

*Super Heat Conduction Metal
Vacuum (SHCMV) Tube Series*



This product has adopted the national standard of Q/321282 YZD08-2001
The manufacturer has quality control system certified by ISO9001: 2000
This product is approved by the EN12975 standard by TUV

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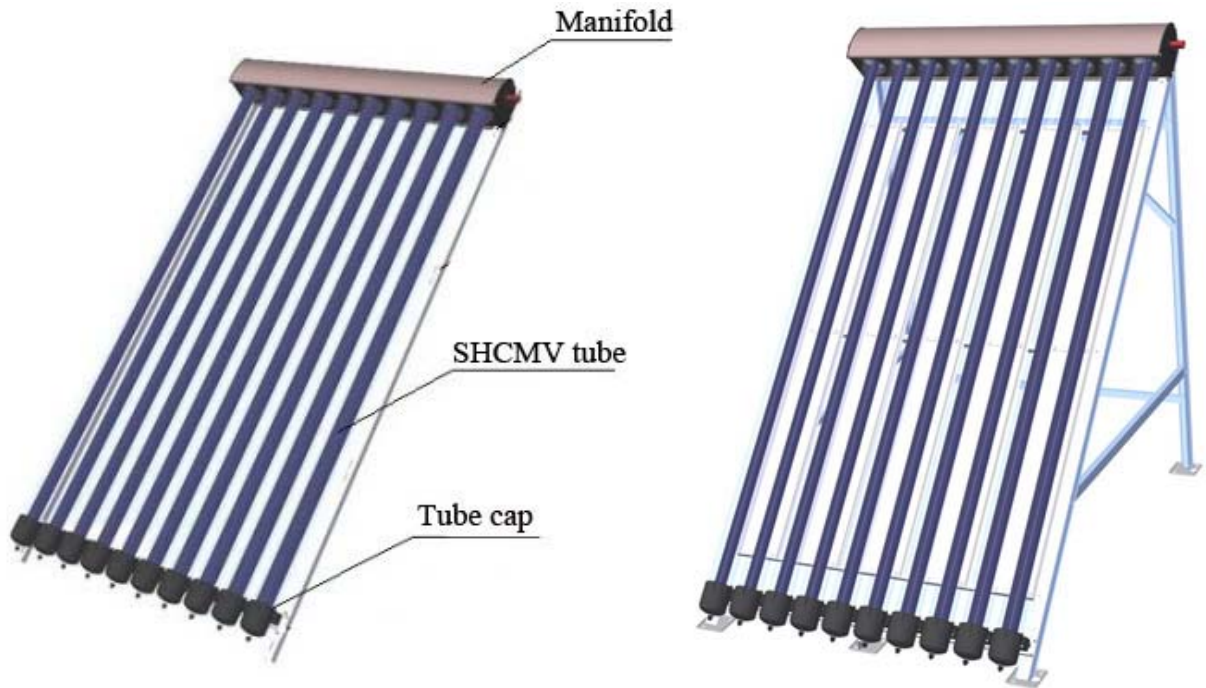
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1. **Model:** GM-Ø70-1900- series Solar Collector

2. **Name of the product:** Super Heat Conduction Metal Vacuum (SHCMV) Tube Collector



Specifications:

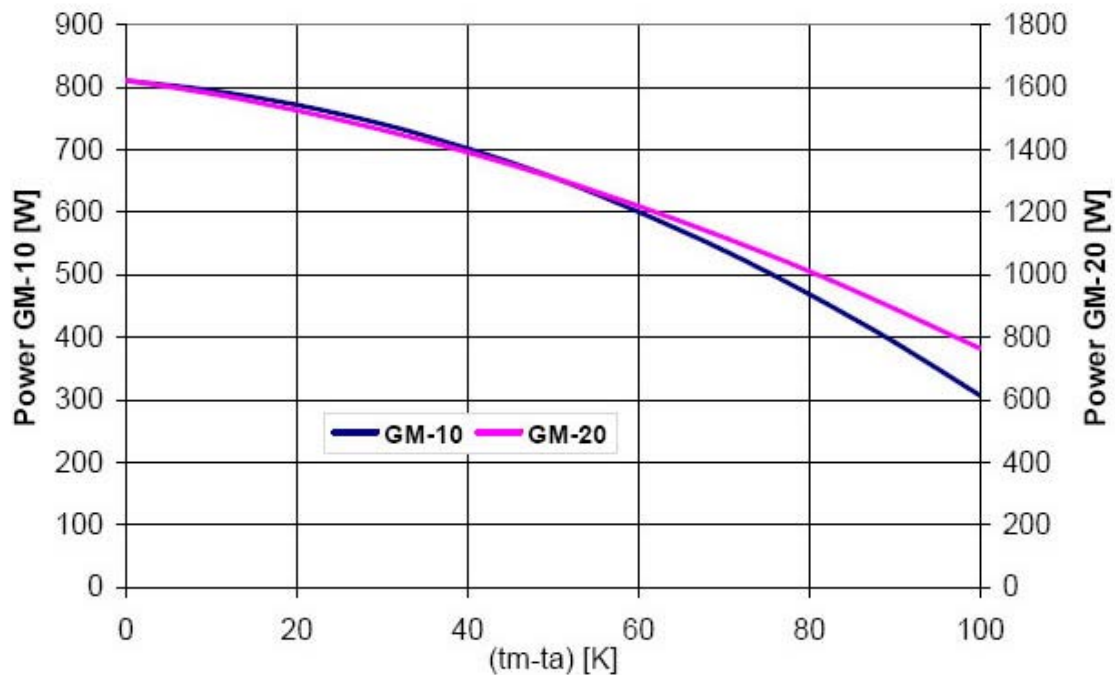
- ✧ Manifold material: Aluminum alloy
- ✧ Insulation Rock wool: core inside Copper (T2);
- ✧ Frame: Aluminum alloy;
- ✧ Diameter of the core: Ø35mm;
- ✧ Cover material: Nylon;
- ✧ Diameter of Interface: Ø22mm;



Power per collector unit (W):

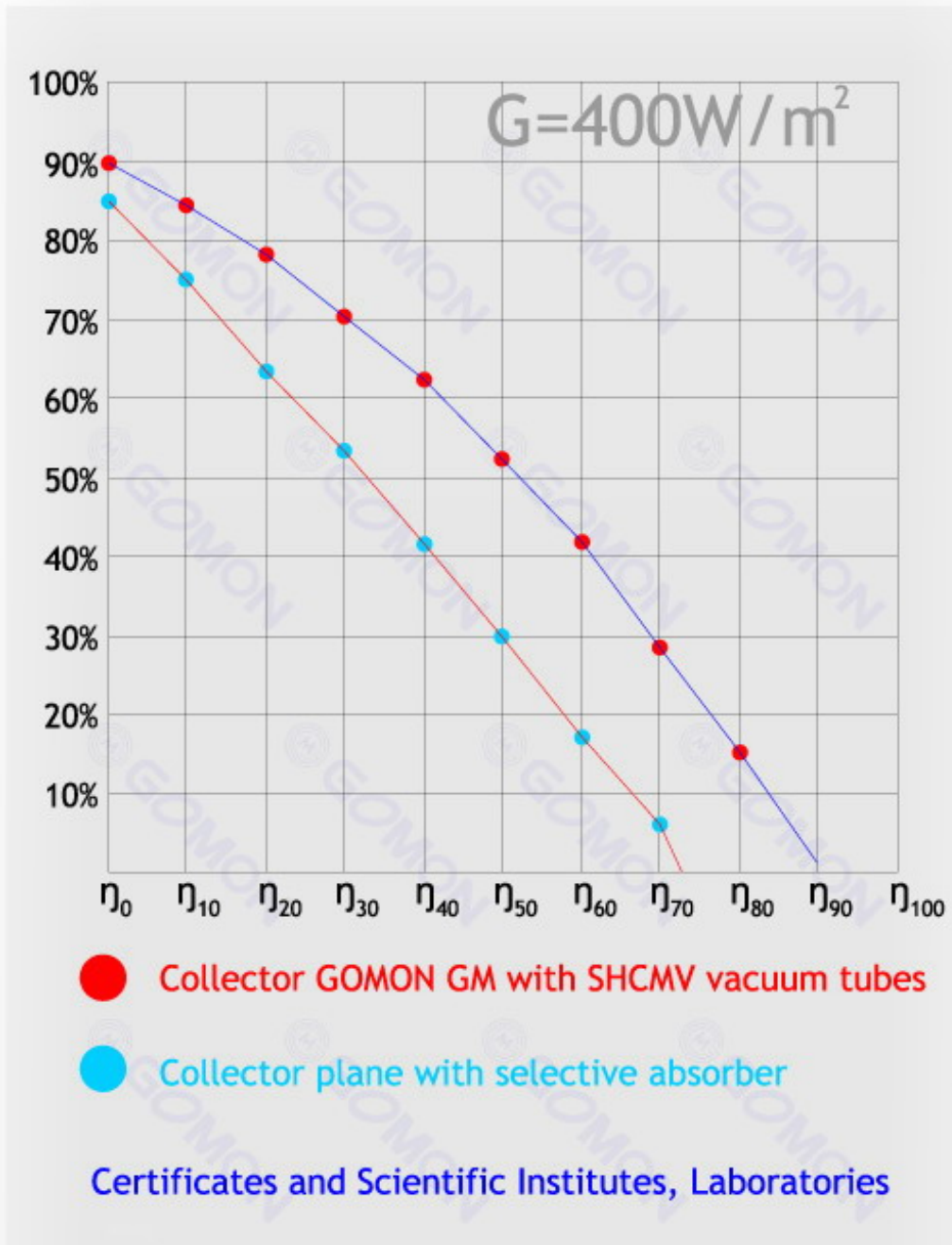
T _m -T _a [K]	Irradiation [W/m ²]					
	400		700		1 000	
	GM-10	GM-20	GM-10	GM-20	GM-10	GM-20
10	309	606	552	1093	795	1580
30	254	490	498	977	741	1464
50	169	337	412	824	656	1311

(values for normal incidence angle)



Power curve for each collector unit (for G = 1000 W/m²)

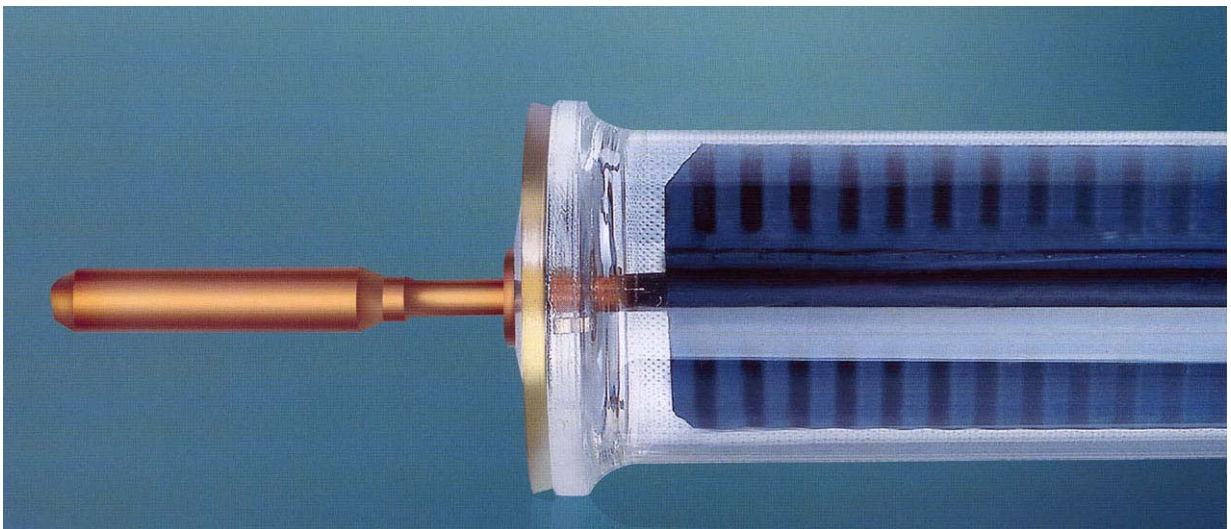
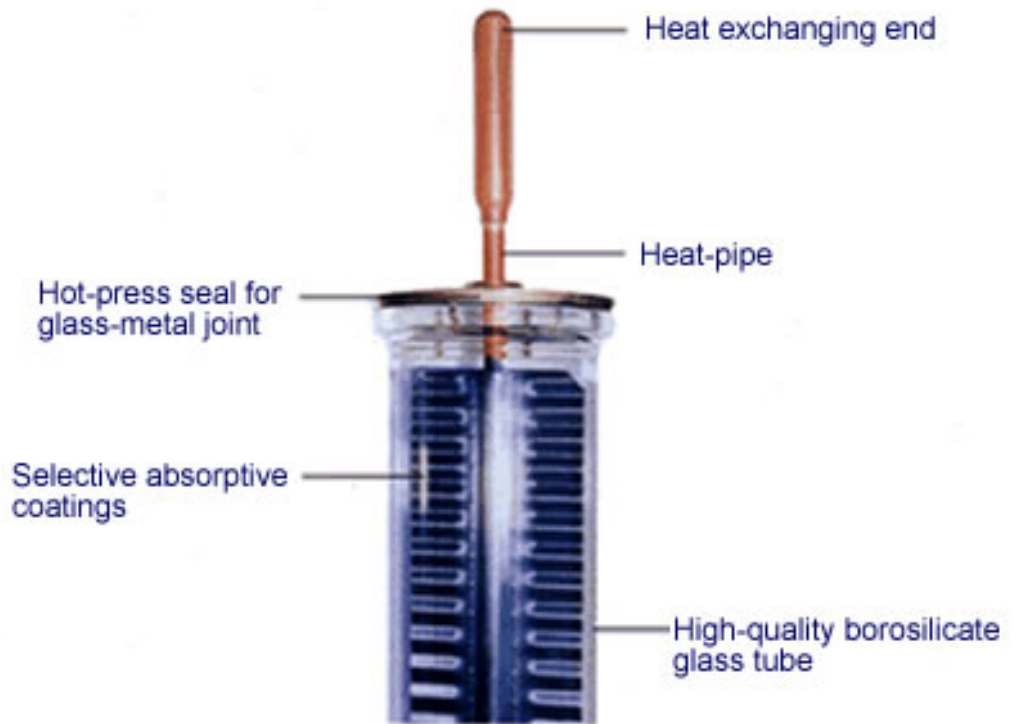
Efficiency test in Spain (SHCMV tube collector vs Flat panel):



Heat performance testing record:

Model: GM-Ø70-Ø1900-15					
Place: Gomon Group			Latitude: N32.02		
Item	Content				
Time	2006-03-16 8:00-16:00	2006-03-23 8:00-16:00	2006-03-25 8:00-16:00	2006-03-28 8:00-16:00	2006-03-31 8:00-16:00
Weather	Sunny	Sunny	Cloudy	Sunny Cloudy	Cloudy
Wind speed m/s	< 4	< 4	< 4	< 4	< 4
Average Temp. C	17	20	17	15	17
Solar radiation per unit MJ/m ²	17.72	14.61	12.77	18.97	9.49
Total radiation MJ	42.5	35	30.6	45.52	22.77
Water capacity	150 Liters				
Direction	South				
Angle	45 degrees				
Lighting area m ²	2.4				
Starting water Temp. C	26	38	24.5	22	17
Ceased water Temp. C	58	63	48	54	37
Rising Temp. C	32	25	23.5	32	20
Received heat Qty MJ	20.16	15.75	14.81	20.16	12.6
Qty of heat per unit MJ/m ²	8.06	7.65	8.21	7.52	9.4
International standard of heat MJ/m ²	> 7.0				
Efficiency of system	47%	45%	48%	45%	55%
International system	> 45%				

Super Heat Conduction Metal Vacuum (SHCMV) Tube:



Technical description of SHCMV tube (complete):

Glass material	High-quality borosilicate glass
Glass tube diameter	70mm
Wall thickness	2.5mm
Diameter of heat exchanging end	Ø14*75mm
Single tube weight	2.2kg
High vacuum, long-term stability	$5 \cdot 10^{-3} \text{Pa}$
Absorber material	Aluminum
Coating	Aluminum Nitride
Absorption coefficient	$\alpha \geq 0.94$
Emission coefficient	$\varepsilon \leq 0.08$
Wind resistance	30m/s
Freezing tolerance	-50°C
Hail resistance	Φ35mm
Insolation temperature	250°C
Start up temperature	$\leq 25^\circ\text{C}$
Power output	120W

Material: borosilicate glass according to ISO3585: 1991.

Transmittance of borosilicate glass: ≥ 0.92 .

Absorbance of solar selective absorptive coating: $\alpha \geq 0.94$;

Hemispherical emittance : $\varepsilon \leq 0.08$;

Getter according to GB/T 9505-1998.

Start-up temperature : No more than 25°C .

Start-up time: no longer than 2 minutes under normal sunshine.

Isothermal performance: The temperature tolerance between any 2 random points does not exceed 2°C after 5 minutes of working.

Low temperature resistance: No breaks at -50°C .

Air pressure: $\Delta P \leq 5 \cdot 10^{-3} \text{Pa}$.

Heat impact resistance: No damages after over 3 times' alternative impacts of cold water below 25°C and hot water over 90°C .

Pressure resistance: can withstand 0.6 MPa.

Hail resistance: no damage by the impact of $\phi 35$ mm hail.

Appearance standard: the color of the selective absorptive coatings should be even, and the coatings should have no wrinkles and peelings. The support parts inside the tube should be correct and tight.

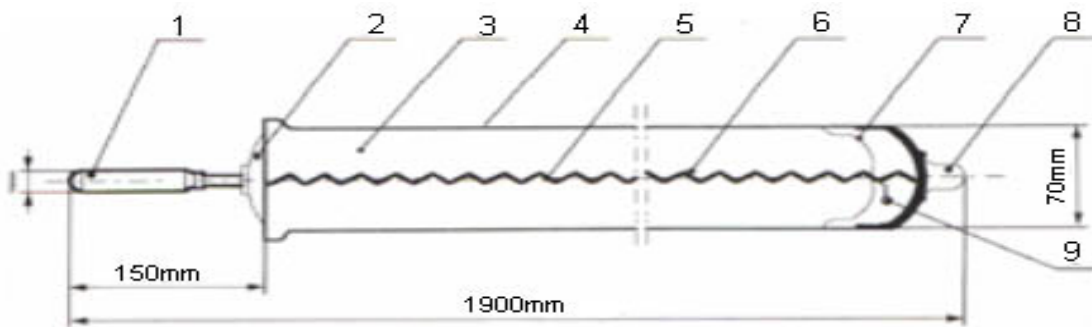
The allowed tolerance of borosilicate glass tube's diameter should be in accordance with ISO4803: 1978.

Camber of the borosilicate glass tube should be no more than 0.3%.

The transection of the borosilicate glass tube, which is 40-60mm away from flange end, should be round. The ratio of the longest to the shortest radial dimensions of the borosilicate glass tube should be no more than 1.02.

The diameter of the heat-exchanging end is $\phi 14\text{mm}$, and should be matched with the standard.

Engineering drawing:



- 1. Heat exchanging end; 2. Metal cover 3. Vacuum layer; 4. Glass tube;
- 5. Heat-collecting plate; 6. Selective absorptive coating; 7. Support part;
- 8. Aluminum safety-protection cap; 9. Getter;

Efficiency bent (graphic)

