



- 1 3-dimensional curved thermochromic glass segment.
- 2 Self-regulating solar protection glazing, surface temperature from left to right: 25 °C – 32 °C – 37 °C.
- 3 Functional principle of thermotropic laminated glass.
- 4 Rapid decrease in transmittance between 30 and 40 °C.

Fraunhofer Institute for Applied Polymer Research IAP

Potsdam-Golm Science Park
Geiselbergstr. 69
14476 Potsdam-Golm
Germany

Contact

Dr. Christian Rabe
Geiselbergstraße 69
14476 Potsdam

Phone +49 331 568-2320
christian.rabe@iap.fraunhofer.de

www.iap.fraunhofer.com

pioneers in polymers

SOLARDIM[®]-ECO

HIGH ENERGY SAVINGS THROUGH A SELF-REGULATING SOLAR PROTECTION GLAZING

Product description

FORMGLAS SOLARDIM[®]-ECO is a self-regulating solar protection glazing. Due to an increase of temperature caused by solar radiation, SOLARDIM[®]-ECO changes from clear to opaque. The switching process is reversible: if the outside temperature decreases below the switching temperature, the glass becomes clear again. In contrast to conventional smart windows, SOLARDIM[®]-ECO requires no additional power source.

In its light-diffusing state, solar and radiation is deflected proportionately. Above all in summer, SOLARDIM[®]-ECO contributes to a noticeable reduction in heat and to a well-balanced indoor climate. Less strain is put on air-conditioning systems. In winter, SOLARDIM[®]-ECO remains clear even when the sun is shining. Thus, daylight can be used to its full extent. The energy demands on heating and lighting are minimized.

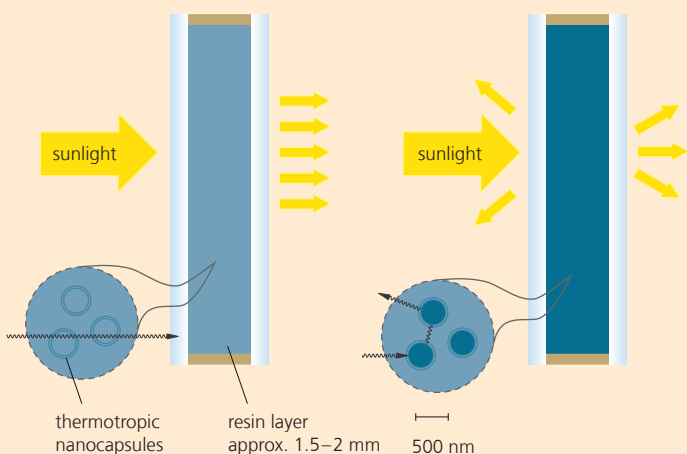
Moreover, SOLARDIM[®]-ECO decreases glare and eye discomfort, and harmful UV radiation is absorbed.

Functional principle

The new FORMGLAS SOLARDIM[®]-ECO consists of an optically active, thermotropic resin layer sandwiched between two glass panes. The resin layer is doped with spherical nanocapsules containing the mixture of compounds responsible for the switching behaviour. In the off state (e.g. 25 °C) solar radiation passes directly through the resin layer. SOLARDIM[®]-ECO is transparent. Above the switching temperature (on state, e.g. 40 °C), the core of the capsule changes its structure leading to scattering effects at the core-shell interface. As a result, SOLARDIM[®]-ECO becomes light diffusing and up to 30 percent of the solar radiation is reflected.

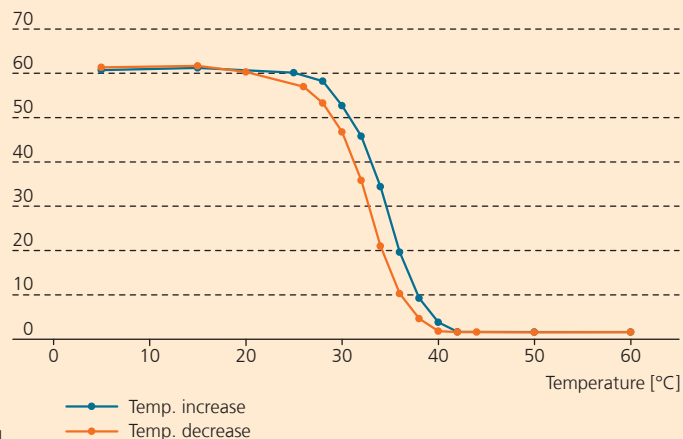
off state (e.g. 25 °C)

on state (e.g. 40 °C)



3

Normal visible transmittance [%]



4

Essential features

- self-regulating solar protection glazing
- solar controlled, reversible change from a transparent (off) to a light-diffusing (on) state
- dynamic adjustment to the fluctuating amount of light and heat depending on the time of day or year
- reflection of up to 30 percent of solar radiation > prevention of excessive heat during summer > reduction of air-conditioning costs
- efficient use of daylight during winter > reduction of heating and interior lighting costs
- applications: protection against overheating, glare and for use as a blind
- no additional power source required, no electrical control device needed
- degree of light scattering and switching temperature can be varied
- very durable, environmentally-friendly and maintenance free
- compatible with existing technology, capable of being integrated into conventional glazing systems (e.g. heat protection glazing), no sealing frame required
- combination with an individual switching behaviour is possible

Technical Data

Degree of doping	Visible transmittance [%]			Solar transmittance [%]			<ul style="list-style-type: none"> ▪ configuration – laminated glass, 2x1 mm clear glass, resin layer ≈ 1.7 mm ▪ measurement of the normal-hemispheric transmittance ▪ calculation of the transmittance values as per DINEN410 ▪ diff.=Difference
	off	on	Diff.	off	on	Diff.	
no	90	90	0	85	85	0	
low	86	69	17	81	68	13	
medium	74	46	28	73	50	23	
high	69	35	34	69	41	28	

Configuration	g Value		U Value [W/m²K]	<ul style="list-style-type: none"> ▪ configuration 1 – laminated glass, 2x1 mm clear glass, resin layer ≈ 1.7 m, medium doping ▪ configuration 2 – exterior: configuration 1, gap: 16 mm air, interior: clear glass 4 mm ▪ configuration 3 – exterior: configuration 1, gap: 16 mm argon 90percent, interior: low-e glass 4 mm ▪ g value as per DINEN410, U value as per DINEN673
	off	on		
1	0.78	0.59	5.74	
2	0.69	0.51	2.72	
3	0.53	0.37	1.13	

Funding

Federal Ministry of
Economics and Technology
Code: 0329820

Cooperation

TILSE FORMGLAS GmbH
Dammer Landstrasse 1
14715 Nennhausen/OT Liepe
Germany



Phone +49 033876 40212
E-Mail formglas@tilse.com

www.tilse.com

