

# Guidelines to calculate annual solar energy savings for domestic solar water heaters produced by adding a solar preheater to an existing gas hot water system

## Version 3.0 updated June 2011

### Annual solar energy savings calculation methodology for domestic solar water heaters

To determine the annual solar energy savings for a solar water preheater for inclusion on Sustainability Victoria's list of preheaters approved for a rebate, use the following methodology:

#### 1. OVERVIEW

Modelling shall be conducted in the same manner as for a complete packaged solar water heating system as specified in the General Guidelines document 'Guideline to calculate annual solar savings for domestic SWH' available on the Sustainability Victoria website, with modifications as outlined in this guideline.

As there is no conventional heat source included as part of the pre-heater, a generic gas storage water heater (post heater) shall be included for the modelling of Annual Energy Savings.

Modelling shall be conducted to AS/NZS 4234:2008 using the TRNSYS program or extensions of the software in the TRNSYS modelling package, to determine the relative solar fraction in Southern Victoria (Zone 4). The command file Preheater.dck for TRNSYS shall be used for modelling, available for download on the Sustainability Victoria website. The characteristics of the components to be used in the model are specified below.

#### 2. POST HEATER CHARACTERISTICS

The characteristics of the heater are defined in the table below:

Tank volume	170	Litres
Burner rate	28	MJ/hr
Burner efficiency	78.8	%
Maintenance rate	0.88	MJ/hr
Thermostat temperature	65	°C
Thermostat differential	10	K
Tank inner diameter	400	mm

#### 3. PLUMBING CHARACTERISTICS

The characteristics of the plumbing between tank and solar collector(s) are defined in the following table:

Inlet pipe inner	10.9	mm
------------------	------	----

Guidelines to calculate annual solar energy savings for domestic solar water heaters produced by adding a solar preheater to an existing gas hot water system. Version 3.0 June 2011

diameter		
Inlet pipe length if pre-heater tank is roof mounted	10	m
Inlet pipe length if pre-heater tank is on the ground	5	m
Inlet pipe insulation material thermal conductivity	0.038	W/mK
Inlet pipe insulation thickness	10 <sup>1)</sup>	mm

Note: <sup>1)</sup> If a higher grade of insulation is supplied as part of the solar preheater the thickness of the supplied insulation material may be used.

#### 4. CALCULATION METHOD

1. Configure model as a pre-heater to a gas storage water heater, defined in Sections 2 and 3 above.
2. Simulate the model for the chosen load following the requirements of the General Guidelines. If the model fails to meet a 60% solar saving then a lower load should be selected. If the product fails to meet this condition under the small load, the product does not qualify

Please direct queries regarding these guidelines to:

SHW Registry Team, Sustainability Victoria  
Level 28/50 Lonsdale St  
Melbourne 3000

Ph: 1300 366 195 or 03 8626 8700

Fax: 03 9663 1007

Email: [shw.registrations@sustainability.vic.gov.au](mailto:shw.registrations@sustainability.vic.gov.au)