

The World's First Brush-On Thermal Glass Coating

Comparison of Insulating Products for Windows

Sketch Co., Ltd.

Development History

- More than ten years ago, an affiliate of NTT, the major Japanese telephone company, was barraged by complaints about how hot the glass-sided public telephone booths became in the glare of the summer sun. NTT-AT requested Sumitomo Metals and one of Sketch's current officers to come up with a solution and they developed the world's first room-temperature cured thermal insulating glass coating solution.
- Sumitomo Metals patented the earliest thermal insulating glass coating which was based on ruthenium and was weak transparent green in color. Developed to deal with the heat of summer, this coating primarily blocked near infrared radiation, but had little effect on far infrared. Because this weak green coat easily generates coating imperfections, application was limited to trained professionals. Moreover, as a result of the franchise and training fees extracted by the NTT-AT group, the installed price of the product for a single square meter ranged from JPY 12,000~15,000. At this high price, the market for the product did not expand rapidly.
- In November, 1999, Sketch successfully developed a thermal insulating coat based upon ATO (antimony tin oxide) that is effective in both winter and summer because it blocks near and far infrared. Anyone can easily apply this new coating without visible imperfections at a cost of only JPY 6,000 per square meter.
- As a result of the Kyoto Agreement reached on February 16, 2005, construction companies throughout the world are beginning to deal with improving the energy efficiency of windows as a means of reducing greenhouse gases like CO₂. In response, Delphi Labs and Sketch introduced IRUV Cut Coat using ATO developed by Mitsubishi Materials which exhibits better thermal performance than films at various trade shows in the US and China, including GlassBuild 2005 and 2006. Sales, concentrated in China and Southeast Asia, are growing.

Thermal Insulating Window Products

Three major categories are commercially available today

Glass Window Products

Double-Paneled Glass

Reflective or Tinted
Glass

Heat Absorbing Glass

Heat Absorbing
Double-Paneled Glass

Low-E Double-Paneled
Glass

Window Films

Reflective Film

Transparent Insulating
Film

Tinted Film

Liquid Coating Products

Sketch Group Insulating Coat

NTT-AT Group Insulating
Coat

Technical Data for Sketch's Thermal Insulating Liquid Coating

	Standard 3mm float glass	Treated with Sketch Coat
Visible Light Transmittance	90%	69.3~80%
UV Block Percentage	34%	99%
SC or Shading Coefficient	1	0.72~0.80

1. High degree of transparency. Easy to apply without visible gaps or imperfections. One person can apply about 20~25 square meters per day.
2. 99% of UV radiation is blocked (by UV block version)
3. 1 L can cover 40~50 square meters of window or more.
4. Effective in keeping out summer heat (by blocking far infrared), but also effective in keeping in winter warmth.
5. Cost advantageous given installed price of JPY 6,000 per square meter and product cost as low as JPY 1,000 per square meter.
6. Unlike window films, Sketch's coating has no seams.
7. Expensive window replacements can be avoided because liquid coating can be applied to existing windows.
8. The product lasts ten or more years giving it an edge on window films.
9. Applying IRUV Cut Coat to double paned normal float glass produces windows equivalent in thermal performance to low-e double paned glass.

Comparison of Liquid Insulating Coatings

	NTT-AT's AT Shield Clear on 5mm float glass	3mm float glass with Sketch Coat	
Visible Light Transmittance	69%	79.6%	69.3%
UV Block Percentage	99%	99%	99%
SC or Shading Coefficient	0.78	0.79	0.72

Drawbacks of NTT-AT's AT Shield

- Because of the light green color, imperfections from the application process are readily apparent. In contrast, Sketch's product is nearly transparent.
- Nearly twice as expensive as Sketch's product in the range of JPY 12,000~15,000.
- 1 L only covers 20 square meters. In contrast, Sketch's product covers 50 square meters per liter.
- Because near infra red is blocked, the insulating effect in winter is low.
- Because far infrared is hardly blocked at all, substantial amounts of heat is allowed to escape during the winter months.

Comparison with Energy Efficient Windows

(Using Asahi Glass Window Products)

Product	Visible Light Transmittance	UV Block	SC
Double-paned glass 8mm-6(12)mm-8mm	77.8%	58.6%	0.80
Heat reflecting glass Sun Cut Sigma Clear 6mm	63.1%	65.2%	0.78
Heat absorbing glass Sun Blue 5mm	79.4%	60.2%	0.82
Heat absorbing glass Sun Blue double-paned 3mm-6(12)mm-3mm	76.4%	58.1%	0.79
Low-E double paned Sun Balance Clear 6mm-6(12)mm-6mm	75.4%	74.8%	0.65
3mm float glass treated with Sketch's coating	79.6%	99%	0.79
3mm float glass treated with Sketch's coating	69.3%	99%	0.72

Drawbacks of Low-E Glass

- Low percentage of UV blocked (refer to UV percentages in chart)
- Because the surface will oxidize, cannot be used in a single pane product
- 20~30% waste from storage and fabrication of double pane glass units from low-e glass
- Replacement costs are very high for existing glass (JPY 30,000~50,000 per square meter)

Merits of Low-E Glass

- Strong thermal properties (refer to SC or shading coefficient in chart)

Comparison with Window Films

Product	Visible Light Transmittance	UV Block	SC
Teijin Reftel ZC06T attached to 3mm float glass	80%	99%	0.69
Sumitomo 3M Scotch Tint WH72CLAR 6mm Attached to float glass	74%	99%	0.70
Sketch's Coating attached to 3mm float glass	79.6%	99%	0.79
Sketch's Coating attached to 3mm float glass	69.3%	99%	0.72

Weaknesses of Window Films

- Longevity of films is limited by the glue used which weakens over time (only lasts half the period of Sketch's liquid coating)
- Scratches easily because only has a hardness of 1~2H (in contrast with Sketch's liquid coating of 4~5H)
- Higher cost – often twice the cost of Sketch's liquid coating reaching JPY 12,000~15,000.
- Cannot apply to patterned glass or composite glass
- Because film comes in rolls with defined widths, films have seams (usually every 1.5M)

Strengths of Window Films

- Thermal properties are good (refer to SC or shading coefficient in chart)
- Also has shatter-resistance properties that liquid coatings do not have