

MIRO – THERM



**Selective Absorption Layers on Aluminium for
Solar Collectors**

Applications:

- Flat plate collectors
- Tube fins (available also with selective coating on both sides).

Construction:

The multilayer selective coating is deposited on anodized aluminium substrate by the Physical Vapor Deposition technique (PVD). The three optically active layers are applied continuously in our worldwide unique "air-to-air" thin film process.

The high infrared (IR) reflection ensures a low thermal emission coefficient (e). The oxide layers on the top are optimized for a very high solar absorption coefficient (a) and resistance against environmental influences.

Sizes:

Production width: up to 1250 mm

Material thickness: 0.3 - 0.8 mm

Available in:

slit coils or sheets, with protective film

Optical values:

Solar absorption (AM1.5)

$$a_{sol} = 0.94 \pm 0.02$$

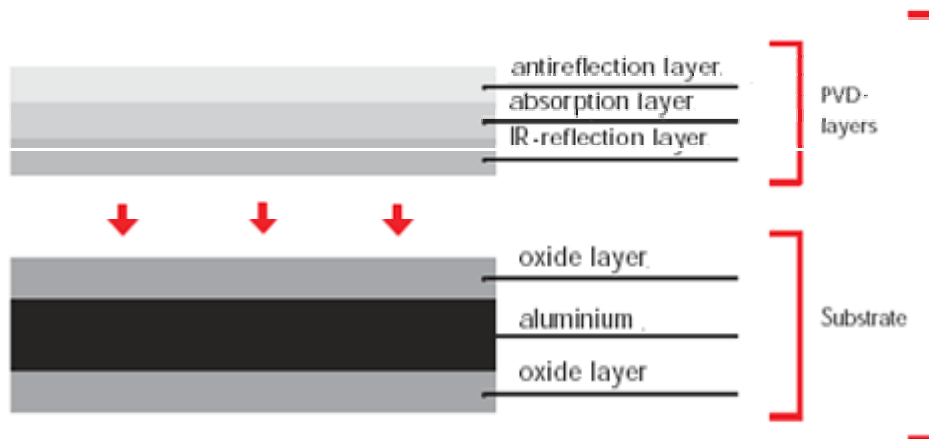
Thermal emission (at 100° C)

$$e_{100^{\circ}\text{C}} = 0.05 \pm 0.02$$



Coating line

Structure MIRO-THERM



Material Tests

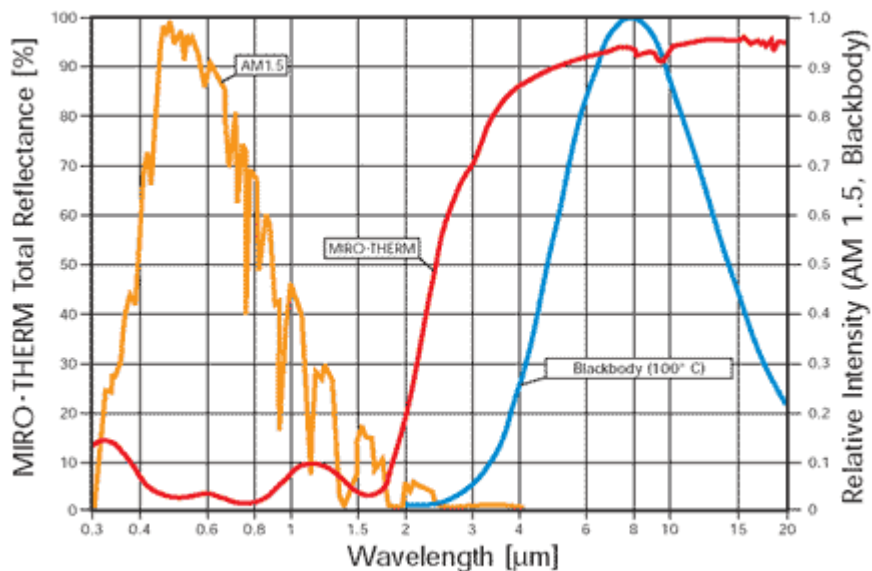
Composite adhesion:

Result:

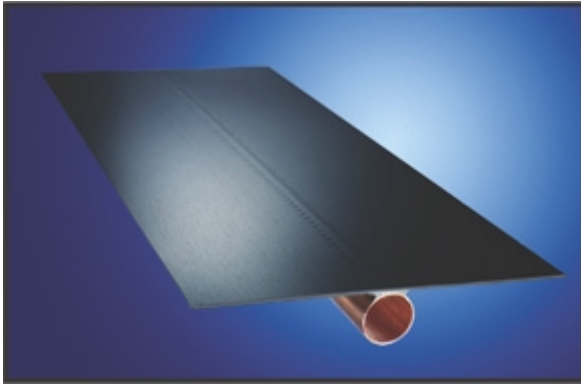
Without temperature stressing

Cross cut test 1 mm acc. to DIN EN ISO 2409 with Scotch-Tape 670 CFM	GT 0	✓
Bending around 2 mm - mandrel and Scotch-Tape 670 CFM; (material thickness 0.5 mm, standard strength) After temperature stressing at 400° C for 100 h	OK	✓
Cross cut test 1 mm acc. to DIN EN ISO 2409 with Scotch-Tape 670 CFM	GT 0	✓
Bending around 2 mm - mandrel and Scotch-Tape 670 CFM; (material thickness 0.5 mm, standard strength) Resistance against micro climate in flat collectors	i.O.	✓
Ageing test acc. to procedure ISO/CD 12952.2	OK	✓

Spectral Reflectance MIRO-THERM

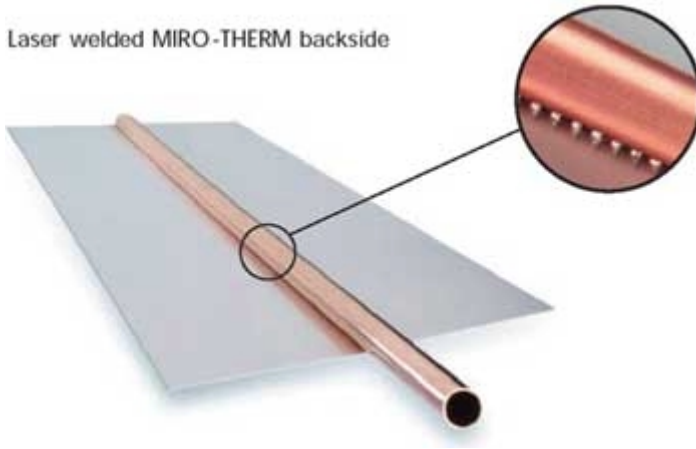


Technology for Absorber Production



The laser welding technique can be used to join the copper tubing with MIRO-THERM. The thermal efficiency of the bond is excellent and no removal of the protective film is required prior to welding.

Laser welded MIRO-THERM backside



Thermal Efficiency

For example:

Collector efficiency factor F'

(values determined by SPF)

$$F'(20l/h) = 0.938$$

$$F'(60l/h) = 0.975$$

measured on MIRO-THERM-fins, with 0.5mm thickness, 90mm width,
welded to Cu-tubing 10x0.5mm



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