

# SPACE COOL

Radiative cooling materials catalog.

Bringing the coolness of tree shade to the world.

With "zero energy" cooling,  
delivering safe and comfortable cooling to the world.



We strive to improve the heat environment with zero energy.

We can make a change in our environment.

Our radiative cooling technology will help eliminate fundamental causes of global warming.

## VISION

Bringing the coolness of tree shade to the world.

Zero Energy cooling is brought to you, the environment, and everyone worldwide. It brings truly safe and comfortable coolness.

## MISSION

Reversing global warming with a radiative cooling technology.

Our mission is to deliver durable, radiative cooling materials that can be used for various applications. Our technology will not only provide safety and comfort for us, but it reduces energy costs and is extremely environmentally friendly.

## VALUE



For People

**Comfort & Safty**

Heat stroke prevention. Keeping perishable food cool.



For Business

**Stability & Efficiency**

Overheating prevention for outdoor devices and equipment. Improving space efficiency. Reducing electricity consumption.



For the Environment

**No Electricity & No CO2**

Cooling without use of electricity. Reducing planet-warming emissions.

## About SPACECOOL

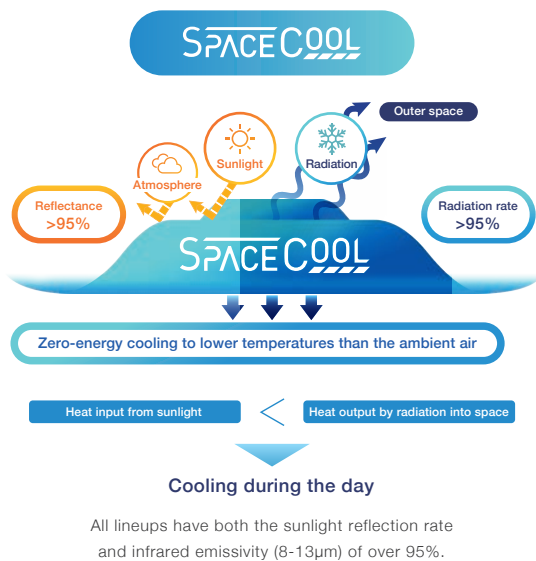
# SPACECOOL

SPACECOOL is a new material. It manages to achieve a lower temperature than the ambient temperature without consuming electricity by limiting heat absorption through blocking heat from sunlight and the atmosphere, as well as radiating heat into space.

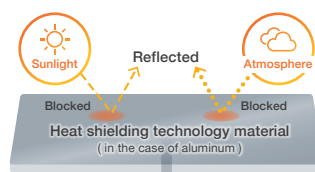
It is a product which can mitigate global warming while increasing comfort and safety.

It can be used in various applications.

A new material that uses zero energy to lower the temperature compared to the outside temperature without using conventional thermal barriers and insulating materials.



### Heat Shielding Technology Materials

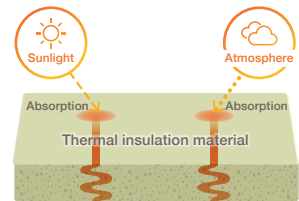


The inside is heated by conduction\*1, convection\*2 and radiation\*3

The temperature rises more than the outside temperature

Materials that reduce the heat input of sunlight into a room from the surface of the material. However, the temperature rises above the ambient air temperature when exposed to sunlight.

### Thermal Insulation Materials



The inside is heated by conduction\*1, convection\*2 and radiation\*3

The temperature rises more than the outside temperature

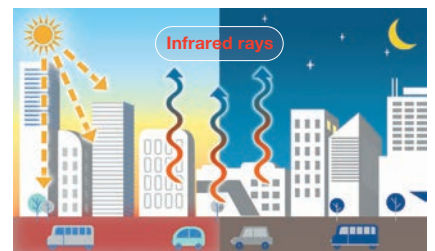
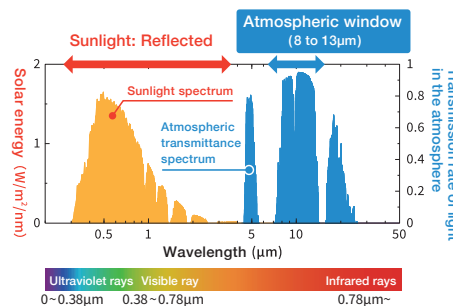
Insulation materials slow down the heat flow. The temperature is above the ambient air temperature when exposed to sunlight. Heat storage and heat buildup are likely to occur.

\*1. Conduction: A phenomenon in which heat is transferred through an object (solid).  
 \*2. Convection: A phenomenon in which heat is transferred by the movement of air.  
 \*3. Radiation: A phenomenon in which heat is transferred through light.

## About Radiative Cooling

When heat from the ground surface is released into space and cools down, we call it "radiative cooling". It is necessary to radiate heat in a limited wavelength range that passes through outer space called the "atmospheric window" to generate radiative cooling. Clear nights are cool because heat continues to be emitted from the earth into space with no solar radiation.


Conversely, the ground warms up because the heat input from solar radiation is greater than the heat that is emitted from the earth during the day.



# Product List

## FILM

### Film

Serial number	SCF-A25M-ONW (White) SCF-A25M-ONS (Silver)
Non-combustible / Flameproof	 Non-combustible
Recommended usages	Outdoor equipment Containers Transportation Buildings
Size (width (mm) × length (mm))	1250 × 25
Material properties	Polyvinyl chloride, etc.
Color	White <input type="checkbox"/> Silver <input checked="" type="checkbox"/>
Thickness (μm)	110 (Adhesive included)
Weight (typical value) (g/㎡)	145 (Not including release paper)
Adhesive	Made of pressure-sensitive re-peelable acrylic
Adhesive strength (stainless steel plates)	About 9N/25 mm (Measured 24 hours after installatio)
Certified	• MLIT-certified non-combustible material Certification: NM-5427, NM-5428, NM-5429
[Test methods]	Thickness: ISO 4593 as standard. The values for the product attributes are based on the results of tests conducted at a temperature of 20°C and a humidity of 65%.

## MAGNETIC SHEET

### Magnetic Sheet

Serial number	SCG-040I-OOW (White) SCG-040I-OOS (Silver)
Non-combustible / Flameproof	—
Recommended usages	Temporary Facilities Outdoor equipment
Size (width (mm) × length (mm))	1020 × 10
Material properties	Base Material: Bond magnet   Surface: PVC, etc.
Color	White <input type="checkbox"/> Silver <input checked="" type="checkbox"/>
Thickness (mm)	0.54 ± 0.02
Weight (typical value) (g/㎡)	1450 ± 50
Magnetized pitch (mm)	2.2
Surface inductive flux (mT, G)	27, 270
Adsorption power (kPa, l/m)	1.77, 18
Maximum energy product (BH <sub>max</sub> ) (kJ/m <sup>3</sup> , MG.Oe)	4.0, 0.5
Remanence (mT, G)	150, 1500
Coercivity (bHc) (kA/m, Oe)	103, 1300
Coercivity (iHc) (kA/m, Oe)	219, 2750




## MEMBRANE

### Membrane

### Tarpaulin (high strength)

### Tarpaulin (light weight)

### Canvas

	Membrane	Tarpaulin (high strength)	Tarpaulin (light weight)	Canvas
Serial number	SCM-300G	SPACECOOL-200E	SPACECOOL-TP50F	SPACECOOL-100E
Non-combustible / Flameproof	 Non-combustible	 Flameproof	 Flameproof	—
Recommended usages	Membrane-installed buildings Warehouses, factories Tent Warehouse	Tents Roof Shade	Cover Parasol Sunshades	Cover Parasol
Size (width (mm) × length (mm))	1040 × 50	1040 × 50	1200 × 50	1030 × 50
Material properties	Base Material : Glass fiber Surface : PVC, etc.	Base Material : Polyester Surface : PVC, etc.	Base Material : Polyester Surface : PVC, etc.	Base Material : Polyester Surface : PVC, etc.
Color	White <input type="checkbox"/> Silver <input checked="" type="checkbox"/>	White <input type="checkbox"/> Silver <input checked="" type="checkbox"/>	White <input type="checkbox"/>	White <input type="checkbox"/> Silver <input checked="" type="checkbox"/>
Thickness (mm)	0.56	0.73	0.56	0.53
Weight (typical value) (g/㎡)	820	880	700	560
Tensile strength (N/3cm, vert × lat)	3300 × 3000	2100 × 1800	490 × 490	1400 × 1200
Elasticity (% , vert × lat)	5 × 7	19 × 25	18 × 25	22 × 27
Certified	• MLIT-certified non-combustible material Certification: NM-5553 • Membrane Structures Association of Japan Class B Membrane Materials Certification: MMEM-0100	• Japan Fire Retardant Association certified flame retardant product Certification: FR-03259	• Japan Fire Retardant Association certified flame retardant product Certification: FR-04296	—
[Test methods]	Size : JIS L 1096 8.2.1 as standard. Thickness : JIS L 1096 8.4 as standard. Weight : JIS L 1096 8.3.2 as standard. Tensile strength : JIS L 1096 8.17.3 as standard.	Size : JIS L 1096 as standard. Thickness : JIS L 1096 as standard. Weight : JIS L 1096 as standard. Tensile strength : JIS L 1096 as standard.	Size : JIS L 1096 as standard. Thickness : JIS L 1096 as standard. Weight : JIS L 1096 as standard. Tensile strength : JIS L 1096 as standard.	

\*In order to improve product design and specifications, changes will be made without any prior notice. We kindly ask for your understanding.


\*The above physical properties are initial measured values, not guaranteed values. High frequency welding must not be used. It may result in electrical accident.

# FILM

## Film

It can be used on buildings, and the flexible adhesive sheet material can be processed to match various forms.



Product	Film
Serial number	SCF-A25M-ONW (White) SCF-A25M-ONS (Silver)
Non-combustible / Flameproof	 Non-combustible
Size (width (mm) × length (mm))	1250 × 25
Material properties	Polyvinyl chloride, etc.
Color	White <input type="checkbox"/> Silver <input type="checkbox"/>
Thickness (μm)	110 (Adhesive included)
Weight (typical value) (g/m <sup>2</sup> )	145 (Not including release paper)
Adhesive	Made of pressure-sensitive re-peelable acrylic
Adhesive strength (stainless steel plates)	About 9N/25 mm (Measured 24 hours after installatio)

### [ Test methods ]

Thickness: ISO 4593 as standard.

The values for the product attributes are based on the results of tests conducted at a temperature of 20°C and a humidity of 65%.

MLIT-certified non-combustible material - Certification: NM-5427, NM-5428, NM-5429

Non-combustibility: This product has passed the performance evaluation for non-combustible materials (metal plates, excluding metal plates, aluminum plates) based on Article, Item 9, of the Building Standards Act (Act No. 201 of 1950). \*1

- NM-5427 (synthetic resin film clad/non-combustible material (excluding metal plates))
- NM-5428 (synthetic resin film clad/non-combustible material (metal plates))
- NM-5429 (synthetic resin film clad/aluminum alloy plates)

\*1 To be recognized as a non-combustible product, this film must be installed on construction materials listed in "Stipulations for Non-combustible Materials" in the Ministry of Construction Public Notice No. 1400 issued on May 30th, 2000, or base materials listed in the appendix of the certificate.

It does not constitute a certified non-combustible product when installed on construction materials listed in the Ministry of Construction Public Notices No. 1401 (Quasi-non-combustible Materials) and No. 1402 (Flame-retardant Materials), other quasi-non-combustible and flame-retardant materials, or base materials whose surfaces have been processed with decorative coatings.

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\*The above physical properties are initial measured values, not guaranteed values. High frequency welding must not be used. It may result in electrical accident.

### Examples of Applications



#### Outdoor equipment

Outdoor equipment, Storage battery, Base station

#### Expected effects

- Reduce incidence of heat-associated failures and malfunctions.



#### Containers and storage tanks

Shipping containers, Gas tanks

#### Expected effects

- Control temperature rise during transportation and storage.
- Eliminate heat-related issues with contents.



#### Transportation

Mixer trucks, Tank lorries, Truck beds

#### Expected effects

- Control temperature rise inside the vehicle when it remains still improve.
- Cooling efficiency.

\*It may be wrinkled or peeled off depending on your usage environment.



#### Buildings

Large facilities such as factories, warehouses, airports, etc.

#### Expected effects

- Control the rise of indoor temperature
- Prevent heat stroke

## MAGNETIC SHEET

# Magnetic Sheet

It conforms to various forms  
and much easier to be installed.



Product	Magnetic Sheet
Serial number	SCG-040I-OOW (White) SCG-040I-OOS (Silver)
Non-combustible / Flameproof	—
Size (width (mm) × length (mm))	1020 × 10
Material properties	Base Material : Bond magnet Surface : PVC, etc.
Color	White <input type="checkbox"/> Silver <input type="checkbox"/>
Thickness (mm)	0.54 ± 0.02
Weight (typical value) (g/m <sup>2</sup> )	1450 ± 50
Magnetized pitch (mm)	2.2
Surface inductive flux (mT, G)	27, 270
Adsorption power (kPa, f/m <sup>2</sup> )	1.77, 18
Maximum energy product (BHmax) (kJ/m <sup>3</sup> , MG.Oe)	4.0, 0.5
Remanence (mT, G)	150, 1500
Coercivity (bHc) (kA/m, Oe)	103, 1300
Coercivity (iHc) (kA/m, Oe)	219, 2750

### Examples of Applications



#### Temporary Facilities

Power conditioners, Containers

##### Expected effects

- Reduces the temperature rise during transportation and storage.
- Solves the head problems of the content.



#### Outdoor equipment

Outdoor equipment, Storage battery, Base station

##### Expected effects

- Reduce incidence of heat-associated failures and malfunctions.

\*In order to improve product design and specifications, change will be made without any prior notice. We kindly ask for your understanding.

\*The above physical properties are initial measured values, not guaranteed values. High frequency welding must not be used. It may result in electrical accident.


## MEMBRANE

# Membrane

It can be used on buildings  
and can be sewing processed  
to match various forms.



### Examples of Applications

Product	Membrane
Serial number	SCM-300G
Non-combustible / Flameproof	 Non-combustible
Size (width (mm) × length (mm))	1040 × 50
Material properties	Base fabric : Glass fiber Surface : PVC, etc.
Color	White <input type="checkbox"/> Silver <input type="checkbox"/>
Thickness (mm)	0.56
Weight (typical value) (g/m <sup>2</sup> )	820
Tensile strength (N/3cm, vert × lat)	3300 × 3000
Elasticity (%, vert × lat)	5 × 7



#### Membrane structures

Membrane structures,  
(Warehouses, shopping facilities)  
Membrane roofs, etc  
(Parks, train stations, sports facilities)

#### Expected effects

- Prevention of heat stroke.
- UV protection, prevention of burns.



#### Warehouse / Factory

Simple warehouses,  
cargo handling areas

#### Expected effects

- Prevention of heat stroke.
- Prevention of heat damage to stored goods.



#### [ Test methods ]

Size : JIS L 1096 8.2.1 as standard. Thickness : JIS L 1096 8.4 as standard.  
Weight : JIS L 1096 8.3.2 as standard. Tensile strength : JIS L 1096 8.17.3 as standard.

MLIT-certified non-combustible materia - Certification: NM-5553

Membrane Structures Association of Japan Class B Membrane Materials - Certification: MMEM-0100

Non-flammability certification : Conforms to the provisions of Article 2, Item 9 of the Building Standard Law, and Article 108-2, Items 1 through 3 (nonflammable materials) of the enforcement ordinance of the same law.

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\*The above physical properties are initial measured values, not guaranteed values. High frequency welding must not be used. It may result in electrical accident.

## MEMBRANE

# Tarpaulin / Canvas

It is durable and can be sewed and processed to match various forms.

### Examples of Applications

Product	Tarpaulin (high strength)	Tarpaulin (light weight)	Canvas
Serial number	SPACECOOL-200E	SPACECOOL-TP50F	SPACECOOL-100E
Non-combustible / Flameproof	 Flameproof	 Flameproof	—
Size (width (mm) × length (mm))	1040 × 50	1200 × 50	1030 × 50
Material properties	Base Material :Polyester Surface :PVC, etc.	Base Material :Polyester Surface :PVC, etc.	Base Material :Polyester Surface :PVC, etc.
Color	White <input type="checkbox"/> Silver <input checked="" type="checkbox"/>	White <input type="checkbox"/>	White <input type="checkbox"/> Silver <input checked="" type="checkbox"/>
Thickness (mm)	0.73	0.56	0.53
Weight (typical value) (g/m <sup>2</sup> )	880	700	560
Tensile strength (N/3cm, vert × lat)	2100 × 1800	490 × 490	1400 × 1200
Elasticity (% , vert × lat)	19 × 25	18 × 25	22 × 27

#### [ Test methods ]

Size : JIS L 1096 as standard. Thickness : JIS L 1096 as standard.  
Weight : JIS L 1096 as standard. Tensile strength : JIS L 1096 as standard.

Tarpaulin (high strength) | MLIT-certified non-combustible material - Certification: FR-03259

Tarpaulin (light weight) | MLIT-certified non-combustible material - Certification: FR-04296

Disaster prevention product types: tents (rollout tents, tents for accessories, tents for camping, etc.), sheets (sheets for curing/loading cover, etc.), flags (advertisements like banner flags, banners, etc.)



#### Tarpaulin (high strength)



#### Tents / Roof Shade

Tents (leisure, event, medical),  
Roof shades

#### Expected effects

- Preventing heatstroke.
- Preventing heat concerns with stored items.



#### Tarpaulin (light weight) • Canvas



#### Cover / Sunshade / Parasol

Truck covers,  
Sunshades (residential, office, retail, automotive),  
Parasols (leisure, events)

#### Expected effects

- Preventing heatstroke.
- Preventing heat concerns with stored items.
- Cutting UV rays, preventing burn injury.

\*In order to improve product design and specifications, change will be made without any prior notice. We kindly ask for your understanding.

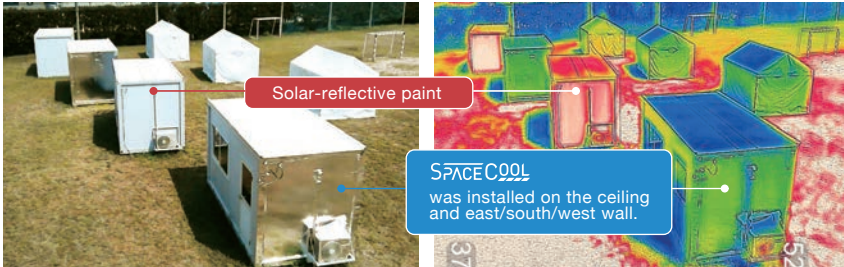
\*The above physical properties are initial measured values, not guaranteed values. High frequency welding must not be used. It may result in electrical accident.



## Results of Demonstration Tests

### FILM Solutions | SPACECOOL film installed on the outer surface of the unit house/container house.

Compared to ordinary paint, installing SPACECOOL on the ceiling, east, south, and west sides resulted in a reduced A/C burden, with as much as a ~20% reduction in energy consumption.



#### Test condition

- Cool air conditioner operational for 24 hours a day / set at 25°C.
- Comparison of power comparison between 9:00 a.m. and 5:00 p.m. (excluding rainy days).
- Unit house size 10.2479m<sup>2</sup>.



It can improve the loading space efficiency by minimizing the need for heat insulation measures.

Reduce the air conditioning burden and enable both cost and CO<sub>2</sub> reductions.

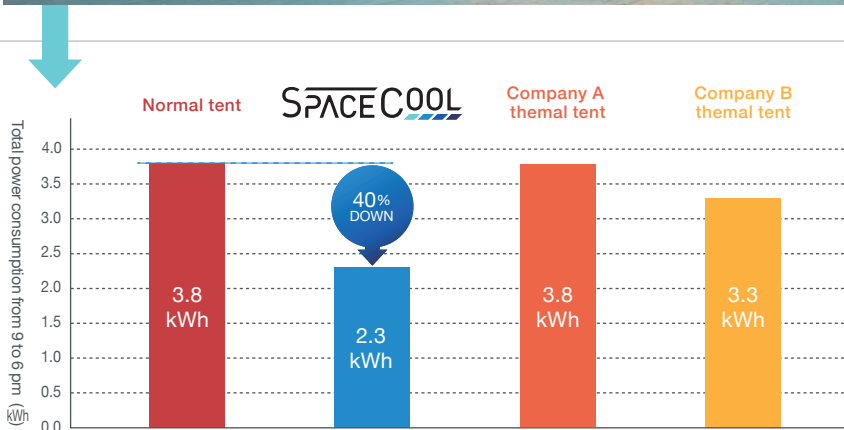
### MEMBRANE Solutions | Tent manufacturing using SPACECOOL's membrane materials.

Comparison of power consumption of an air conditioner placed in a SPACECOOL tent and tents made of materials from other manufacturers. Confirmed power savings of approximately - 40% compared to a standard tent.



#### Test condition

- Cool air conditioner operational set at 24°C.
- Comparison of power comparison between 9:00 a.m. and 6:00 p.m. (excluding rainy days).
- Tent size 270cmx360cm.



Alleviate the high-temperature environment inside a tent exposed to direct sunlight in mid-summer and prevent health hazards, such as heat strokes.

Reduce the air conditioning burden and enable both cost and CO<sub>2</sub> reductions.

## Example of Construction / Construction Method

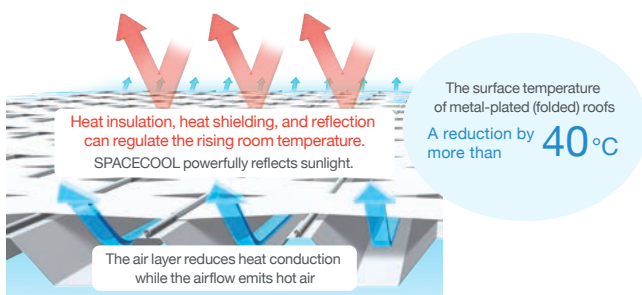
# ROOF SHADE

Many factories and warehouses have metal-plated (folded) roofs, but one big disadvantage of that is the accumulation of heat due to sunlight during summer. In mid-summer, the surface temperature of the metal-plated (folded) roof can reach up to 70-80°C, which is a major reason why the temperature rises inside the room. As the room temperature rises from the heat conducted through the roof, there are various problems, such as high electricity bills and air conditioning not working enough. Roof Shade is the solution to these problems. By covering the upper surface of the metal-plated (folded) roof with the radiative cooling sheet, SPACECOOL, the temperature of the roof surface can be lowered. Furthermore, we could achieve "low price, short construction period, and superior durability" compared to other methods.

## Roof Shade Characteristics

### ① Structured with air layer between the roof and SPACECOOL to reduce thermal conduction.

By placing fabric in a plover-shaped pattern, heat can be emitted without stopping the airflow. Also, the air layer between the roof and the fabric reduces heat conduction.



### ② Few parts are required.

The only parts required are SPACECOOL and securing fixtures. We simplified our estimates and construction.

### ③ No electric tool is used.

The construction needs no power because a special caulking machine is used. There is almost no noise during the construction.

### ④ It is walkable after the construction.

It has an endurance that can withstand a meter of snow tolerance. The maintenance after the construction is also easy.

## Construction Method

### 1 Fixate SPACECOOL using a shade grip.



### 2 Firmly fixate the shade grip using a special caulking machine.



### 3 Repeat steps 1-2.

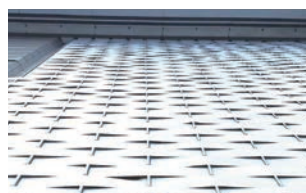


## Example of Construction

Factories, offices, refrigerated warehouses, recycling facilities, etc.



Ibaraki



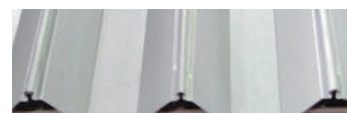
Wakayama



Hiroshima

### Attention

The roof shade can only be installed on seam-jointed folded-plate roofs.



Contact us



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2935-4 Tsumatori-cho, Shikokuchuo-shi, Ehime 799-0113  
TEL 0896-56-5042 / FAX 0896-58-7991

## Cautions for product use - 1

### Film

- For installation and maintenance, please refer to our manual Installation and Maintenance Methods for SPACECOOL Film SCF Series.
- Be sure to seal the edges with silicone caulking compound or sealing tape to protect the film's edges.
- Do not apply extreme tension when laminating.
- Please note there may be wrinkles when installing on tertiary curved surfaces.
- Please note that weak crimping during lamination may cause blistering after installation.
- Be sure to apply the film to a dry surface. Attaching to wet surfaces will not provide sufficient adhesive strength and may cause the product to peel off.
- When attaching to a foundation with severely uneven surfaces, use a squeegee to temporarily adhere the film. Then use a rivet brush or similar tool to completely blend the film into the foundation's shape.
- In particular, the film edge should be completely adhered to the foundation by tapping it with a rubber hammer or the like to prevent it from lifting.
- For special foundations, the condition of the foundation may affect durability, so please exercise care depending on the application.

### Membrane/ Tarpaulin / Canvas

- May cause crease during application.
- Please handle gently to avoid creasing.
- Do not use high frequency welding. May result in electrocution.
- After installation, processing such as sealing the edges or folding and sewing the edges are recommended.

### Magnetic

- Please tape the edges, etc., if constructed in very windy areas or if there is a risk of the sheet peeling off.
- Strongly bending the product may create wrinkles.
- Please use the product carefully to avoid wrinkles.
- Please do not use the product where there is magnetic interference or close to devices that can be damaged.
- When storing cut products and stacking them, please be ensure to put paper between the sheets.
- Please refer to the IATA/packing standard 953 when transporting the product by air. Packing needs to be improvised to prevent the leakage of magnetic lines.
- Before the application, please wipe off any moisture or stains well on the surface you want to apply the sheet.
- Also, fully wipe moisture/stains from the magnetic sheet surface before usage if any is found.
- Please ensure that the surface (to be applied to) is a flat surface when applying the magnet sheet.
- Gaps can be created between the magnetic sheet and the application surface for the following situations: curves (that create gaps), bumpy surfaces, and edge/corner sections popping up. These conditions may result in the peeling off/falling off of the product. Please be very careful about how to use this product, where to use it, and the application design.
- Rain, dust, metallic powder, etc. that get in between the magnet sheet and the application surface can alter the surface applied to (such as the paint). If this occurs, remove the product once and wipe off any moisture/stain well from the application surface and the magnet sheet surface before reapplication.
- Also, if you notice any abnormality on the application surface, we recommend stopping the usage. If you are worried about altering the application surface, we recommend processing the edges.
- The magnet sheet is magnetic. Please do not bring it close to pacemakers, magnetic cards, magnetic tapes, watches, and other forces affected by magnets.
- Please do not bring the magnetic sheet close to highly magnetic objects (electromagnets, rare earth magnetic, high-voltage electric cables, etc.). The magnetic force may be disturbed, and the magnetic force can be reduced/demagnetized.

## Cautions for product use - 2

### Disposal

- The following method should be used when disposing of the films and membrane materials that we manufacture and sell, as well as products made from processing such films and membrane materials.
- Dispose of the product in accordance with the Act on Waste Management and Public Cleaning and municipal ordinances.
- Please outsource the processing of the waste to a certified industrial waste disposal company.

### Fabric Storage

- Store the product in a dry location away from direct sunlight between 5 to 38°C. It can be stored for up to a year.
- Avoid hot and humid locations for storage, as a high temperature can deform the sheet shape.

### Other

- The values used in this document are averages and are not guaranteed values. They cannot be used to create specifications.
- The product surface may contain scratches and holes up to a few millimeters. However, this does not affect the product performance.
- Please exercise caution, as strongly bending the product can make the surface pop up.
- When using this product, please use it after fully checking the content of this instruction manual. Please determine the usage location and usage method at your own responsibility. We do not guarantee our product' s usefulness under all usage conditions. We bear no responsibility for damages caused by using this product unless it is due to the product' s defect.

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Therefore, unauthorized reproduction, citation, etc., is forbidden.

Please contact our representative by email ([support@spacecool.jp](mailto:support@spacecool.jp)) if you have any questions.

Radiate heat into space and

Block the sunlight.

## COMPANY PROFILE

Company Name SPACECOOL INC.

Date Founded Apr 1, 2021

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<https://spacecool.jp/en/>

Contact us



Online Shop

