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MIRO-THERM/E/10.05

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WHERE THE SUN FEELS AT HOME

mirotherm®

Selectively absorbing aluminium strip for solar collectors

Applications:

- Flat-plate collectors
- Vacuum tube collectors

Construction:

consists of an aluminium strip which has been anodised on both sides; then in a world-wide unique air-to-air process, a system of three layers is applied using the physical vapour deposition technique.

While an infrared reflecting layer ensures low thermal emission (ϵ), the metal oxide absorption- and antireflection layers ensure highest solar absorption (α) while offering resistance against outside agents.

Sizes:

Material width: up to / typically 1250 mm
Material thickness: 0.3 – 0.8 mm

Available in:

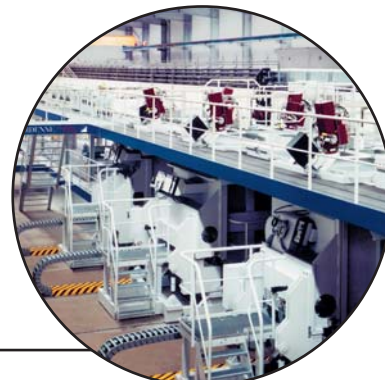
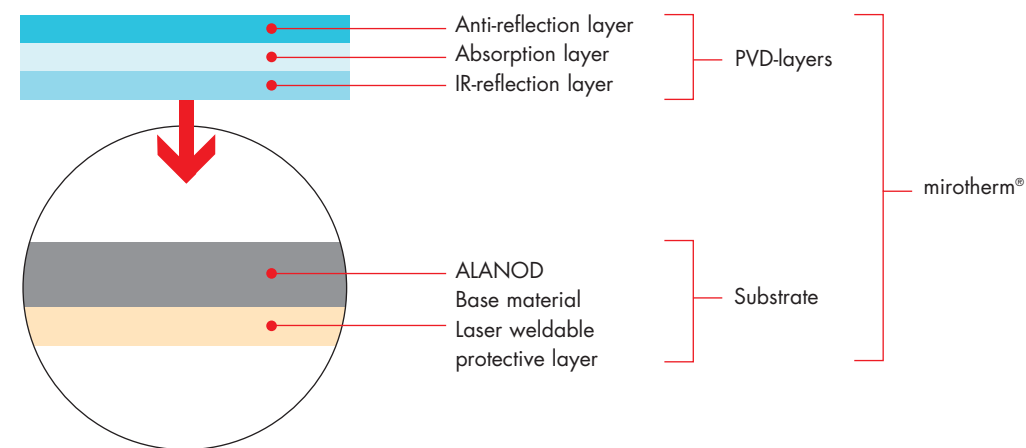
Slit coil or sheets with protective tape or paper interleaving upon request.

Optical values:

Solar absorption: (AM 1.5)
 $\alpha_{sol} = 0.94 \pm 0.02$

Thermal Emission (100° C)
 $\epsilon_{100^\circ C} = 0.05 \pm 0.02$

Layer System



Vacuum coating line

sunselect®

Selectively absorbing copper strip for solar collectors

Applications:

- Flat-plate collectors
- Vacuum tube collectors

Construction:

consists of a copper strip, which in a world-wide unique air-to-air process, a system of three layers is applied using the physical vapour deposition technique.

While an infrared reflecting layer ensures low thermal emission (ϵ), the metal oxide absorption- and antireflection layers ensure highest solar absorption (α) while offering resistance against outside agents.

Sizes:

Material width: up to 1200 mm (mill's limit)
Material thickness: 0.1 – 0.5 mm

Available in:

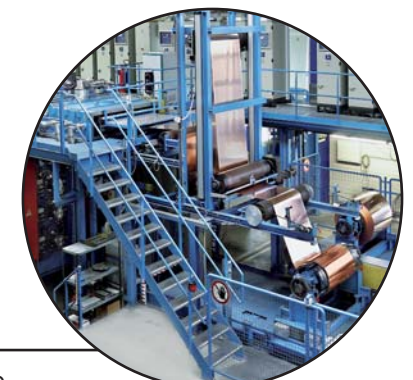
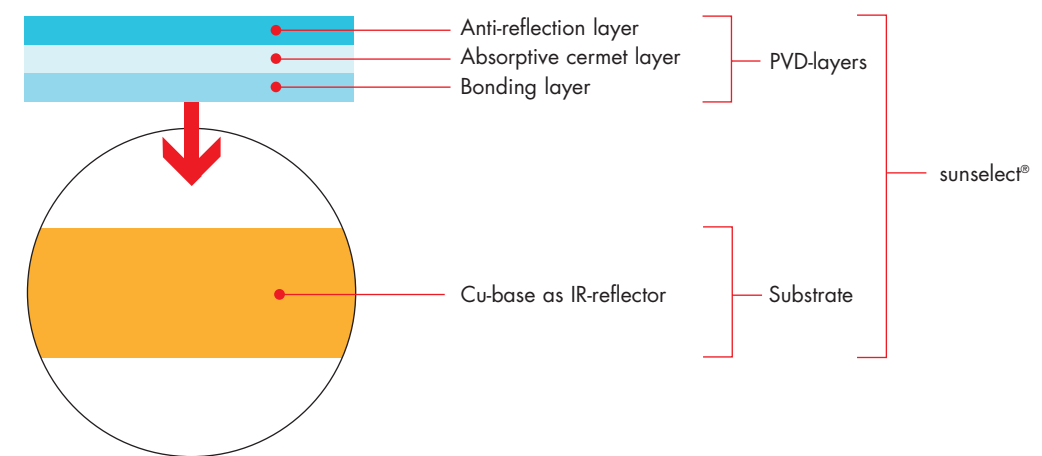
Slit coil or sheets with protective tape or paper interleaving upon request.

Optical values:

Solar absorption: (AM 1.5)
 $\alpha_{sol} = 0.95 \pm 0.02$

Thermal Emission (100° C)
 $\epsilon_{100^\circ C} = 0.05 \pm 0.02$

Layer System

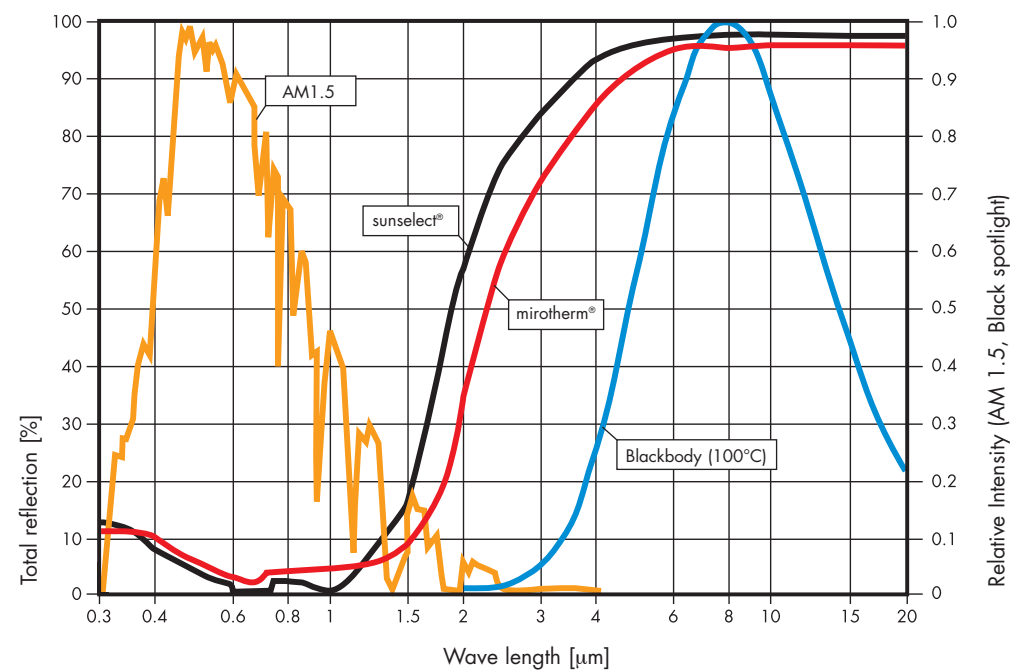


Vacuum coating line

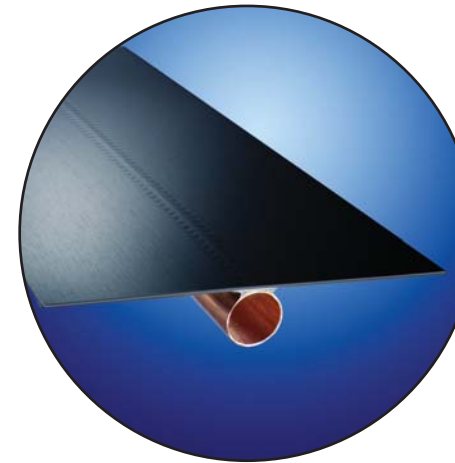
Material Tests

Composite adhesion:	Result:	
Without temperature stressing		
Cross cut test 1 mm acc. to DIN EN ISO 2409 with Scotch-Tape 670 CFM	GT 0	✓
Bending around 2 mm – mandrel and with Scotch-Tape 670 CFM (material thickness 0.5 mm, mirotherm®)	OK	✓
(material thickness 0.2 mm, sunselect®)	OK	
After temperature stressing at 72 h for 300° C		
Cross cut test 1 mm acc. to DIN EN ISO 2409 with Scotch-Tape 670 CFM	GT 0	✓
Bending around 2 mm – mandrel and with Scotch-Tape 670 CFM; (material thickness 0.5 mm, mirotherm®)	OK	✓
(material thickness 0.2 mm, sunselect®)	OK	
Resistance against micro climate in flat collectors		
Ageing test acc. to procedure ISO/CD 12952.2 (Task X)	OK	✓

Reflection spectrum mirotherm® & sunselect®

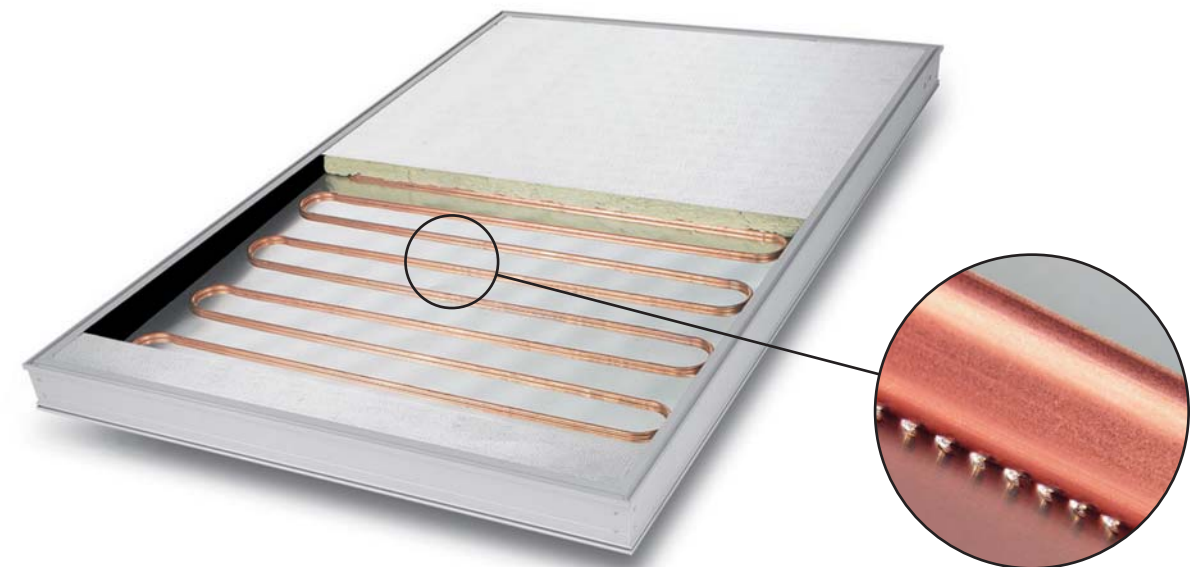


Absorber Production Technology



A thermally tight laser weld joint connection between mirotherm® and the copper tubing system is achieved with a pulsed laser. The protective film from the top surface does not need to be removed prior to the welding process.

Laser welded mirotherm® -reverse side



Thermal Efficiency

Example:
 F' - Collector efficiency factor
 (Figures provided by the SPF testing laboratories in Switzerland)

$F'(20l/h) = 0.938$
 $F'(60l/h) = 0.975$
 (Temperatures measured on mirotherm® fins: 0.5 mm thickness
 90 mm width, welded to a Cu-pipe, dimensions 10 x 0.5 mm)



mirotherm® & sunselect® – The Professional Standard

Highest efficiency, easy handling



Today the Alanod-Sunselect production systems set the standard for state of the art technology. Due to its excellent technical features and ecologic advantages, these products have been awarded renowned international technology prizes since 1999.

The reception of mirotherm® & sunselect® within the commercial world has been even more significant. Nowadays the absorber systems of virtually all brand name solar systems producers show the trademark blue shimmer of Alanod-Sunselect.

For the environment

Active environment protection requires products which conform to the latest technology, can be produced economically and are environmentally friendly.

Alanod-Sunselect with mirotherm® & sunselect®

offers high efficiency thermal absorber strip to help conserve resources.

The energy requirement for production of a square meter of selective absorber strip is only a fraction of that required for a wet chemical process.

Highest efficiency, easy handling

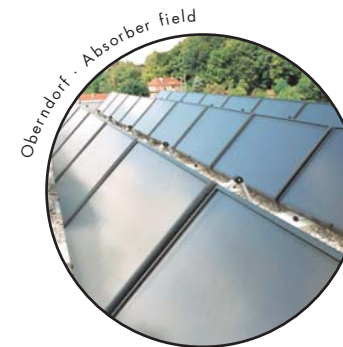
Solar collectors as thermal systems for the use of renewable energy sources are becoming more and more applicable. Environment and climate protection becomes ever more relevant. Over the past decade, Alanod-Sunselect has used their expertise in layer system technology to further improve the efficiency of the environmentally friendly solar technology.

mirotherm® & sunselect®

Projects



Absorber collector



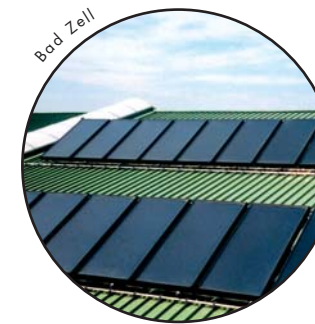
Oberndorf - Absorber field



High-rise with vertical absorber collectors



Apartments - Facade in Eschwege



Bad Zell



ALANOD - Headquarters in Germany



Car Wash



Private home



Private home



Private apartments



SOLVIS - Headquarters in Germany

Projects from:
 Gasokol GmbH, Austria · SOLVIS GmbH & Co. KG, Germany · Wagner & Co. Solartechnik GmbH, Germany
 ALANOD Aluminium-Veredlung GmbH & Co. KG, Germany