

ARCON solar collector - type HT 28/8

Data

External dimensions:	2.27 x 5.96 x 0.14 m
Gross area:	13.57 m ²
Aperture area:	12.56 m ²
Weight, excl. fluid:	250 kg
Fluid content:	6.7 litre

Efficiency

$$\eta = \eta_0 - \frac{a_1 \cdot (T_m - T_a)}{G} - \frac{a_2 \cdot (T_m - T_a)^2}{G}$$

where:

T_a	= Ambient temperature [°C]
T_m	= Mean fluid temperature [°C]
G	= Irradiance [W/m ²]

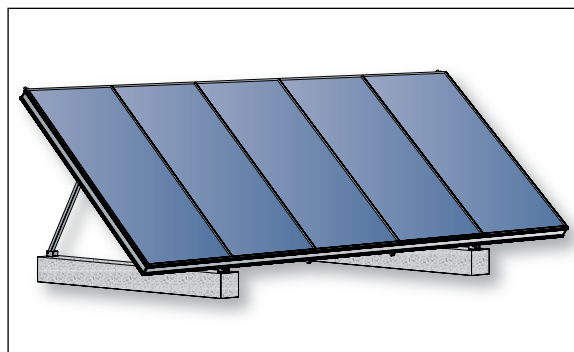


Figure 1: HT collector mounted on concrete foundations

Efficiency based on aperture area of 12.56 m², a flow of 25 ltr/min and a wind velocity of 3 m/s:

η_0	= 0.801
a_1	= 3.367 [W/(m ² K)]
a_2	= 0.010 [W/(m ² K ²)]

Conditions:

Fluid	= 40 %
Flow	= 25 L/min
Irradiance [G]	> 800 W/m ²

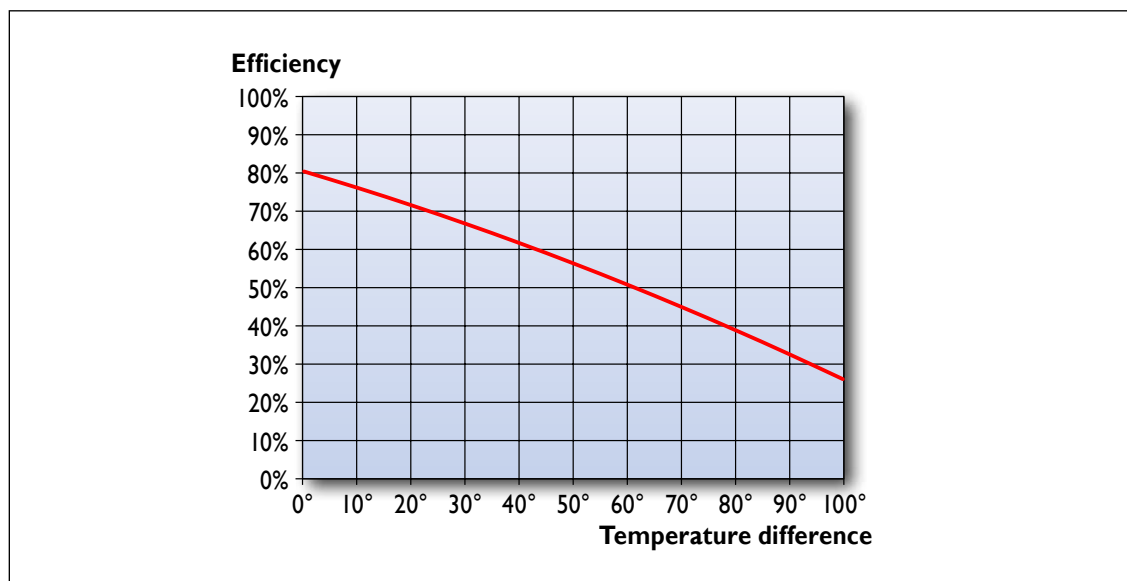


Figure 2: Efficiency graph (G = 800 W/m²)



ARCON Solar A/S
Skørping Nord 3
DK-9520 Skørping
Tel. +45 98 39 14 77
arcon@arcon.dk
www.arcon.dk

Collector power output [W]			
Temperature difference [K] $T_m - T_a$	Irradiance [W/m ²]		
	400	700	1000
10	3656	6675	9693
30	2846	5864	8882
50	1934	4952	7971
70	922	3941	6959

Figure 3: Collector power output at different irradiance, without wind

Absorber

Type: Selective - Alanod
 Material: Copper/aluminum
 Coating: Mirotherm, $\alpha > 0.95$; $\varepsilon < 0.05$
 Pipe system: 18xØ8 parallel pipes and 2xØ28 distribution pipes
 Sectional area: 40 mm²
 Material thickness: 0.5 mm

Finish

Number of layers: 1
 Material: Low iron glass
 Thickness: 3.2 mm

Connection

Stainless flex tube: 2 x 28 mm

Insulation

Back side: 75 mm mineral wool
 Side: 30 mm mineral wool

Pressure

Recommended max. working pressure: 10 bar
 Testing pressure: 13 bar
 Maximum flow: 3.3 m³/h

Incidence angle modifiers

$$K_{\theta} = 1 - \tan^a (\theta / 2)$$

where:

θ = incidence angle [°]

a = exponent (4.51)

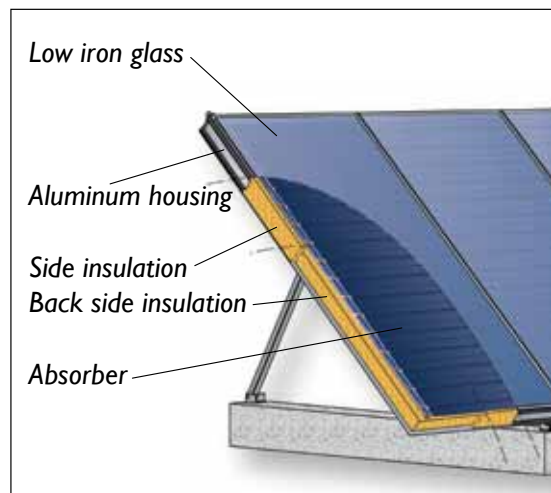


Figure 4: Cut through HT solar collector

Pressure loss

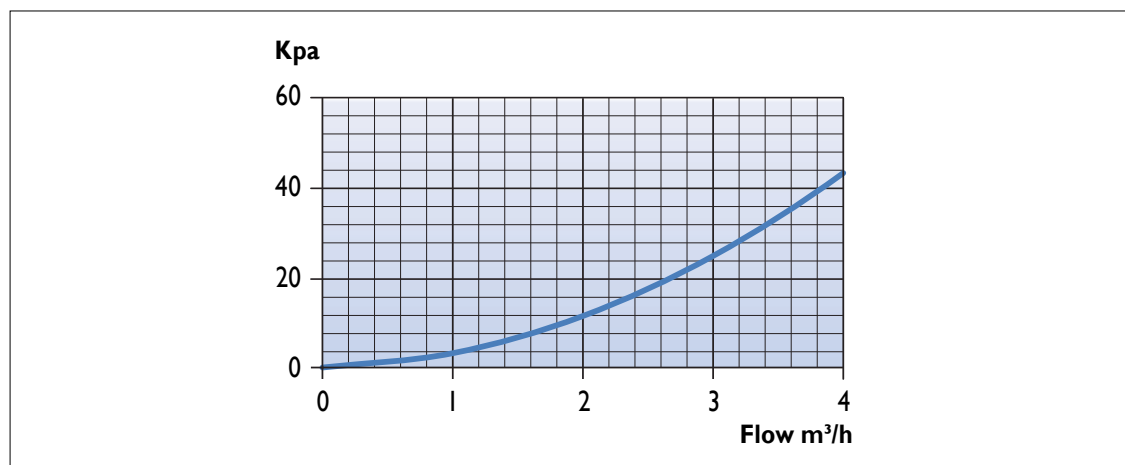


Figure 5: Pressure loss graph



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