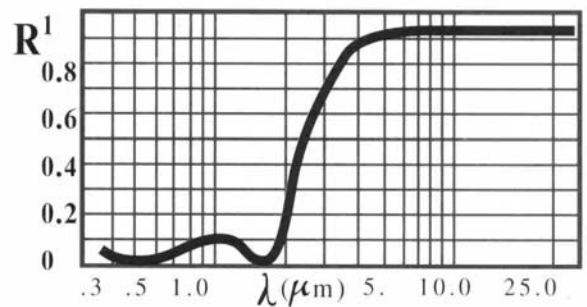
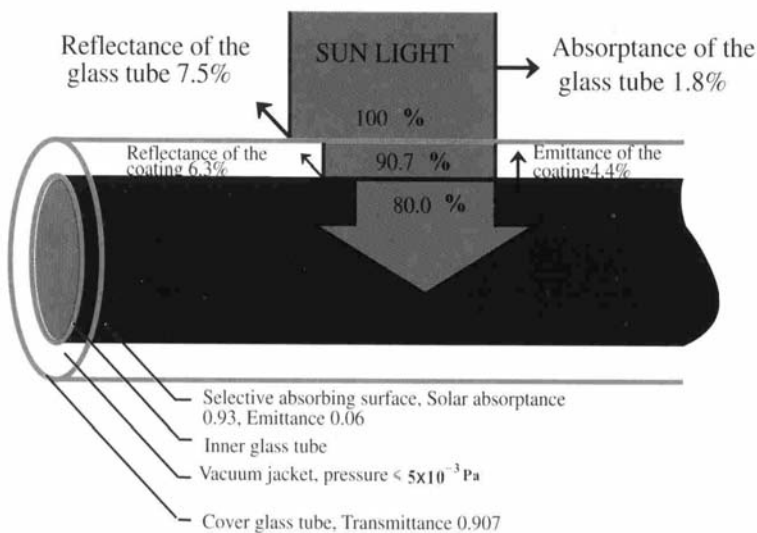


# SCHEMATIC OF SOLAR THERMAL CONVERSION OF ALL-GLASS EVACUATED COLLECTOR TUBE

The limited availability of fossil fuel and their environmental impact, have led to a growing awareness of the importance of renewable energy sources. All-glass evacuated collector tubes and their collectors, high tech products, exhibit high efficiency of solar thermal conversion. The sputtered selective absorbing surface, a China invention patent (851001424), developed at Tsinghua University by professor Yin Zhiqiang is a graded aluminium-nitrogen on an aluminium base layer, which is now produced in Tsinghua Solar Corporation, Beijing, China. The technology won a golded medal of the Geneva International invention and new technology exhibition in 1987 and a state invention prize (3rd class) in 1988.

All-glass evacuated collector tube has the configuration of two concentric borosilicate glass tubes, the selective absorbing surface is coated on the outside of inner glass tube using magnetron sputtering, the jacket between cover and inner glass tubes is evacuated and permanently sealed off. The all-glass evacuated collector tubes have widely utilized due to their high efficiency, low heat losses, long life time and low costs.

**SAVING ENERGY, SAFETY AND CLEAN ARE OUR GOAL**

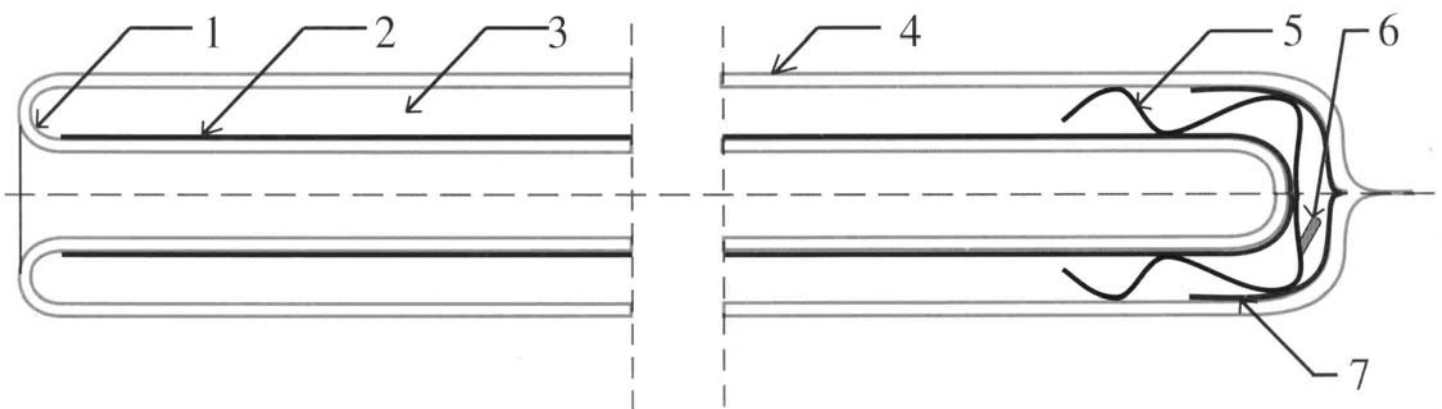


The dependence of near normal spectral reflectance on wavelength. China patent-Graded Al-N/Al solar selective absorbing coating.



# SPECIFICATION OF ALL-GLASS EVACUATED COLLECTOR TUBES

Type	SL-1200 (QB-AI-N/AI-37/47-1200-1)	SL-1500 (QB-AI-N/AI-37/47-1500-1)
Configuration	Two concentric borosilicate glass tubes	Two concentric borosilicate glass tubes
Glass thermal expansion coefficient	$3.3 \times 10^{-6} / ^\circ\text{C}$	$3.3 \times 10^{-6} / ^\circ\text{C}$
Length	1200 mm	1500 mm
Cover tube diameter	47 mm	47 mm
Absorber tube diameter	37 mm	37 mm
Wall thickness	1.6 mm	1.6 mm
Transmittance of cover tube	0.91	0.91
Solar selective absorbing coating, Technology	Graded Al-N/AI selective surface, Sputtering	Graded Al-N/AI selective surface, Sputtering
Solar absorptance (AM1.5)	0.93	0.93
Emissance (80°C)	0.06	0.06
Vacuum Gas Pressure	$\leq 5 \times 10^{-3} \text{ Pa}$	$\leq 5 \times 10^{-3} \text{ Pa}$
Stagnation temperature (typical)	200 °C	200 °C
Heat loss coefficient of collector tube	$\leq 0.85 \text{ W}/(\text{m}^2 \text{ } ^\circ\text{C})$	$\leq 0.85 \text{ W}/(\text{m}^2 \text{ } ^\circ\text{C})$
Impact resistance	Withstand 1 in (25mm) diameter hailstone without breaking	Withstand 1 in (25mm) diameter hailstone without breaking
Strength (pressure tested)	1 MPa	1 MPa
Empty weight	1.1kg	1.3kg



## Schematic of all-glass evacuated collector tube

1, Inner glass tube 2, Selective absorbing coating 3, Vacuum space

4, Cover glass tube 5, Retainer 6, Getter 7, Fired getter film