

Low-Contamination High Thermal Energy Reflectance Fluoropolymer Coating (High Solar Reflectance Paint)

Features

Bonnflon Sun Barrier®, high solar reflectance paint developed by AGC Coat-Tech Co., Ltd., a consolidated subsidiary of AGC Inc. Group, is a next-generation energy saving coating that combines infrared reflective pigment and fluoropolymer paint. Applied on roofs and exterior walls, it efficiently reflects sunlight and suppress increase in surface temperature, reducing air conditioning loads as well as CO₂ emissions.

When applied on roofs, rooftop, and exterior walls, it helps lower electricity bills, saves energy, and mitigates the heat-island effect.

Basic Concept or Summary

Bonnflon Sun Barrier® contains a special pigment with high infrared reflectance that reflects infrared rays from the sun to prevent the heat from causing the increase in room temperature.

Bonnflon Clear, used for the second top coat, has low contamination property and prevents adhesion of dirt for a long period to prevent decrease in the infrared reflectance of the paint (Fig. 1).

With the double coating technique that applies Bonnflon Clear over Bonnflon Sun Barrier, the paint prevents decrease in the reflectance of the paint applied on exterior walls exposed to harsh weather conditions and even roofs in the most severe environmental conditions.

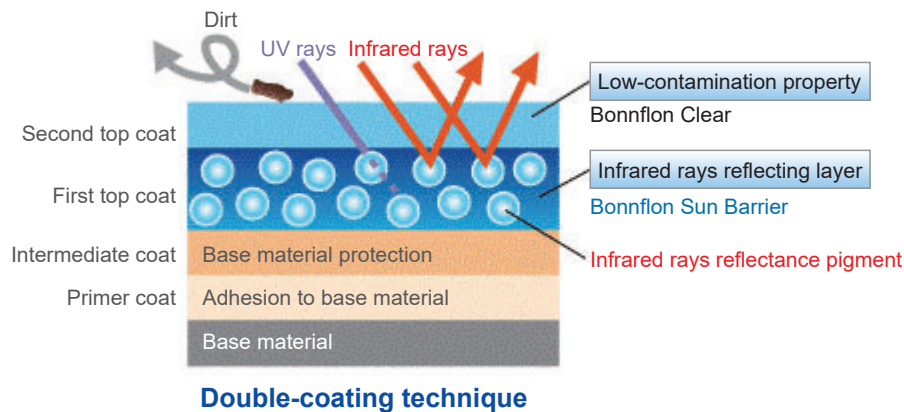
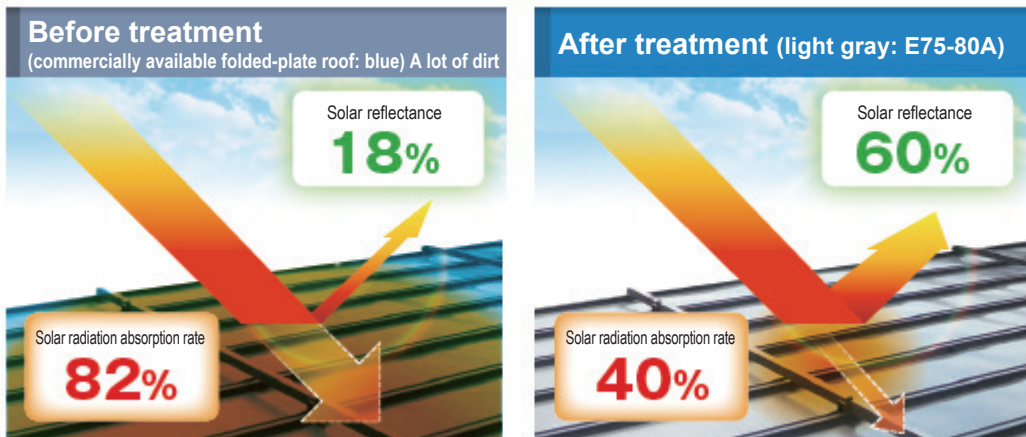


Diagram showing solar heat reflection (animation)



We conducted a verification test to determine to what extent the difference in solar reflectance between the rooftop surface treated with Sun Barrier and not treated with Sun Barrier coating would affect the temperature rise on the surface (Fig. 3). The test has shown that the temperature rise within the test time was reduced by ~12 °C on the treated surface compared to the untreated surface.

Verification test on the rooftop of a RC condominium

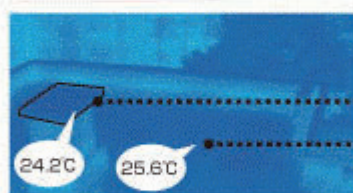
We applied Bonnflon Sun Barrier to the rooftop of a condominium with actual residents to verify the following effects.

Temperature measurement on the rooftop surface treated/not treated with the coating

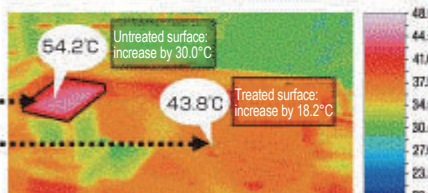
- Applied Bonnflon Sun Barrier on the rooftop of a condo (RC construction structure with seven floors) Color: N-7 Gray



Bonnflon Sun Barrier untreated area



Minimum surface temperature measured at 6:00 AM



Maximum surface temperature measured at 2:00 PM

Results

	AM6:00	PM2:00	Rising temperature difference
Untreated surface	24.2°C	54.2°C	30.0°C
Treated surface	25.6°C	43.8°C	18.2°C

**Reduction
by ~12°C**

Effects or Remarks

The result of the simulation to determine CO₂ emission reduction rate shows that, when the solar high reflectance paint is applied on a building roof, it reduces air conditioning and heating loads and can reduce CO₂ emissions by up to 21%.

Result of CO₂ emission reduction rate simulation

	A/C and heating loads (kwh / year)	Power consumption (kwh / year)	Electricity cost (yen / year)	CO ₂ emission amount (kg / year)
Bonnflon Sun Barrier	31.401	10.467	136.073	4.449
General paint	39.528	13.176	171.289	5.600
Reduction amount	8.127	2.709	35.216	1.151
Reduction rate	21%	-	-	21%

*The above numerical values are simulation results and not guaranteed values.

Calculation conditions:

- the unit price of electricity consumption is 13 yen per 1 kWh, and only the price of electricity is considered in calculation (excluding basic charge/service fee);
- *The unit price of electricity varies depending on the condition of how the customer receives electricity.
- Power consumption is calculated assuming energy consumption efficiency (COP) as 3.
- CO₂ emission amount is 0.425 kg / kwh.
- 1 kwh will be 3.6 megajoules.

Items	Conditions			
Region / weather conditions	Calculated based on the weather data for Tokyo.			
Comparison conditions	The roof surface treated with Bonnflon Sun Barrier and the one treated with a general paint are compared. The roof is gray (N-4). * The exterior walls are light-colored and painted with a general paint.			
Air conditioner operating conditions	Period of use	June - October		
	Preset temperature	26 °C	Usage time	9: 00 - 20: 00

- Roof: stainless steel / plate thickness 3 mm / area 300 m²
- Exterior wall: flexible board / plate thickness 4 mm / area 52 m² × 4
- Floor: regular concrete / thickness 150 mm / area 300 m²

* This simulation was calculated using standard weather data and thermal load calculation program LESCOM (author: Jin Takeda, published by Inoue Shoin).

Installation in Practice or Schedule

Domestic Examples of cases where this technology is applied:
Factories and warehouses, residential buildings, commercial and public buildings, gymnasiums.

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