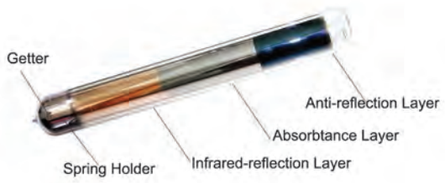
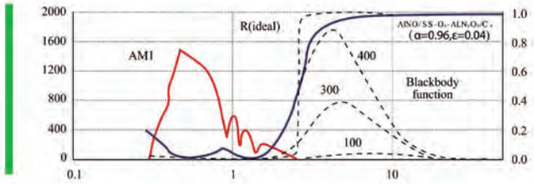
VACUUM TUBE

Introduction

All glass vacuum tubes are the key component of solar collectors. The vacuum tube is similar to a conventional Dewar flash and consists of two borosilicate glass tubes with high chemical and thermal shock resistance. The outer side of the inner tube is coated with a sputtered solar selective surface. This coated inner tube is closed at one end and sealed at the other end to the outer tube. The annular space between the outer tube and inner tube is evacuated to virtually eliminate heat loss by conduction and convection.





Leading Technology

All-Glass Evacuated SS-ALN Cermet Solar Collector Tubes are manufactured by using the interference absorption type of solar absorption layer, and the technology of “metallic-membrane plating”, such as SS and Al duplex metallic target sputter manufactured Cermet absorption layer etc. It also adopts new interference absorption type of super low emission ratio and selective absorption membrane layer with absorptance ration α=0.94, emission ratio: ε≤0.06. Absorption layer possesses special stainless steel aluminum nitride with high temperature resistant. It will not shed even the glass has melted; also with characters of anti-damping, ageing-resistance and dry collection resistance, low emission ratio, small thermal losses. It can still produce hot water when it is below 300℃, and with longer life.

Why Himin

- Full automatic vacuum tube production line and advanced & strict testing processing guarantee the entire quality stability.
- Vacuum degree can reach to 10^{-4} Pa which effectively reduces the heat loss rate of 0.03-0.06.
- Apply metallic copper as bottom metal layer, which is super strong in absorbing and possessing extra low heat loss. The heat loss rate is 50% lower than ordinary vacuum tubes which U_{LT}≤0.5W/(W/(m2.℃).
- Excellent insulation. The stagnation temperature higher than 270℃.
- Patent technology developed by Himin breaks the limitation of graded coating ,and enable its working temperature from -40℃ to 40 ℃.
- Huge production capacity. 5 full automatic production lines accompany with production capacity of 100000 pcs per day.

Full automatic vacuum tube production line


Material Tube Transmission Line

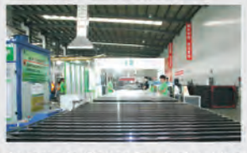

Edging Line


Automatic Coating Line 1


Automatic Evacuating Line


Cleaning Line


End Sealing Line


Automatic Getter Producing Line


Automatic Packaging Line

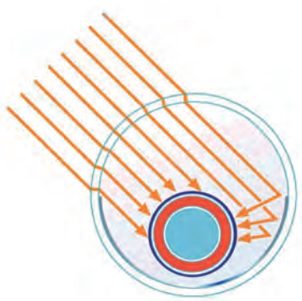
Technical specifications

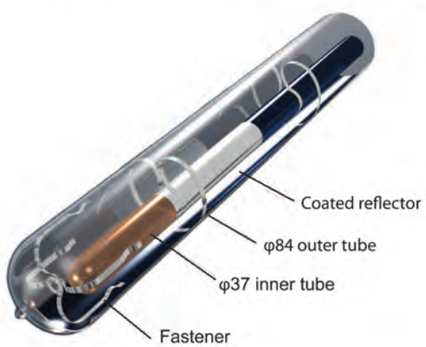
		ULTE(Ultra low emission evacuated tube)						Inner focusing film vacuum tube	
Length (m)		1.6	1.8	1.6	1.8	1.92	2.1	2	2.1
Structure		Three Target							
Material of glass		Borosilicate Glass 3.3							
Selective coating type		ALNO/ALNOSS/Cu							
Outer tube diameter (mm)		φ47		φ58				φ84	
Thickness of outer tube (mm)		1.6		1.8				2.0	
Inner tube diameter (mm)		φ37		φ47				φ37	
Thickness of inner tube (mm)		1.6		1.6				1.6	
Absorptance ratio		⩾0.94							
Emission ratio		⩽0.06							
Solar transmission rate		⩾92%							
Vacuum rate (Pa)		⩽ 5.2×10^{-4}							
Max. Temperature (℃)		300							
Average heat loss (W/(m²·℃))		⩽0.60		⩽0.60		⩽0.50		⩽0.65	
Rated Pressure (Mpa)		1.0						0.6	
Stagnation parameter (m²·℃/kW)		241	256	265	284	289	290	314	309
Coefficient of Thermal Expansion (K^{-1})		3.3×10^{-6}							
Solar Radiance Exposure (MJ/m²)		⩽3.6		⩽4.6				⩽3.0	
Life time(yrs)		15							
Loading capacity (Pkg)	20'GP	3240	2916	2496	2304	2112	1920	728	728
	40'GP	6804	5832	5376	4608	4440	3960	1512	1512

New Product - Inner focusing film vacuum tube

The inner tube absorbs sunlight first and converts to heat energy, and then conveys heat energy to the liquid in inner tubes.

The coated reflector inside outer tube can reflect the sunshine to heat inner tube which concentrate the heat and sunshine to inner tube to improve the heat efficiency..





Hi-MIN | Vacuum tube

QA Center

QA and Test Center

Himin persists on product quality and customer oriented principle all the time and never stagnates in quality improvement. It creates the first and largest quality assurance system and test center in China beyond China Nation Standard to guarantee output quality of products. Because of which, Himin is granted the ISO 9000 Quality Control Certification and CNAS certification and gets outstanding reputation and solid brand recognition in global solar market.

Coating Composition Test

Absorptance Ratio Test

Steel Ball Impact Test

Coefficient of Thermal Expansion Test