

TIGI

More solar heat in cold climates and demanding applications

Executive Summary

Over 40% of the total end use of energy in most developed countries goes for heating spaces and water, mostly by using gas and electricity. While the sun is the most abundant and potentially cheapest source of heat energy, current solar collectors' efficiency and financial viability fail exactly when and where demand for heat is greatest - in cold countries and demanding applications (with high differential temperature from ambient). TIGI has solved this challenge!

TIGI has developed the Honeycomb Collector – a new breed of solar thermal collector using breakthrough proprietary technology, which offers very high efficiency even in cold climate and demanding applications, producing year-round heat energy for a cost dramatically lower than any available alternative, including natural gas.

The TIGI solar thermal Honeycomb Collector



The Honeycomb Collector is field-proven, ready for mass production, and simple to add to new and existing heating systems.

Main applications

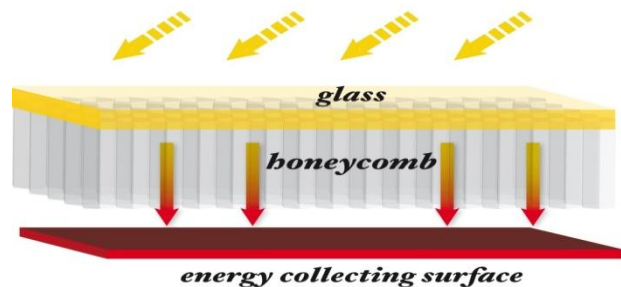
TIGI targets primarily commercial, industrial and institutional customers with the following applications:

- Space heating
- Industrial process heat
- Sanitary hot water
- Space cooling

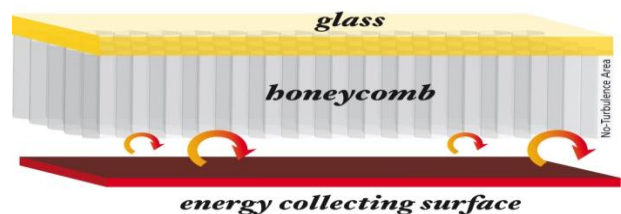
How it works

At the heart of TIGI's breakthrough is a highly efficient, transparent insulation technology incorporating proprietary components and design. The main principles of its operation are visualized below:

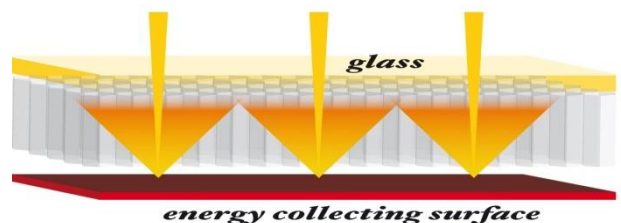
1. Sunlight passes through the honeycomb transparent insulation, heating the energy collecting surface.



2. The honeycomb layer suppresses convection and conduction heat losses, since turbulent flow is restricted to the air gap between the honeycomb and the energy collecting surface.



3. The honeycomb additionally suppresses thermal back-radiation.



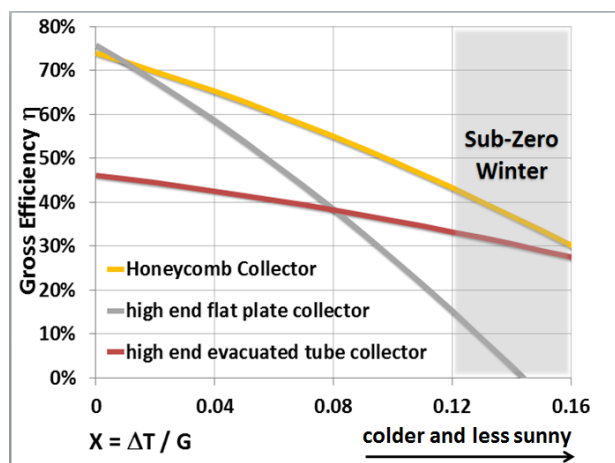
4. The outcome is a collector with very high energy-efficiency, allowing energy to enter freely while limiting energy losses even when thermal differentials are large.

Overheating due to this very high efficiency, is prevented with a proprietary integrated overheat protection device, which releases heat to the environment above a preset temperature.

Performance

The following graph compares the gross efficiency of the Honeycomb Collector vs. high end models of the major solar thermal collectors currently available: flat plate and evacuated tube collectors. The higher the figure on the horizontal axis - the colder and less sunny the conditions.

Honeycomb vs. high end flat plate & evacuated collectors



The Honeycomb Collector efficiency data is from the SPF of Rapperswil in Switzerland, a leading solar thermal testing and research institute. It shows that the Honeycomb Collector outperforms both alternative collectors. It generates substantial heat in a wide range of climate conditions and applications. The relative performance advantage increases as the return temperature rises, even when the temperature differential with ambient exceeds 70°C!

Main Advantages

The Honeycomb Collector offers the following advantages over flat plate or evacuated tube collectors, especially in cold climate and in demanding applications (with high temperature differential from ambient):

- Substantially better year round performance across multiple apps and climate conditions.
- Lower heat price per m².
- Shorter return on investment.

- Integrated overheat protection device (no need for costly system level protection component).
- Resilience to tough conditions (transportation, installation, hail).
- Over 20 years useful life compared to shorter lifespan of evacuated tube collectors (due to their continuous loss of vacuum).

Technical data

Dimensions

Overall Dimensions (L,W,H)	2030 x 1030 x 18.6 mm ³
Gross Area	2.09 m ²
Aperture Area	1.881 m ²
Absorber Area	1.881 m ²
Weight	45.0 kg
Fluid Volume	1 L
Inlet & Outlet Dimensions	22 mm

Mounting

Recommended Inclination	20-70°
-------------------------	--------

Test report

Performance Test Report	EN12975:2006
-------------------------	--------------

Quality test report

Stagnation Temperature	250 °C
Max. Operating Pressure	8 bar
Flow rate (Rated)	120 L/h
Heat Transfer Fluid	Water/Glycol

Operating data

Efficiency (DIN 4757-4)	
η ₀	0.79
a ₁	2.15 W/m ² K
a ₂	0.0061 W/m ² K ²
Incident Angle Modifier	0.91
Annual collector yield (Munich)	750 kWh/m ² annual (ITW 5m ²)

With year round efficiency advantages, particularly in cold climates and demanding applications, Honeycomb Collector offers a shorter ROI and compelling business case where and when heat is most needed!

For more information visit www.tigi.co.il or contact us at sales@tigi.co.il