

Anti-Reflective Coatings for Thermal Solar Glass



Description

ARX-330 is a one-component solution forming highly transparent and clear, thin coating over a glass substrate. Based on nanotechnology, the optimized composition of the organic-inorganic matrix provides anti-reflective properties with high hardness after a low-temperature heat curing process. ARX-330 material is tuned for applications especially requiring good scratch resistance.

Applications

- Thermal Solar Collectors
- Concentrated Solar Power
- Glass Tubes and Sheets

Highlights of ARX-330

- Increases transmission by up to 5% for double side coating covering the IR range
- Is a furnace curable coating on soda-lime, low-iron, or borosilicate glass
- Low curing temperature from 200°C to 450°C
- High scratch resistance and environmental durable, >5H hardness
- Increased easy to clean qualities ensures no drop off in performance of the module due to dirt

Technical Background

With the low refractive index of ARX-330, the efficiency of thermal solar modules can be improved with peak transmission increasing up to 98% for double-side coating.

Optitune's patented monophasic siloxane nanomaterials result in a matrix, where the pore distribution and pore size are controlled on a molecular level yielding a homogeneous coated structure.

How to Apply

Apply the solution by dip coating process. The ARX-330 is suitable for both tube and sheet shaped glass, including various glass types. By altering the dipping speed, the coating transmission peak maximum can be adjusted easily to meet the customer needs. The low viscosity of the solution is adjusted to fulfill dip coating conditions of an industrial coating line. Materials can be also fine-tuned towards higher dipping speed. ARX-330 is also available in formulations designed for other coating processes. Before applying, filtering is recommended. Both IR and oven heating are suitable for curing, but to optimize drying and tempering parameters, a test matrix of heat-treatment variables is recommended due to furnace differences.

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Key Properties of Coating		
Cross-Cut Adhesion	Excellent, 5B	ASTM D3359-09, Cross-Hatch tester
Pencil Hardness	Excellent, >5H	ASTM D3363-00, Elcometer tester and leads
Transmittance	T% > +2.3 % per side	ASTM D1003, Cary 5000 norm incident, AM1.5 λ 300-2500nm

Storage and handling

Solution should be stored below room temperature (+20°C) in a well-ventilated place. Keep containers tightly closed and protected from sources of heat and light. Shelf life is 6 months from the date of manufacture. For working safety, consult product Material Safety Data Sheet.

Typical Solution Properties

- Appearance: Clear liquid
- Specific gravity, 20°C: 0.8-0.9 kg/l
- Viscosity, Rolling-Ball: 4-5 mPas
- Diluents: Alcohols, Glycol ethers
- Molecular weight: $M_w > 2000$ g/mol
- Fluorine free

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