



Summary collector efficiency test

Subject: Collector EURO-FK SV 2300, SOLIMPEKS Solar Energy Systems Co., Konya, Turkey.

The summary is based on the test report 11-02/D of the Institut für Solarenergieforschung (ISFH) Hameln, Germany.

The prediction is based on the calculation of the yearly energy gains of the collector in a reference solar hot water system. This system is designed for a four-person-household. The calculation is done for aperture areas of 3, 4, 5 and 6 m² as well as for reference climate data of Hannover, Würzburg und Stötten (Ostalb).

collector characteristics (based on aperture area)			
conversion factor	heat transfer coefficient		area related heat capacity
$\eta_0 = 0.772$	$a_1 = 3.84 \text{ W/(m}^2\text{K)}$	$c = 4.6 \text{ kJ/(m}^2\text{K)}$	
	$a_2 = 0.011 \text{ W/(m}^2\text{K}^2)$		
incidence angle modifiers	$K_{90}(50^\circ) = 0.88$	incident angle modifier for direct solar radiation, incident angle 50°	
	$K_{90} = 0.82$	incident angle modifier for diffuse solar radiation	
system data of the ITW reference solar hot water system			
roof orientation:	south; tilt angle equal to latitude		
collector piping:	15 m each to store, from store; nominal value DN 16; insulation thickness 25 mm, $\lambda = 0.04 \text{ W/(mK)}$, one half of each pipe is located outside, the other half is located inside		
storage:	volume 300 l heat loss rate 2.2 W/K; ambient temperature 15°C volume auxiliary 135 l; set temperature 60 °C stratification number 100: effektive vertical heat conductivity $2 \lambda_{\text{water}}$		
heat:	immersed heat exchanger, $(kA)_{WT} = 9 \text{ W/(m}^2\text{K)}$; aperture area $\cdot c_w^{0.5}$, (t_m = average value of heat exchanger inlet temperature and local storage temperature in °C)		
warm water consumption:	200 l/day (7 ^{AM} : 80 l; 12 ^{AM} : 40 l; 19 ^{AM} : 80 l); cold water temperature 10 °C; hot water temperature 45 °C; annual consumption: 2936 kWh/a		
calculation results			
location	Hannover	Würzburg	Stötten
radiation [kWh/(m ² a)]	1022	1212	1354
aperture area [m ²]	yearly energy gain ¹⁾ [kWh/(m ² a)]		
3	445	536	586
4	408	492	536
5	376	450	489
6	348	412	445

¹⁾ energy gain of the collector without heat losses in the tubes and hot water store

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