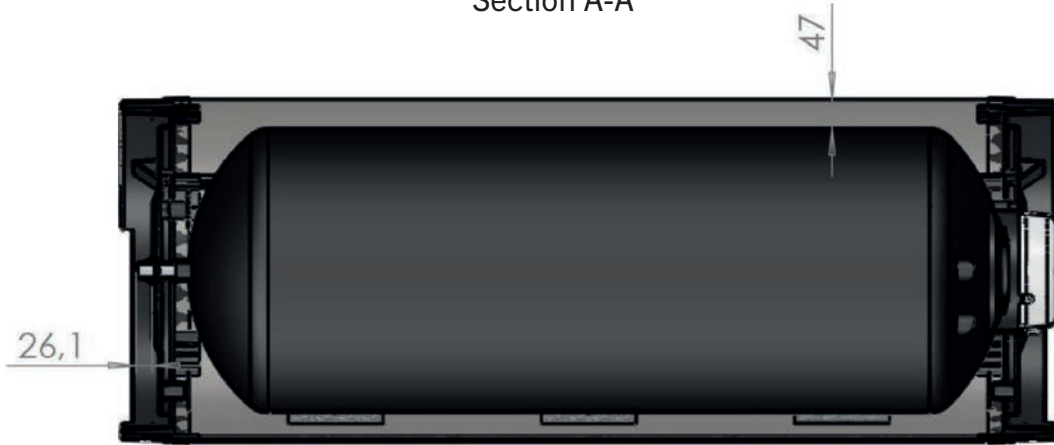


THERMAL PERFORMANCE COEFFICIENTS (2013, Tm)						
ISO Efficiency Equation : [Note : Based on gross area and P = Tm - Ta -In accordance with ISO 9806-2013]						
Second Order Thermal Efficiency Equation <sup>1</sup>			Linearized Thermal Efficiency Equation <sup>1</sup>			
SI UNITS	n <sub>0,hem</sub> = 0.6205 - 3.3064 (P/G) -0.00775 (P <sup>2</sup> /G) [W/m <sup>2</sup> -°C]		Y Intercept:	0.6276	Slope:	-3.9116
IP UNITS	n <sub>0,hem</sub> = 0.6205 - 0.5823 (P/G) -0.00076 (P <sup>2</sup> /G) [Btu/hr-ft <sup>2</sup> -°F]		Y Intercept:	0.6276	Slope:	-0.6689
<p>1 : Second order thermal efficiency equation provided in accordance with ISO 9806-2013. The non-linear, second order efficiency equation should be considered to be a more accurate representation of the measured collector performance test results than the linear version. The linearized efficiency equation is provided for use with incentive programs, regulations and software that require the "slope" and "intercept" terms to describe collector performance.</p>						

# STORAGE TANK



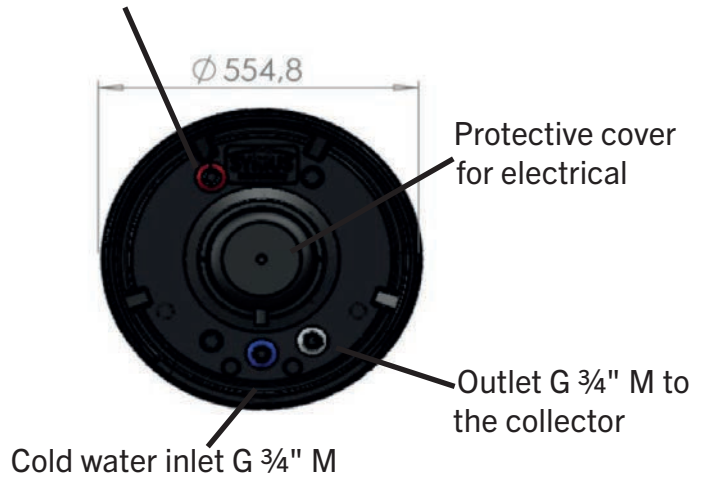
Section A-A



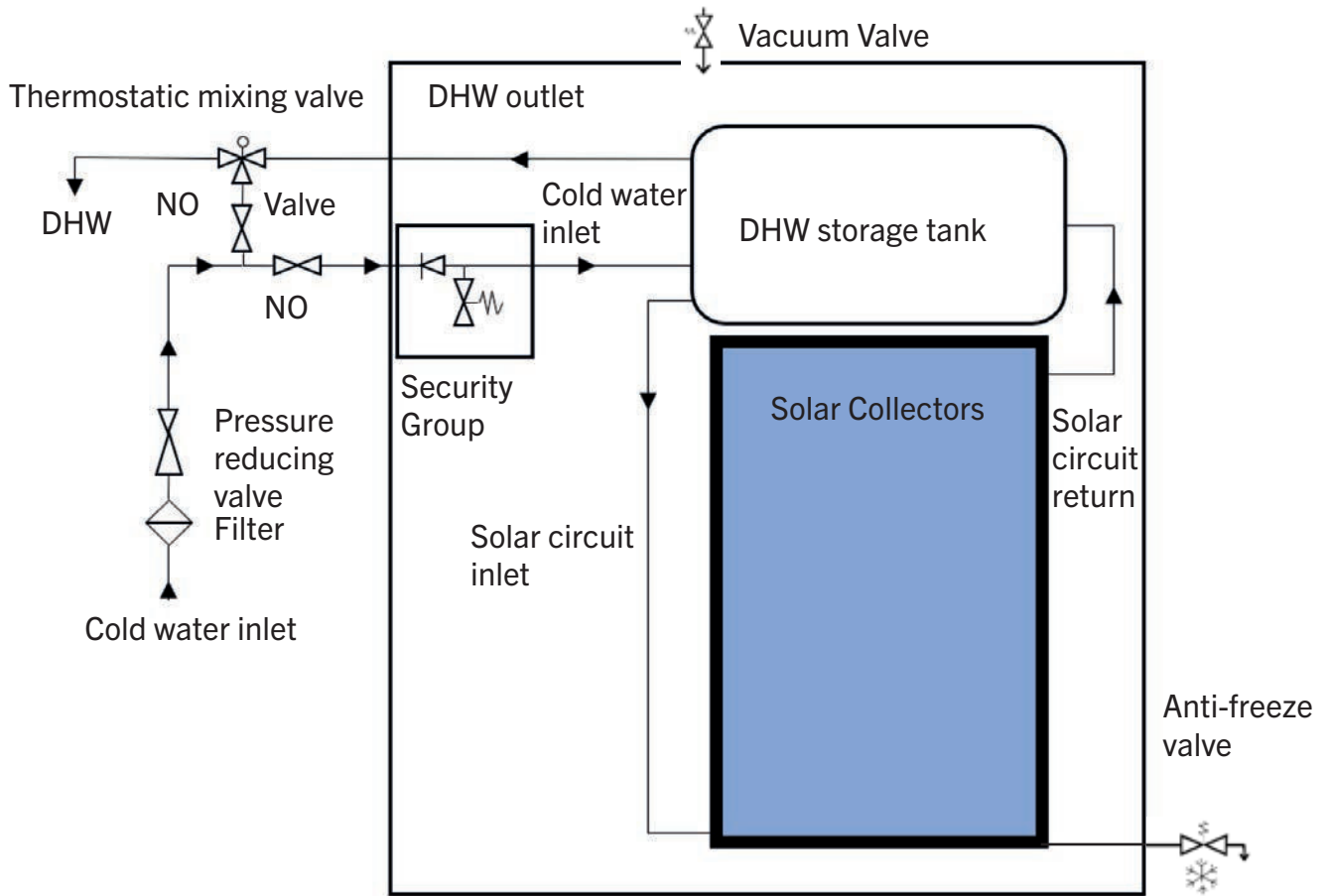
Inlet G 3/4" M from the collector



Output G 3/4" M to consumption



# HYDRAULIC DIAGRAM

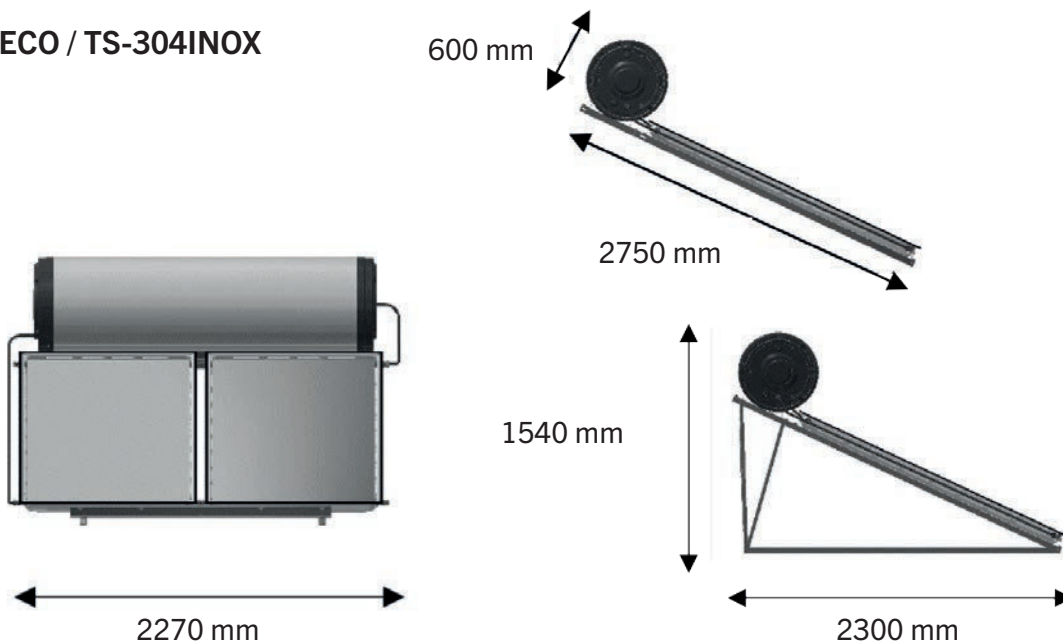


NOTE: The items outside the box are optional components that are not included in the system.

\* The fluid used must always be potable water. No other fluid shall be used that changes the original rating of this system. Unauthorized alterations to this system could result in a hazardous health condition.

## SYSTEMS DIMENSIONS

TS-304ECO / TS-304INOX



NOTE: The indicated dimensions are for an inclination of 25°

# PERFORMANCE

The performance of TS-ECO/INOX solar water heaters has been determined by Solar Rating & Certification Corporation, obtaining the OG300 certification and Energy Star mark. The OG300 solar energy factor rating (SEF) is 2.00. The annual solar water heating system performance obtained on the OG300 process are presented in the following tables.



USA			
Location	Climate Zone (ASHRAE 169)*	Solar Fraction (SFA)	Annual Energy Savings (kWh)
AK - Anchorage	7	0.21	1110
AZ - Phoenix	2B	0.90	3180
CO - Denver	5B	0.59	2750
FL - Tampa	2A	0.80	2750
GA - Atlanta	3A	0.62	2520
MA - Boston	5A	0.44	2020
MO - St Louis	4A	0.52	2240
MT - Helena	6B	0.40	2030
TX - Dallas-Fort Worth	3A	0.70	2670
WA - Seattle	4C	0.37	1670
WI - Milwaukee	6A	0.39	1900

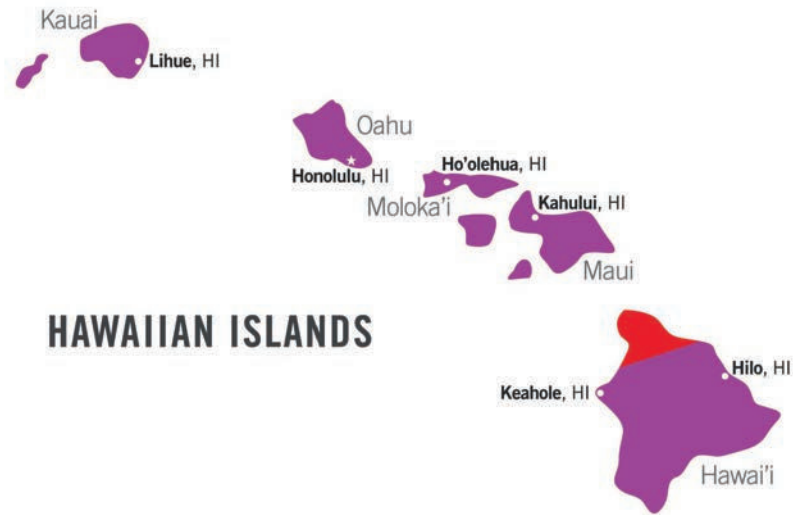
\*Climate zones are as established in ANSI/ASHRAE 169, Climatic Data for Building Design Standards.





CALIFORNIA			
Location	CA Climate Zone**	Solar Fraction (SFA)	Annual Energy Savings (kWh)
CA - Climate Zone 1	7	0.41	1870
CA - Climate Zone 2	6B	0.64	2740
CA - Climate Zone 3	3C	0.63	2720
CA - Climate Zone 4	4C	0.68	2880
CA - Climate Zone 5	5C	0.69	2970
CA - Climate Zone 6	3B	0.74	2890
CA - Climate Zone 7	3B	0.73	2890
CA - Climate Zone 8	3B	0.77	3040
CA - Climate Zone 9	3B	0.75	3050
CA - Climate Zone 10	3B	0.79	3120
CA - Climate Zone 11	3B	0.68	2700
CA - Climate Zone 12	3B	0.70	2830
CA - Climate Zone 13	3B	0.74	2930
CA - Climate Zone 14	3B	0.83	3150
CA - Climate Zone 15	3B	0.91	3100
CA - Climate Zone 16	7	0.57	2600

\*\* California Building Climate Zones and representative cities are established by the California Energy Commission for use in the CA Title 24 Energy Efficiency Standards.



## HAWAIIAN ISLANDS

HAWAII			
Location	Climate Zone (ASHRAE 169)*	Solar Fraction (SFA)	Annual Energy Savings (kWh)
HI - Hilo	1	0.68	2260
HI - Honolulu	1	0.88	2790
HI - Kahului, Maui Island	1	0.88	2790
HI - Keahole, Hawaii Island	1	0.84	2840
HI - Lihue, Kauai Island	1	0.81	2650
HI - Ho'olehua, Molokai Island	1	0.88	2810

\*Climate zones are as established in ANSI/ASHRAE 169, Climatic Data for Building Design Standards.



CANADA			
Location	Climate Zone (ASHRAE 169)*	Solar Fraction (SFA)	Annual Energy Savings (kWh)
Edmonton, Alberta	5	0.37	1980
Halifax Nova Scotia, Canada	7A	0.32	1560
Thunder Bay, Ontario, Canada		0.40	1950
Quebec City, Quebec	5	0.35	1820
Winnipeg, Manitoba	7A	0.36	1940
Calgary, Alberta	7A	0.41	2150
Vancouver, British Columbia	7	0.38	1760

\*Climate zones are as established in ANSI/ASHRAE 169, Climatic Data for Building Design Standards.

# CENTRAL AMERICA AND THE CARIBBEAN REGION



CARRIBEAN AND CENTRAL AMERICA			
Location	Climate Zone (ASHRAE 169)*	Solar Fraction (SFA)	Annual Energy Savings (kWh)
Barbados - Christ Church	1	0.97	3010
Costa Rica - San Jose	1	0.76	3480
Jamaica - Kingston	1	1.00	3080
Mexico - Monterrey 2	0.56	2120	
MEX - Mexico City	2	0.56	2580
BLZ - Belize	1	0.81	2500
PR - San Juan	1	0.91	2820

\*Climate zones are as established in ANSI/ASHRAE 169, Climatic Data for Building Design Standards.





PUERTO RICO SUPPLEMENTAL RATINGS					
Location	Annual Solar Fraction (SFA)				
	SRCC OG-300 Draw Pattern	U.S. DOE Uniform Energy Factor Draw Patterns** 3010			
		Very Small	Low	Medium	High
	64 gpd	10 gpd	38 gpd	55 gpd	84 gpd
San Juan, PR	91%	101%	101%	96%	80%
Aguadilla-Bo-rinquen, PR	93%	101%	101%	98%	83%
Mercedita, PR	93%	101%	101%	97%	84%
Roosevelt Roads NAS, PR	91%	101%	101%	96%	80%

\* Molina-Rivera, W.L., Estimated water use in Puerto Rico, 2010: U.S. Geological Survey Open-File Report 2014–1117, 35 p., <http://dx.doi.org/10.3133/ofr20141117>

\*\* Draw patterns specified in 10 CFR 430, Subpart B, Appendix E, Uniform Test Method for Measuring the Energy Consumption of Water Heaters

# GENERAL

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The following instructions enable authorised personnel to install the systems efficiently and safely. The installation and safety instructions must be followed. The accident prevention regulations and safety rules of the local professional associations must be observed, especially when working on the roof. If there is a risk of falling, precautions must be taken. The entire solar energy system must be installed and operated in accordance with recognised technical standards. Errors and mistake excepted.

## PICTURE GRAMS



Important instructions



Possible danger or damaged product



Electrical hazard

## REQUIRED TOOLS



Drill / Screwdriver



Flat spanner



Nipper



Cross-head and flat-head screwdriver



Measuring tape

# DEFINITIONS

**Terrestrial Equatorial Line:** The line that marks the orientation of the equipment, that is, in the northern hemisphere towards the south and in the southern hemisphere towards the north.

**Solar collector:** solar collector, element that transforms the energy coming from the sun into thermal energy in the form of hot water.

**Solar storage tank:** solar tank, container where the water heated by the solar collector is stored.

# GENERAL SPECIFICATIONS

This installation manual describes the installation of the TS-ECO water heater for a pitched roof. These are the main components of the system:

- Solar storage tank
- Solar collector(s)
- Structure
- Hydraulic kit

Detailed information can be found in the product bill of materials.

The TS-ECO and TS-INOX thermosiphon water heaters operate in direct circulation. The storage tank of the TS-ECO is protected against corrosion by its vitrified coating and magnesium anode, while the TS-INOX is made of 316L stainless steel. The magnesium anode of the TS-ECO is only effective if it is grounded.

The temperature of the hot water in the storage tank can exceed 100°C. The maximum operating pressure is 10 bar for TS-ECO systems and 7 bar for TS-INOX systems. If the mains pressure is higher than 4 bar, a pressure reducer must be used.

For optimum performance, the solar collectors should face south in the northern hemisphere and north in the southern hemisphere. To ensure hot water production all year round, it is possible to install an electric heating element as a backup. To avoid scalding and for greater comfort, it is necessary to install a thermostatic mixing valve.

# PACKAGING, MAINTENANCE, AND STORAGE

The collector is packed with two cardboard protections, reinforced with cardboard wedges at the corners. The accumulator is wrapped in a protective foam, covered with a plastic stretch film. The structures are shrink-wrapped, as are the pipes of the hydraulic kit. The products must be stored indoors. Do not handle the collectors or the accumulator by the sockets. Protect the glass and the back of the collector during transport.

# MAINTENANCE

To ensure that the system functions properly over time, it is important to perform all maintenance steps mentioned in the user manual. Failure to follow these steps may affect the longevity of the product and its warranty. It is important to replace the magnesium anode every year.

# SAFETY INSTRUCTIONS

## BUILDING ROOF

Make sure that there is enough space available for the correct installation of the system. Check that the minimum distance is 1.5 m from the edge of the roof. This is necessary with regard to roof aesthetics, snow and wind loads, as well as for ease of system maintenance. The weights of the equipment are listed in the table on page 2. Before installation, make sure that the cover can support the load of the equipment when full. If you are not sure that the cover will allow this, please consult a structural engineer.

## ORIENTATION

The unit should be oriented towards the earth's equator (i.e. towards the south in the northern hemisphere and towards the north in the southern hemisphere) with a minimum inclination of 20° for the thermosyphon effect to work properly. Avoid shading of the equipment by elements located on the roof such as chimneys, air conditioning machines or others. The minimum distance recommended to avoid losses due to shading at any time of the year is twice the height of the shading object.

## ROOF WATERPROOFING

To avoid moisture and water infiltration into the roof, the pipes penetrating the roof must be well sealed. The sealing elements to be installed must have sufficient elasticity to absorb the thermal expansions produced in the pipes. Likewise, the pipe supports shall be fastened using bolts with sealing gaskets.

If it is necessary to drill holes in the casing to secure the equipment with bolts, use a chemical sealant that seals the hole completely once the bolts are in place. Always keep in mind that required roof penetrations shall be made following applicable codes and also per National Roofing Association recommended practices.

## ADDITIONAL REMARKS

The connection pipes must be well insulated to prevent heat loss and UV damage. We recommend that you declare the Sirius thermosyphon system to your insurance company as an added value to the building and that you take out insurance against lightning and glass breakage.



## Risk of burns



On sunny days, the collectors can be very hot, as well as the hot water supply pipes.

Cover the collectors during installation. Early morning installation is preferable.

## Electrical risk



The connection of the electrical resistor may cause a risk of electric shock.

Disconnect the power supply of the property before handling.

Use protection equipment (gloves, goggles, etc.) during handling.

# TECHNICAL INSTRUCTIONS

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The installation of the equipment is described in detail in the following pages. This installation manual is divided into three parts:

1. The installation of the collectors and the storage tank.
2. Configuration of the hydraulic circuit and its components
3. Maintenance

Before starting the installation, please consider the following points:

## INSTALLATION HYDRAULIC CIRCUIT

The hydraulic circuit must always be carried out by qualified personnel to ensure compliance with the sectoral legislation in force at the place of installation. However, from Sirius Solar we recommend the following guidelines to achieve a proper installation of cold-water supply to the equipment and hot water supply to the home:

- Use pipes that withstand the usual temperatures of use in domestic hot water circuits ( $\approx 60^{\circ}\text{C}$ ). The use of copper or stainless steel is recommended. If the pipe is plastic, consult with the manufacturer about its use limits.
- If during the installation, it is necessary to make shafts for the passage of the pipes, ensure the subsequent watertightness of these by finishing them with sealing materials (resins, polyurethanes, silicones, etc.). Penetration of the building through which pipes or wiring are passed shall not reduce or impair the function of the enclosure. Penetrations through walls or other surfaces shall not allow intrusion by insects and/or vermin. Required roof penetrations shall be made in accordance with applicable codes and per National Roofing Association recommended practices.
- Do not make straight line runs longer than 6 metres to avoid problems with material expansion. If necessary, install expansion joints or loops to prevent possible ruptures due to heating of the material.
- Insulate the pipes with thermal insulation to prevent heat loss when hot water passes through. If the installed pipe is metallic, also insulate the cold-water pipe to avoid external condensation that could damage it. The type of insulation used can be any of those available on the market (synthetic rubber, mineral wool, polyurethane, etc.) but it should always have a coating that protects it, at least, against UV radiation (paint, plastic, aluminium, etc.) and, if possible, against possible aggression from animals. The recommended minimum thickness depends on the type of insulation material used. For materials with thermal conductivity  $0.040 \text{ W}/(\text{m}\cdot\text{K})$ , the thickness of the pipes that run outside should be 35 mm and those that run inside should be 25 mm.

# SECURITY COMPONENTS

## FROST PROTECTION

As they are direct systems, the TS304ECO and TS304INOX thermosiphon water heaters are not recommended for installation in areas where there is a risk of frost. However, in order to prevent possible freezing, it is recommended to follow some of the following precautions:

- Install an anti-freeze valve (optionally supplied by Syrius) in the lower part of the solar collector (see hydraulic diagram on page 4). It must be considered that the use of this type of valve can affect the performance of the equipment, especially during cold periods of the year.

When a temperature below 1°C (33.8°F) is reached, open a water tap slightly to allow circulation through the system. If the temperature drop is severe, it is recommended to drain the system to avoid internal ruptures.

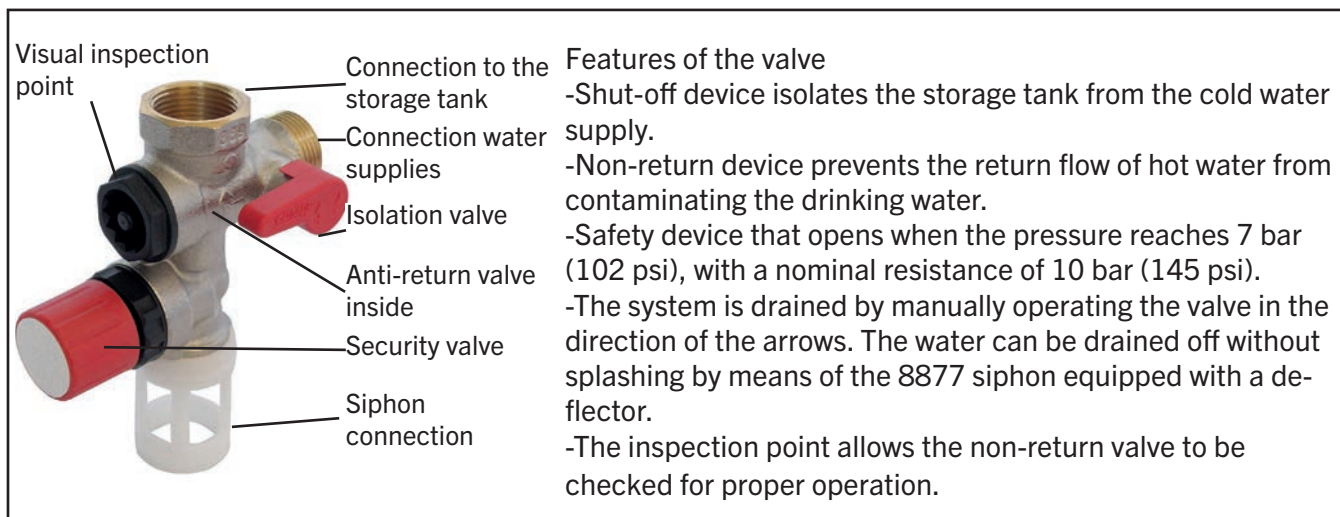
In any case, the equipment is designed to operate at temperatures above 0°C (32°F). The freezing tolerance limits are based on an assumed set of ambient conditions. Overpressure, backflow and drain protection (safety group) Safety groups protect the water heaters when the internal pressure reaches 7 bar. This also makes it possible to open and close the water supply to the thermosiphon and to drain the storage tank by actuating the valve cover. A picture of the safety group and its features can be seen below. Please read the installation instructions supplied with the unit carefully, paying particular attention to the following installation conditions:

- The safety unit must be connected to a gutter or drain by means of a rigid pipe according to the temperature of the drainage system.
- Valve discharge must never endanger users or their belongings.
- The drainage installation must comply with the plumbing code adopted by the competent authority or, in the absence of such a code, with the International Plumbing Code.
- The drain pipe must be free of obstructions so that surplus water can drain normally.

Where a relief valve discharges into a structure or drainage system, the installation shall conform to the plumbing code adopted by the authority having jurisdiction or, in the absence of such a code, to the International Plumbing Code.

In addition to the pressure relief valve, it is advisable to place an expansion vessel at the tank cold-water inlet. This element will protect the inside of the tank by preventing the pressure relief valve from being activated too frequently if the supply network has regular pressure variations. Some states have their own codes that require this expansion control element.

Check the current legislation in case you are obliged to install it.





Inspect the valve for proper operation once a year, checking that it discharges correctly at the set pressure. Replace it in case of failure or obvious wear.

## VACUUM PREVENTION

Eventually a situation may arise where a negative pressure is produced inside the tank, which could damage the inside of the tank. A vacuum valve can be fitted to prevent negative pressure inside the system. Its placement in the equipment is specified in the hydraulic diagram on page 4.

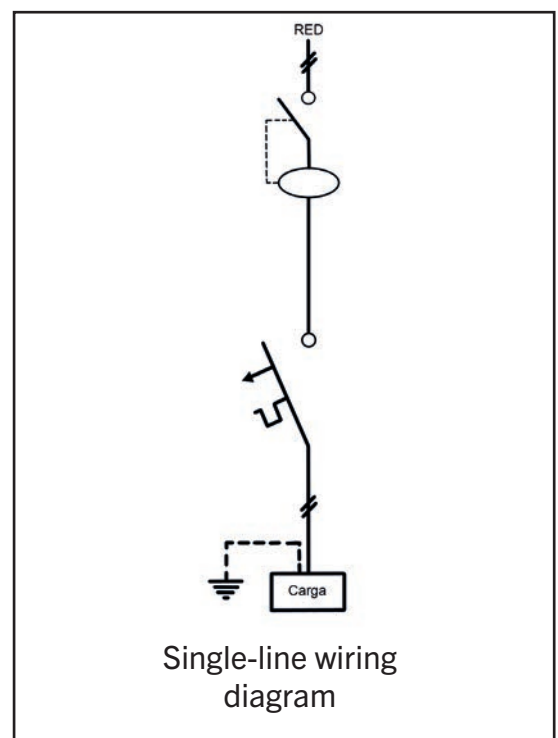
## ELECTRICAL CONNECTIONS

This installation must be carried out by an approved electrician. When an electrical booster resistor is required, a circuit breaker must be installed, in addition to the necessary protections to prevent possible damage to materials or persons. At least one differential switch and one circuit breaker must be installed, rated according to the power of the electrical element installed, as specified in the diagram below. The cable must be installed inside a conduit or have a sheath prepared for outdoor installation.

Overload or overcurrent protection of electrically operated components shall be consistent with the current maximum rating of the device and with the provisions of Article 240, Chapter 2 of the National Electrical Code.

The characteristics of the electrical resistor (optional) supplied by Syrius can be seen in the following table.

CERAMIC HEATER FOR SHEATH MOUNTING	
Mounting	Horizontal
Material	Iron-Chrome-Aluminium
Inner diameter of the sheath	36 to 38 mm
Electrical connection	230V single phase
Resistor wire	Ø 0.55mm
Power supply cable	3x2.5 mm
Load limit	4.6W/cm <sup>2</sup>
Hot part	
Load limit	4.37 W/cm <sup>2</sup>
Material	Silicoaluminium
Temperature Coefficient	1.05 at 800°C
Maximum power (+5%)	1890 W
Maximum ohmic value	31.10 Ohm
Minimum power (+5%)	1620 W
Minimum ohmic value:	26.66 ohm



The magnesium anode must be earthed by connecting a green/yellow conductor cable with a minimum cross-section of 2.5 mm<sup>2</sup> to the terminal provided for this purpose on the tank flange.

## MEASUREMENT AND CONTROL SYSTEM

Thermosiphon systems are systems that work by means of the natural convection of the water that rises towards the storage tank as it heats up inside the collector. This generates a circulation that, after enough cycles, manages to heat all the accumulated water. It is, therefore, a heating system that does not need control elements for its operation, as far as heating with the sun is concerned. However, it is important to know which the working temperatures of the equipment are in order to know when the equipment has hot water available for consumption. For this purpose, two measuring thermometers clearly visible to the user shall be installed:

- In the water storage tank
- At the cold-water inlet

To determine if the solar system is working, observe the thermometer when hot water is being used in the house. The water returning from the solar system on a sunny day should be at least warmer than the water going up to the solar collector. In general, and depending on the incident solar radiation, the temperature difference between the flow and return pipes to the solar collector should always be more than 10°C if the equipment is working properly on a sunny day.

On the other hand, when the electric heater is installed, it is necessary to install a control system that allows the connection and disconnection of the heater. The Sirius electrical kit consists of a ceramic heating element (see characteristics above) and an analogue control thermostat with a double cut-off system.

## LIGHTNING PROTECTION

The supporting structure of the collectors must be earthed. If a lightning protection device is already installed in the building, the metallic piping of the solar system must be connected to this device with a green/yellow conductor cable with a minimum cross-section of 6 mm<sup>2</sup> Cu (H07 V-U or R). If this is not the case, grounding can also be provided by an earth spike.

# DISMANTLING AND SCRAPPING

The system must be dismantled early in the morning to avoid the risk of burns. Consider the temperatures of the system before starting dismantling. Cover the collectors the day before, if possible, to prevent solar radiation from passing through.

If your equipment has reached the end of its useful life, the different elements should be taken to a recycling centre. Bear in mind that most of the elements of which they are manufactured are recyclable and can be used for other purposes. In all cases the raw materials can be separated, always bearing in mind that the storage tank and collector insulations must be taken to a specific recycling centre.

# ASSEMBLY OF THE SYSTEM - THE STRUCTURE

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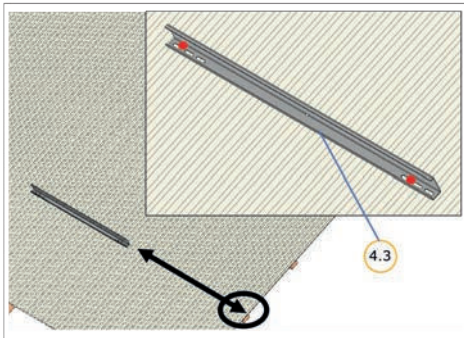
TS304ECO/SS view inclined roof structure (STO) (5)



TS304ECO/INOX view flat roof structure (STT) (5)

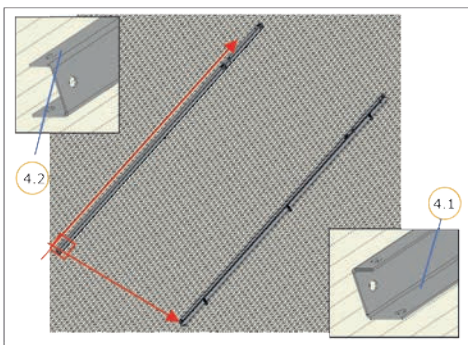


# SYSTEM ASSEMBLY - THE STRUCTURE (INCLINED ROOF-STO)

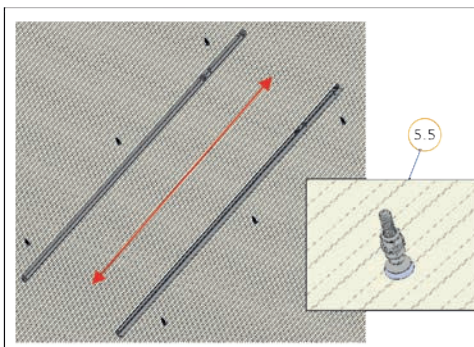


Place the collector cross member (4.3 or 4.4) on a structural beam.

Use this cross member as a drilling guide. Mark the ceiling in the oblong holes of the cross beam at three bar heights. **Información con relleno sólido** This step allows the ceiling to be drilled in order to fix the anchor bolts (5.5). Drill at high corrugations.



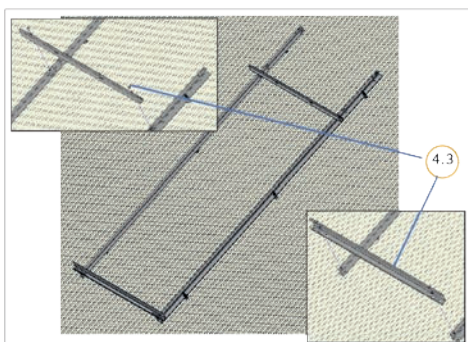
Place the side rails members along the previously made marks to check the alignment. Drill holes in the ceiling and screw in the anchor bolts (5.5).



Drill through the side collector supports (4.1 and 4.2) at the level of the bars.

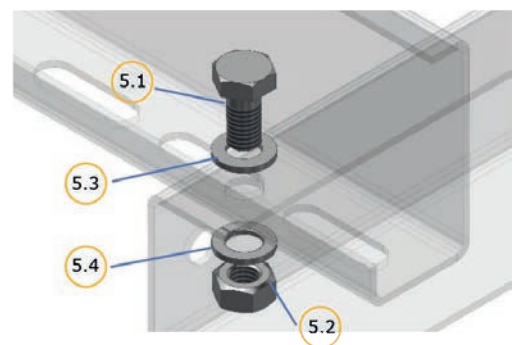
Pay attention to the perpendicularity of the ropes in relation to the horizontal.

Screw the longitudinal members to the anchor bolts (5.5).



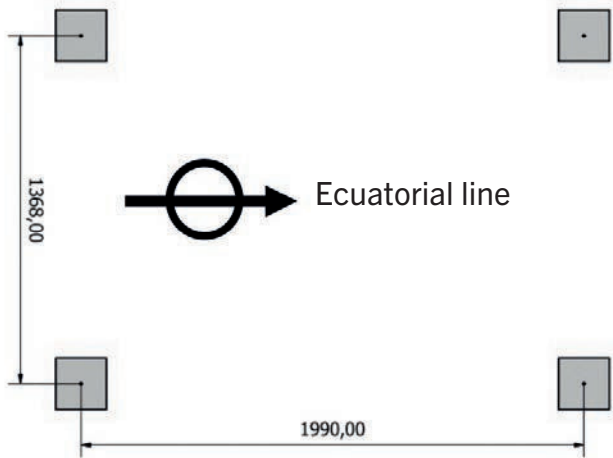
Screw the collector cross members (4.3 or 4.4) to the side rails members.

Use screws (5.1) (5.2) (5.3) (5.4).

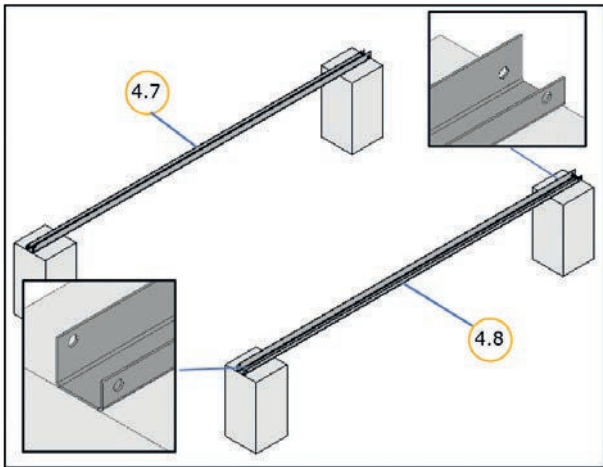




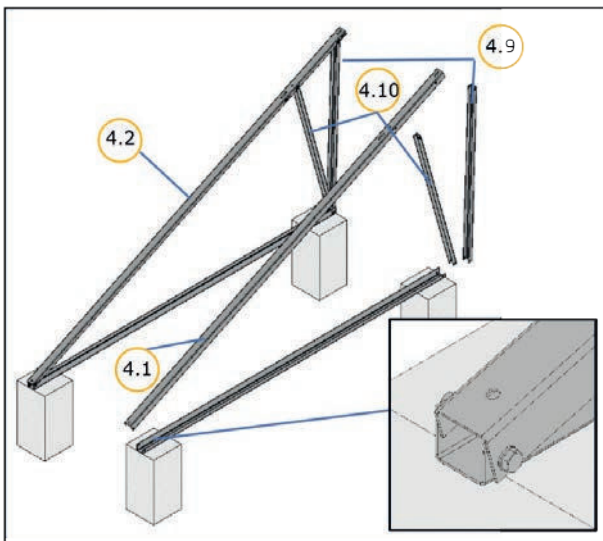
# SYSTEM ASSEMBLY - THE STRUCTURE (FLAT ROOF -STT)



Position the concrete pads on the deck.

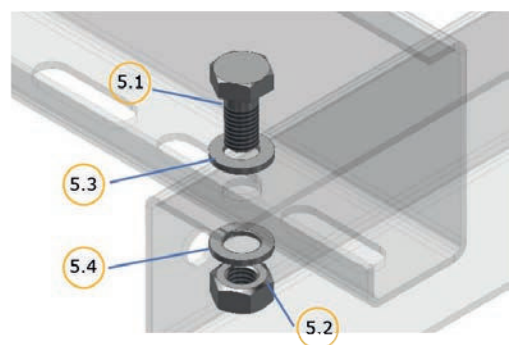


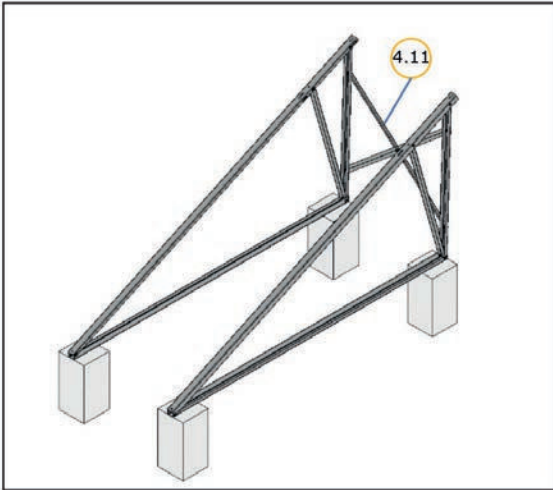
Tighten the base bars (4.7) and (4.8) with the M8 anchor bolts (5.5).



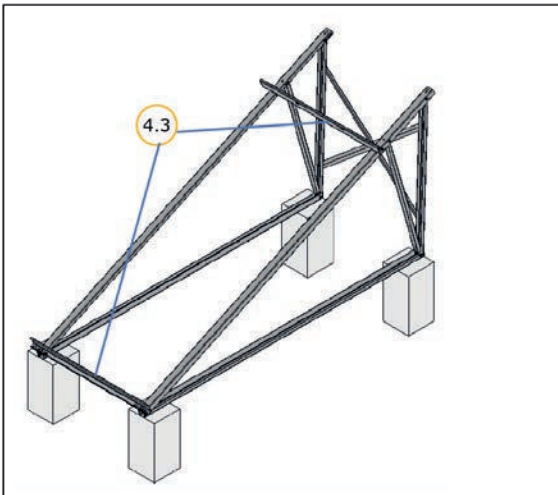
Assemble the side rails members (4.1) and (4.2), the rear rods (4.9) and the stiffeners (4.10) to the corresponding base members (4.7) and (4.8).

Use the screws (5.1) (5.2) (5.3) (5.4) to make the connection.



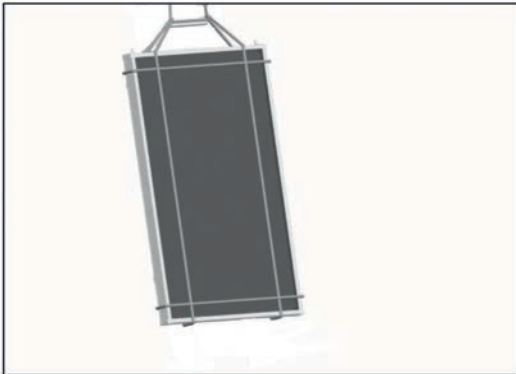


Assemble the cross brace (4.11) to the rear rods (4.9). Use the screws (5.1) (5.2) (5.3) (5.4) to make the connection.



Assemble the collector cross members (4.3 or 4.4) to the side rails members (4.1) and (4.2). Use the screws (5.1) (5.2) (5.3) (5.4) to make the connection.

# SYSTEM INSTALLATION : COLLECTORS AND STORAGE TANK



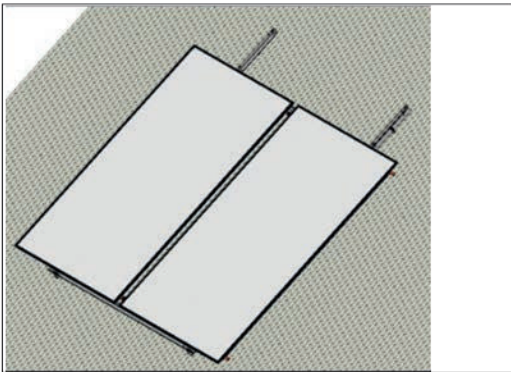
Lift the collectors (3) onto the roof. To lift them, use strong straps as shown in the figure. During handling, make sure that the strap does not cover the copper connectors. It is recommended to use a crane for lifting.

This task requires at least two professionals: one secures the collectors, the other guides the panels.



Lift the storage tank onto the roof. For assembly, use sturdy straps as shown in the figure opposite. We recommend using a crane for lifting.

This task requires at least two professionals: one secures the collectors, the other guides the storage tank.

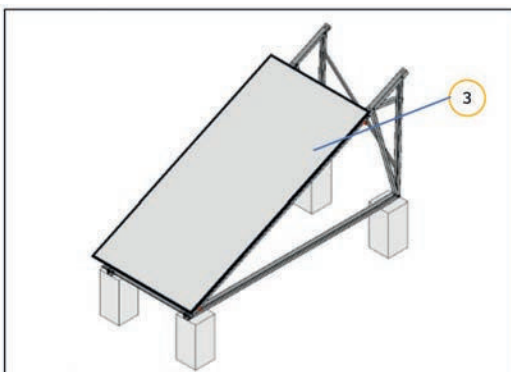


## Observe the safety instructions!

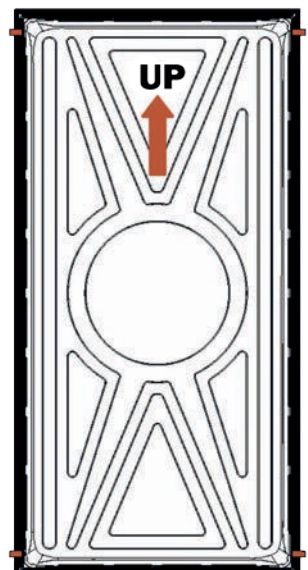
Do not walk under suspended loads  
Secure collectors and accumulators to prevent them from falling down.

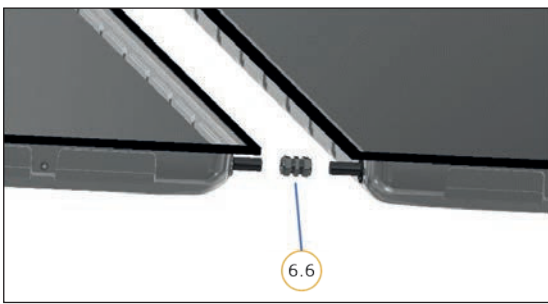


Place the collectors (3) on the structure.



Collector Back view

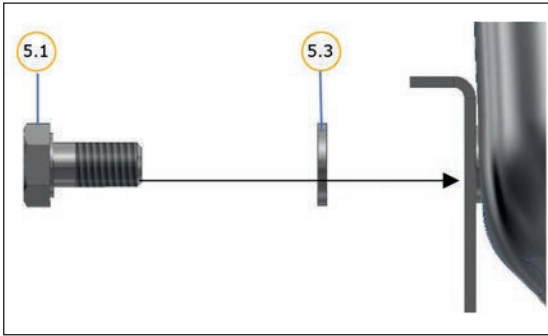




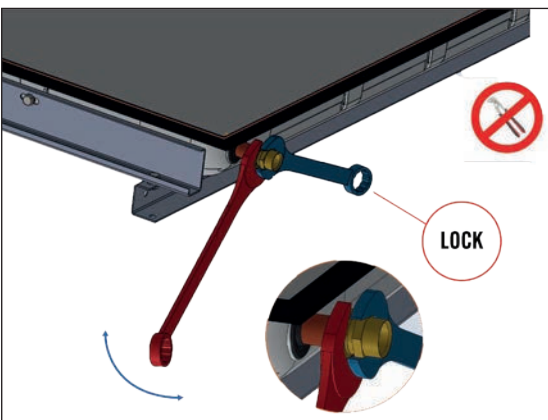
Connect the collectors with 22x22 connections (6.6).



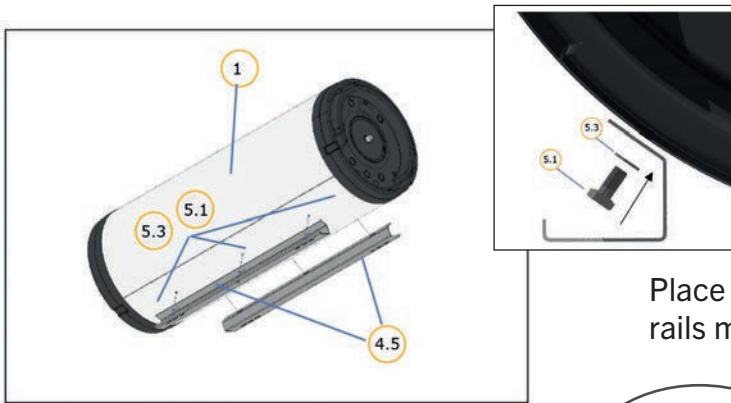
**Be careful not to overtighten the connections.  
The terminals of the collectors are fragile.**



Screw the collector to the cross members (4.3) with M8 screws (5.1) and flat washers (5.3).



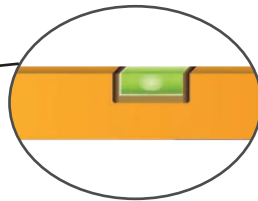
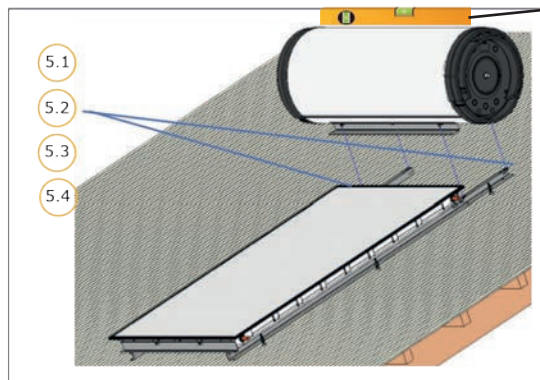
It is essential to use 2 open-end spanners, one to hold the centre nut to prevent rotation of the fitting, and one to tighten the nut on each side. Failure to follow this protocol will damage the welds and the manifold.



Fix the tank cross members (4.5 or 4.6) to the storage tank with the M8 screws (5.1) and flat washers (5.3).

The cold water inlet and hot water outlet should be on the left side of the tank when standing in front of the equipment.

Place the storage battery (1) on the side rails members (4.1).



Screw the storage tank cross members (4.5 or 4.6) to the longitudinal cross members with the screws (5.1) (5.2) (5.3) (5.4).

**Tighten all bolted joints.**

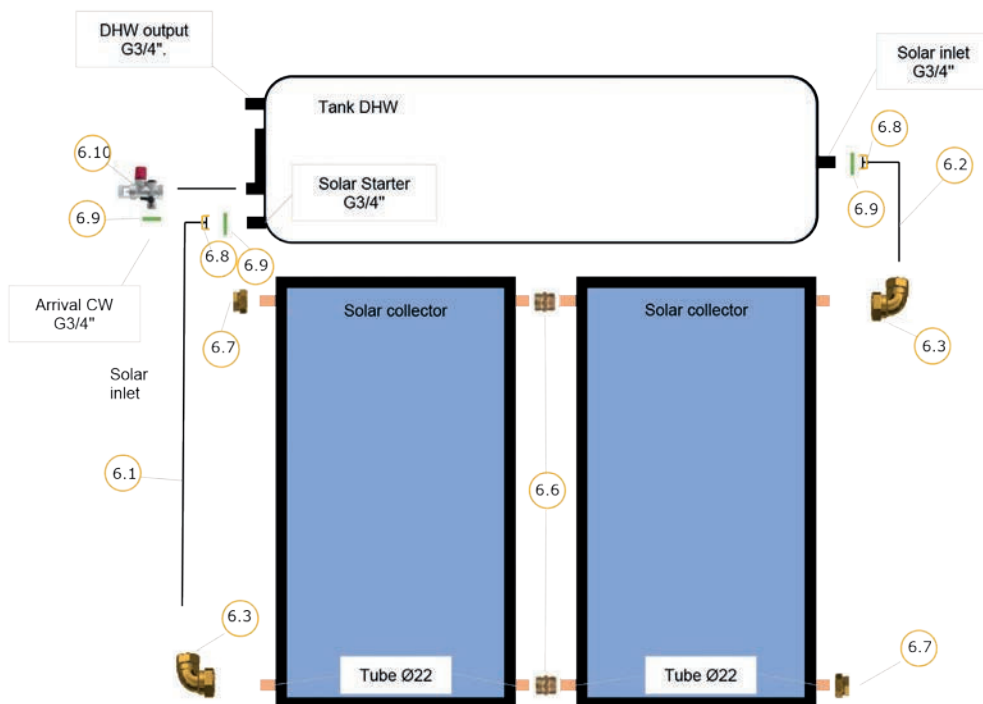


# SYSTEM INSTALLATION : HYDRAULIC CIRCUIT

Connect the hydraulic kits in accordance with the following considerations:

- Connect the flow inlet pipe (6.1) between the tank and the collector using the compression fittings (6.3) and the nut (6.8) with the high temperature fibre seal (6.9).
- In the same way, connect the return pipe (6.2) using the compression fitting (6.3) and the nut (6.8) with the high temperature fibre seal (6.9).
- Fit the compression fittings on the remaining 2 collector tubes.
- Assemble the safety group (6.10) to the storage tank using a high-temperature fibre seal or plumber's putty.

## TS-304ECO/SS HYDRAULIC CONNECTION ASSEMBLY



Number	Description
6.1	Hydraulic flow inlet pipe
6.2	Hydraulic return pipe (with insulation)
6.3	Brass Compression Elbow 22x18
6.4	Brass compression elbow F3/4"x18
6.5	Brass Compression Fitting Straight 22x18
6.6	Brass compression fitting straight 22x22
6.7	Brass compression plug 22
6.8	Brass nut 18x3/4"x18
6.9	3/4" HT fibre gasket
6.10	Safety group Mod. 889

# THERMOSYPHON COMMISSIONING

## SYSTEM FILLING

Carefully follow the steps below to fill the equipment. We recommend that you fill slowly to allow time for the air to escape from the system, otherwise air blockages may occur, which will reduce the performance of the equipment:

- Opening a hot water tap in the home.
- Turn on the water supply at the level of the safety group.
- Allow air to escape from the water heater through the hot water tap.
- When water comes out of the hot water tap, turn it off. This means that the water heater is full.

**Be sure to use a threaded connection to seal the system. Each threaded connection must be sealed with a plumber's putty. Do not use Teflon.**



## OPERATIONAL TESTING

Perform the following checks to ensure that the equipment is working properly.

- Check that when the solar collectors are exposed to the sun, the thermometers start to change their temperature.
- After two hours of filling (on a sunny day), check that the tank temperature has risen by at least 8 - 10 °C (46 - 50 °F)
- Open and close the safety group handle a couple of times to ensure that it is not blocked.

# CHECKLIST

## INSTALLATION

SYSTEM	
Date of installation	
Customer's name	
Customer address	
Serial number of the storage tank	
Serial number of the collector	
Name of the installer	

Was the installation carried out in accordance with work health and safety standards ?

Has the system been installed in accordance with this installation manual ?

Is the minimum distance from the edges of the roof is 1,5 m ?

Have the pipe connections through the roof been properly sealed ?

Are all screws and mechanical connections tightened and double-checked ?

Have the safety group, pressure reducing valve and thermostatic mixing valve been installed and tested ?

Are all hydraulic connections tight and has the system been checked for leaks ?

Has the collector cover been removed after installation ?

Does the system produce domestic hot water during sunny periods ?

Has the client been informed about the use of this system and given the manual ?

# MAINTENANCE

Your equipment is prepared to withstand the harshest weather conditions. However, you need to maintain it. With good maintenance, your equipment can extend its useful life by several years, which will provide you with a good amount of energy savings in your home. In addition, this will help to maintain the warranty conditions that Sirius offers for its equipment.

In addition to visits from your maintenance company, regular monitoring of your equipment would help to reduce the costs associated with maintenance. The periodicity of these works is indicated in the following tables, being necessary to replace those elements that present some of the signs described in them.

MAINTENANCE PLAN		
COLLECTORS		
Part	Periodicity (months)	Description
Collectors	6	VI differences on original
Glass	6	VI differences between collectors
Seals	6	VI condensation and dirt
Absorber	6	VI cracks, deformations
Housing	6	VI corrosion, deformations
Connections	6	Vi deformation, oscillations, breathing windows
Structure	6	VI appearance of leaks
Collectors	12	VI degradation, signs of corrosion, and tightening of bolts
Collectors	12	Partial covering of the collector field
Collectors	12	Partial uncovering of the collector field
Collectors	12	Partial emptying of the collector field
STORAGE TANK		
Part	Periodicity (months)	Description
Tank	12	Bottom sludge presence
Sacrificial anodes	12	Check for wear and tear
Insulation	12	Humidity
Coil heat Exchanger	12	FC Efficiency and performance cleaning
HYDRAULIC CIRCUIT AND VALVES		
Part	Periodicity (months)	Description
Watertightness	24	Carry out pressure test
Insulation on the outside	6	VI degradation protection joints and absence of humidity
Insulation on the inside	12	VI joints and absence of moisture
Shut-off valves	12	FC actions (open and close) to prevent seizure. Replace in case of failure
Safety valves	12	FC actuation

VI: Visual inspection

FC: Functioning control



The following checklist will help your maintenance company to carry out this work which you are responsible for.

SYSTEM	
Date of installation	
Customer's name	
Customer address	
Serial number of the storage tank	
Serial number of the collector	
Name of the installer	

- Is the structure in good condition?
- Are all screws tightened securely?
- Is the storage tank in good condition and free of leaks or other damage?
- Is the collector in good condition and free of leaks or other damage?
- Is the pipe insulation in good condition?
- Have the anodes been replaced?
- Have the valves and safety components been checked?
- Are all hydraulic connections tight and has the system been checked for leaks?
- Does the system produce domestic hot water during sunny periods ?



The solar energy system described by this manual, when properly installed and maintained, meets the minimum standards established by the SRCC. This certification does not imply approval or warranty of this product by SRCC.



# NOTES

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# NOTES

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# DATASHEETS

(products, accessories,  
spare parts...)  
available on  
[www.syrius-solar.com](http://www.syrius-solar.com)

SAS with a capital of 156 800 € - RCS Montpellier 794 797 753 00041 - Production by : Syrius Solar Industry

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