Conference Trans Solar , February 2, 2009, Prague

Transfer of experience for the developement of Solar thermal products

www.suntime.cz

Brief history of the company:

1993 PROPULS

2006 suntime

2008 ISO 9001:2000

2009 PROPULS SOLAR

Brief company profile:

- pure Czech production and development company
- 14 employees
- own development centre of solar collectors
- production technology of own design and own know-how

SOLAR COLLECTORS SUNTIME

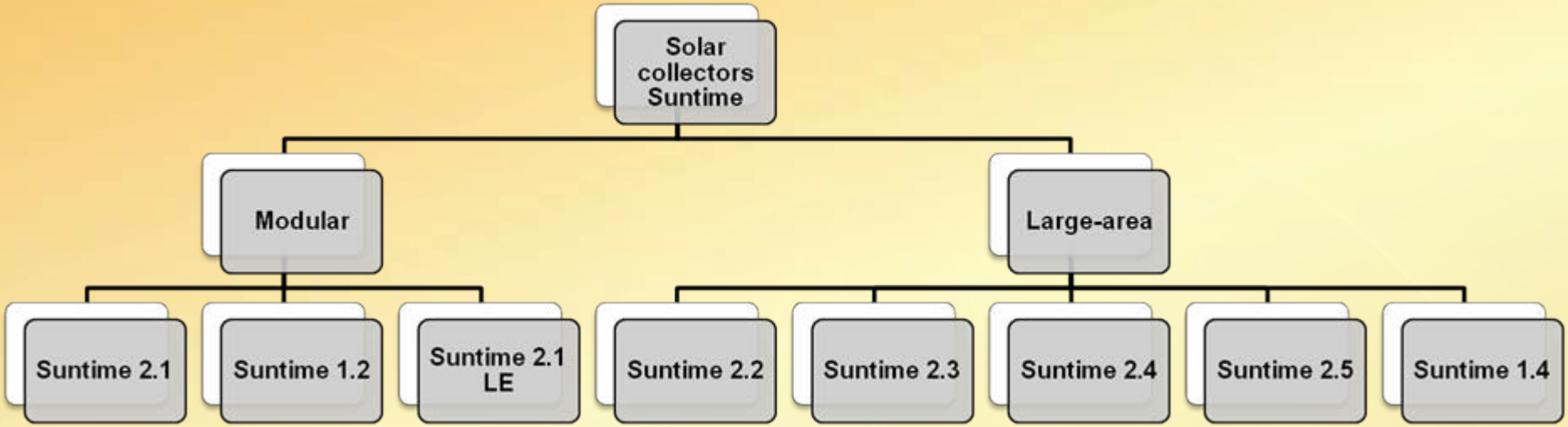
suntime

www.suntime.cz

Vyrábí společnost PROPULS SOLAR s.r.o.

Production program of PROPULS SOLAR s.r.o.:

Graph 1: division of solar collectors Suntime



- designed for solar systems up to 20 collectors

Advantages

- easy handling
- option of application with lifting – for roofs with a small slope
- lower demands for transporting

Disadvantages

- longer installation time on the roof – higher risk

- designed for large-area solar systems

Advantages

- shorter installation time on the roof – lower risk
- absorbers connected and tested in production – leakage removal the installation
- one frame collector – interesting design and lower losses

Disadvantages

- higher demands for transporting
- bigger weight – installation needs a crane

suntime 2.1

Technical data		
Aperture area	[m^2]	1,84
Absorption area	[m^2]	1,83
External dimension	[mm]	1895 x 1063
Covering glass		tl. 4 mm, solar, safety
Connecting dimension	[mm]	Cu tube Ø 22 mm
Thermal insulation		mineral fibre 30 mm + PUR 20 mm
Volume of the heat-transport liquid	[l]	1,1
Weight	[kg]	39
Absorber surface		highly selective layers: Sunselect or Eta+
Solar absorption	[%]	95 ± 2
Emissivity at 100°C	[%]	4 ± 2
Optical efficiency	[%]	80
Recommended working temperature	[°C]	do 100
Max. overpressure of the heat-transport liquid	[bar]	6
Testing pressure	[bar]	10
Recommended flow	[l/h collector]	40 – 120
Collector frame		eloxal dural profile
Staganation temperature*	[°C]	203
Energetic gains**	[kWh/year]	800 – 1200

* Valid for the intensity of global solar radiation 1000 W/m² and ambient temperature 30°C
** Collector energetic gains are dependent on the operational way, south-ward orientation of the collector, collector slope and geographical position

Fit centre OK GYM Fitness Pardubice:

- installation company: AP Simko s.r.o.
- realization date: 06/2007
- size of the collector field: 10 m^2
- collector type: Suntime 2.1 – 5 pcs
- capacity of accumulative tanks: 0,5 m^3
- system type: TV heating
- bivalent heat source: gas boiler
- max. output of the collector field: 8 kWh
- roof type: flat

Fit centre OK GYM Fitness Pardubice:

Technical data		
Aperture area	[m^2]	3,68
Absorption area	[m^2]	3,66
External dimension	[mm]	1895 x 2110
Covering glass		thickness 4 mm, solar, safety
Connecting dimension	[mm]	Cu tube Ø 22 mm
Thermal insulation		mineral fibre 30 mm + PUR 20 mm
Volume of the heat-transport liquid	[l]	2,2
Weight	[kg]	78
Absorber surface		highly selective layers: Sunselect or Eta+
Solar absorption	[%]	95 ± 2
Emissivity at 100°C	[%]	4 ± 2
Optical efficiency	[%]	80
Recommended working temperature	[°C]	do 100
Max. overpressure of the heat-transport liquid	[bar]	6
Testing pressure	[bar]	10
Recommended flow	[l/h collector]	80 - 240
Collector frame		eloxal dural profile
Staganation temperature*	[°C]	203
Energetic gains**	[kWh/year]	1600 - 2400

suntime 2.2

* Valid for the intensity of global solar radiation 1000 W/m² and ambient temperature 30°C
** Collector energetic gains are dependent on the operational way, south-ward orientation of the collector, collector slope and geographical position

suntime 2.3

Technical data		
Aperture area	[m^2]	5,52
Absorption area	[m^2]	5,49
External dimension	[mm]	1895 x 3157
Covering glass		thickness 4 mm, solar, safety
Connecting dimension	[mm]	Cu tube Ø 22 mm
Thermal insulation		mineral fibre 30 mm + PUR 20 mm
Volume of the heat-transport liquid	[l]	3,3
Weight	[kg]	117
Absorber surface		highly selective layers: Sunselect or Eta+
Solar absorption	[%]	95 ± 2
Emissivity at 100°C	[%]	4 ± 2
Optical efficiency	[%]	80
Recommended working temperature	[°C]	do 100
Max. overpressure of the heat-transport liquid	[bar]	6
Testing pressure	[bar]	10
Recommended flow	[l/h collector]	120 - 360
Collector frame		Eloxal dural profile
Staganation temperature*	[°C]	203
Energetic gains**	[kWh/year]	2400 - 3600

* Valid for the intensity of global solar radiation 1000 W/m² and ambient temperature 30°C
** Collector energetic gains are dependent on the operational way, south-ward orientation of the collector, collector slope and geographical position

Technical data		
Aperture area	[m^2]	7,36
Absorption area	[m^2]	7,32
External dimension	[mm]	1895 x 4204
Covering glass		thickness 4 mm, solar, safety
Connecting dimension	[mm]	Cu tube Ø 22 mm
Thermal insulation		mineral fibre 30 mm + PUR 20 mm
Volume of the heat-transport liquid	[l]	4,4
Weight	[kg]	156
Absorber surface		highly selective layers: Sunselect or Eta+
Solar absorption	[%]	95 ± 2
Emissivity at 100°C	[%]	4 ± 2
Optical efficiency	[%]	80
Recommended working temperature	[°C]	do 100
Max. overpressure of the heat-transport liquid	[bar]	6
Testing pressure	[bar]	10
Recommended flow	[l/h collector]	160 - 480
Collector frame		eloxal dural profile
Staganation temperature*	[°C]	203
Energetic gains**	[kWh/year]	3200 - 4800

suntime 2.4

* Valid for the intensity of global solar radiation 1000 W/m² and ambient temperature 30°C
** Collector energetic gains are dependent on the operational way, south-ward orientation of the collector, collector slope and geographical position

suntime 2.5

Technical data		
Aperture area	[m^2]	9,2
Absorption area	[m^2]	9,15
External dimension	[mm]	1895 x 5251
Covering glass		thickness 4 mm, solar, safety
Connecting dimension	[mm]	Cu tube Ø 22 mm
Thermal insulation		mineral fibre 30 mm + PUR 20 mm
Volume of the heat-transport liquid	[l]	5,5
Weight	[kg]	195
Absorber surface		highly selective layers: Sunselect or Eta+
Solar absorption	[%]	95 ± 2
Emissivity at 100°C	[%]	4 ± 2
Optical efficiency	[%]	80
Recommended working temperature	[°C]	do 100
Max. overpressure of the heat-transport liquid	[bar]	6
Testing pressure	[bar]	10
Recommended flow	[l/h collector]	200 - 600
Collector frame		eloxal dural profile
Staganation temperature*	[°C]	203
Energetic gains**	[kWh/year]	4000 - 6000

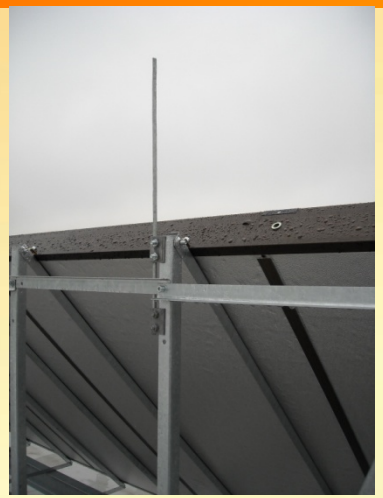
* Valid for the intensity of global solar radiation 1000 W/m² and ambient temperature 30°C
** Collector energetic gains are dependent on the operational way, south-ward orientation of the collector, collector slope and geographical position

Asylum in the castle Bystré u Poličky:

- installation company: TENET CZ s.r.o.
- realization time: 06/2008
- size of the collector field: 60 m^2
- collector type: Suntime 2.5 – 6 pcs
- capacity of accumulative tanks: 2,5 m^3
- system type: TV heating + additional heating
- bivalent heat source: gas boiler
- max. output of the collector field: 41 kWh
- roof type: oblique, tiles, slope 30°

Company FEIFER-kovovýroba s.r.o. Holice:

- installation company: TENET CZ s.r.o.
- realization date: 11/2008
- size of the collector field: 90 m^2
- collector type: Suntime 2.5 – 9 pcs
- capacity of accumulative tanks: 5 m^3
- system type: TV heating + additional heating – heating system re-sized for low parameters of the temperature gradient 50/30°C
- bivalent heat source: condensation gas boilers
- max. out of the collector field: 62 kWh
- roof type: flat



Technical data		
Aperture area	[m^2]	1,84
Absorption area	[m^2]	1,83
External dimension	[mm]	1063 x 1895
Covering glass		thickness 4 mm, solar, safety
Connecting dimension	[mm]	Cu tube Ø 22 mm
Thermal insulation		mineral fibre 30 mm + PUR 20 mm
Volume of the heat-transport liquid	[l]	1,1
Weight	[kg]	39
Absorber surface		highly selective layers: Sunselect or Eta+
Solar absorption	[%]	95 ± 2
Emissivity at 100°C	[%]	4 ± 2
Optical efficiency	[%]	80
Recommended working temperature	[°C]	do 100
Max. overpressure of the heat-transport liquid	[bar]	6
Testing pressure	[bar]	10
Recommended flow	[l/h collector]	40 – 120
Collector frame		eloxal dural profile
Staganation temperature*	[°C]	203
Energetic gains**	[kWh/year]	800 – 1200

suntime 1.2

* Valid for the intensity of global solar radiation 1000 W/m² and ambient temperature 30°C
** Collector energetic gains are dependent on the operational way, south-ward orientation of the collector, collector slope and geographical position

Usage example of Suntime 1.2

suntime 1.4

Technical data		
Aperture area	[m^2]	3,68
Absorption area	[m^2]	3,66
External dimension	[mm]	1063 x 3770
Covering glass		thickness 4 mm, solar, safety
Connecting dimension	[mm]	Cu tube Ø 22 mm
Thermal insulation		mineral fibre 30 mm + PUR 20 mm
Volume of the heat-transport liquid	[l]	2,2
Weight	[kg]	78
Absorber surface		highly selective layers: Sunselect or Eta+
Solar absorption	[%]	95 ± 2
Emissivity at 100°C	[%]	4 ± 2
Optical efficiency	[%]	80
Recommended working temperature	[°C]	do 100
Max. overpressure of the heat-transport liquid	[bar]	6
Testing pressure	[bar]	10
Recommended flow	[l/h collector]	80 - 240
Collector frame		eloxal dural profile
Staganation temperature*	[°C]	203
Energetic gains**	[kWh/year]	1600 - 2400

* Valid for the intensity of global solar radiation 1000 W/m² and ambient temperature 30°C
** Collector energetic gains are dependent on the operational way, south-ward orientation of the collector, collector slope and geographical position

Usage example of Suntime 1.4

Technical data		
Aperture area	[m^2]	1,85
Absorption area	[m^2]	1,83
External dimension	[mm]	1862 x 1034
Covering glass		thickness 4 mm, solar, safety
Connecting dimension	[mm]	Cu tube Ø 18 mm
Thermal insulation		- -
Volume of the heat-transport liquid	[l]	1,0
Weight	[kg]	35
Absorber surface		highly selective layers: Sunselect or Eta+
Solar absorption	[%]	95 ± 2
Emissivity at 100°C	[%]	4 ± 2
Optical efficiency	[%]	80
Recommended working temperature	[°C]	do 100
Max. overpressure of the heat-transport liquid	[bar]	6
Testing pressure	[bar]	10
Recommended flow	[l/h collector]	40 – 120
Collector frame		dural profile
Staganation temperature*	[°C]	160
Energetic gains**	[kWh/year]	700 - 900

suntime 2.1 LE

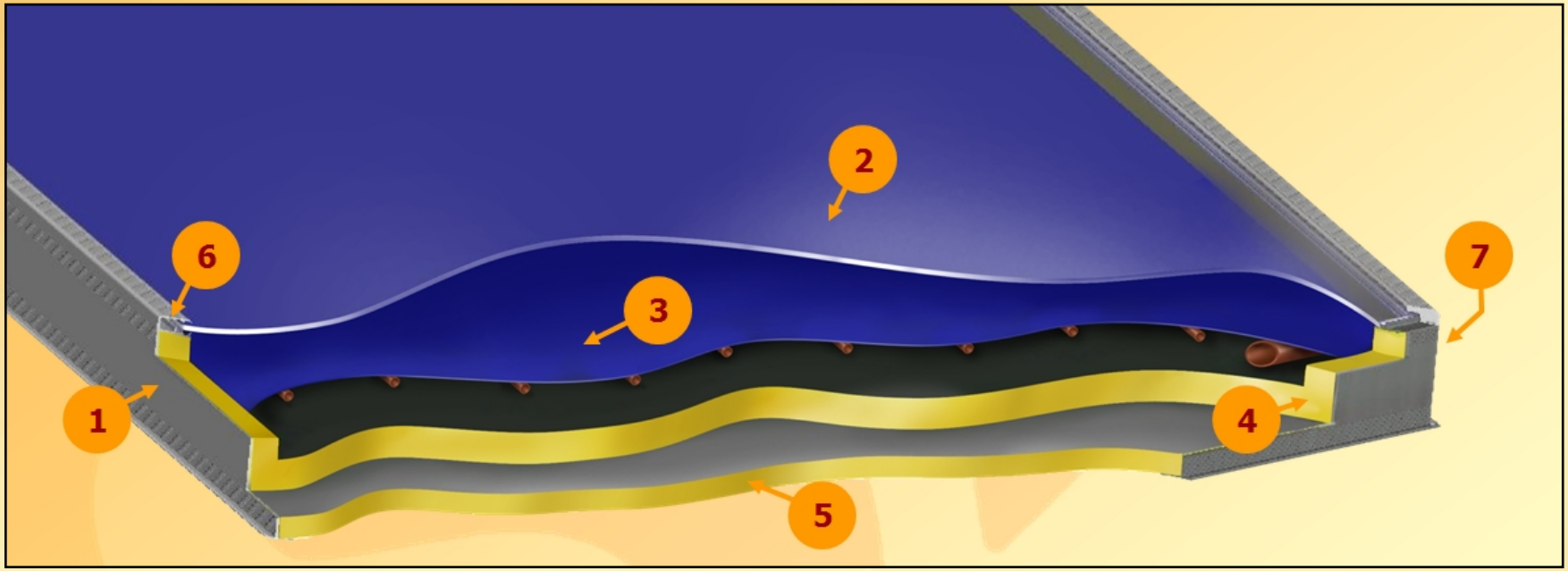
Economic option of highly selective collector for heating the pool water.

At this moment in the prototype stage and testing. Presumption of a market introduction in 06 / 2009.

* Valid for the intensity of global solar radiation 1000 W/m² and ambient temperature 30°C
** Collector energetic gains are dependent on the operational way, south-ward orientation of the collector, collector slope and geographical position

1.2 Construction of solar collectors Suntime

Picture 1.1 Cross-section through the solar collector Suntime



1. Frame – dural profile, eloxal surface finish (bronze colour
2. Glass – Solite thickness 4mm, solar, rasterised, safety
3. Absorber – all-copper, soldered with a highly selective surface
4. Insulation – mineral fibre: rear thickness 30 mm, side thickness 20 mm
5. Rear wall – PUR plate, thickness 20 mm
6. Sealing – EPDM and silicone profiles
7. Glands – modified silicon rubber

1.3 Certification

Company PROPULS SOLAR s.r.o. is the holder of quality certificate **ISO 9001:2000**.

Solar collectors Suntime fulfil all legal requirements of the Ministry of environment (MŽP) and State fund of living environment (SFŽP) as concerns assignments of state grants with regard to implemented solar systems according to applicable notices and annexes.

Solar collectors Suntime are certified in the CR at ČVUT Prague and Machinery test institution in Brno. Further, the collectors are also certified at ISE Freiburg in Germany. Collectors Suntime comply with the standard ČSN EN 12 975-1,2.

Since the end of 2008, a certification procedure SOLAR KEYMARK proceeds at the Fraunhofer Institute for solar energetic systems ISE in Germany, supposed finishing of this certification is spring 2009.

STROJÍRENSKÝ ZKUŠEBNÍ ÚSTAV, s.p.
notifikovaná osoba ES 1015, autorizovaná osoba 202

ISE
Fraunhofer Institut Solare Energiesysteme

spring 2009

Thank you for your attention

www.propuls.cz

www.suntime.cz

propuls@propuls.cz