

**VIESMANN**

climate of innovation

Vitosol Solar Heating Systems

# Solar Energy Harvesting with Vitosol

Solar Thermal



Liquid heating

Glazed collectors



Vitosol Flat plate and Tube collectors

Pool heating

DHW heating

Space heating

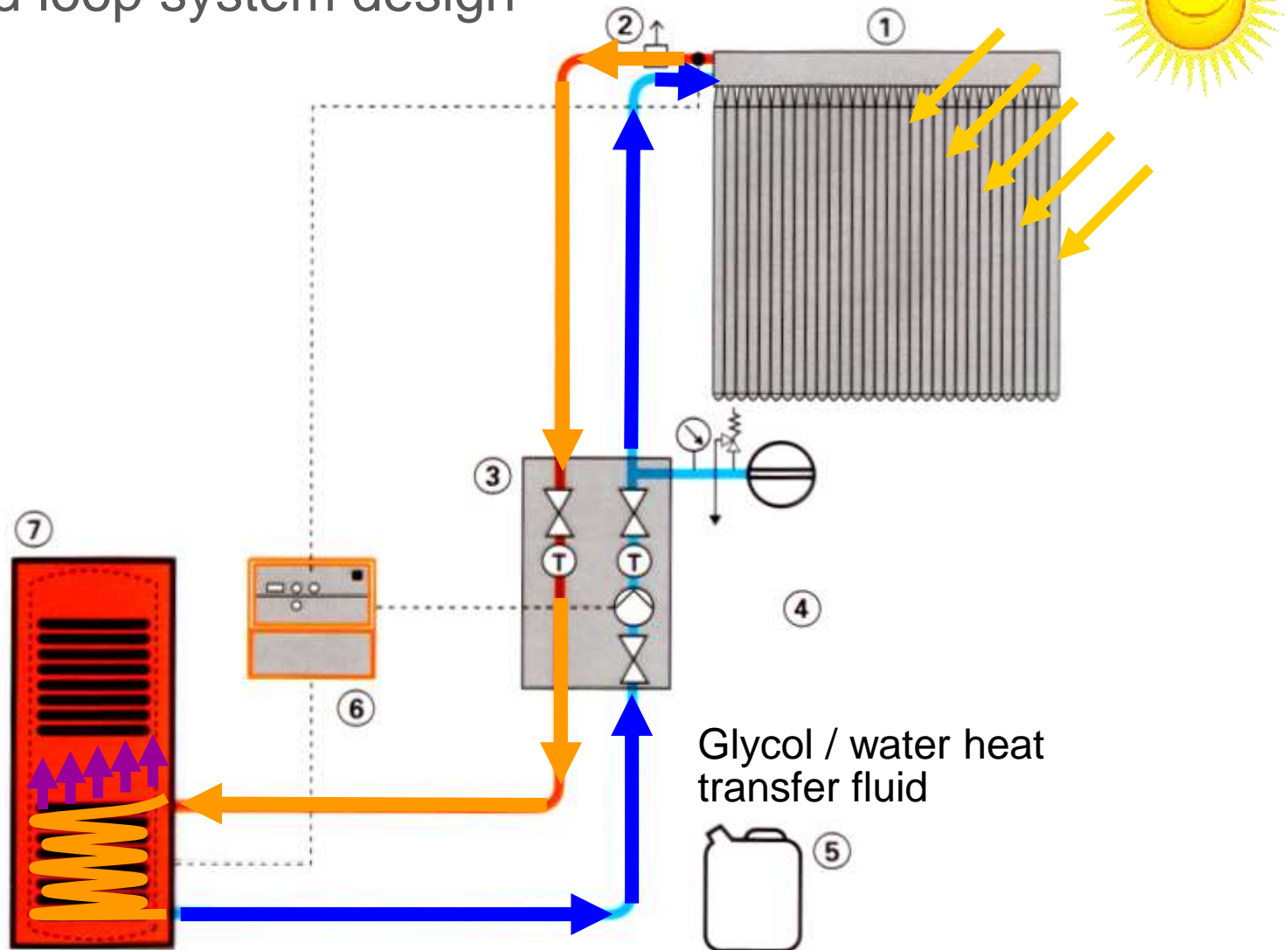
Space cooling



*The **best** and most **cost effective** solar water heating applications*

# Vitosol Solar Thermal Systems

Closed loop system design



# Vitosol Solar Systems



Vitosol 100-F  
Vitosol 200-F  
Vitosol 200-T



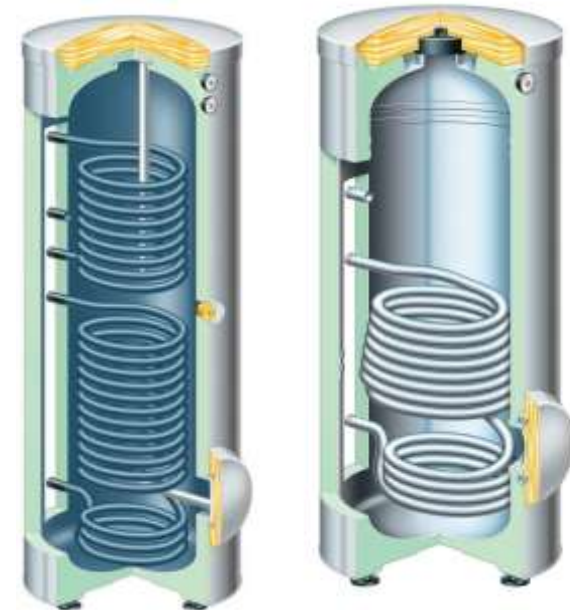
SCU Solar Controls



Solar-Divicon Pump Stations



Accessories and Tools

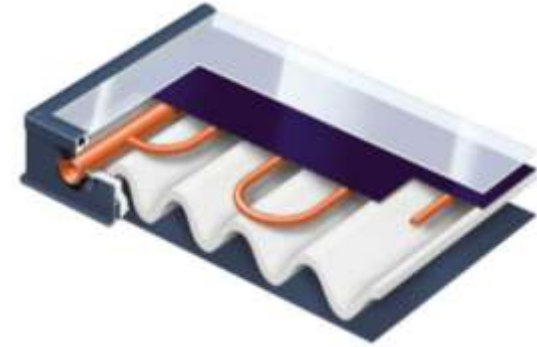


Vitocell Solar DHW Tanks

# Vitosol Flat Plate Collector Comparison



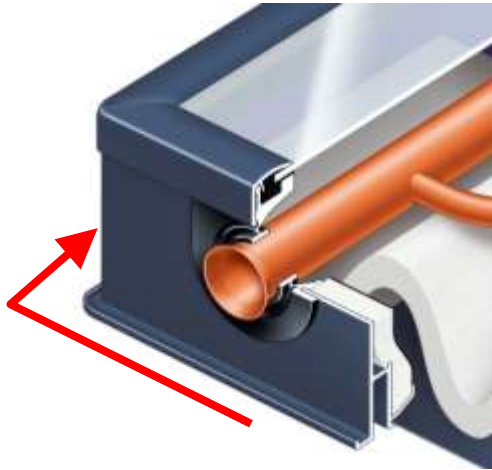
Vertical and Horizontal versions



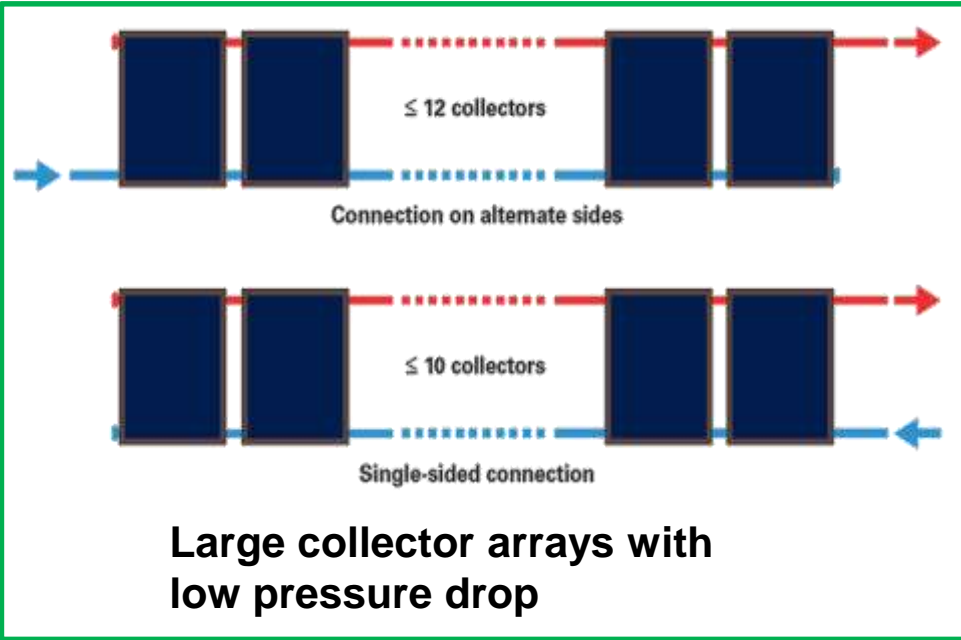
|                        | <b>VITOSOL 100-F</b> | <b>VITOSOL 200-F</b>  |
|------------------------|----------------------|-----------------------|
| Dimensions             | 94" x 41.6" x 2.8"   | 94" x 41.8" x 3.5"    |
| Aluminum frame         | Bare aluminum        | Painted aluminum      |
| Glass trim             | Corners only         | Continuous            |
| Absorber sheet coating | Black Chrome         | Sol-Titanium          |
| Insulation             | Bottom (1.2")        | Bottom (2") and sides |
| Weight                 | 97 lb                | 115 lb                |
| List price             | 15% less than 200-F  |                       |

# Vitosol 100-F / 200-F

Your best flat plate collector choices



**One piece wraparound frame with no screws or rivets visible**



**Large collector arrays with low pressure drop**



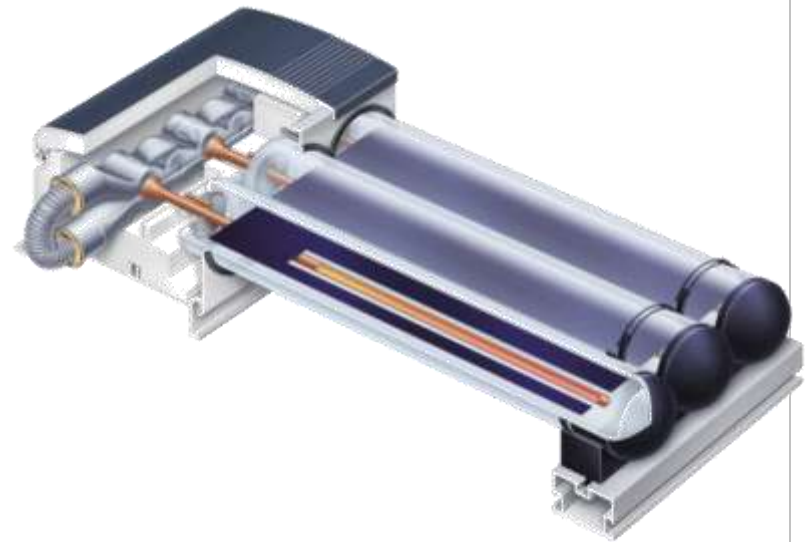
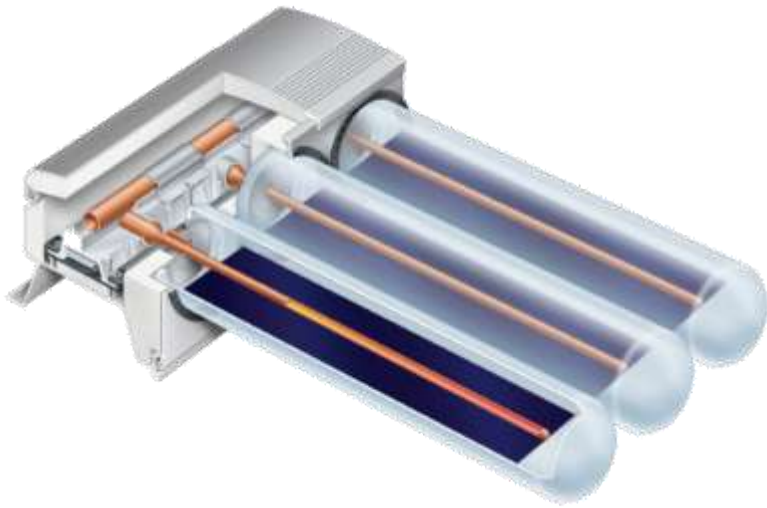
**Horizontal and Vertical versions**



**Leak-free quick connect fittings**



# Vitosol Vacuum Tube Collector Comparison



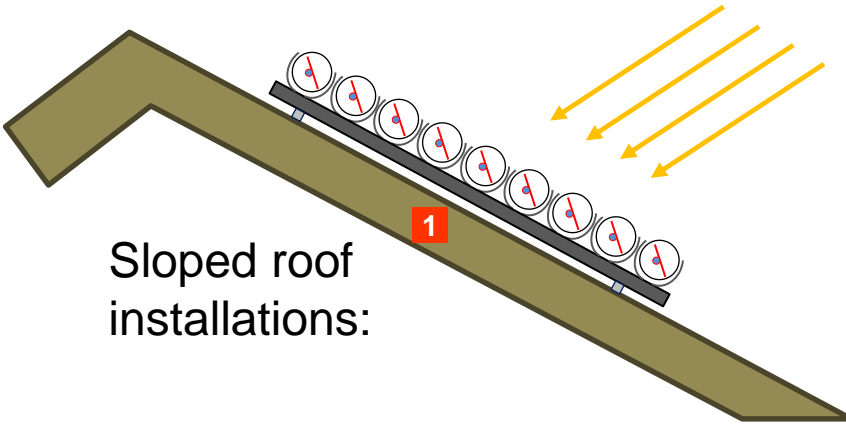
|               | <b>VITOSOL 200-T, SPE</b> | <b>VITOSOL 200-T, SP2A</b> |
|---------------|---------------------------|----------------------------|
| Header design | One pipe copper           | Two pipe stainless steel   |
| Tube diameter | 4"                        | 2.75"                      |
| Tube rotation | 45                        | 25                         |
| Header cover  | Bare aluminum             | Painted aluminum           |
| Models        | 9 tube, 18 tube           | 10 tube, 12 tube, 24 tube  |

# Vitosol 200-T, SPE / SP2A

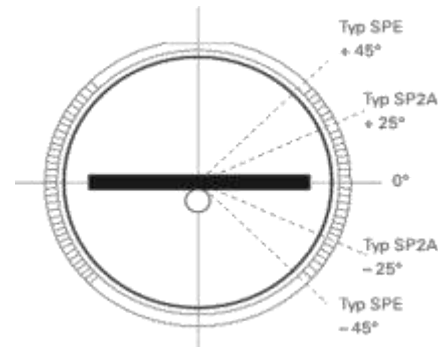
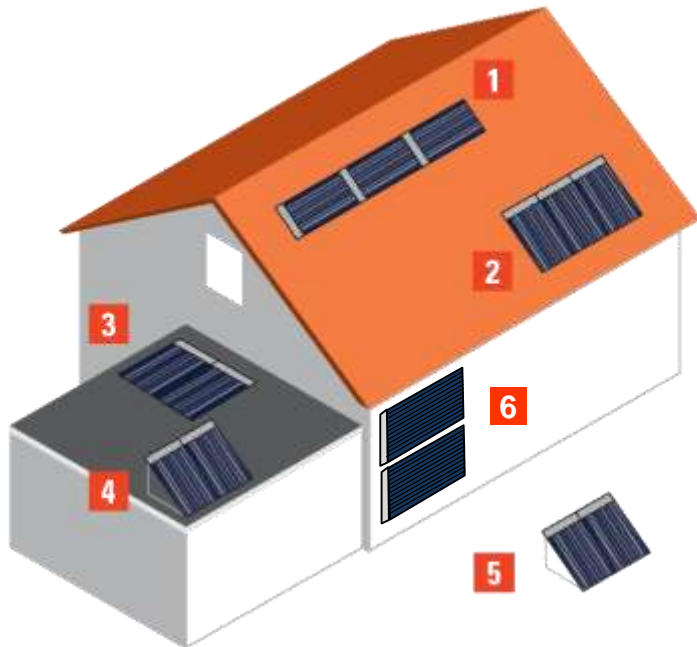
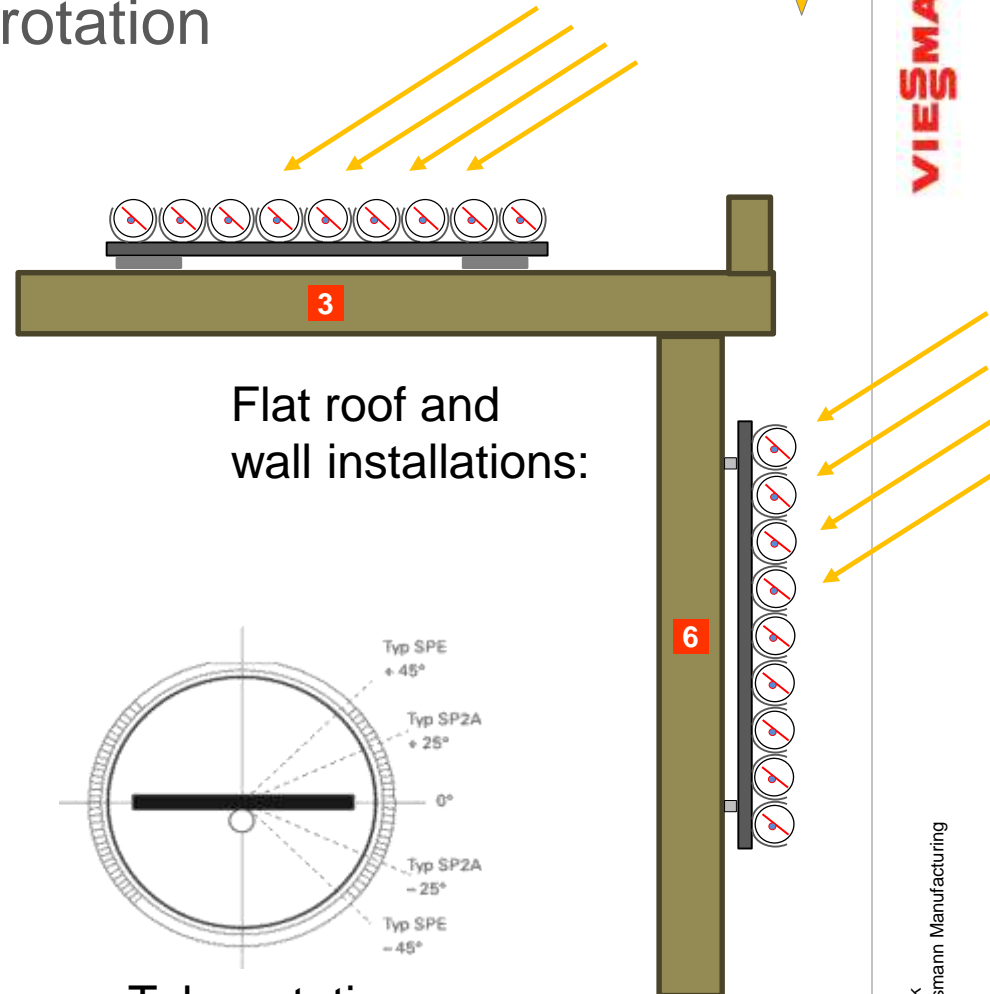
## Mounting versatility with tube rotation



Sloped roof installations:



Flat roof and wall installations:




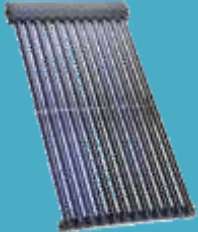





Tube rotation

SPE - 45°

SP2A - 25°



# Solar Panel Comparison

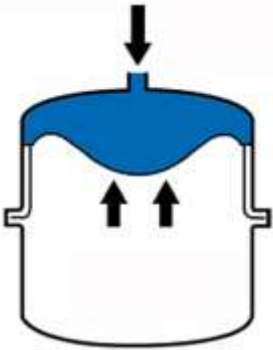
|   | <b>Flat Plate collectors</b>                  | <b>Vacuum Tube collectors</b>                 |   |   |   |
|---|---|--|---|---|---|
| <b>Cost</b>                             | Low / medium cost   | Medium / high cost   |   |   |   |
| <b>Performance</b>                      | <ul style="list-style-type: none"> <li>▪ Excellent in mild or warm weather</li> <li>▪ Drops off in colder conditions</li> </ul> | <ul style="list-style-type: none"> <li>▪ Excellent in mild or warm weather</li> <li>▪ Good in colder conditions</li> </ul>       |   |   |   |
| <b>Applications / temperature range</b> | <ul style="list-style-type: none"> <li>▪ DHW heating</li> <li>▪ Indoor pool heating</li> </ul>                                  | <ul style="list-style-type: none"> <li>▪ Space heating supplement</li> <li>▪ Process heating</li> <li>▪ Solar cooling</li> </ul> |   |   |   |
| <b>Other variables:</b>                 | <br>Mounting location                        | <br>Space available                           | <br>Aesthetics | <br>Wind loads | <br>Snow loads |

# Vitosol System Components:



## Tyfocor high temperature non-toxic solar fluid

- Frost protection to  $-31^{\circ}\text{F}$  ( $-35^{\circ}\text{C}$ )
- Temperature stable to  $338^{\circ}\text{F}$  ( $170^{\circ}\text{C}$ )
- Reverse evaporatable propylene glycol



## Solar Expansion tank

- High temperature resistance  $248^{\circ}\text{F}$  ( $120^{\circ}\text{C}$ )
- 30-40 psi precharge
- 4 sizes available

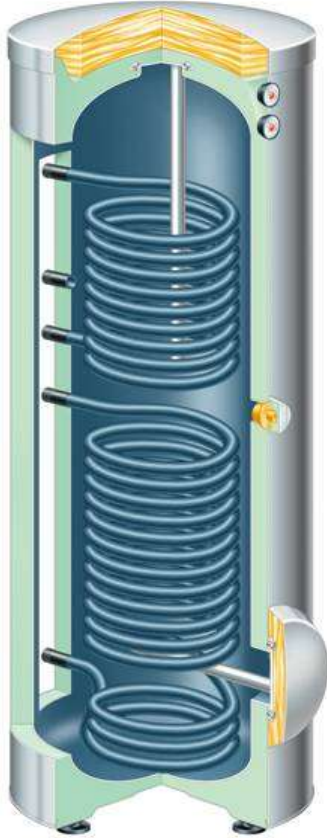


## Solar Divicon pre-assembled pumping station

- Pump, PRV, flow meter, system fill manifold, air separator, flow check valves, temperature and pressure gages
- 2 sizes available

# Vitocell 100 /300

## Solar storage tanks



### Dual Coil

- 300 series stainless
- 100 series enamel
- Sizes:
  - 80 (300L)
  - 120 gal (450 L)



### Single Coil

- 300 series stainless
- 100 series enamel
- Sizes:
  - 42 gal (160 L)
  - 53 gal (200L)
  - 80 gal (300L)
  - 120 gal (450 L)

# Solar Differential Temperature Controls



**SCU124**

**SCU224**

## Features:

- Variable speed pump control
- Pre-programmed configurations
- Illuminated display with layout picture and status information



**SCU345**

|                              | SCU124   | SCU224    | SCU345   |
|------------------------------|----------|-----------|----------|
| Relay outputs                | 2        | 2         | 4        |
| Variable speed pump          | Yes      | yes       | yes      |
| Sensor inputs                | 4        | 4         | 5        |
| <b>System configurations</b> | <b>3</b> | <b>10</b> | <b>9</b> |
| <b># Heat loads (tanks)</b>  | <b>1</b> | <b>2</b>  | <b>3</b> |
| <b># of differentials</b>    | <b>1</b> | <b>2</b>  | <b>3</b> |
| Heat dump layout             | yes      | yes       | yes      |
| Energy meter                 | yes      | yes       | yes      |
| Pump hour counter            | yes      | yes       | yes      |
| Collector cooling            | yes      | yes       | yes      |
| Night tank cooling           | yes      | yes       | yes      |
| V-Bus accessories            | yes      | yes       | yes      |
| Internal SD Card             | no       | no        | yes      |
| Flow meter option            | no       | no        | yes      |

# Compact Mobile Charge Station

The essential system commissioning tool



- *Flushes, Vents air, and Fills* solar loop in one step
- Save valuable time:
  - Speed up flushing / filling
  - Eliminate air problems at start-up
  - Reduce call backs
- Filters solar glycol to remove debris
- Compact and mobile
- Use for any hydronic system

# VITOSOL

## Solar Thermal Heating Systems

### Collector Installation Details





# Vitosol 100-F / 200-F / 200-T

Sloped roof installations



# Vitosol 100-F / 200-F / 200-T

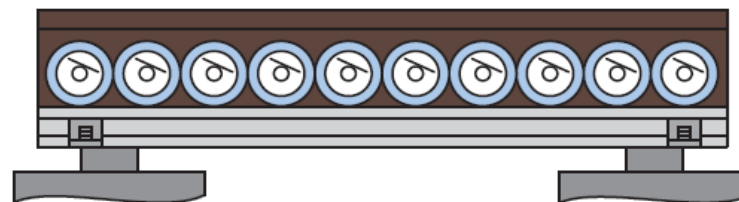
## Flat roof installations





# Vitosol 200-T, SPE / SP2A

Flat roof, laid flat mounting



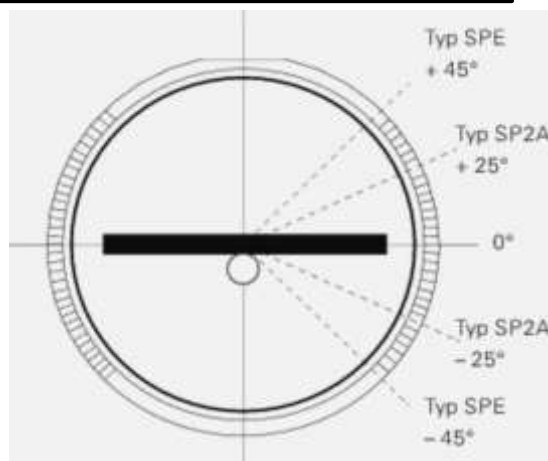
Note:

## **VITOSOL 200-T, SP2A**

- Maximum tube rotation is 25°
- Angle of inclination 0° to 25°

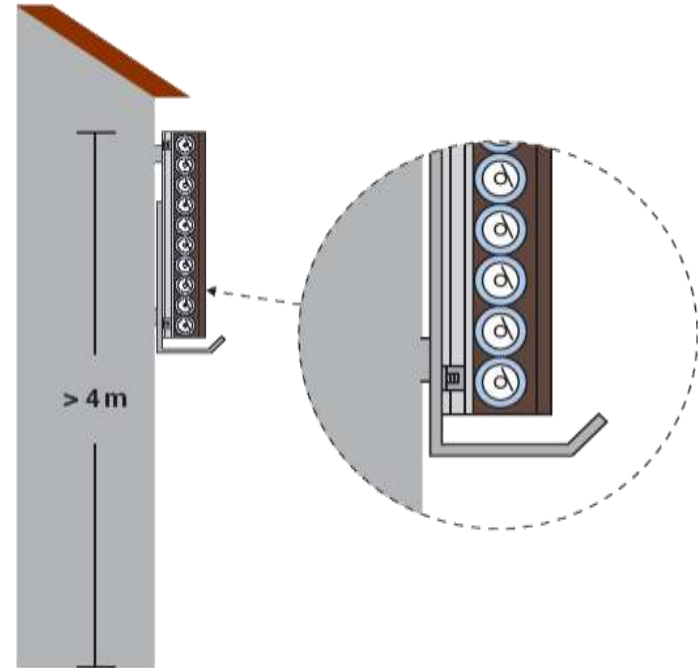
## **VITOSOL 200-T, SPE**

- Maximum tube rotation is 45°
- Angle of inclination 0° to 45°



# Vitosol 200-T, SP2A

Wall mounting - Vacuum tube collectors

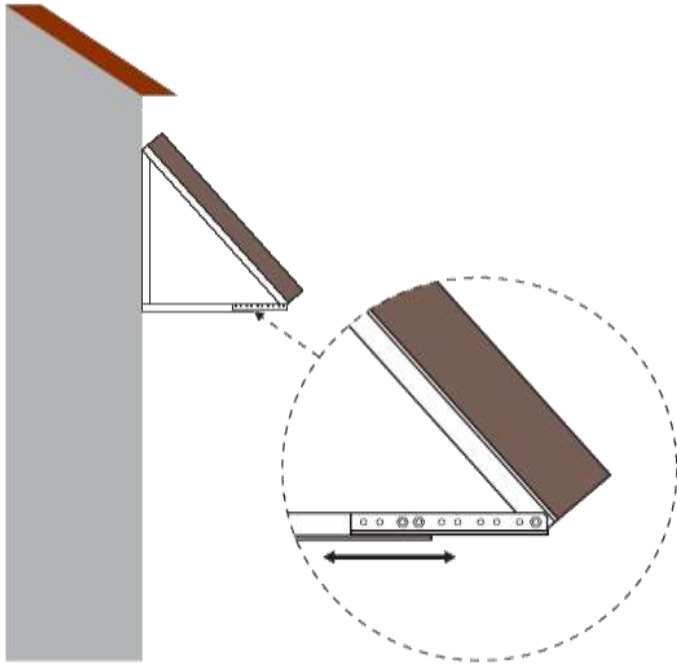


Note:

- *Viessmann hardware only available for SP2A*
- Maximum tube rotation is 25°
- Angle of inclination 65° to 90°

# Vitosol 100-F / 200-F

## Wall mounting - Flat plate collectors



- Angle of inclination adjustable between 10 - 45°
- *Viessmann hardware only available for SH series*



# VITOSOL Solar Thermal Heating Systems

DHW Solar PACK





# Vitosol DHW Solar PACK

## Packaged solar water heating systems

- Closed loop Solar water heating system
- Pre-assembled components and simple design
- For residential DHW applications
- 2 tank versions available:
  - Dual coil
  - Single coil with electric element



# Vitosol DHW Solar PACK

## Package includes:

- 2 x Vitosol 200-F, SVK collectors
- Vitocell100-W, CVBA or CVSA tank
- Factory integrated pumping station and control
- Sloped roof mounting hardware
- Other required system components\*



\* Piping between collectors and tank not included in Solar PACK. Optional pre-insulated SS piping available.

# Vitosol DHW Solar PACK

## Features:

- High performance solar collectors and storage tank
- Design matched components
- Pre-assembled pump/control station factory mounted to solar tank
- Expansion tank mounting bracket on tank
- Only 2 collector tee-fittings to install on the roof with *no tools required*
- Use Viessmann stainless steel piping system for a “solderless” solar loop
- *Low package pricing*



# Vitosol DHW Solar PACK

## Fast and easy to install:

- Smaller, lighter panels easy to handle and install
- Pre-assembled components
- Pre-wired control, pump and sensors
- Quick connect fittings



# Vitosol DHW Solar PACK

## Simple and easy to order:

- Complete solar system with *all required components*
- One part number *for easy ordering*
- Packaged on *one skid*
- *Compact footprint* with solar panels standing vertical



48" x 48" x 92"

# Solar PACK Tank Versions



## Vitocell 100-W, CVBA Dual coil tank

- 250L / 66 gal solar tank
- Top coil for reheating by boiler



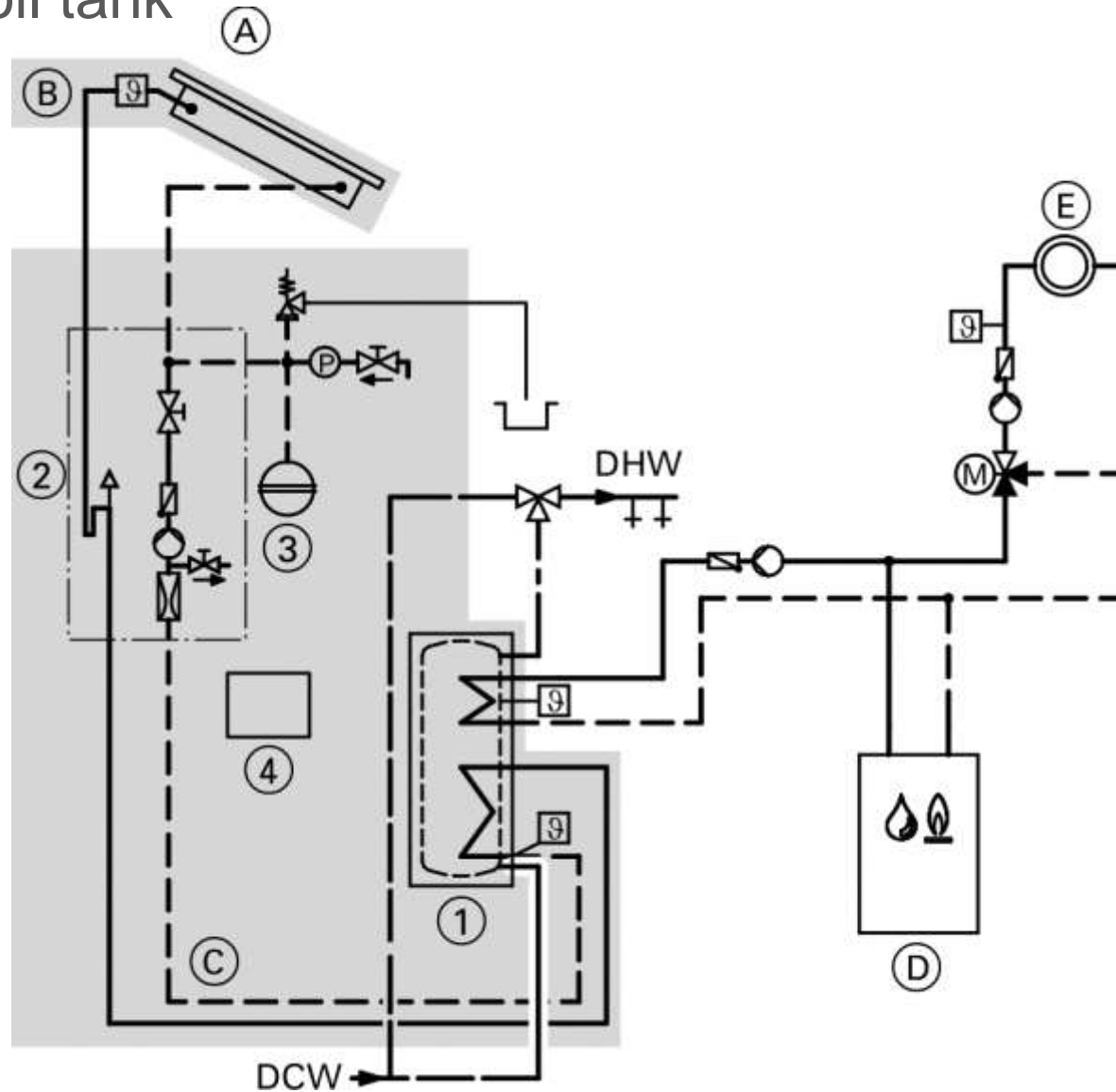
## Vitocell 100-W, CVSA Single coil tank

- 260L / 69 gal solar tank
- 4.5 kW electric Immersion element



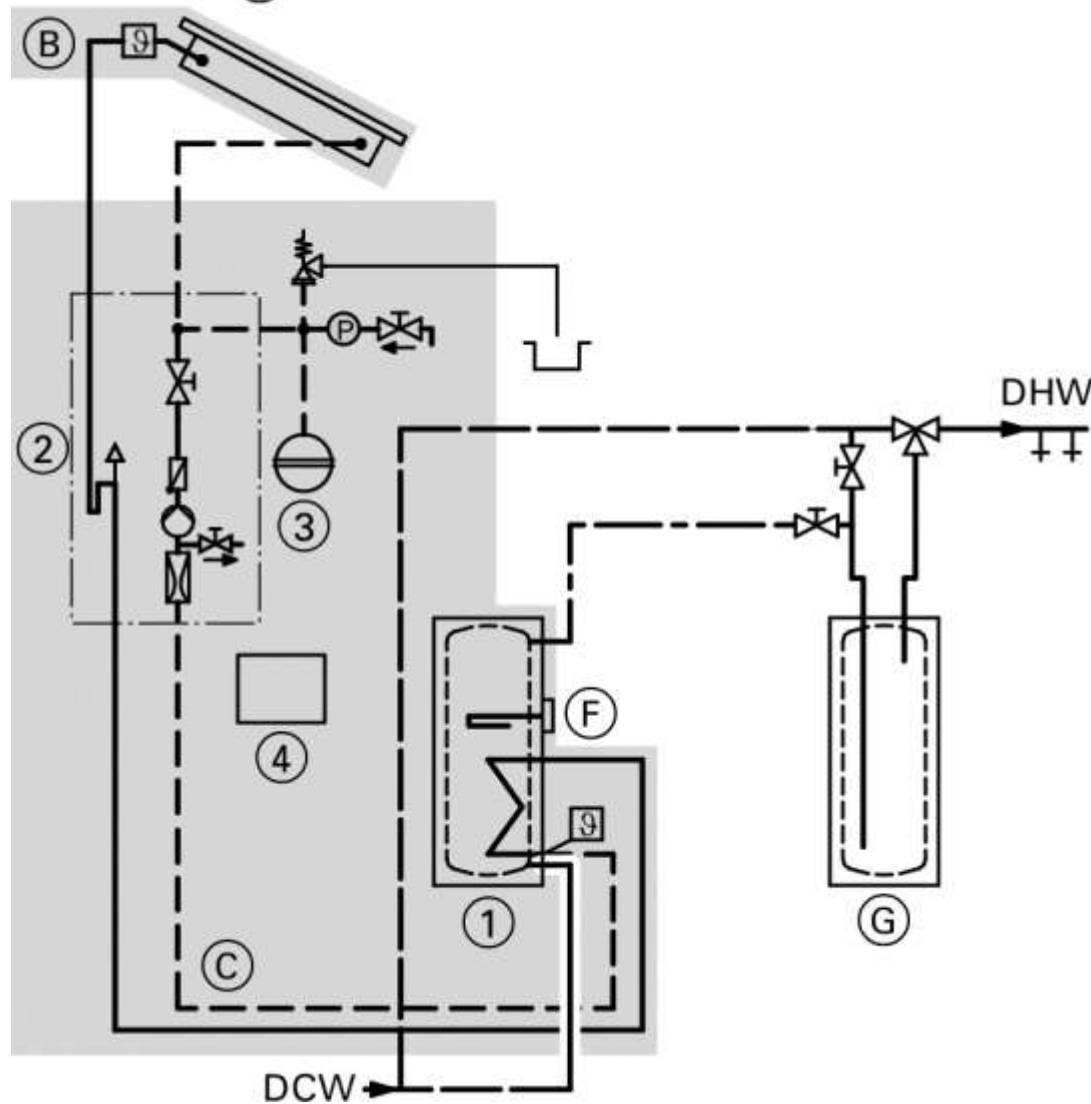
# Solar PACK Sample Piping Layout

CVBA dual coil tank



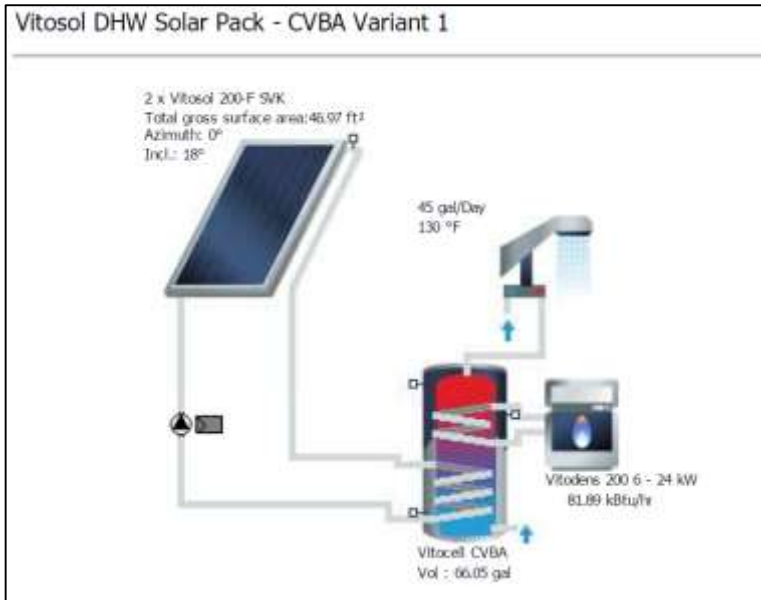
# Solar PACK Sample Piping Layout

CVSA Single coil tank



# Vitosol Solar PACK

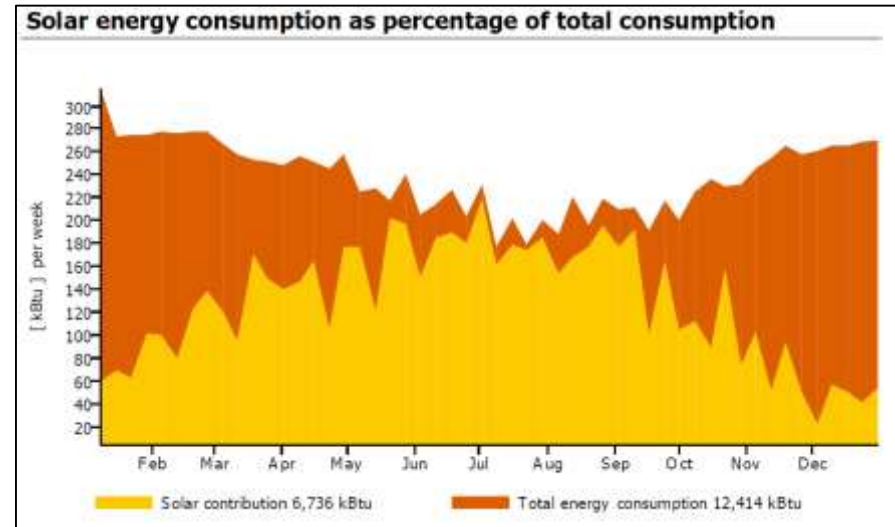
## Sample T\*SOL Simulation results



- Domestic hot water usage for 3-4 person household
- 54% solar fraction

**Results of annual simulation**

|   |             |                             |
|---|-------------|-----------------------------|
| Installed collector power:                    |             | 10.42 kBtu/hr               |
| Installed solar surface area (gross):         |             | 46.97 ft <sup>2</sup>       |
| Irradiation on to collector surface (active): | 20.77 MMBtu | 479.15 kBtu/ft <sup>2</sup> |
| Energy delivered by collectors:               | 8.73 MMBtu  | 201.37 kBtu/ft <sup>2</sup> |
| Energy delivered by collector loop:           | 6.93 MMBtu  | 159.93 kBtu/ft <sup>2</sup> |
| DHW heating energy supply:                    |             | 11.61 MMBtu                 |
| Solar contribution to DHW:                    |             | 6.71 MMBtu                  |
| Energy from auxiliary heating:                |             | 5.7 MMBtu                   |
| <b>Natural gas (H) savings:</b>               |             | <b>8.3 MMBtu</b>            |
| <b>CO2 emissions avoided:</b>                 |             | <b>1,094.58 lbs</b>         |
| <b>DHW solar fraction:</b>                    |             | <b>54.3 %</b>               |



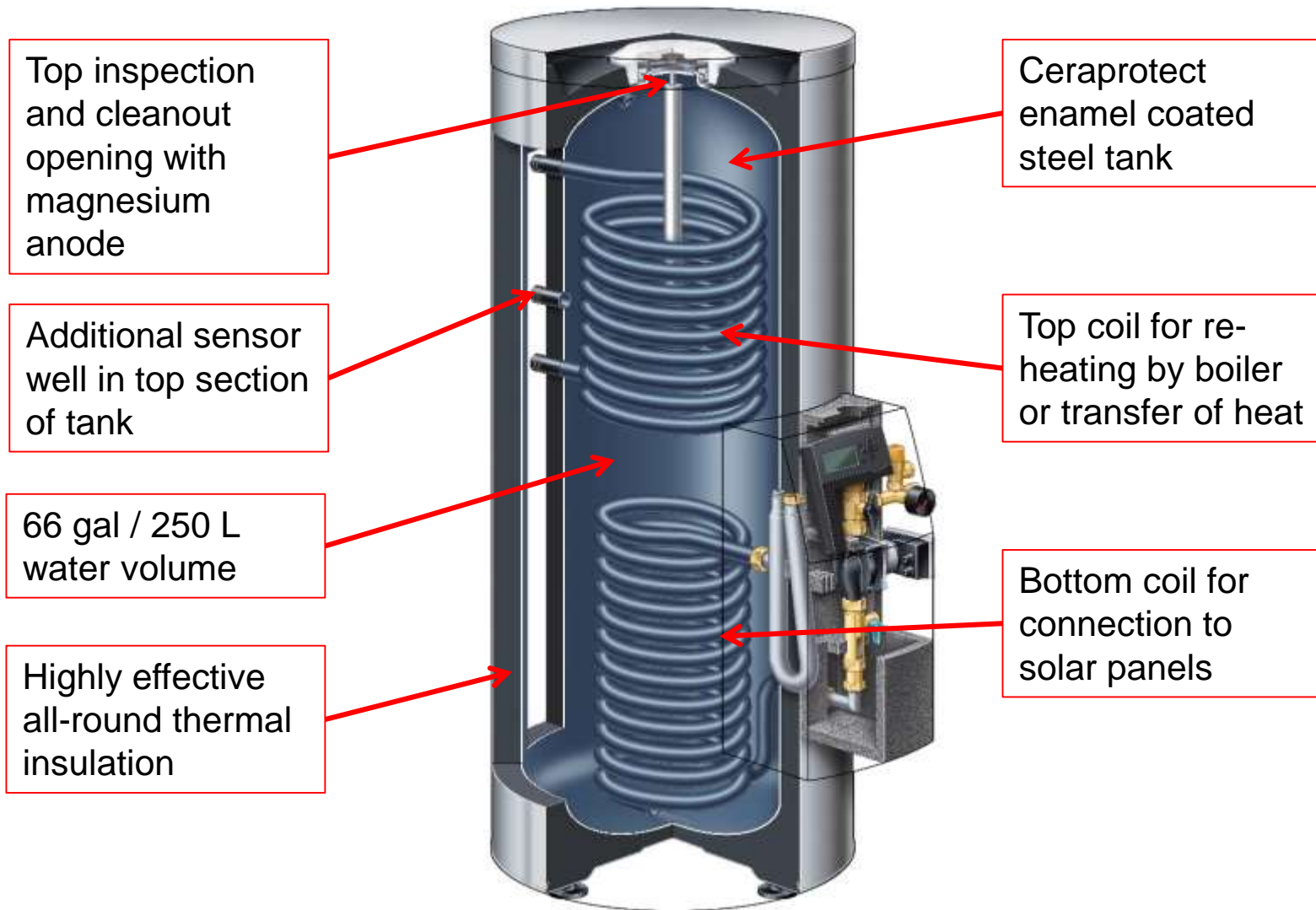
Simulation location: Waterloo, ON  
Results will vary by location

# What's in the Solar PACK?



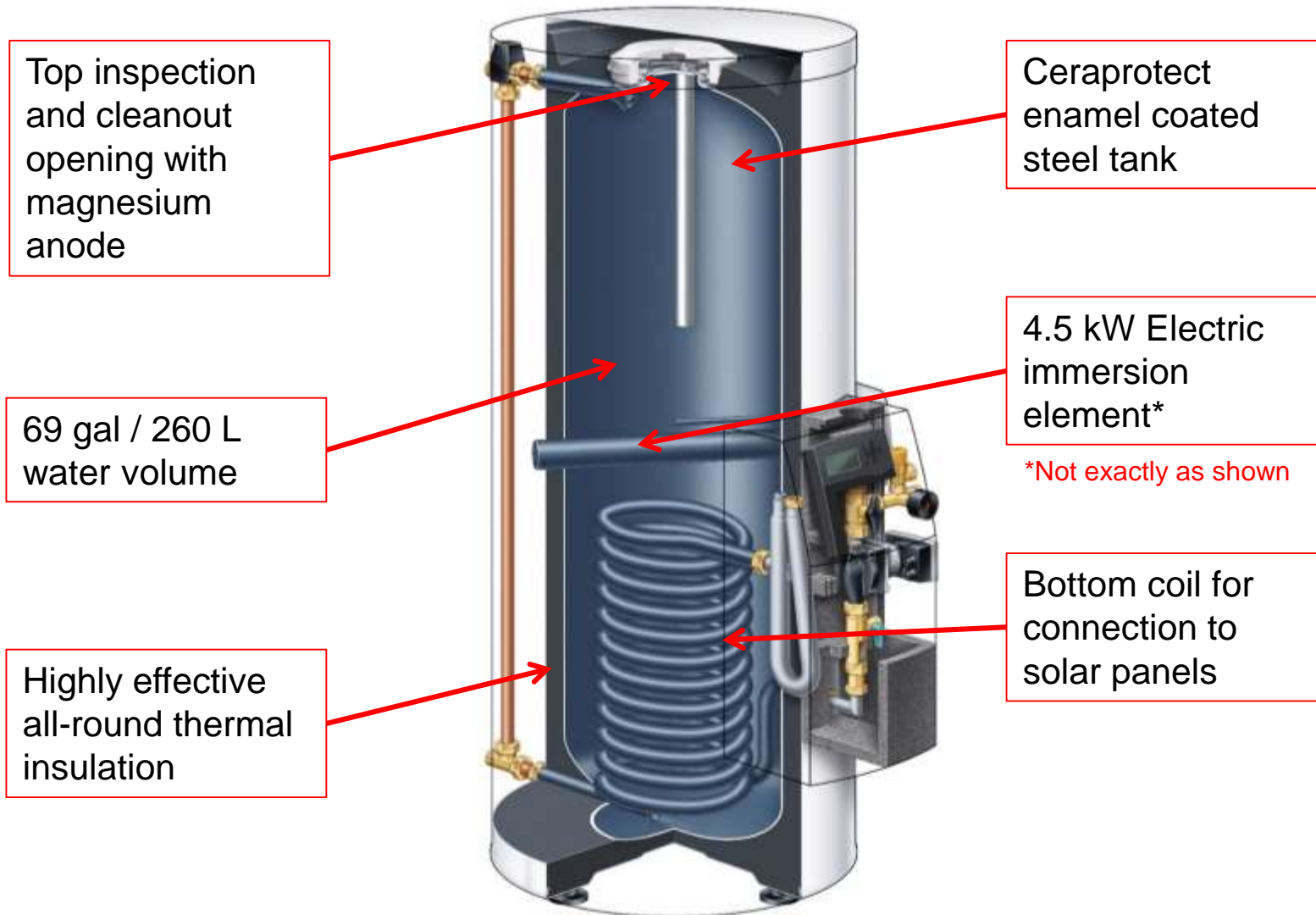
# Solar PACK Components

Vitocell 100-W, CVBA - 66 gal solar tank



# Solar PACK Components

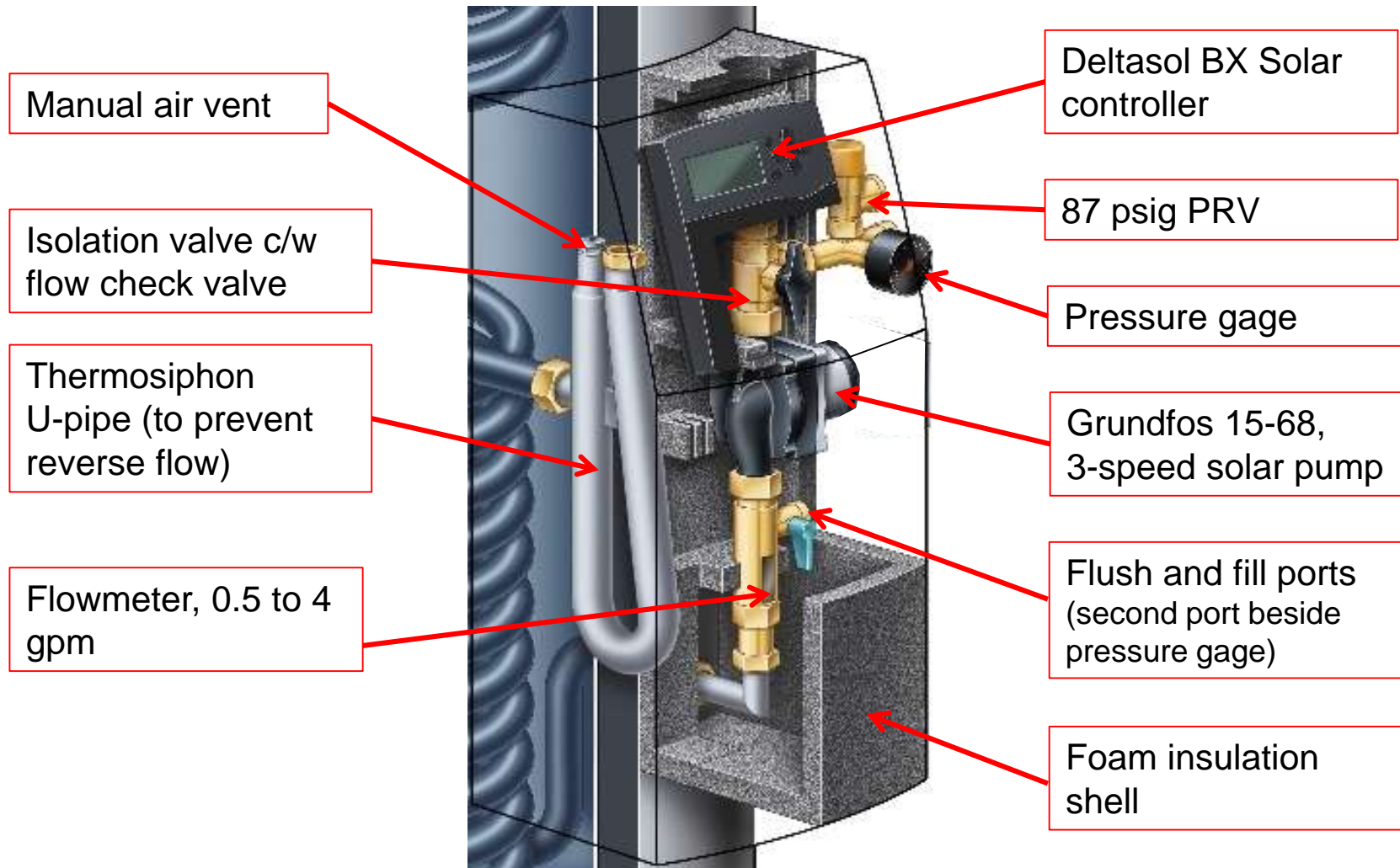
Vitocell 100-W, CVSA - 69 gal solar tank





# Solar PACK Components

## Solar-Divicon pumping station



# Solar PACK Components

## Viessmann Deltasol BX Solar Controller

- Powerful, easy to use solar control
- Power cord, solar pump, and tank sensors: *all factory wired*
- 4 relay outputs, 7 sensor inputs; allows for control of additional loads and functions
- PWM relay outputs for variable speed control of solar pump
- Data logging onto SD card
- VBus connection for accessories



\*SD card is field supplied

# Solar PACK Components

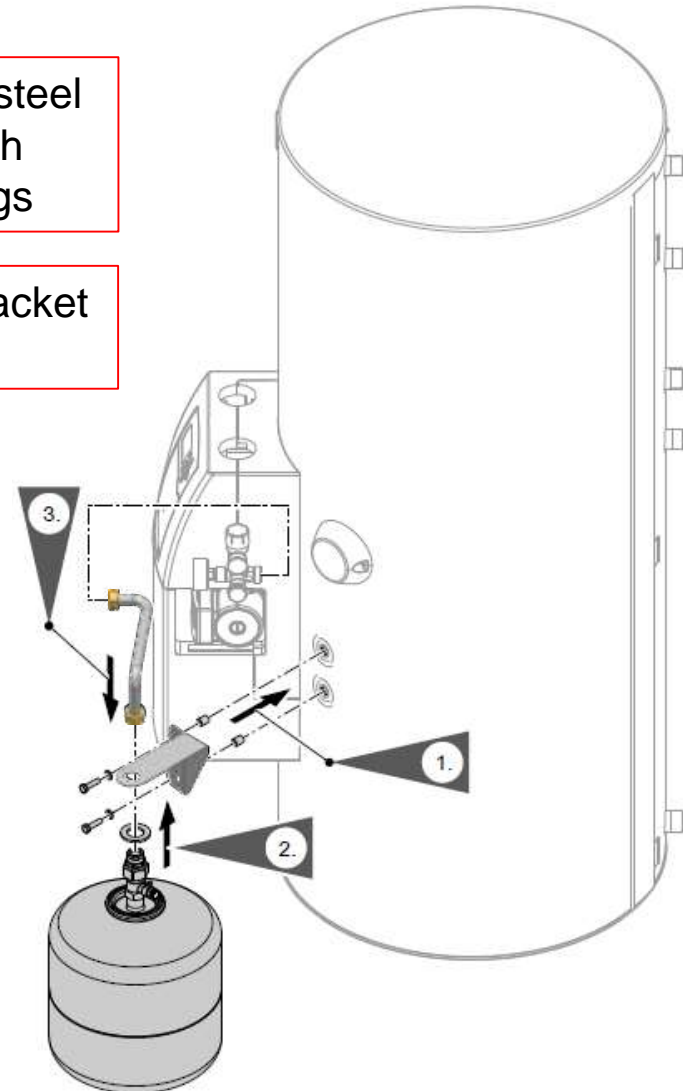
## Solar expansion tank and mounting bracket



Flexible stainless steel connector pipe with compression fittings

Tank mounting bracket and hardware

4.7 gal / 18L Solar expansion tank with service fitting



# Solar PACK Components

Vitosol 200-F, SVK collectors

## Construction:

- Highly selectively coated one-piece aluminum absorber
- Meander shaped copper piping
- One piece wrap around aluminum frame
- Low iron solar glass with permanent seal

Gross area – 23.5 ft<sup>2</sup>  
Aperture area – 21.7 ft<sup>2</sup>  
Dimensions – 81"x41"x 2.8"

No side pipe connections (eliminates use of brass plug fittings)

All pipe connections in middle of two collectors

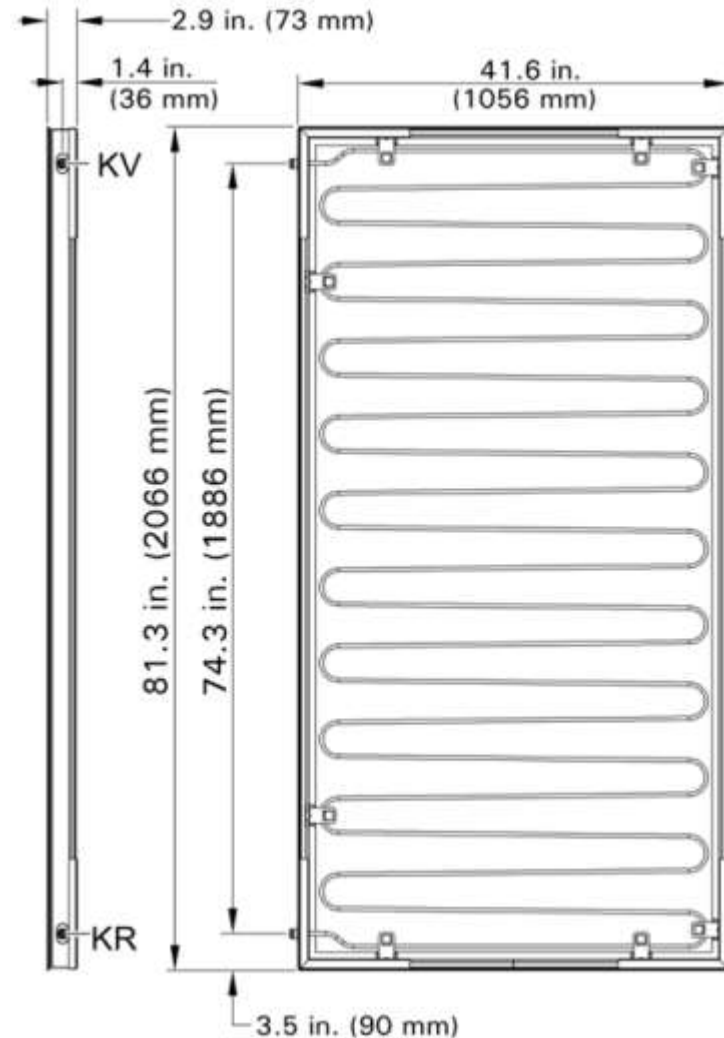


# Solar PACK Components

Vitosol 200-F, SVK collectors

Differences from existing collectors:

- No internal header pipe
- Connection fittings on one side of collector only
- 12.4" / 314 mm shorter than SV1 and SV2



# Solar PACK Components

Vitosol 200-F, SVK collector connection set

**Step 1: Attach collector mounting clip**



**Step 2: Insert Tee-fitting**



**Step 3: Push collectors together**



**Step 4: Tighten collector clip...that's it!**





# Solar PACK Components

Vitosol 200-F, SVK collector connection set



**Supply connector:** 31" insulated SS pipe  
c/w Tee fitting and sensor well



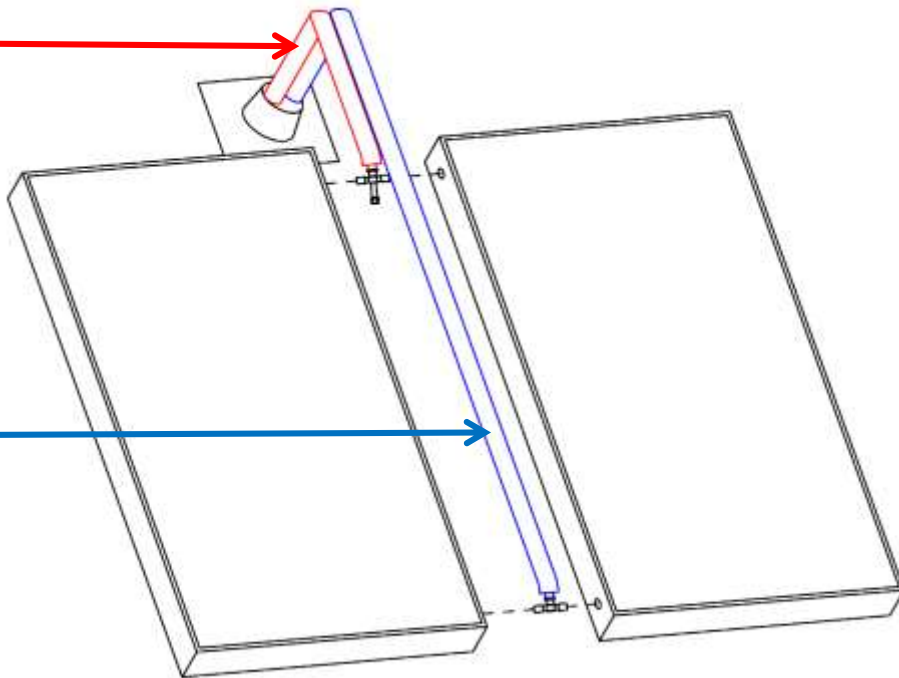
**Return connector:** 105" insulated SS pipe  
c/w Tee fitting

# Solar PACK Components

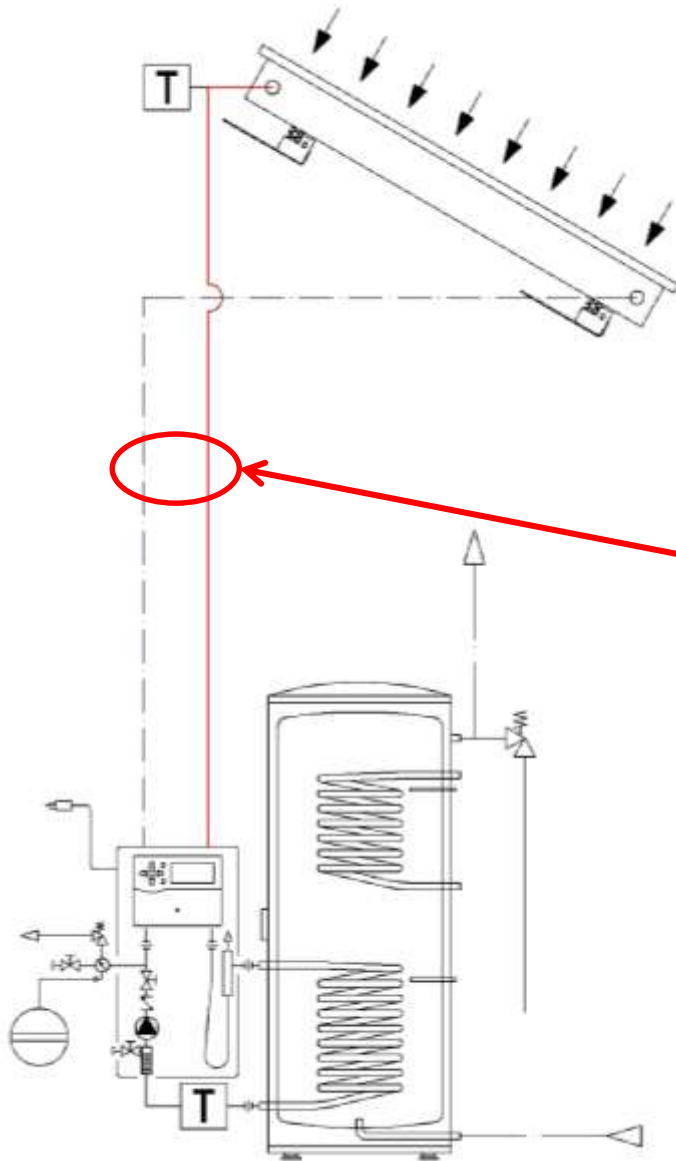
Vitosol 200-F, SVK collector connection set

Pre-insulated stainless steel  
**supply** pipe with Tee-fitting and  
built-in sensor well

Pre-insulated stainless steel  
**return** pipe with Tee-fitting



# Solar PACK Collector Piping



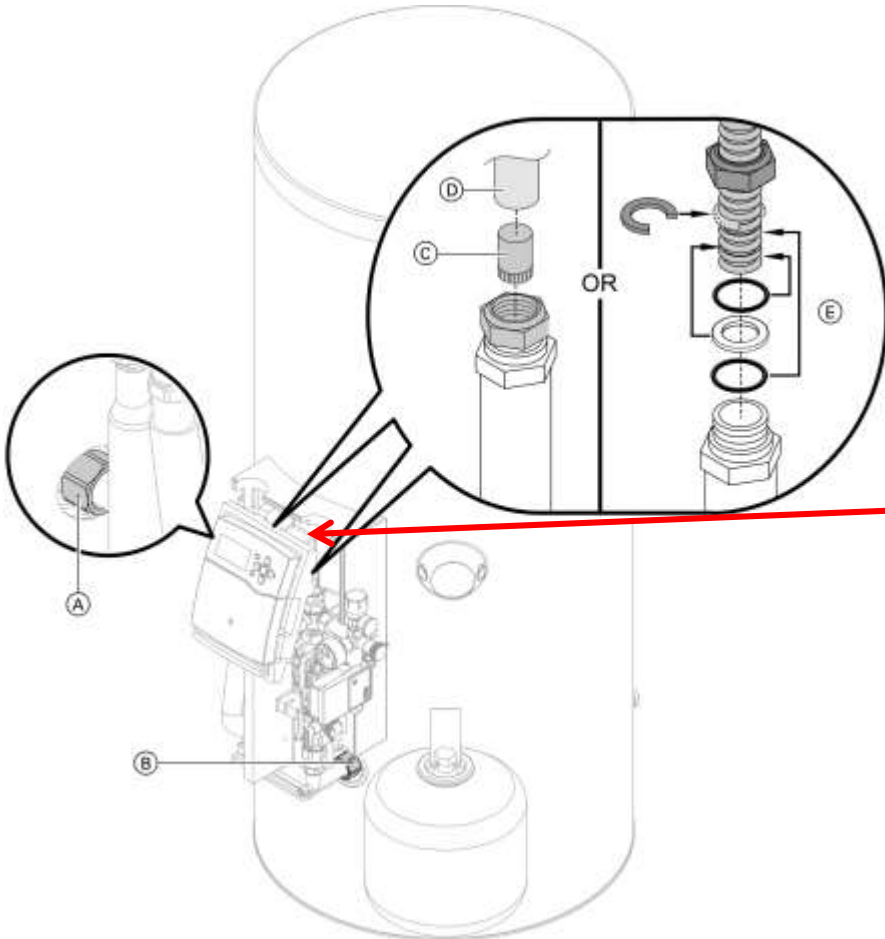
## Supply / return piping:

- **Option 1:** Viessmann pre-insulated stainless steel 1/2" lineset. Available in 20', 40' and 50' coils
- **Option 2:** 1/2" Copper + insulation + wire



\* Supply and return piping between collectors and tank not included in Solar PACK, and must be field supplied.

# Solar PACK Collector Piping



## Supply / return piping connections:

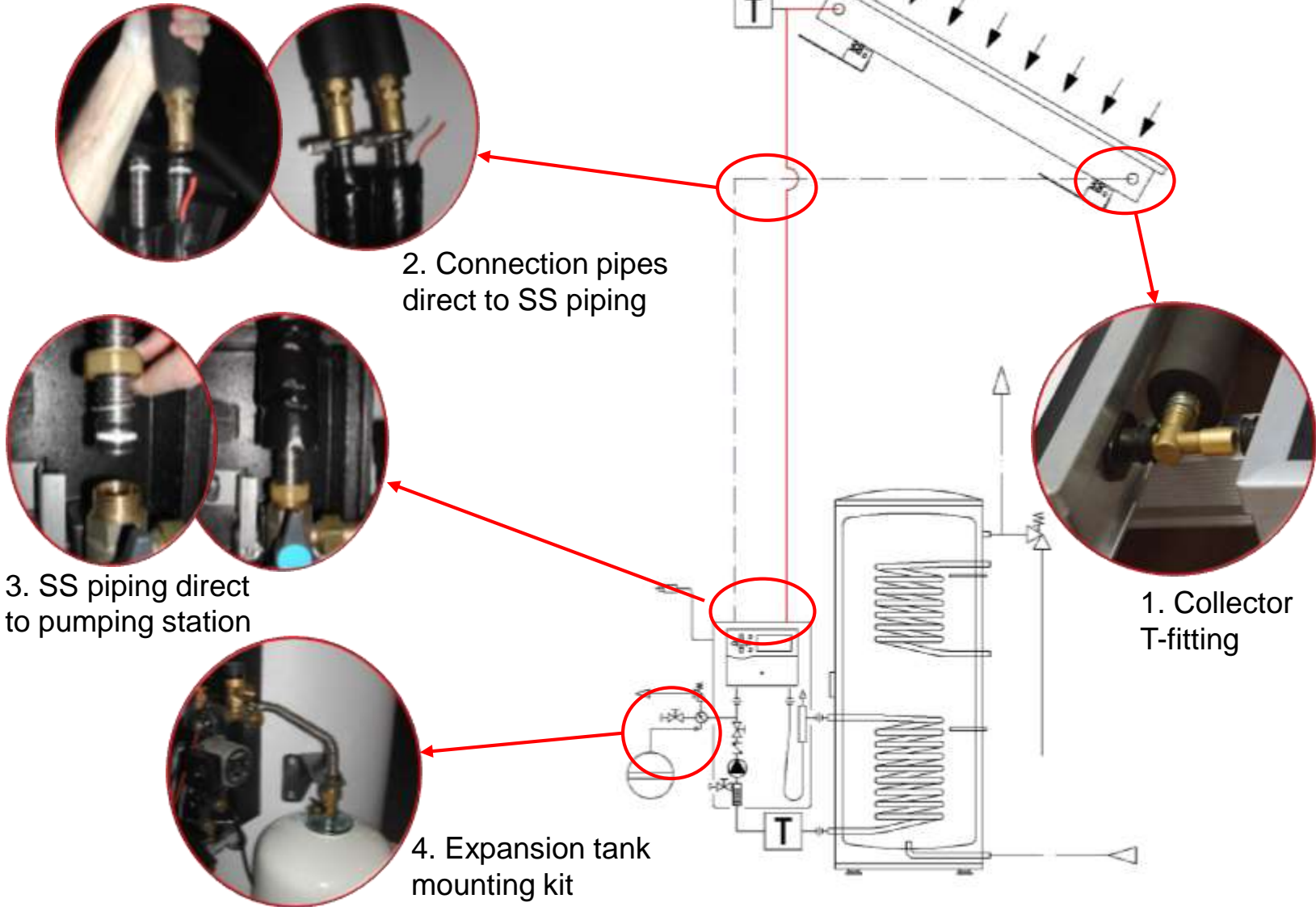
- **Option 1:** 1/2" Stainless steel lineset – compression fitting with O-rings
- **Option 2:** 1/2" Copper - with copper adaptor 22 mm x 3/4"



\* Supply and return piping between collectors and tank not included in Solar PACK, and must be field supplied.

# Solar PACK – A complete “No-Solder System”

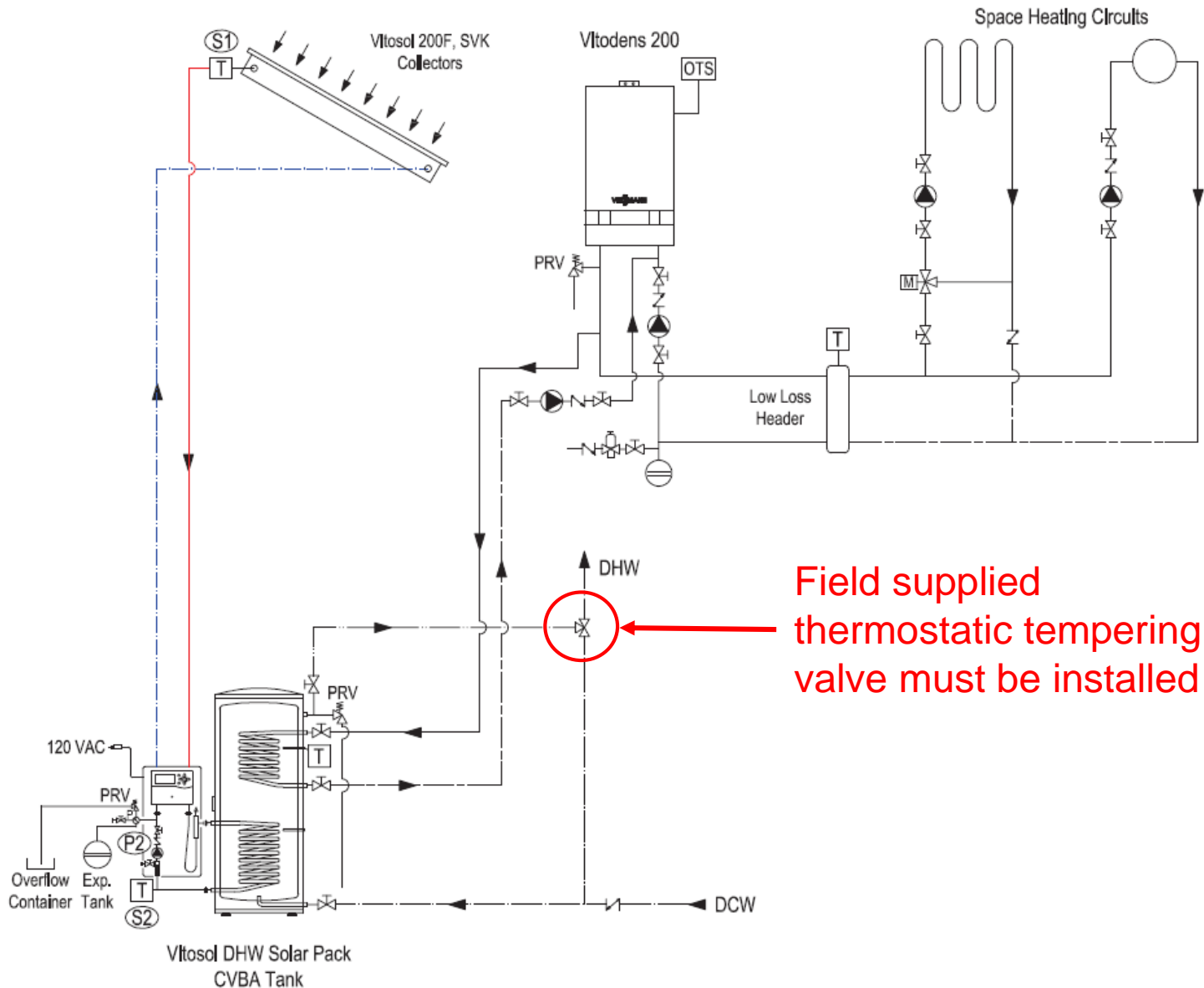
With SS pre-insulated piping





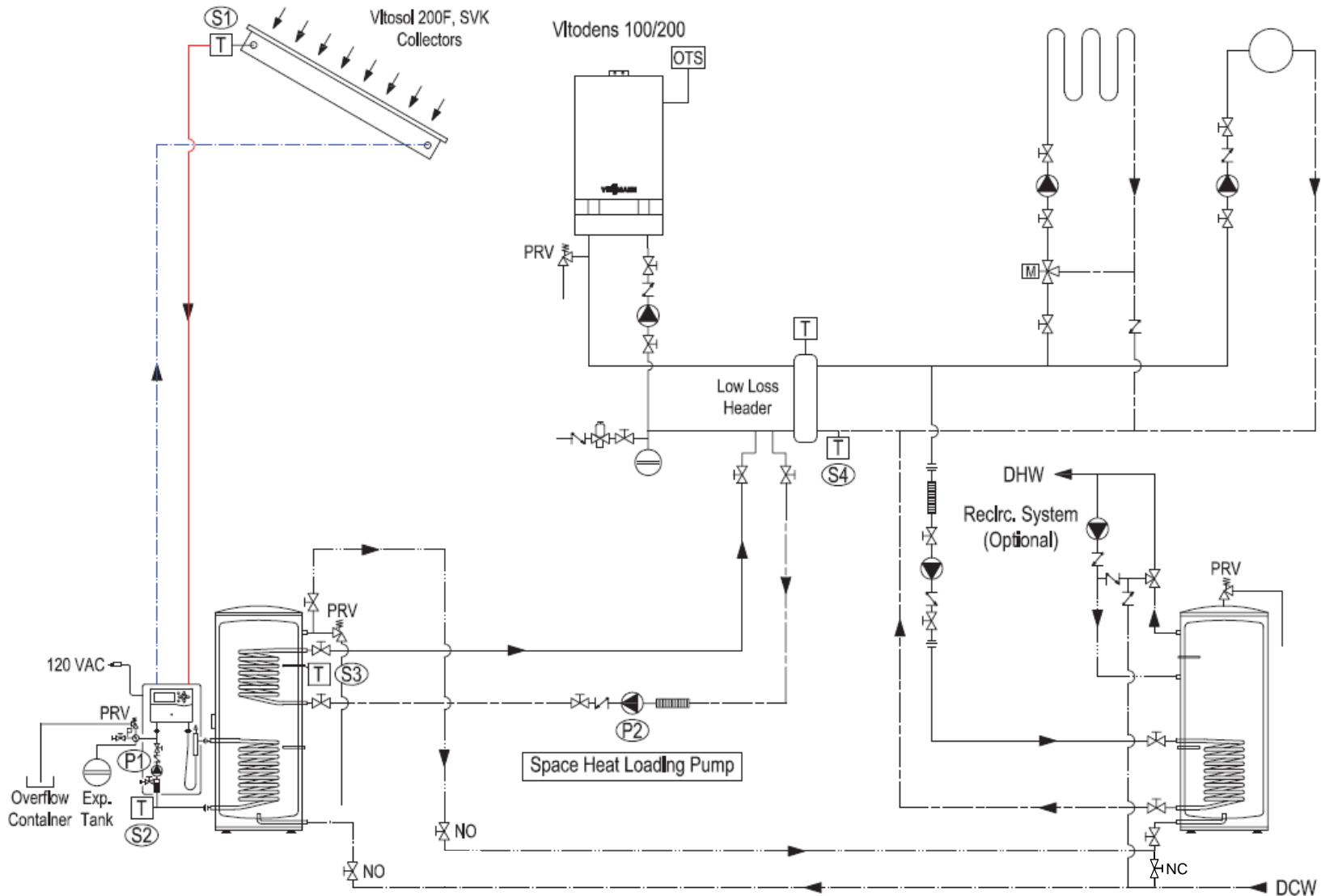
# Solar PACK Sample Piping Layout

## Solar DHW only



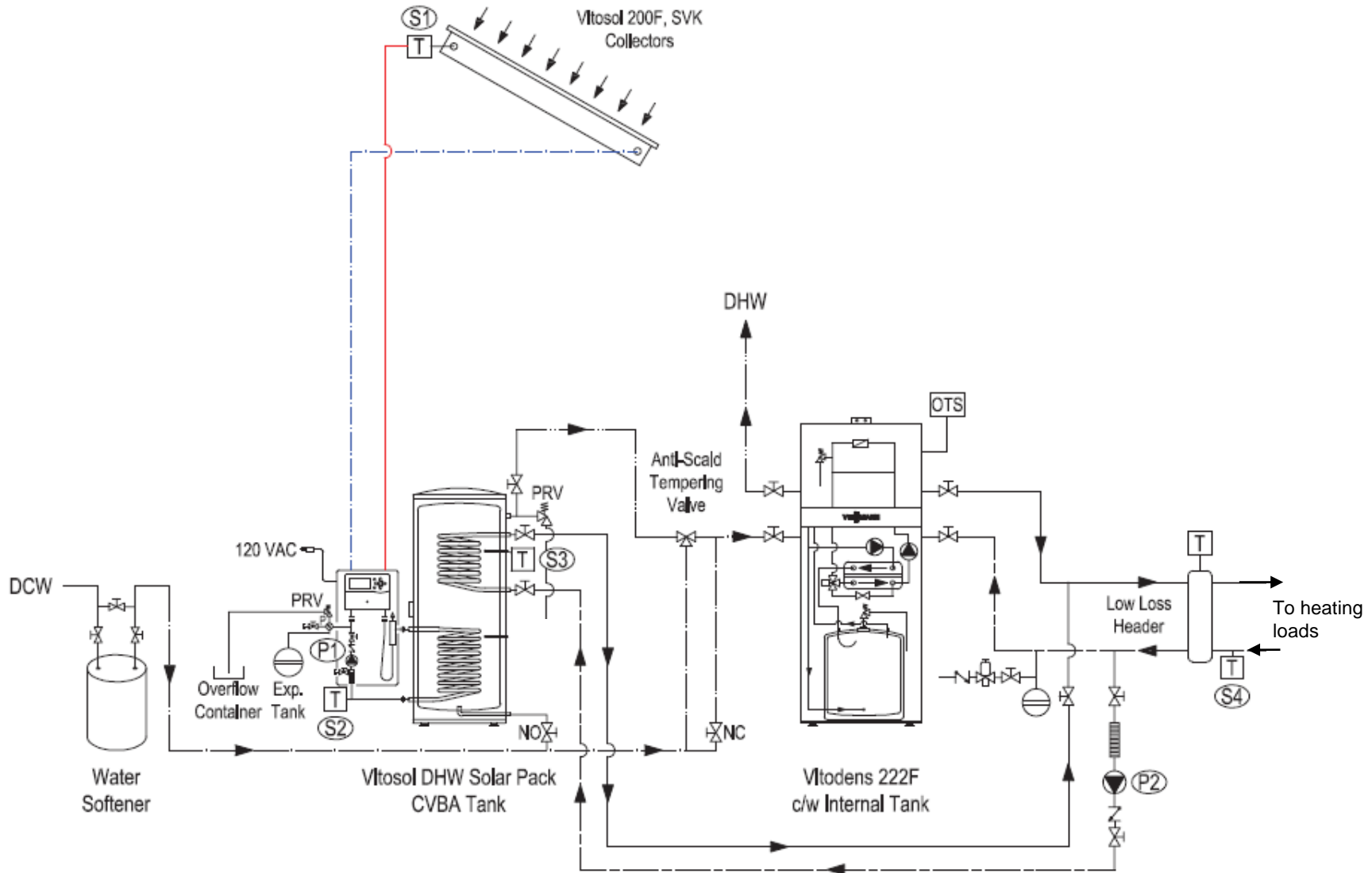
# Solar PACK Sample Piping Layout

## Solar DHW + Space heating supplement



# Solar PACK Sample Piping Layout

Solar DHW + Space heating supplement (with 222-F)



# Vitosol DHW Solar PACK

## Benefits:

- Highly efficient solar collection with high solar fraction
- Easy to order and simple to install
- Reduced number of fittings for installer to assemble
- Reduced on-site installation labor
- Reduced cost makes solar affordable for your customers



# Vitosol Solar PACK

Sales Promotion: Feb – Sept, 2015

## \$150 Rebate on Vitosol DHW Solar Pack

Viessmann Value, for our Valued Customers

Receive a \$150 rebate for each Vitosol DHW Solar Pack you buy, just follow these three simple steps.

### **1** Purchase

Purchase a Vitosol DHW Solar Pack between February 1, 2015 – September 30, 2015

### **2** Enter

Enter your company info and enter the serial number from the peel off serial number sticker for each Solar Pack (located on Vitocell Solar tank).

### **3** Submit

Click submit once the form is completed. Submit by October 15, 2015 at the latest.



# Vitosol Solar PACK

Sales Promotion: Feb – Sept, 2015

## Promotion Terms and Conditions

The following terms and conditions only apply to Viessmann's **\$150 Rebate on Vitosol DHW Solar Pack**

1. Vitosol DHW Solar Pack must be purchased from an Authorized Viessmann Stocking Wholesalers.
2. Serial numbers from the CVBA Solar tank must be provided for all claimed solar products.
3. Serial numbers will be verified with our Wholesalers for valid purchase dates.
4. Promotion valid for purchases between: February 1, 2015 - September 30, 2015.
5. Rebate cheques will be issued by December 1, 2015.
6. For Canadian contractors only.
7. Cannot be combined with any other Viessmann promotion.

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**Toll Free:** (800) 387-7373

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**Viessmann Manufacturing Company Inc.**

6350 204th Street  
Langley, BC V2Y 2V1, Canada


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**Toll Free:** (877) 853-3288

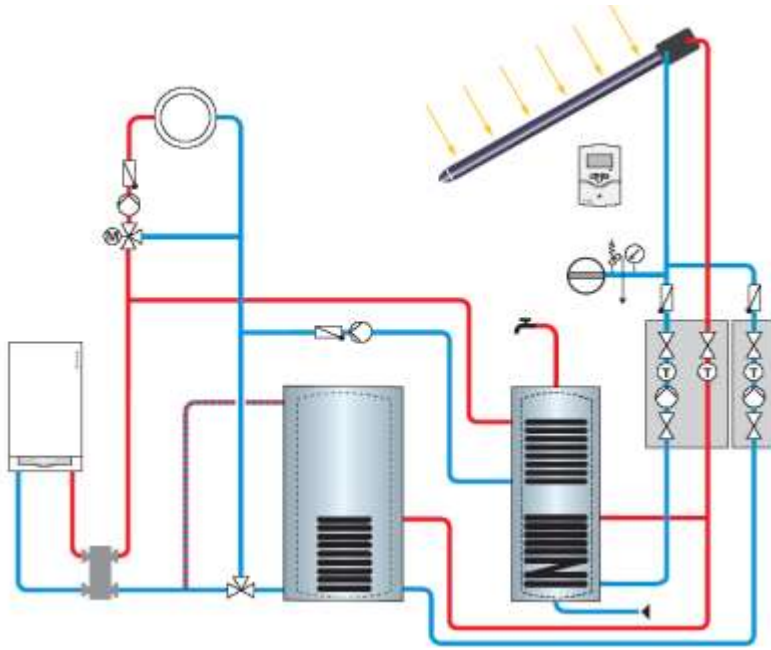
**Fax:** (604) 533-9439

# Vitosol Solar PACK

Sales Promotion: Feb – Sept, 2015

|   |  |
|---|--|
| Company Name  | Name   |
| <input type="text"/>  | <input type="text"/>                             |
| Street Address  | Email  |
| <input type="text"/>  | <input type="text"/>                             |
| City  | Work Phone Number                                |
| <input type="text"/>  | <input type="text"/>                             |
| Province  |  |
| <input type="text" value="Please Select"/>  | <input type="text"/>                             |
| Postal Code   |  |
| <input type="text"/>  |  |
| <small>All fields must be filled out.</small>   |  |
|  Earn Partner Program points when you submit your installation claim |  |
| Serial Number(s):   |  |
| <input type="text" value="Enter Serial Number"/>  | <input type="text" value="Enter Serial Number"/> |
| <input type="text" value="Enter Serial Number"/>  | <input type="text" value="Enter Serial Number"/> |

# Vitosol Support Services



**We're here to help!**

- Solar project sizing
- T\*Sol simulations
- Material list / quotation
- CAD layout drawings
- Collector spacing calcs/  
Roof layouts
- Project submittals
- System troubleshooting
- Product training
- In-field support

# Solar Project Checklist

Two versions available:

- Excel Spreadsheet
- Pdf documents
  
- ***Send in to our support team if you have a solar project***

## Solar Project Checklist



### 7. SWIMMING POOL HEATING

#### a) Pool Size:

Length: \_\_\_\_\_ ft.    Width: \_\_\_\_\_ ft.    Average Depth: \_\_\_\_\_ ft.    Pool volume: \_\_\_\_\_ gal

#### b) Pool location:

*Outdoor Pool*

Swimming season:

Opening date: \_\_\_\_\_ Closing date: \_\_\_\_\_

Geographic location:

Unsheltered     Sheltered     Well sheltered

Windshield:

None     Partial     Full

*Indoor Pool*

Pool room climate:

Air temperature: \_\_\_\_\_ °F    Relative Humidity: \_\_\_\_\_ %



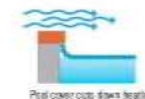
#### c) Pool heating data:

Desired pool temperature: \_\_\_\_\_ °F    Maximum pool temperature: \_\_\_\_\_ °F

Is a pool cover used?     Yes     No    If yes, hours/day used: \_\_\_\_\_ hrs

# of swimmers/day: \_\_\_\_\_    Make-up water per day: \_\_\_\_\_ gal

Is backup heating used?     Yes     No    If yes, what type: \_\_\_\_\_



### 8. SPACE HEATING SUPPORT

Size of heated area: \_\_\_\_\_ ft<sup>2</sup>    Design building heat load: \_\_\_\_\_ btu/hr @ \_\_\_\_\_ °F

High temp heating (radiator/fan coil)    System temp: \_\_\_\_\_ °F    % of building heated: \_\_\_\_\_ %

Low temp heating (radiant floor)    System temp: \_\_\_\_\_ °F    % of building heated: \_\_\_\_\_ %

Installed boiler output: \_\_\_\_\_ MBH    Fuel type: \_\_\_\_\_



### 9. SPACE COOLING SUPPORT

Size of cooled area: \_\_\_\_\_ ft<sup>2</sup>    Design building cooling load: \_\_\_\_\_ (btu/hr / tons / kW)

Installed chiller output: \_\_\_\_\_ tons    Cooling season (which months): \_\_\_\_\_

Existing cooling tower?     Yes     No

Existing reheating type:     Electric     Gas     Steam    Capacity: \_\_\_\_\_ btu/hr

#### Additional comments:

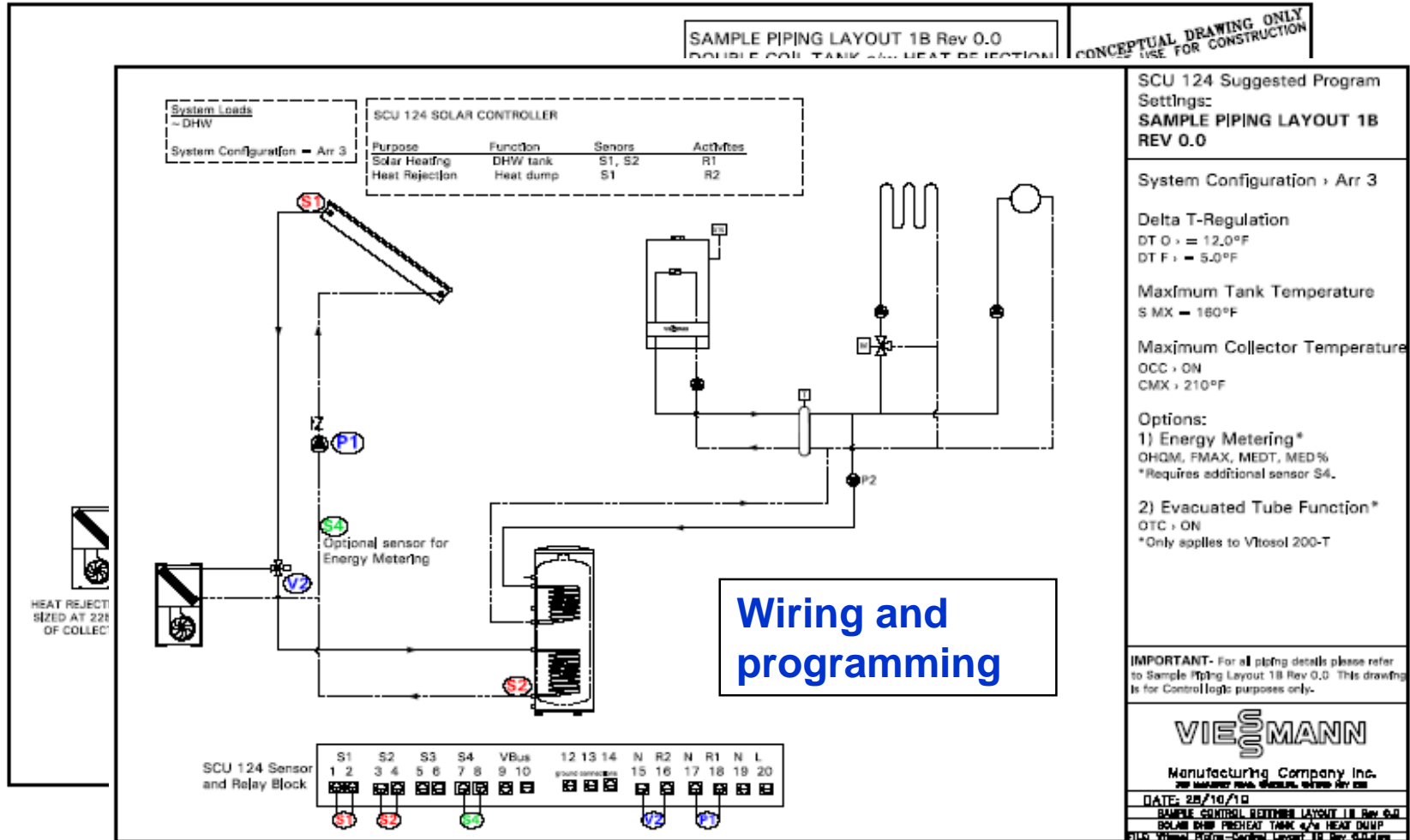
Please fill out as completely as possible, then return to the appropriate Solar Project Support department at Viessmann:

|         |              |  |                     |                       |
|---------|--------------|--|---------------------|-----------------------|
| USA:    | Warwick, RI, | email <a href="mailto:us_solar@viessmann.com">us_solar@viessmann.com</a> , | Fax (401) 732-0590, | Phone (401) 732-0667. |
| Canada: | Waterloo, ON | email <a href="mailto:roy@viessmann.com">roy@viessmann.com</a> ,           | Fax (519) 885-5432, | Phone (885) 885-6300. |
|         | Langley, BC  | email <a href="mailto:bous@viessmann.com">bous@viessmann.com</a> ,         | Fax (604) 533-9439  | Phone (604)-533-9445  |

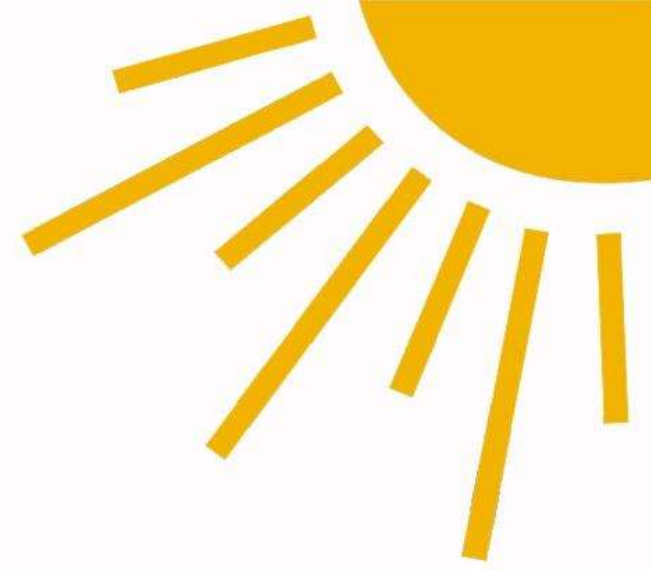
Include separately all necessary site drawings, sketches, utility bills, photos and project notes. The Checklist is reviewed and you will be contacted with receipt acknowledgement and questions within 48 hrs. An analysis of solar performance, list of Viessmann materials, and generic system schematic will usually be returned to you within five to seven business days of receipt of ALL information.

**NOTICE:** Any information that is unknown, or not supplied, will require us to make assumptions. This may result in inaccurate performance estimates, and can sometimes lead to oversized systems. Viessmann strongly encourages that all buildings seriously considering installing a Solar System have the hot water consumption metered, to ensure a properly sized and efficient SDHW system.

# Sample Piping Layout Drawings







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