

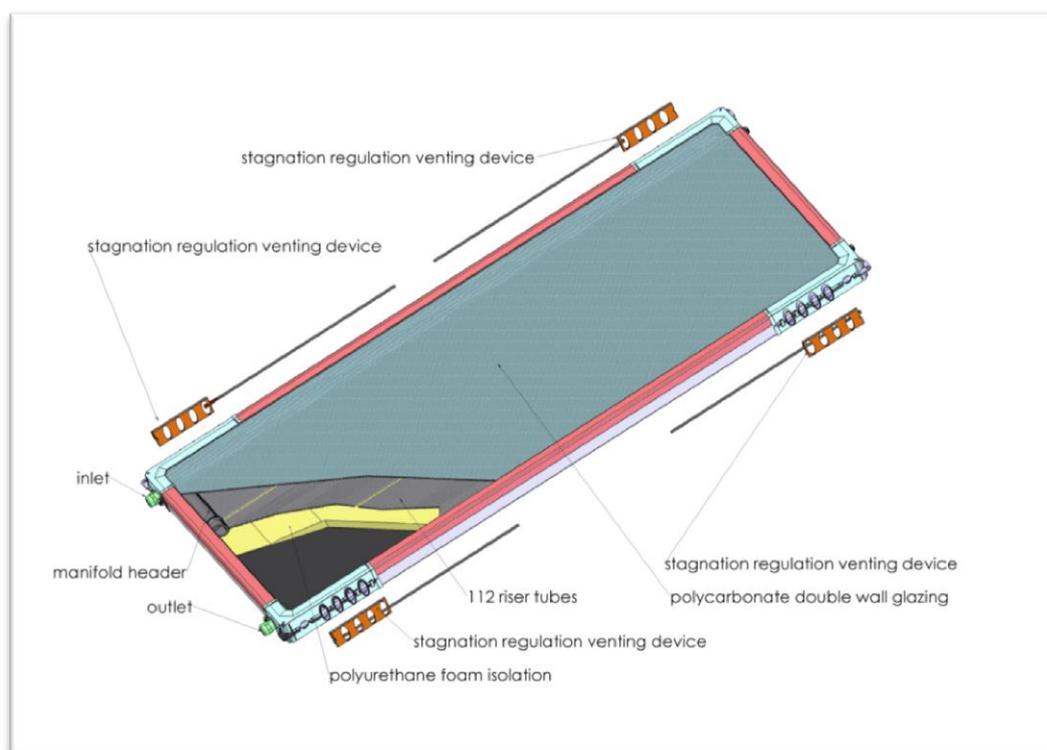
Thermal limitation of glazed collector for DHW INFO Sheet B6

Description:	<i>Dry stagnation Overheating protection based on automatic venting of collector casing.</i>
Date:	May 2015
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Introduction

A plastic collector using a Polyolefin absorber, a Nylon glass reinforced casing and a double wall Polycarbonate glazing were designed. In order to limit the dry stagnation temperature to an acceptable level (120 °C) it was necessary to invent a venting system which would function without external intervention.

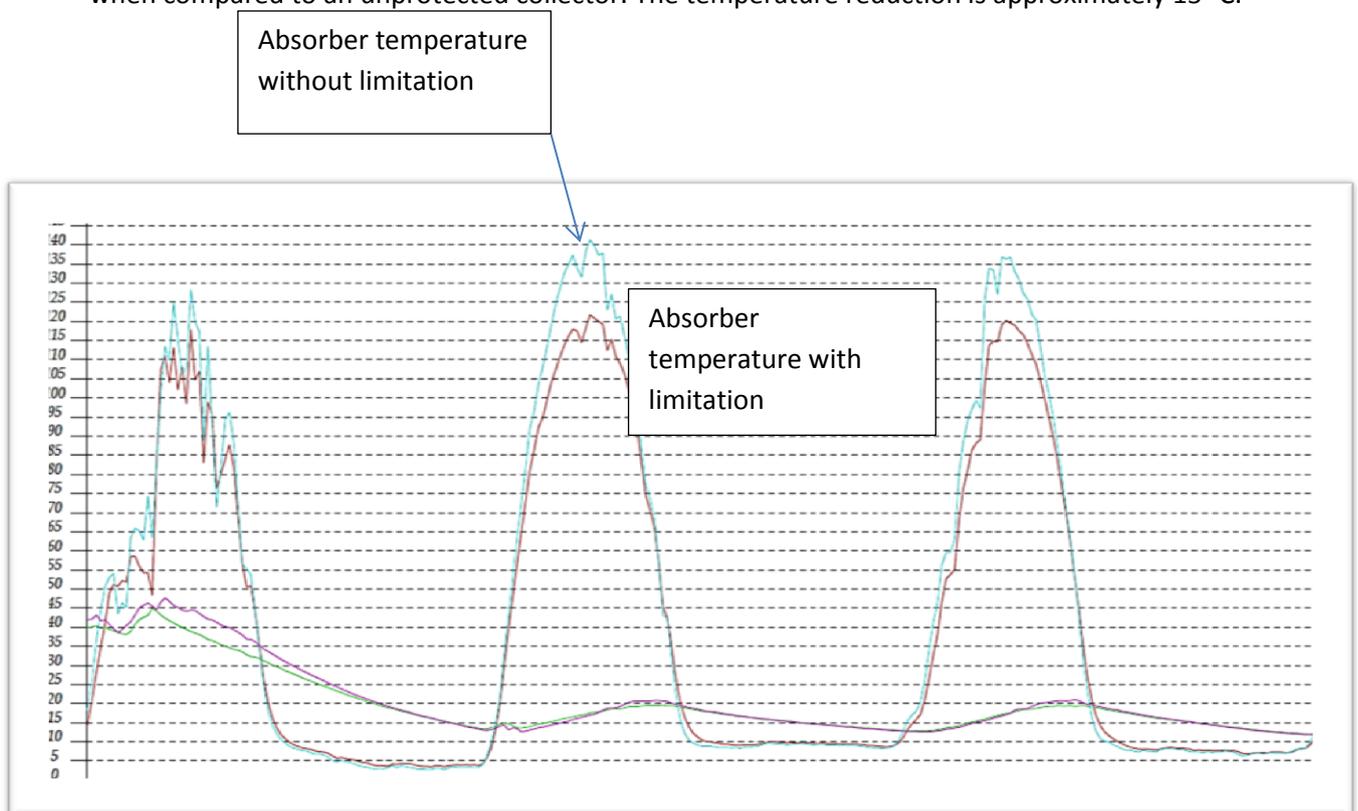
The polyolefin absorber will expand due to its inherent thermal expansion coefficient. This change in total length of approximately 30 mm is exploited to open particularly designed venting orifices situated on the lateral sides of the collector frame. This automatically controlled device produces a thermo-gravitational air flow throughout the collector casing and reduces the stagnation temperature to an acceptable level for the specially formulated heat resistant polyolefin used for the absorber.
NB: this system is patented by Magen-Eco –energy.



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Measurements and results:

- 1) The effectiveness of the system is influenced by the installation angle of the collector. The upper vents should be situated higher above the lower vents in order to generate a thermo-gravitational air flow. Thus an installation angle of 45° will produce better results compared to a 30° angle.
- 2) Temperature tests measured during the months June, July, August 2012 in the Negev climate at Kibbutz Magen (Israel) showed that this collector system installed at an tilt angle of 39° limited the absorber dry stagnation temperature at its upper position (2/3 height) to a maximum of 128 °C when compared to an unprotected collector. The temperature reduction is approximately 15 °C.



TYPICAL MEASUREMENTS: 3 days in JULY 2012:

Max radiation 1015 W/m² and maximum ambient air temperature 35 °C