

Energy-saving and structural protection measures for rooftop outdoor units.



Notes / Precautions / Cautions.



◆ Points to note for painting work ◆

① If there is a possibility of rain, please avoid painting.

On the day of painting, please confirm that the surface is not wet. If it is wet, wipe it off with a cloth and allow it to dry sufficiently.

② Please remove grease, oil, lifted paint film, bird droppings, and moss adhering to the surface.

③ If the temperature is 5°C or below or the humidity is 85% or higher, please avoid painting.

(During the winter season, the application time is approximately from 10 am to 3 pm. Please especially make sure that the dew on the roof has dried before painting.)

④ If you put a protective covering the access route, please bring the necessary amount of blue sheets, masking tape, cardboard, etc. beforehand.

⑤ If a ladder to access the rooftop is not installed on the building, please confirm in advance the location for installing a staircase and scaffolding (additional estimate required) and the storage location for materials during the on-site inspection.

⑥ To create an application completion report, please be sure to take multiple photos of the site before painting and record photos of the site after painting from the same angles so that the before and after can be clearly compared. Also, please take thermography images of the outdoor unit temperature and floor surface temperature after painting to clearly show the areas where coating has been applied and where it has not been applied.

⑦ When mixing paint with an electric stirrer on the rooftop, it is important to ensure a power supply. If a power supply cannot be secured, a generator will be required.

⑧ Please seal any unused cans tightly to prevent the paint from evaporating and store them. Use them as soon as possible.

*To prevent evaporation, please cover the can with plastic wrap or similar material and seal it tightly.

⑨ The temperature and humidity conditions related to basic paint management are the same as those for general paint.

⑩ Rust Shield is an epoxy solvent-based paint, while Thermo ECO Shield is a water-based paint. Please prepare separate application tools for each.

⑪ If the substrate to be coated with Rust Shield has a surface coated with a water-based paint and there is no rust or degradation, please apply a high-adhesion primer instead of using it directly.

Application tools

① Field Survey (The tools needed for measuring the dimensions of a Metal Corrugated Steel Sheet roof and an outdoor unit)



Steel Tape Measure Tape measure Masking Tape Camera Helmet Stepladder

② Items to be installed in the material storage area
 → Regardless of the following, please prepare items that are generally considered necessary for painting.



Curing cushion mat Blue tarp Colored cones and bars Curing sheet for painting Masking Tape Garbage bag



← Image of material storage area on site

③ Cleaning and high-pressure washing → Please prepare what you think is generally necessary for work.



Pressure washers and other accompanying tools Cleaning brush Bucket For wiping, rags and waste cloths (when drying is bad) Scraper Scraper Non-woven abrasive PORTABLE AIR BLOWER

Application tools

④ Protection of the outdoor unit and its surroundings

→ Please prepare generally necessary items for the work regardless of the following.



KAMOIIのLupin
18,24mm



Various masking tapes tape



Scraper with blade

⑤ During painting → Please prepare generally necessary items for the work regardless of the following.



Rust Shield
Base material
&
Hardener



Epoxy thinner.



Thermo ECO
Shield



Water
for dilution



Super Glass
Barrier



Measuring tools.



Paint bucket



Mixing Cup



For Rust Shield
"Makita Impact"
for mixing



For Thermo ECO
Shield or Rust Shield,
electric stirrer
(2 types: solvent and
water-based)



Bucket for cleaning
(2 types: solvent
and water-based)



WET THICKNESS
GAUGE



Various brushes and rollers
(for solvent and water-based)



Short hair
roller for
antifouling
coat



Coating Target for rooftop outdoor unit



Rooftop equipment: The manufacturer's warranty covers the installation for a period of three years, with guaranteed operation within a temperature range of up to 40°C. However, since the actual temperatures during the summer can reach 50°C to 60°C, any malfunctions occurring at these higher temperatures are not covered by the warranty.

1. Rooftop outdoor units for refrigeration, cooling, and air conditioning



2. Outdoor unit mounting bracket



3. Refrigerant pipes



4. Exhaust duct



5. Cable rack cover



6. Electrical distribution panels and similar enclosures



7. high-voltage power receiving equipment



The equipment listed from 2 to 7 will only be subject to painting if they are located within the floor area of the site designated for painting. For items 2 to 5, which are related to piping, only the upper half exposed to direct sunlight will be painted.

Types of equipment for use (distinguishing between solvent-based and water-based):



Types of rollers:

1. Roller widths vary between approximately 100mm, 180mm, and 230mm, with no standardized specifications, and there may be slight variations depending on the manufacturer.

In general, when painting a large surface, use a wide roller, and when painting narrow areas, use a narrow roller.

Please choose the type that is easy to use.

2. There are also different types of roller diameters to choose from. A standard roller with an inner diameter of around 38mm is commonly used. Rollers with an inner diameter of approximately 23-26mm are referred to as middle rollers, while those with an inner diameter of around 15mm are called small rollers or slim rollers.

Thicker rollers can hold more paint, making them suitable for painting large surfaces, but they can become quite heavy when soaked with paint.

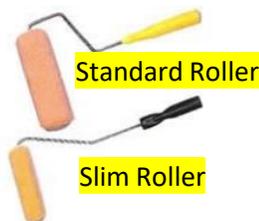
Since we won't be applying the coating to the entire roof this time, a slim roller is suitable for convenience.

3. There are three types of roller hair lengths.

The most common type is the medium hair type, with hair length of about 10 to 15 mm, and it is a versatile type that is used for walls, concrete, plywood, etc.

Long-haired types with hair lengths of 20 mm or more can easily coat uneven surfaces such as blocks.

Short-haired types with hair lengths of 9mm or less are used to create a beautiful finish on smooth surfaces. The roller marks are not very noticeable either. Since the main purpose of painting is not to maintain the aesthetic appearance of the roof, long hair is suitable for painting.



◆ Long-haired for rough surfaces ◆



◆ Medium-haired for general-purpose use ◆



◆ Short-haired for smooth surfaces. ◆



Urethane for textured surfaces



Sponge rollers like urethane rollers are used for applying water-based paint on smooth surfaces. On the other hand, rollers with a coarse, mesh-like texture are used for applying water-based exterior wall paint with aggregate (a type of sand) for creating a textured finish with clean and uniform patterns.

Cleaning and protective covering work.



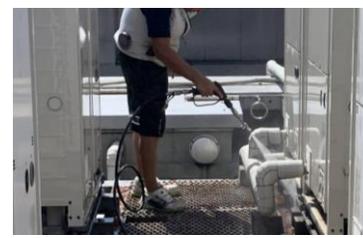
① Abrasive cleaning

We perform abrasive cleaning on the exterior surfaces of outdoor units, the floor area, and surrounding equipment to remove rust and improve paint adhesion. For older outdoor units with chalking surfaces due to their age, we conduct thorough abrasive cleaning. Additionally, we use a blower to remove dust as needed. ◦



② water washing

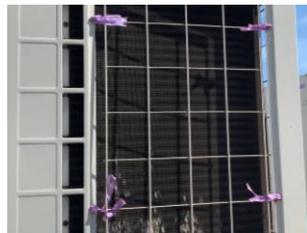
We conduct high-pressure washing on the floor surfaces and perform water washing with a brush on the surrounding equipment, using reduced water pressure. If drainage is poor and drying is slow, we will also consider wiping with a cloth or similar means if possible.



③ Protection by Masking tape

We perform masking and protective covering on labels or stickers attached to the outdoor unit's surface. Additionally, we provide protective covering in areas around the fan and air intake where there is a risk of paint splatter. When possible, we also cover around screws, but if there are too many screws to cover, we take measures to ensure they are not painted.

If there is water leakage from refrigerant pipes or the bottom of the outdoor unit, causing the floor to become wet, we will cover the leaking area to prevent the floor from getting wet.



Anti-Rust Base Coat 'Rust Shield' Painting



◆Preparation of Paint◆

Mix the base material and hardener for approximately 1 minute and 30 seconds, stirring thoroughly. The mixing ratio is 6 base material to 1 hardener by weight. For example, when preparing 2800g, use 2400g of base material and 400g of hardener.

If the working environment is unfavorable and the mixture feels too viscous, consider adding 3-5% of epoxy thinner. For instance, for 2800g, add 5% (140g), resulting in a total of 2940g.

During stirring, please be careful to avoid creating unevenness and air bubbles in the mixture.

The standard application rate is 180g/sqm. Please prepare the liquid by mixing the required quantity plus a little extra. The usable time is approximately 2 hours (for environments above 25°C).

Conversely, if you can use the mixture within 2 hours, you can prepare it as needed. For example, if you have a 100 sqm area to cover, you can directly add the hardener to the base material in a container and mix it as required.

If there are areas with rust, it's necessary to apply diluted Rust Shield for penetration before applying Rust shield. Dilute the Rust Shield with epoxy thinner and make sure to stir it thoroughly before application.

Dilute the pre-mixed "Rust Shield," which is at 100%, with epoxy thinner at a ratio of 30-40%. The application rate remains the same at 0.18kg/sqm.



Stir the Rust Shield base material by hand For 2~3min..



Put it into bucket



Put Hardener into Rust shield in the bucket



Mixing by Impact Made from Makita.



Dilute the epoxy thinner as follows:
- For rust-prone areas, dilute it at a rate of 30-40%.
- For normal use, dilute it at a rate of 3-5%.



Mixing by Impact Made from Makita.

During the peak of summer, use it within 2 hours.

◆Regarding the condition of the substrate before Rust Shield painting:◆

1. The painted areas should be confirmed to be completely dry before painting. This typically involves water cleaning, followed by allowing the surface to fully dry for at least a day.
2. For areas that are not rusted, degreasing with thinner may be necessary, depending on the substrate's condition. Be cautious when there is oil or strong water repellency, as it can lead to the formation of holes or affect adhesion during painting.
3. For rusted areas, it is advisable to schedule the painting on a day with no rain and cloudy or clear weather conditions. Complete drying is a prerequisite for painting in these areas.



Painting Rust Shield (In the case of Rust, painting twice)

Regarding the painting method:

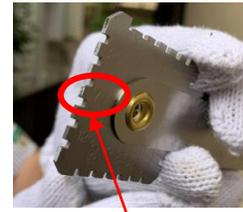
1. When painting the outdoor unit and the foldable roof, always start by painting the outdoor unit and the area around it. Then, proceed to paint the roof section. Be sure to take measures to prevent the paint container from getting too hot, such as using aluminum or stainless steel tape to avoid temperature rise.
2. A wet state with a film thickness of 75μ or more is required. Use a film thickness gauge to check whether the painting is being done at the appropriate film thickness.

Note: For areas with rust, after performing penetrating coat with diluted Last Shield, proceed with primer without waiting for finger-touch drying.

3. When dealing with screws, it's ideal to apply paint carefully with a brush or similar tool, allowing the screws to remain exposed. However, if there are a large number of screws, be cautious around the screw holes while applying paint with a roller or brush.



WET THICKNESS GAUGE



It is OK if the paint adheres to the 75μ area.

Rust shield as an undercoat (film thickness 75μ m or more)



outdoor unit



mounting bracket



Floor



Refrigerant pipes



Cable rack cover



Rising Part

Before and after painting



Before



After



Before



After

Painting Thermo ECO Shield (Middle coat and topcoat)

Paint Mixing Instructions:

Due to the high amount of hollow beads, there may be a solid layer of hollow beads formed at the top 5cm of the paint after opening.

However, by thoroughly mixing, the paint can be restored to a clean state. If it is challenging to break through the bead layer with the mixer's blades and reach the resin layer, you can use tools like a paddle to dig into it.

Please be cautious not to scatter the beads when doing so.

Once you have broken through the bead layer and the mixer reaches the bottom, continue mixing thoroughly until the bead layer is dispersed, and any lumps have completely disappeared, making the paint smooth.



*Can be diluted with water up to 5%.

For both the intermediate coating and top coating, if the paint adheres to the surface at a thickness of 150 μ m each (totaling 300 μ m), then it is considered acceptable.

Painting Thermo ECO Shield (Middle coat and topcoat)

Painting Method:

- One can of paint is typically sufficient for covering an area of 50 square meters with two coats (300g per square meter). Choose the appropriate roller or brush size to match the site's requirements.
- Between the first intermediate coat application and the second coat application, it may take 0.5-1 hour in summer and 2-3 hours in winter. The first coat may exhibit unevenness, but it becomes less noticeable after the second coat.
- When painting around screws, be careful not to cover them, or use masking tape to protect the screw areas from paint. If you paint over them directly, the screw holes may get filled in.
- If you decide not to use protective covering and paint over the screw areas, inform the customer in advance that the screws may become difficult to turn after painting.
- Try to avoid painting over areas where sealing or masking tape has been applied. When removing the protective covering, make it clear where the tape was applied so it can be easily identified.

The first coat (intermediate coat).



2nd coat (top coat)



Surface image after intermediate coating



Surface image after topcoating

Apply 150g of paint per 1 sqm for the first coat, and then apply a second coat in the same manner.

Removing protective covering (Masking tape)

After the surface has dried following the topcoat application of Thermo ECO Shield, you can remove the protective covering using tools like tweezers, a cutter, a single-edged scraper, or a spatula.

Sometimes, after painting, the seal marks may not be visible, and it can be challenging to identify where masking was applied. To address this, take photos before applying the protective covering so that you can identify the areas that were covered.

Using adhesive tape that is too strong can leave tape residue and make it difficult to read the original information on the sealed surface. Additionally, if you leave highly adhesive tapes like 3M's masking tape on the Thermo ECO Shield topcoat for several days, the coating can become too hard, making removal challenging. Kamoi's masking tape, with its moderate adhesive strength, is recommended as it can be removed cleanly.

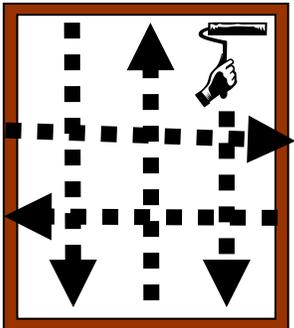


Coating Anti-fouling Coat, Super Glass Barrier

After completing the two coats of Thermo ECO Shield and ensuring that finger-touch drying is complete, you can proceed with the application of the anti-fouling coat.

Place Super Glass Barrier in a container made of polypropylene or polyethylene, and apply it using a brush or roller. The recommended amount is 20g per 1 square meter.

Since it's a clear liquid, be attentive to avoid missing any spots, and make sure to apply it both vertically and horizontally. As it contains mainly alcohol components, it evaporates quickly, so it's essential to work quickly during roller application.



Notes for Super Glass Barrier application

● Notes / Temperature

Optimal substrate temperature is less than 30°C degrees.

- 1) When the temperature or the glass surface is hot, slightly increase the amount of coating
 - 2) Put the coating liquid to cooler box with ice, it will be better finish and cool the liquid itself.
- ※Store in the refrigerator is also possible, in the field, it should put in a cooler box and store in the shade.

Purpose : By cooling the solution, delay the volatilization order to promote the densification of the coating film.

● Notes / Application

Please avoid the application under direct sunlight. Since volatility is fast, better to intercept the solar radiation so as not to be exposed to direct sunlight will be well to both finish and performance.

- 1) Even without the direct sunlight, in order to promote volatile liquid by wind, you might need to consider the windshield.

※Problem of temperature and substrate temperature and wind, in order to influence the volatilization rate of all coating liquid, the surface of coating may becomes poor (plaque comes out).

Reason: The substrate surface temperature is too high, then volatilized before forming. Also it can be a cavity on the coating surface, then the coating film will be white because of the diffused reflection effect of silica.

For the above reasons, please avoid the application, especially during the hot season in summer and the strong winds.

● Notes / After application

- 1) In the case of rain or snow on the application date or next day, it does not recommend to apply.
Reason: This product will take 12 hours or more to complete cure. When it's rain and water sprayed, it drops the adhesion and the durability of the coating film.
- 2) In the case of application to the glass and mirrors, maintenance is only to wash by water, please do not use detergent.
- 3) When the oil of the surfactant contained in the detergent remains, the persistence of ultra-hydrophilic effect will be reduced.

Points to note throughout



During high pressure washing



paint splatters



During Masking Tape



Removing masking tape



During Masking Tape

"Be cautious during high-pressure washing of the outdoor unit, as there is a risk of water getting into the circuitry and causing damage."

"We always use protective covering around the fan area and intake to prevent paint splatter."

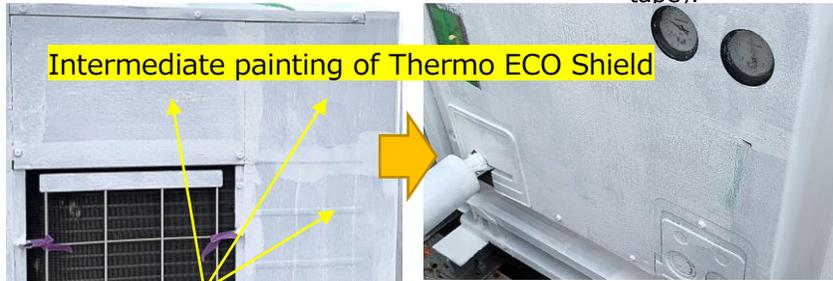
"Tapes with strong adhesion may leave residue when removed and can take time to peel off (including 3M masking tape)."

"We usually cover areas prone to leakage, but if it's not possible to cover them, we cannot proceed with the painting."

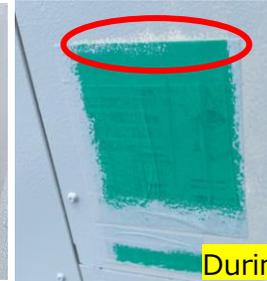


50μまでしか塗膜がない。

Painting Rust shield



Intermediate painting of Thermo ECO Shield



During painting



"Please paint to ensure there are no streaks or areas left unpainted."

"During application, we always verify that the film thickness is 75μm with a film thickness gauge. If it's too thin, we instruct for a recoat."

"The paint film on the roller-coated area is too thin."

"Please paint with an image similar to the level mentioned above, even if there are some inconsistencies in the intermediate coat. If the paint is too thick, dilute it as needed."



Painting Thermo ECO Shield



"Please cover the screw holes with protective covering to prevent them from being painted."



Before



After



Before



After

"When covering the outdoor unit, there's a possibility that it may get buried under the paint, making it difficult to identify during removal. Try to avoid painting over it, or if you paint over it, do so in a way that the seal marks are visible. In the worst case where it's unclear, take photos in advance to confirm the areas that were covered before removal."