MIRACOOL

MIRACOOL™

Solar High Reflective Coating

Japan Environmental Technology Verification
ETV Ministry of the Environment
http://www.env.go.jp/policy/etv/

MIRACOOL S300	Verification No.051-0847
MIRACOOL SW200	Verification No.051-0966
MIRACOOL F200	Verification No.051-1054
MIRACOOL U600	Verification No.051-1131
MIRACOOL AW700	Verification No.051-1132

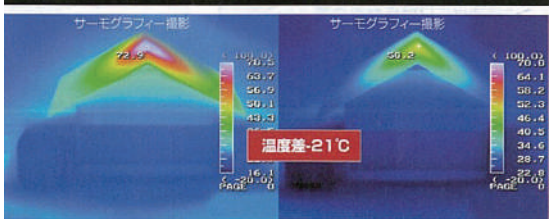
PATENTED TECHNOLOGY
MADE IN JAPAN

MIRACOOL CAN REDUCE SURFACE TEMPERATURE OF BUILDINGS AND FACILITIES THAT ARE EXPOSED TO SOLAR RADIATION.

How does solar radiation affect the surface temperature and heat flow through the roof?

When the roof surface is exposed to the sunlight, part of the solar radiation is reflected away by the surface substrate and the rest is absorbed. The absorbed solar radiation heats the roof surface, and the heated surface partially emits radiation in the far infrared part of the spectrum. The rest of the absorbed energy passes through the roofing material into the room, which increases the room temperature consequently. MIRACOOL is designed through the state-of-the-art technology to have very high reflectance and extremely high emission of solar radiation, and low heat conductivity in order to minimize the heat flow into the room.

We have a vast of experiences and job records with regard to High Reflective Coating i.e. MIRACOOL Series in Japan. Now, we are very pleased to introduce MIRACOOL to other countries.



BENEFITS

Reduction of surface temperature

Reduce cooling load and cost of air-conditioning systems up to 40 % in hot seasons. In a room without air-conditioning systems, the room temperature can be dropped by up to 10 degree C. That helps working environment and quality control of stored goods.

Protection of surface material

Extend the life of existing roofing materials.

Reduction of thermal shock

Reduce heat expansion of roofing materials that may cause loud noises.

Extraordinary weathering resistance

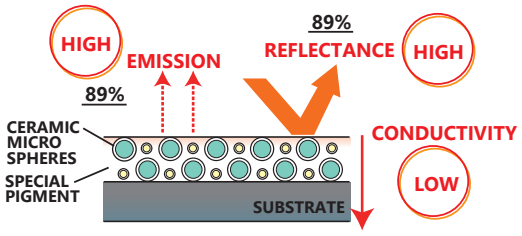
Reduce the maintenance cost of buildings.

Abundant color variation

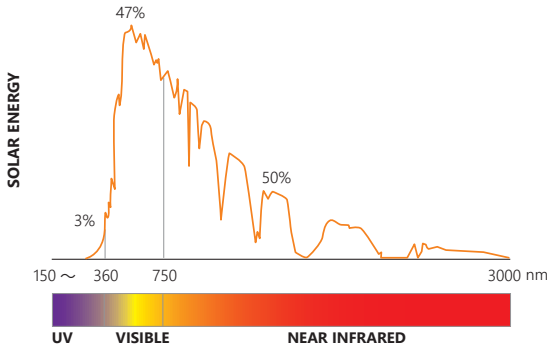
	Cool White		
Light color	Cool Gray	Pastel Blue	Light Green
	Orange Pink	New Ivory	Coral Brown

*This sample is printed matter so it differs somewhat from the actual product.

SECTIONAL VIEW OF DRY FILM OF MIRACOOL COATING

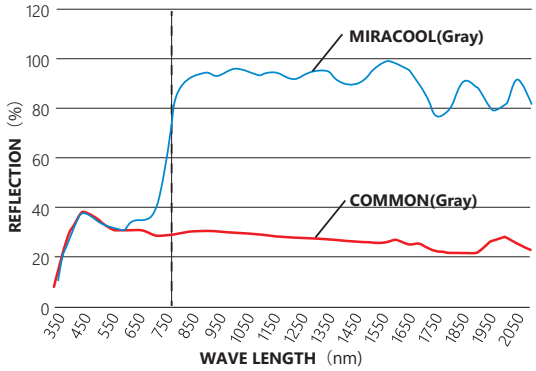


SOLAR SPECTRUM



The sun is burning at 5,700 degrees Kelvin, radiating solar energy to the earth. In the solar radiation, energy of the ultra violet ray accounts for only 3%, energy of the visible ray accounts for 47%, and the rest 50% of energy is in the infrared ray.
Our target is to reflect the infrared ray as much as possible.

REFLECTION OF INFRARED



This graph shows the reflection rates of the 2 paints at every wave length of the solar spectrum.
Both paints have the similar reflectance in the visible area, around 35%, which means both look as Gray in the human eye.
However there is a remarkable difference in the infrared area between the 2 paints: Miracool marks much higher reflection than a normal paint. This causes the difference of the temperature of the painted surface.

Room temperature reduction effect / Energy saving effect

DATA OF REDUCING ROOM TEMPERATURE（With/Without MIRACOOL）

Folded Plate Roofing At a facility operated by Company A in Hanoi, Vietnum temperatures reached 40.0℃ .

Building Structure

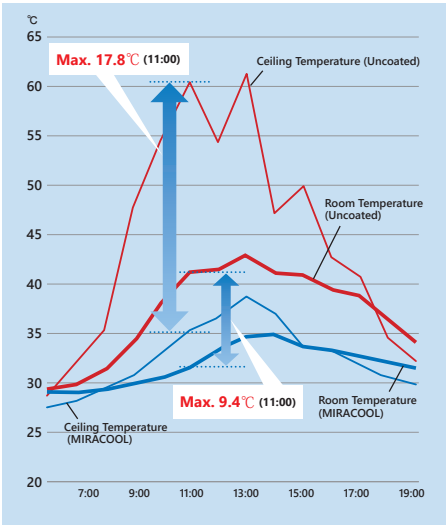
Steel-framed structure with colored folded plate roofing.

Temperature Measurement

Temperature at the inside surface of the roof on the loft side and room temperatures near the ceiling were measured by continuous recording thermometers.

Proven Effective in Reducing Both Loft Space and Room Temperatures

We compared room temperatures inside buildings with folded plate roofing, one before and the other after application of MIRACOOL coating on the days when ambient temperature was almost the same. The difference in room temperature was 8.0°C. This demonstrates MIRACOOL's effectiveness in reducing temperatures inside buildings with folded plate roofing.



DATA OF SAVING ENERGY（Comparison of Electric Energy Consumption）

Folded Plate Roofing Location of facility: Warehouse in Saitama city, Saitama Prefecture

Roof surface area: approx. 2,350 ㎡
Coating: MIRACOOL (Cool White)
Date of application: April 2013
Roof structure: colored folded plate roofing (t = 0.8 ㎜)
Insulation material: anticondensation insulation (t = 5 ㎜)

Achieved reduction of electricity consumption in the summer before and after coating

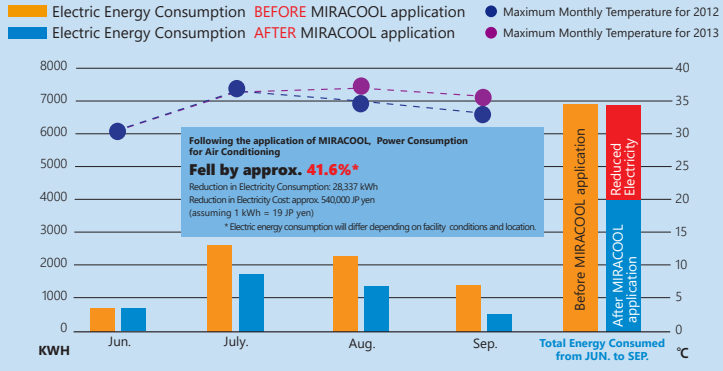
We compared electricity consumption for air conditioning during the summer at a warehouse to which MIRACOOL coating had been applied in 2013.

While the maximum ambient temperature conditions were nearly the same for the summers of 2012 and 2013, MIRACOOL coating dramatically reduced energy consumption.

This shows MIRACOOL is extremely effective in saving energy.

Comparison of Electric Energy Consumption for Air Conditioning in Summertime

Not only did MIRACOOL cut electricity consumption, it also achieved room temperatures of 26–27°C when the air conditioning is set to 26°C, in contrast to a temperature of around 30°C achieved for the same setting before MIRACOOL application, thereby creating a more comfortable workplace environment. Furthermore, the cost of electricity usage has also been significantly reduced.



Product introduction

Miracool AQ800 Primer

Water-based, two-component epoxy coating with excellent adhesion to a variety of material surfaces.

It has good film thickness retention and high hiding power.

It does not contain harmful anti-corrosive pigments (lead and chrome) and has low odor, making it an environmentally friendly paint.

Miracool AQ800

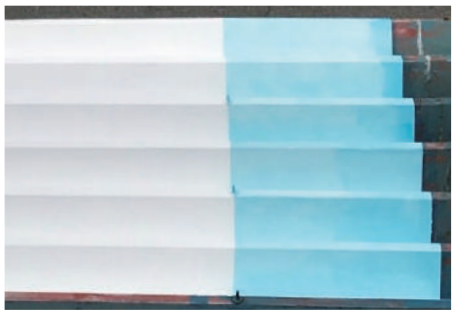
Solar high reflective coating with excellent cost performance, which is mainly composed of acrylic silicon with good weatherability. It is a one-component, water-based coating that is easy to handle and work with. It contains micro spheres that provide excellent reflective and radiative performance, and suppresses the rise in roof surface temperature and room temperature.

Miracool AQ Clear

A clear topcoat to prevent staining. When applied, the coating film becomes super hydrophilic, which greatly reduces the initial staining characteristic of water-based paints. Since the performance of thermal barrier paints (Solar high reflective coating) deteriorates when they get dirty, applying AQ Clear helps to maintain the thermal barrier function. In addition, since the clear coating does not reveal the application area, it is colored blue with food coloring, which fades with ultraviolet rays, and becomes colorless and transparent in one to two weeks.

Function of Miracool AQ Clear proven at the site

Difference in stain between uncoated and coated area (each photo, left half: uncoated area, right half: coated area)

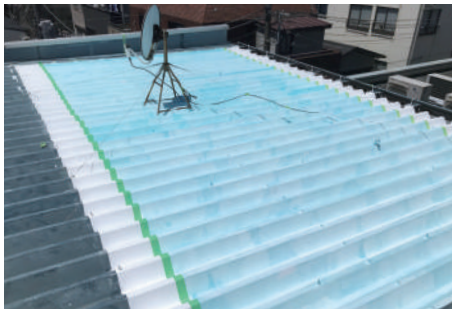


Immediately after coating with AQ Clear

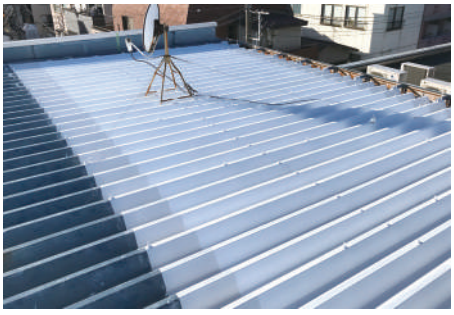
Colorant disappears in about one week

Comparison of AQ Clear coated area vs uncoated area

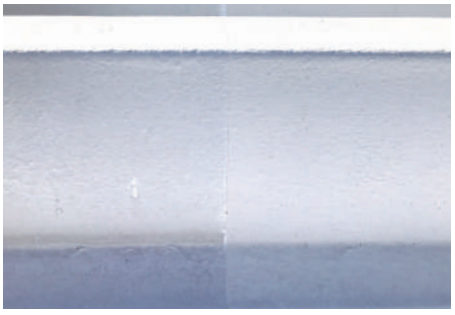
Before and after Miracool AQ clear construction



Immediately after coating with AQ Clear



3 months later



Comparispn of AQ Clear coated area vs uncoated area

Abundant achievements in various applications

Roofs of commercial facilities

Coating applied to Over 9,000,000 m^2

(Japan)

(Japan)

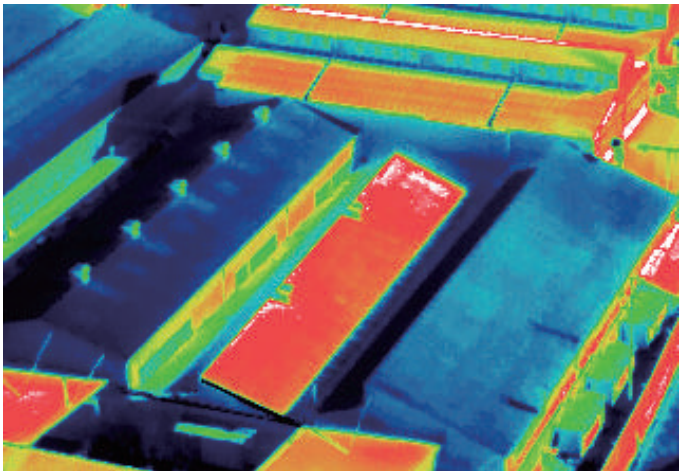
Roofs of office & school

(Guam)

(Philippines)

Roofs of factory

(Japan)



(Japan)

Roofs & Walls of warehouses

(Philippines)

(Vietnam)

Roads

(Japan)

(Singapore)

Courts

(Singapore)

Cubicle

(Japan)

APPLICATION PROCEDURE FOR MIRACOOL AQ800

Procedure for "Steel Roof " made of PCM (except fluorine coating)

Process	Product name	Coating method	Required amount (g/m²)	Coating Interval at 23°C	Dry film Thickness (μm)
Surface Preparation	Thoroughly remove efflorescence, laitance, stain, dust, dirt, debris, oil and all other foreign matters from the surface by high pressure jet water or else. Touch up by modified epoxy anti-rust primer shall be applied where the rust on the metal surface is observed.				
The primary coat	MIRACOOL AQ800 Primer Part A 15kg/can Part B 1.5kg/can (A : B = 10 : 1) Water 0 ~ 5 %	Paintbrush, roller or spray	200 ～ 220	3 hrs ～ 1 week	Approx. 55
The first coat	MIRACOOL AQ800 16 kg / can Water 0 ~ 5 %	Paintbrush, roller or spray	100 ～ 110	3 hrs ～ 1 week	Approx. 25
The second coat	MIRACOOL AQ800 16 kg / can Water 0 ~ 5 %	Paintbrush, roller or spray	100 ～ 110	3 hrs ～ 1 week	Approx. 25
The top coat (Option)	MIRACOOL AQ Clear 3 kg / can	Paintbrush, roller or spray	30 ～ 40	3 hrs ～ 1 week	-

Procedure for "Concrete or Mortar Roof "

Process	Product name	Coating method	Required amount (g/m²)	Coating Interval at 23°C
Surface Preparation	Clean stain and dust by high pressure water jet.			
Sealer	Local sealer suitable for concrete and mortar surface	According to manufacturer's standard		
The first coat	MIRACOOL AQ800 100 Water 0~5	Paintbrush, roller or spray	100 ～ 110	3 hrs ～ 1 week
The second coat	MIRACOOL AQ800 100 Water 0~5	Paintbrush, roller or spray	100 ～ 110	—
The top coat (Option)	MIRACOOL AQ Clear 3 kg / can	Paintbrush, roller or spray	30 ～ 40	3 hrs ～ 1 week

PATENT

	Patent number
JAPAN	4118090
JAPAN	4401171
JAPAN	4672589
JAPAN	3794824
JAPAN	3794837
THAILAND	28271
CHINA	ZL 01 1 22013.9
MALAYSIA	MY-136929-A
HONGKONG	HK1041281B

Miracool SDGs Initiatives

Reduces the burden on the global environment and working environment

Miracool Co., Ltd. will contribute to the realization of a sustainable society by "reducing the burden on the environment" by developing, manufacturing and selling environmentally friendly products.

- Expand the development, manufacture and sales of water-based paints and low VOC paints.
- The heat shield of the paint contributes to the suppression of greenhouse gas emissions and measures against the heat island.
- By reducing the heat, we will contribute to improving the working environment of our customers and protect our employees from mask heat stroke in the summer.
- We will work with partner companies to realize a sustainable society.

Manufacturer

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