

# CLEAS<sub>vol.3</sub>

Glass Film 2025-2028

Transmittance and Reflectance Photo Samples

Product Information Overview

Precautions for Selection and Installation

**CLEAS** Glass Film

product information

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Project Examples



Japanese only

Explore a range of  
completed projects  
featuring CLEAS



## Solar Control Film (Solar Adjustment / Mirror / Privacy)



Shadow 40 / GF1113

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Steam Bronze 20 / GF1411

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Shadow 20 / GF1114

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Mirror 40 / GF1106

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Steam Shadow 20 / GF1410

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Mirror 20 / GF1108

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Bronze 50 / GF1111

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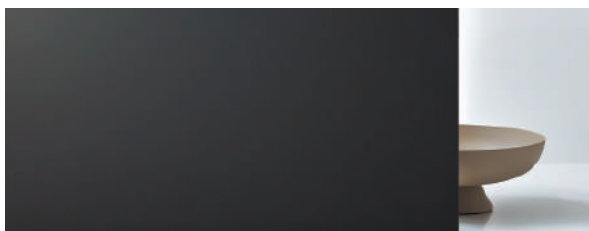
Perfect White II / GF1463

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Bronze 20 / GF1112

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Perfect Black / GF1413

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## Exterior Use Film

## Matte / Frost



Mirror 20EX / GF1110

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Filmy II 85 / GF1891

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Misty Mist 90 / GF1719

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Filmy II 50 / GF1892

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Misty Mist 30 / GF1849

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Diffuse 90 / GF1819

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Pilvi 70 / GF1712

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Lumikki 30 / GF1715

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## Matte / Frost | Center Gradation | Fog



Lumikki R 75 / GF1901

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Steam 35 / GF1821

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Lumikki R 50 / GF1902

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White Pearl 40 / GF1716

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Lumikki R 35 / GF1903

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Neo Grain 600 / GF1906

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Neo Grain 400 / GF1904

\* 100% concentration



Steam 85 / GF1718

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Circular Frost / GF1862

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\* 100% concentration



Steam 80 / GF1717

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Fog 2300 / GF1853

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Fog 2000 / GF1854

Fog 1500S / GF1861

\* 100% concentration

## Stone / Rust



Shiny Onyx / GF1864

P.33



Iron Rust / GF1866

P.33



Shiny Marble / GF1863

P.33



Marble / GF1802

P.33

## Wood / Fabric



Bronze Pearl Wood / GF1865

P.35



Chenille Silver / GF1867

P.35



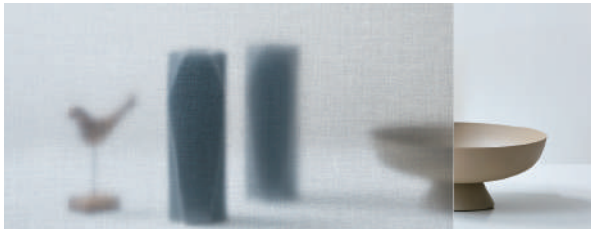
Clear Wood / GF1803

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Chenille Brown / GF1868

P.35



Lanka / GF1869

P.35



Risti / GF1737

P.35



Liina / GF1804

P.35



Neulaa / GF1870

P.35



# Stripes / Geometric



Polaris / GF1723

P.37



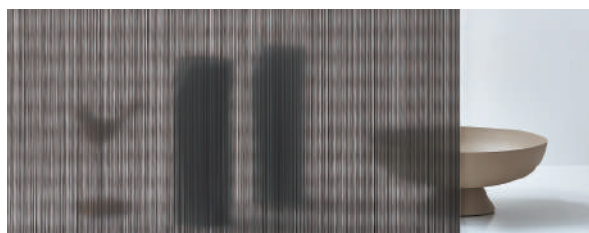
Runo / GF1824

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Joki / GF1826

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Runo Black / GF1825

P.37



Nagisa / GF1730

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Sade / GF1871

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Kitara / GF1827

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Sade Silver / GF1872

P.37



Kitara Black / GF1828

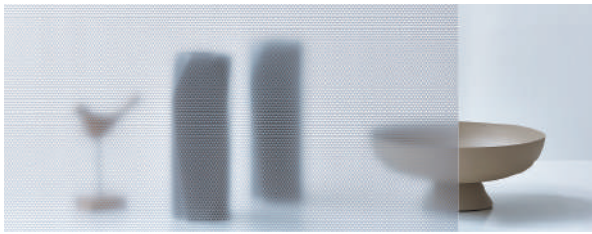
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Triangle / GF1831

P.37

## Stripes / Geometric



Triangle Silver / GF1830

P.37



Lumi / GF1832

P.37



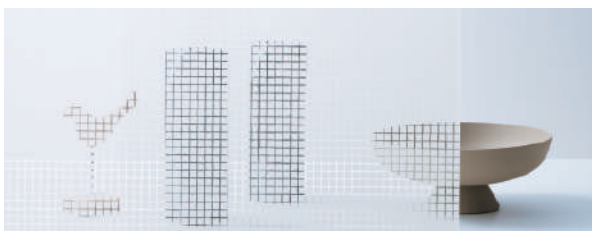
Lokki / GF1833

P.37



Cubic / GF1835

P.37



Ethico R / GF1911

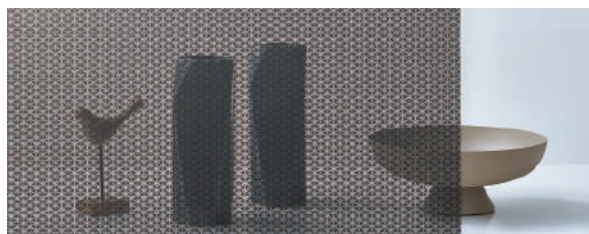
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## Japanese



Shiraginu / GF1836

P.39



Asanoha kuro kiriko / GF1838

P.39



Unryu / GF1747

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Shippo kumohada / GF1750

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Kozue / GF1748

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Asanoha kumohada / GF1752

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Shirotae / GF1746

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Ichimatsu kumohada / GF1753

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Asanoha kiriko / GF1837

P.39

## Playful Pattern



Repose / GF1873

P.41



Kodachi / GF1761

P.41



## Textured Glass



Antique / GF1809

P.43



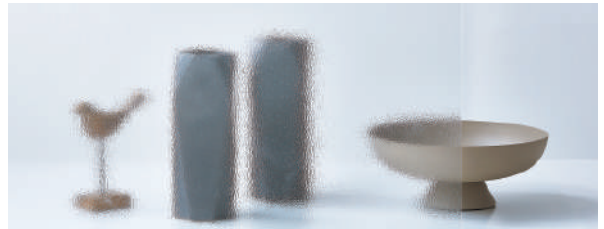
Retro / GF1720

P.43



Vertical / GF1806

P.43



Norm / GF1812

P.43



River / GF1874

P.43



Kangas / GF1813

P.43



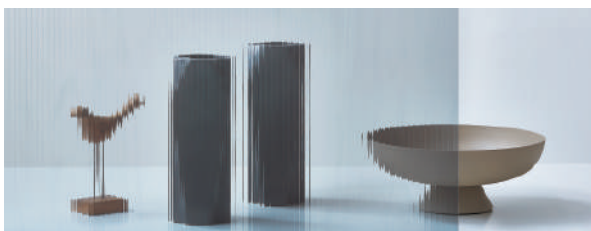
Antique Gray / GF1811

P.43



Retro White / GF1721

P.43



Vertical Gray / GF1808

P.43

## Effect



Gemstone / GF1876

P.45



Aurora / GF1875

P.45



Fantasy / GF1740

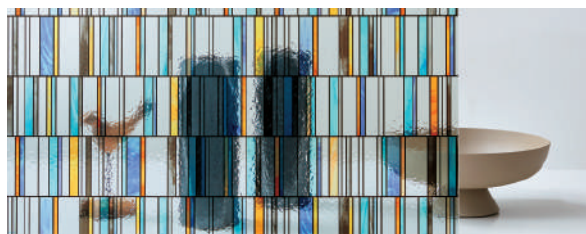
P.45



Mosaic Cube / GF1741

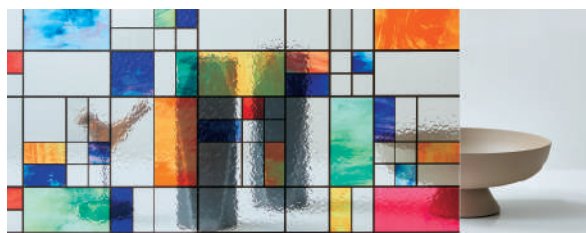
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## Stained Glass



Slim Block / GF1877

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Colorful Tile / GF1878

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## Digital Print Library



Frosted Clear Single-layer Ink Process

P.61



Standard White Single-layer Ink Process

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Frosted Color Single-layer Ink Process

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Standard Color Single-layer Ink Process

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Frosted White Double-layer Ink Process

P.61



Standard White Color Double-layer Ink Process

P.61

# Solar Control Film (Solar Adjustment / Mirror / Privacy) | Matte / Frost



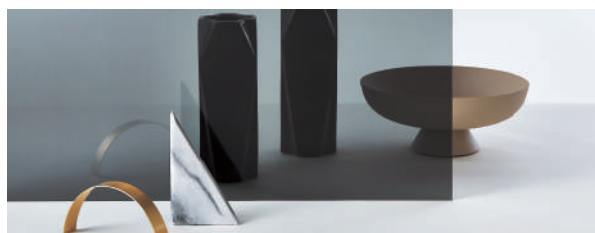
Shadow 40 / GF1113

P.11



Mirror 20 / GF1108

P.11



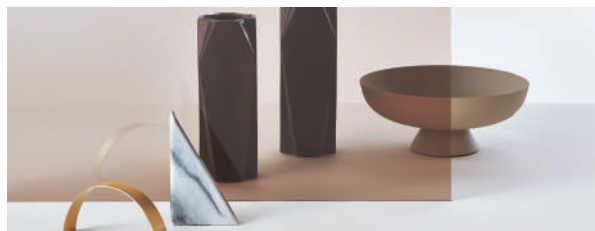
Shadow 20 / GF1114

P.11



Mirage / GF1822

P.11



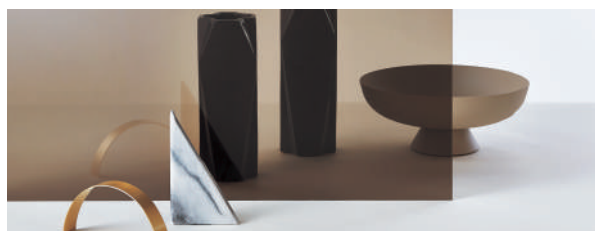
Bronze 50 / GF1111

P.11



Perfect Black / GF1413

P.11



Bronze 20 / GF1112

P.11



White Pearl 40 / GF1716

P.23

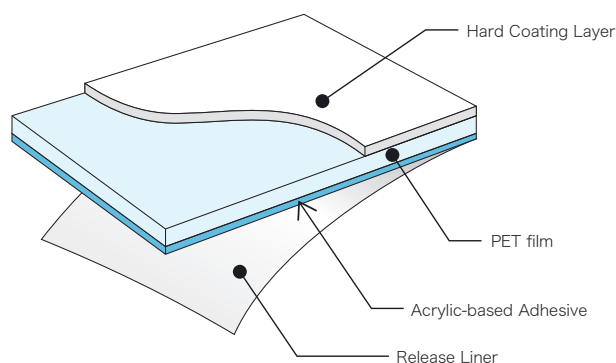


Mirror 40 / GF1106

P.11



## About Products



\* This illustration is a general example—specific product structures may differ.

## Function Description

|   |  |
|---|--|
| Solar Radiation                         | Refers to the spectrum of light emitted by the sun that reaches the Earth's surface, spanning wavelengths from 300 to 2500 nm.   |
| Visible Light                           | The portion of solar radiation visible to the human eye, commonly referred to as "light" or "visible light" (wavelengths: 380–780 nm).   |
| Ultraviolet Radiation                   | Part of solar radiation that includes UV-B (300–315 nm) and UV-A (315–380 nm) wavelengths, as defined by JIS A 5759.   |
| Shading Coefficient                     | Indicates the effectiveness of solar heat blocking. A lower value means better performance and greater energy-saving benefits in summer. The standard reference value is 1.0 for uncoated float glass.   |
| Solar Heat Gain Coefficient             | The proportion of solar heat that enters a room, including both the heat transmitted directly through the glass and the portion absorbed and re-radiated indoors.  |
| Thermal Transmittance                   | Measures how easily heat passes through a material due to temperature differences between inside and outside. Lower values indicate better insulation and higher energy efficiency in winter. Units: W/m <sup>2</sup> K.   |
| Shatter-Resistance                      | These products comply with the shatter-resistant performance tests (Method A = Impact Destruction Test, Method B = Interlayer Displacement Test) specified in JIS A 5759.  |
| Impact Destruction Test                 | Simulates breakage caused by accidental impact from people or objects. Conducted by striking the glass with a weighted object.   |
| Interlayer Displacement Test            | Simulates breakage caused by building distortion, such as during an earthquake. Conducted by distorting the window frame.  |
| Missile Collision Test                  | Simulates breakage from flying debris during strong winds or typhoons. Conducted by launching a steel ball at the glass.   |
| UV Protection                           | Products that block 99% or more of ultraviolet rays (300–380 nm) as specified by JIS A 5759.   |
| High-Range UV Protection                | Products that block 99% or more of ultraviolet radiation (280–400 nm) from sunlight.   |
| Insect Repellence                       | Helps reduce the attraction of insects that are drawn to ultraviolet light (phototaxis).   |
| Low Iridescence                         | Designed to minimize visible iridescence (optical interference patterns).  |
| Heat Rejection                          | Blocks infrared rays to reduce heat transfer, enhancing indoor comfort and energy efficiency—especially during summer.   |
| Low-E                                   | Provides high transparency while blocking external heat in summer and retaining indoor warmth in winter, supporting energy efficiency year-round.  |
| Hard Coating                            | A tough resin coating protects the surface from scratches caused by cleaning or everyday contact.  |
| Exterior Use                            | Products suitable for installation on exterior (outdoor) surfaces.   |
| Green Purchasing Law-Compliant Products | Products meeting the following criteria: Shading coefficient below 0.7, Visible light transmittance of 10% or higher, Thermal transmittance below 5.9 W/m <sup>2</sup> K<br>Note: For products with visible light transmittance of 70% or higher, the shading coefficient must be below 0.8. |
| Eco Mark Certification                  | The Eco Mark is an environmental label awarded to products—including both goods and services—that are recognized for helping to protect the environment and for having a low environmental impact throughout their entire life cycle, from production to disposal.                           |

# Product Information Overview

## Functional Film

| Page                          | Category   | Product Name  | Product Number | Product Width (mm) | Roll Length ( m ) | Total Thickness (Excluding Release Liner) ( μm ) | Base Film Thickness ( μm ) | Optical Properties |                   |                 |                   |                |                      | Thermal Properties  |                                 |  |
|-------------------------------|--|---|----------------|--------------------|-------------------|--|----------------------------|--------------------|-------------------|-----------------|-------------------|----------------|----------------------|---------------------|---------------------------------|--|
|                               |  |   |                |                    |                   |  |                            | Visible Light      |                   | Solar Radiation |                   |                | UV Transmittance (%) | Shading Coefficient | Solar Heat Gain Coefficient (%) | Thermal Transmittance (U-value) (W/m <sup>2</sup> K) |
|                               |  |   |                |                    |                   |  |                            | Reflectance (%)    | Transmittance (%) | Reflectance (%) | Transmittance (%) | Absorption (%) |                      |                     |                                 |  |
| P.6                           | A multi-layer PET Heat rejection film                    | Multi-layer PET Heat Rejection Gene HR 80                   | GF1461         | 960/1270/1524      | 50/50/30          | 76   | 51                         | 8                  | 81                | 16              | 44                | 40             | < 1                  | 0.66                | 58                              | 6.1  |
| P.7                           | High-range UV Protection & Heat Rejection Film           | High-range UV Protection & Heat Rejection Film Shinra HR 90 | GF1462         | 970/1250/1550      | 50/50/30          | 70   | 50                         | 9                  | 87                | 8               | 65                | 27             | < 1                  | 0.84                | 74                              | 5.8  |
| P.8                           | Clear Heat Rejection Film                                | High Transparency Heat Rejection Lucent 90                  | GF1101         | 970/1250/1550      | 50/50/30          | 69   | 50                         | 9                  | 88                | 7               | 67                | 26             | < 1                  | 0.85                | 75                              | 5.8  |
|                               |  | Clear Heat Rejection Core 70                                | GF1102         | 970/1270/1524      | 50/50/30          | 73   | 50                         | 20                 | 70                | 28              | 50                | 22             | < 1                  | 0.65                | 57                              | 5.5  |
| P.9                           | Low-E Film (Heat Rejection / Thermal Insulation Film)    | Low-E (Low Emissivity) Ecorim 70                            | GF1206         | 1270/1524          | 30                | 94   | 50                         | 19                 | 68                | 29              | 47                | 24             | < 1                  | 0.59                | 52                              | 4.5  |
| P.11                          | Solar Control Film (Solar Adjustment / Mirror / Privacy) | Shadow 40   | GF1113         | 970/1250           | 50                | 83   | 50                         | 6                  | 43                | 6               | 59                | 35             | < 1                  | 0.81                | 71                              | 6.0  |
|                               |  | Shadow 20   | GF1114         | 970/1250           | 50                | 83   | 50                         | 5                  | 20                | 6               | 48                | 46             | < 1                  | 0.73                | 64                              | 6.0  |
|                               |  | Steam Shadow 20   | GF1410         | 1250               | 50                | 115  | 75                         | 5                  | 19                | 7               | 44                | 49             | < 1                  | 0.69                | 61                              | 6.0  |
|                               |  | Bronze 50   | GF1111         | 970/1250           | 50                | 83   | 50                         | 6                  | 52                | 6               | 64                | 30             | < 1                  | 0.84                | 74                              | 6.0  |
|                               |  | Bronze 20   | GF1112         | 970/1250           | 50                | 83   | 50                         | 5                  | 26                | 6               | 51                | 43             | < 1                  | 0.74                | 65                              | 6.0  |
|                               |  | Steam Bronze 20   | GF1411         | 1250               | 50                | 115  | 75                         | 5                  | 23                | 7               | 46                | 47             | < 1                  | 0.70                | 62                              | 6.0  |
|                               |  | Mirror 40   | GF1106         | 970/1250           | 50                | 78   | 50                         | 32                 | 40                | 31              | 32                | 37             | < 1                  | 0.50                | 44                              | 5.8  |
|                               |  | Mirror 20   | GF1108         | 970/1250/1525      | 50/50/30          | 78   | 50                         | 58                 | 16                | 52              | 12                | 36             | < 1                  | 0.26                | 23                              | 5.7  |
|                               |  | Mirage  | GF1822         | 1250               | 50                | 68   | 50                         | 83                 | 0                 | 73              | 0                 | 27             | < 1                  | 0.10                | 9                               | 5.8  |
|                               |  | Perfect White II  | GF1463         | 1524               | 30                | 59   | 50                         | 50                 | 9                 | 43              | 11                | 46             | < 1                  | 0.31                | 27                              | 6.1  |
| P.12                          | Recycled PET Transparent Shatter-resistant Film          | Recycled PET Transparent Shatter-resistant Film CLEICEA 90  | GF1451         | 970/1250/1524      | 50/50/30          | 78   | 50                         | 11                 | 89                | 10              | 82                | 8              | < 1                  | 0.97                | 85                              | 6.1  |
|                               |  | Clear Shatter-resistant Film Chiaro 90                      | GF1204         | 960/1220/1524      | 50/50/30          | 76   | 50                         | 8                  | 89                | 8               | 81                | 11             | < 1                  | 0.97                | 85                              | 6.1  |
|                               |  | Clear Shatter-resistant Film Kind 90                        | GF1452         | 960/1270/1524      | 50/50/30          | 67   | 50                         | 8                  | 90                | 7               | 83                | 10             | < 1                  | 0.98                | 86                              | 6.1  |
| P.13                          | High-range UV Protection Film                            | High-range UV Protection Film Unfade 90                     | GF1406         | 970/1250           | 50                | 73   | 50                         | 8                  | 91                | 7               | 82                | 11             | < 1                  | 0.98                | 86                              | 6.0  |
| P.14                          | Security Film  | Security Film Fortis 90                                     | GF1464         | 960/1220           | 10                | 447  | 350                        | 9                  | 88                | 9               | 80                | 11             | < 1                  | 0.95                | 84                              | 6.1  |
| P.15                          | Safety Film  | Safety Film Toughbarrier 90                                 | GF1404         | 960/1220           | 30                | 125  | 100                        | 8                  | 89                | 8               | 81                | 11             | < 1                  | 0.97                | 85                              | 6.1  |
| P.17                          | Exterior Use Film  | Horizon EX  | GF1850         | 1250               | 50                | 100  | 75                         | 31                 | 32                | 22              | 38                | 40             | < 1                  | 0.59                | 52                              | 6.0  |
|                               |  | Circular EX   | GF1851         | 1250               | 50                | 100  | 75                         | 38                 | 32                | 27              | 38                | 35             | < 1                  | 0.57                | 50                              | 6.0  |
|                               |  | Exterior Use Clear Shatter-resistant Film Chiaro 90EX       | GF1105         | 960/1220/1524      | 50/50/30          | 78   | 50                         | 8                  | 88                | 8               | 81                | 11             | < 1                  | 0.97                | 85                              | 6.1  |
|                               |  | Exterior Use Clear Heat Rejection Film Vist 65EX            | GF1453         | 970/1250           | 30                | 70   | 50                         | 21                 | 68                | 33              | 48                | 19             | < 1                  | 0.57                | 50                              | 5.6  |
|                               |  | Mirror 20EX   | GF1110         | 970/1250/1525      | 50/50/30          | 75/75/103  | 50/50/75                   | 56                 | 18                | 51              | 14                | 35             | < 1                  | 0.28                | 25                              | 5.7  |
|                               |  | Misty Mist 90   | GF1719         | 1220               | 50                | 166  | 130                        | 9                  | 86                | 8               | 78                | 14             | < 1                  | 0.94                | 83                              | 6.1  |
|                               |  | Misty Mist 30   | GF1849         | 1220               | 50                | 166  | 130                        | 45                 | 30                | 34              | 35                | 31             | < 1                  | 0.51                | 45                              | 6.1  |
| P.18                          | Low-reflection Film                                      | Luclear II  | GF1401         | 1220/1500          | 50/30             | 76   | 50                         | 0.9                | 96                | 3               | 85                | 12             | < 1                  | 1.00                | 88                              | 6.0  |
|                               |  | Luclear II EX   | GF1402         | 1220/1500          | 50/30             | 78   | 50                         | 1.3                | 96                | 3               | 85                | 12             | < 1                  | 1.00                | 88                              | 6.0  |
| P.19                          | Patterned & Frosted Glass Film                           | Free Fit III  | GF1421         | 970/1250           | 30                | 205  | 100                        | 8                  | 89                | 8               | 81                | 11             | < 1                  | 0.96                | 84                              | 6.1  |
|                               |  | Free Fit III Pearl  | GF1456         | 1250               | 30                | 202  | 100                        | 33                 | 58                | 24              | 61                | 15             | < 1                  | 0.75                | 66                              | 6.1  |
| Clear Float Glass (3mm thick) |  |   |                |                    |                   |  |                            | 8                  | 91                | 8               | 86                | 6              | 75                   | 1.00                | 88                              | 6.0  |

## Matte / Frost / Gradation

| Page | Category      | Product Name | Product Number | Product Width (mm) | Roll Length (m) | Total Thickness (Excluding Release Liner) (μm) | Base Film Thickness (μm) | Optical Properties |                   |                 |                   |                |                      | Thermal Properties  |                                 |  |
|------|---------------|--------------|----------------|--------------------|-----------------|--|--------------------------|--------------------|-------------------|-----------------|-------------------|----------------|----------------------|---------------------|---------------------------------|--|
|      |               |              |                |                    |                 |  |                          | Visible Light      |                   | Solar Radiation |                   |                | UV Transmittance (%) | Shading Coefficient | Solar Heat Gain Coefficient (%) | Thermal Transmittance (U-value) (W/m <sup>2</sup> K) |
|      |               |              |                |                    |                 |  |                          | Reflectance (%)    | Transmittance (%) | Reflectance (%) | Transmittance (%) | Absorption (%) |                      |                     |                                 |  |
| P.23 | Matte / Frost | Filmy II 85  | GF1891         | 1010/1200          | 30              | 151  | 130                      | 9                  | 82                | 8               | 76                | 16             | 4.6                  | 0.93                | 82                              | 6.2  |
|      |               | Filmy II 50  | GF1892         | 1010/1200          | 30              | 151  | 130                      | 24                 | 48                | 17              | 53                | 30             | 9.1                  | 0.73                | 64                              | 6.2  |
|      |               | Diffuse 90   | GF1819         | 970/1250           | 50              | 73   | 50                       | 8                  | 88                | 8               | 80                | 12             | < 1                  | 0.96                | 84                              | 6.0  |
|      |               | Pilvi 70     | GF1712         | 970/1250           | 50              | 65   | 50                       | 15                 | 73                | 12              | 68                | 20             | < 1                  | 0.85                | 75                              | 6.0  |
|      |               | Lumikki 30   | GF1715         | 970/1250           | 50              | 67   | 50                       | 30                 | 28                | 22              | 34                | 44             | < 1                  | 0.56                | 49                              | 6.0  |
|      |               | Lumikki R 75 | GF1901         | 970/1250           | 50              | 79   | 50                       | 12                 | 73                | 10              | 71                | 19             | < 1                  | 0.90                | 79                              | 6.0  |

\* Optical and thermal properties are measured in accordance with JIS A 5759, with the film applied to 3 mm clear float glass. The test results represent measured values and are not guaranteed.

\* Optical and thermal properties for Low-reflection Film Luclear II (GF1401) are based on double-sided application.

\* Optical and thermal properties for Low-reflection Film Luclear II EX (GF1402) are based on double-sided application in combination with Luclear II (GF1401)

| Page | Product Name  | Product Number | Functionality      |               |                   |              |                |                 |              |                      |                           |   | Pattern Repeat |                 |                |
|------|---|----------------|--------------------|---------------|-------------------|--------------|----------------|-----------------|--------------|----------------------|---------------------------|---|----------------|-----------------|----------------|
|      |   |                | Shatter Resistance | UV Protection | Insect Repellence | Hard Coating | Heat Rejection | Low Iridescence | Exterior Use | Reverse Installation | Other Functionalities     | Green Purchasing Law-Compliant Products | Vertical (mm)  | Horizontal (mm) | Remarks        |
| P.6  | Multi-layer PET Heat Rejection Gene HR 80                   | GF1461         | ○                  | ○             | ○                 | ○            | ○              | ○               |              |                      |                           |   | -              | -               | -              |
| P.7  | High-range UV Protection & Heat Rejection Film Shinra HR 90 | GF1462         | ○                  | ○             | ○                 | ○            | ○              |                 |              |                      |                           |   | -              | -               | -              |
| P.8  | High Transparency Heat Rejection Lucent 90                  | GF1101         | ○                  | ○             | ○                 | ○            | ○              |                 |              |                      |                           |   | -              | -               | -              |
|      | Clear Heat Rejection Core 70                                | GF1102         | ○                  | ○             | ○                 | ○            | ○              |                 |              | ○                    |                           | ○                                       | -              | -               | -              |
| P.9  | Low-E (Low Emissivity) Ecorim 70                            | GF1206         | ○                  | ○             | ○                 | ○            | ○              |                 |              | ○                    | Low-reflection            | ○                                       | -              | -               | -              |
| P.11 | Shadow 40   | GF1113         | ○                  | ○             | ○                 | ○            | ○              |                 |              | ○                    |                           |   | -              | -               | -              |
|      | Shadow 20   | GF1114         | ○                  | ○             | ○                 | ○            | ○              |                 |              | ○                    |                           |   | -              | -               | -              |
|      | Steam Shadow 20   | GF1410         | ○                  | ○             | ○                 |              | ○              |                 |              | ○                    |                           |   | -              | -               | -              |
|      | Bronze 50   | GF1111         | ○                  | ○             | ○                 | ○            | ○              |                 |              | ○                    |                           |   | -              | -               | -              |
|      | Bronze 20   | GF1112         | ○                  | ○             | ○                 | ○            | ○              |                 |              | ○                    |                           |   | -              | -               | -              |
|      | Steam Bronze 20   | GF1411         | ○                  | ○             | ○                 |              | ○              |                 |              | ○                    |                           |   | -              | -               | -              |
|      | Mirror 40   | GF1106         | ○                  | ○             | ○                 | ○            | ○              |                 |              | ○                    |                           | ○                                       | -              | -               | -              |
|      | Mirror 20   | GF1108         | ○                  | ○             | ○                 | ○            | ○              |                 |              | ○                    |                           | ○                                       | -              | -               | -              |
|      | Mirage  | GF1822         | ○                  | ○             | ○                 | ○            | ○              |                 |              | ○                    |                           |   | -              | -               | -              |
|      | Perfect White II  | GF1463         | ○                  | ○             | ○                 |              | ○              |                 |              | ○                    |                           |   | -              | -               | -              |
|      | Perfect Black   | GF1413         | ○                  | ○             | ○                 | ○            | ○              |                 |              | ○                    |                           |   | -              | -               | -              |
| P.12 | Recycled PET Transparent Shatter-resistant Film CLEICEA 90  | GF1451         | ○                  | ○             | ○                 | ○            |                |                 |              |                      |                           |   | -              | -               | -              |
|      | Clear Shatter-resistant Film Chiaro 90                      | GF1204         | ○                  | ○             | ○                 | ○            |                | ○               |              |                      |                           |   | -              | -               | -              |
|      | Clear Shatter-resistant Film Kind 90                        | GF1452         | ○                  | ○             | ○                 | ○            |                | ○               |              |                      |                           |   | -              | -               | -              |
| P.13 | High-range UV Protection Film Unfade 90                     | GF1406         | ○                  | ○             | ○                 | ○            |                | ○               |              |                      |                           |   | -              | -               | -              |
| P.14 | Security Film Fortis 90                                     | GF1464         | ○                  | ○             | ○                 | ○            |                | ○               |              |                      |                           |   | -              | -               | -              |
| P.15 | Safety Film Toughbarrier 90                                 | GF1404         | ○                  | ○             | ○                 | ○            |                | ○               |              |                      |                           |   | -              | -               | -              |
| P.17 | Horizon EX  | GF1850         | ○                  | ○             | ○                 |              |                |                 | ○            |                      |                           |   | -              | -               | Horizontal use |
|      | Circular EX   | GF1851         | ○                  | ○             | ○                 |              |                |                 | ○            |                      |                           |   | -              | -               | Horizontal use |
|      | Exterior Use Clear Shatter-resistant Film Chiaro 90EX       | GF1105         | ○                  | ○             | ○                 | ○            |                |                 | ○            |                      |                           |   | -              | -               | -              |
|      | Exterior Use Clear Heat Rejection Film Vist 65EX            | GF1453         | ○                  | ○             | ○                 |              | ○              |                 | ○            | ○                    |                           |   | -              | -               | -              |
|      | Mirror 20EX   | GF1110         | ○                  | ○             | ○                 |              | ○              |                 | ○            | ○                    |                           |   | -              | -               | -              |
|      | Misty Mist 90   | GF1719         | ○                  | ○             | ○                 |              |                |                 | ○            | ○                    |                           |   | -              | -               | -              |
|      | Misty Mist 30   | GF1849         | ○                  | ○             | ○                 |              | ○              |                 | ○            | ○                    |                           |   | -              | -               | -              |
| P.18 | Luclear II  | GF1401         | ○                  | ○             | ○                 | ○            |                |                 |              |                      | Low-reflection            |   | -              | -               | -              |
|      | Luclear II EX   | GF1402         | ○                  | ○             | ○                 | ○            |                |                 | ○            |                      | Low-reflection            |   | -              | -               | -              |
| P.19 | Free Fit III  | GF1421         | ○                  | ○             | ○                 | ○            |                |                 |              | ○                    | Patterned & Frosted Glass |   | -              | -               | -              |
|      | Free Fit III Pearl  | GF1456         | ○                  | ○             | ○                 | ○            | ○              |                 |              | ○                    | Patterned & Frosted Glass |   | -              | -               | -              |

| Page | Product Name | Product Number | Functionality      |               |                   |              |                |                 |              |                      |                       |   | Pattern Repeat |                 |         |
|------|--------------|----------------|--------------------|---------------|-------------------|--------------|----------------|-----------------|--------------|----------------------|-----------------------|---|----------------|-----------------|---------|
|      |              |                | Shatter Resistance | UV Protection | Insect Repellence | Hard Coating | Heat Rejection | Low Iridescence | Exterior Use | Reverse Installation | Other Functionalities | Green Purchasing Law-Compliant Products | Vertical (mm)  | Horizontal (mm) | Remarks |
| P.23 | Filmy II 85  | GF1891         |                    |               |                   |              |                |                 |              | ○                    |                       |   | -              | -               | -       |
|      | Filmy II 50  | GF1892         |                    |               |                   |              |                |                 |              | ○                    |                       |   | -              | -               | -       |
|      | Diffuse 90   | GF1819         | ○                  | ○             | ○                 | ○            |                |                 |              | ○                    |                       |   | -              | -               | -       |
|      | Pilvi 70     | GF1712         | ○                  | ○             | ○                 |              | ○              |                 |              | ○                    |                       |   | -              | -               | -       |
|      | Lumikki 30   | GF1715         | ○                  | ○             | ○                 |              | ○              |                 |              | ○                    |                       |   | -              | -               | -       |
|      | Lumikki R 75 | GF1901         | ○                  | ○             | ○                 | ○            |                |                 |              | ○                    |                       |   | -              | -               | -       |

# Product Information Overview

## Matte / Frost / Gradation

| Page                          | Category         | Product Name   | Product Number | Product Width (mm) | Roll Length ( m ) | Total Thickness (Excluding Release Liner) ( μ m ) | Base Film Thickness ( μ m ) | Optical Properties |                   |                 |                   |                |                      | Thermal Properties  |                                 |  |
|-------------------------------|------------------|----------------|----------------|--------------------|-------------------|---|-----------------------------|--------------------|-------------------|-----------------|-------------------|----------------|----------------------|---------------------|---------------------------------|--|
|                               |                  |                |                |                    |                   |   |                             | Visible Light      |                   | Solar Radiation |                   |                | UV Transmittance (%) | Shading Coefficient | Solar Heat Gain Coefficient (%) | Thermal Transmittance (U-value) (W/m² K) |
|                               |                  |                |                |                    |                   |   |                             |                    |                   |                 |                   |                |                      |                     |                                 |  |
|                               |                  |                |                |                    |                   |   |                             | Reflectance (%)    | Transmittance (%) | Reflectance (%) | Transmittance (%) | Absorption (%) |                      |                     |                                 |  |
| P.23                          | Matte / Frost    | Lumikki R 50   | GF1902         | 970/1250           | 50                | 79  | 50                          | 24                 | 50                | 16              | 52                | 32             | < 1                  | 0.73                | 65                              | 6.0                                      |
|                               |                  | Lumikki R 35   | GF1903         | 970/1250           | 50                | 79  | 50                          | 35                 | 33                | 24              | 38                | 38             | < 1                  | 0.61                | 53                              | 6.0                                      |
|                               |                  | Steam 85       | GF1718         | 970/1250           | 50                | 76  | 50                          | 10                 | 84                | 9               | 76                | 15             | < 1                  | 0.92                | 81                              | 6.0                                      |
|                               |                  | Steam 80       | GF1717         | 970/1250           | 50                | 76  | 50                          | 11                 | 81                | 9               | 74                | 17             | < 1                  | 0.90                | 79                              | 6.0                                      |
|                               |                  | Steam 35       | GF1821         | 970/1250           | 50                | 76  | 50                          | 28                 | 33                | 21              | 37                | 42             | < 1                  | 0.59                | 52                              | 6.0                                      |
|                               |                  | White Pearl 40 | GF1716         | 970/1250           | 50/30             | 75  | 50                          | 43                 | 43                | 32              | 49                | 19             | < 1                  | 0.63                | 55                              | 6.0                                      |
| P.25                          | Side Gradation   | Prickly        | GF1907         | 1250               | 50                | 69  | 50                          | 34                 | 35                | 22              | 47                | 31             | < 1                  | 0.66                | 58                              | 6.1                                      |
|                               |                  | Sandy G        | GF1909         | 1250               | 50                | 69  | 50                          | 25                 | 49                | 18              | 52                | 30             | < 1                  | 0.71                | 63                              | 6.1                                      |
|                               |                  | Loska G        | GF1908         | 1250               | 50                | 69  | 50                          | 18                 | 68                | 14              | 67                | 19             | < 1                  | 0.84                | 74                              | 6.1                                      |
|                               |                  | Digitalism     | GF1817         | 1250               | 50                | 67  | 50                          | 31                 | 32                | 23              | 37                | 40             | < 1                  | 0.58                | 51                              | 6.0                                      |
|                               |                  | Horizon        | GF1703         | 1250               | 50                | 65  | 50                          | 32                 | 33                | 23              | 38                | 39             | < 1                  | 0.59                | 52                              | 6.2                                      |
|                               |                  | Kolmio         | GF1816         | 1250               | 50                | 67  | 50                          | 32                 | 30                | 23              | 36                | 41             | < 1                  | 0.57                | 50                              | 6.0                                      |
|                               |                  | Circular       | GF1702         | 1250               | 50                | 65  | 50                          | 30                 | 33                | 22              | 38                | 40             | < 1                  | 0.58                | 51                              | 6.0                                      |
|                               |                  | Circular Black | GF1818         | 1250               | 50                | 108   | 75                          | 6                  | 0                 | 6               | 2                 | 92             | < 1                  | 0.39                | 34                              | 6.1                                      |
| P.27                          | Center Gradation | Neo Grain 600  | GF1906         | 1550               | 30                | 69  | 50                          | 30                 | 42                | 21              | 47                | 32             | < 1                  | 0.66                | 58                              | 6.1                                      |
|                               |                  | Neo Grain 400  | GF1904         | 1550               | 30                | 69  | 50                          | 30                 | 41                | 21              | 47                | 32             | < 1                  | 0.66                | 58                              | 6.1                                      |
|                               |                  | Circular Frost | GF1862         | 1210               | 3                 | 89  | 50                          | 9                  | 89                | 9               | 80                | 11             | < 1                  | 0.95                | 84                              | 6.1                                      |
| P.29                          | Fog              | Fog 2300       | GF1853         | 1210               | 3                 | 89  | 50                          | 9                  | 89                | 9               | 80                | 11             | < 1                  | 0.95                | 84                              | 6.1                                      |
|                               |                  | Fog 2000       | GF1854         | 1210               | 3                 | 89  | 50                          | 9                  | 89                | 9               | 80                | 11             | < 1                  | 0.95                | 84                              | 6.1                                      |
|                               |                  | t t 1500S      | GF1861         | 1500               | 1.5               | 89  | 50                          | 9                  | 89                | 9               | 80                | 11             | < 1                  | 0.95                | 84                              | 6.1                                      |
| Clear Float Glass (3mm thick) |                  |                |                |                    |                   |   |                             | 8                  | 91                | 8               | 86                | 6              | 75                   | 1.00                | 88                              | 6.0                                      |

## Design Film

| Page | Category            | Product Name      | Product Number | Product Width (mm) | Roll Length (m) | Total Thickness (Excluding Release Liner) (μm) | Base Film Thickness (μm) | Optical Properties |                   |                 |                   |                |                      | Thermal Properties  |                                 |  |
|------|---------------------|-------------------|----------------|--------------------|-----------------|--|--------------------------|--------------------|-------------------|-----------------|-------------------|----------------|----------------------|---------------------|---------------------------------|--|
|      |                     |                   |                |                    |                 |  |                          | Visible Light      |                   | Solar Radiation |                   |                | UV Transmittance (%) | Shading Coefficient | Solar Heat Gain Coefficient (%) | Thermal Transmittance (U-value) (W/m <sup>2</sup> K) |
|      |                     |                   |                |                    |                 |  |                          | Reflectance (%)    | Transmittance (%) | Reflectance (%) | Transmittance (%) | Absorption (%) |                      |                     |                                 |  |
| P.33 | Stone / Rust        | Shiny Onyx        | GF1864         | 1250               | 50              | 71   | 50                       | 19                 | 51                | 18              | 48                | 34             | < 1                  | 0.68                | 60                              | 6.1  |
|      |                     | Iron Rust         | GF1866         | 1250               | 50              | 71   | 50                       | 11                 | 21                | 11              | 22                | 67             | < 1                  | 0.52                | 46                              | 6.1  |
|      |                     | Shiny Marble      | GF1863         | 1250               | 50              | 71   | 50                       | 21                 | 58                | 19              | 54                | 27             | < 1                  | 0.72                | 64                              | 6.1  |
|      |                     | Marble            | GF1802         | 1250               | 50              | 71   | 50                       | 29                 | 33                | 21              | 39                | 40             | < 1                  | 0.60                | 53                              | 6.0  |
| P.35 | Wood / Fabric       | Bronze Pearl Wood | GF1865         | 1250               | 50              | 71   | 50                       | 12                 | 68                | 10              | 66                | 24             | < 1                  | 0.84                | 74                              | 6.1  |
|      |                     | Clear Wood        | GF1803         | 1250               | 50              | 71   | 50                       | 10                 | 73                | 9               | 69                | 22             | < 1                  | 0.88                | 77                              | 6.0  |
|      |                     | Lanka             | GF1869         | 1250               | 50              | 71   | 50                       | 11                 | 63                | 10              | 59                | 31             | < 1                  | 0.79                | 70                              | 6.1  |
|      |                     | Liina             | GF1804         | 1250               | 50              | 71   | 50                       | 15                 | 67                | 13              | 62                | 25             | < 1                  | 0.80                | 70                              | 6.0  |
|      |                     | Neuloa            | GF1870         | 1250               | 50              | 65   | 50                       | 20                 | 66                | 18              | 63                | 19             | < 1                  | 0.79                | 70                              | 6.0  |
|      |                     | Chenille Silver   | GF1867         | 1250               | 50              | 65   | 50                       | 34                 | 47                | 29              | 43                | 28             | < 1                  | 0.59                | 52                              | 6.0  |
|      |                     | Chenille Brown    | GF1868         | 1250               | 50              | 65   | 50                       | 8                  | 69                | 8               | 66                | 26             | < 1                  | 0.86                | 75                              | 6.0  |
|      |                     | Risti             | GF1737         | 1250               | 50              | 65   | 50                       | 21                 | 59                | 15              | 62                | 23             | < 1                  | 0.78                | 69                              | 6.0  |
| P.37 | Stripes / Geometric | Polaris           | GF1723         | 1250               | 50              | 65   | 50                       | 14                 | 59                | 11              | 63                | 26             | < 1                  | 0.82                | 72                              | 6.0  |
|      |                     | Joki              | GF1826         | 1250               | 50              | 67   | 50                       | 19                 | 40                | 14              | 43                | 43             | < 1                  | 0.66                | 58                              | 6.0  |
|      |                     | Nagisa            | GF1730         | 1250               | 50              | 65   | 50                       | 20                 | 56                | 15              | 60                | 25             | < 1                  | 0.78                | 69                              | 6.0  |
|      |                     | Kitara            | GF1827         | 1250               | 50              | 68   | 50                       | 21                 | 65                | 17              | 64                | 19             | < 1                  | 0.81                | 71                              | 5.9  |
|      |                     | Kitara Black      | GF1828         | 1250               | 50              | 68   | 50                       | 14                 | 36                | 13              | 32                | 55             | < 1                  | 0.58                | 51                              | 5.9  |
|      |                     | Runo              | GF1824         | 1250               | 50              | 71   | 50                       | 21                 | 52                | 16              | 54                | 30             | < 1                  | 0.74                | 65                              | 6.0  |
|      |                     | Runo Black        | GF1825         | 1250               | 50              | 71   | 50                       | 6                  | 35                | 6               | 34                | 60             | < 1                  | 0.63                | 55                              | 6.0  |



| Page | Product Name   | Product Number | Functionality      |               |                   |              |                |                 |              |                      |                       |   | Pattern Repeat |                 |                |
|------|----------------|----------------|--------------------|---------------|-------------------|--------------|----------------|-----------------|--------------|----------------------|-----------------------|---|----------------|-----------------|----------------|
|      |                |                | Shatter Resistance | UV Protection | Insect Repellence | Hard Coating | Heat Rejection | Low Iridescence | Exterior Use | Reverse Installation | Other Functionalities | Green Purchasing Law-Compliant Products | Vertical (mm)  | Horizontal (mm) | Remarks        |
| P.23 | Lumikki R 50   | GF1902         | ○                  | ○             | ○                 | ○            | ○              |                 |              | ○                    |                       |   | -              | -               | -              |
|      | Lumikki R 35   | GF1903         | ○                  | ○             | ○                 | ○            | ○              |                 |              | ○                    |                       |   | -              | -               | -              |
|      | Steam 85       | GF1718         | ○                  | ○             | ○                 |              |                |                 |              | ○                    |                       |   | -              | -               | -              |
|      | Steam 80       | GF1717         | ○                  | ○             | ○                 |              |                |                 |              | ○                    |                       |   | -              | -               | -              |
|      | Steam 35       | GF1821         | ○                  | ○             | ○                 |              | ○              |                 |              | ○                    |                       |   | -              | -               | -              |
|      | White Pearl 40 | GF1716         | ○                  | ○             | ○                 |              | ○              |                 |              | ○                    |                       |   | -              | -               | -              |
| P.25 | Prickly        | GF1907         | ○                  | ○             | ○                 | ○            |                |                 |              |                      |                       |   | -              | -               | Horizontal use |
|      | Sandy G        | GF1909         | ○                  | ○             | ○                 | ○            |                |                 |              |                      |                       |   | -              | -               | Horizontal use |
|      | Loska G        | GF1908         | ○                  | ○             | ○                 | ○            |                |                 |              |                      |                       |   | -              | -               | Horizontal use |
|      | Digitalism     | GF1817         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | -              | -               | Horizontal use |
|      | Horizon        | GF1703         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | -              | -               | Horizontal use |
|      | Kolmio         | GF1816         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | -              | -               | Horizontal use |
|      | Circular       | GF1702         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | -              | -               | Horizontal use |
| P.27 | Circular Black | GF1818         | ○                  | ○             | ○                 | ○            |                |                 |              |                      |                       |   | -              | -               | Horizontal use |
|      | Neo Grain 600  | GF1906         | ○                  | ○             | ○                 | ○            |                |                 |              |                      |                       |   | -              | -               | Horizontal use |
|      | Neo Grain 400  | GF1904         | ○                  | ○             | ○                 | ○            |                |                 |              |                      |                       |   | -              | -               | Horizontal use |
|      | Circular Frost | GF1862         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | -              | -               | -              |
| P.29 | Fog 2300       | GF1853         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | -              | -               | -              |
|      | Fog 2000       | GF1854         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | -              | -               | -              |
|      | Fog 1500S      | GF1861         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | -              | -               | -              |

| Page | Product Name      | Product Number | Functionality      |               |                   |              |                |                 |              |                      |                       |   | Pattern Repeat |                 |         |
|------|-------------------|----------------|--------------------|---------------|-------------------|--------------|----------------|-----------------|--------------|----------------------|-----------------------|---|----------------|-----------------|---------|
|      |                   |                | Shatter Resistance | UV Protection | Insect Repellence | Hard Coating | Heat Rejection | Low Iridescence | Exterior Use | Reverse Installation | Other Functionalities | Green Purchasing Law-Compliant Products | Vertical (mm)  | Horizontal (mm) | Remarks |
| P.33 | Shiny Onyx        | GF1864         | ○                  | ○             | ○                 | ○            |                |                 |              |                      |                       |   | 950            | -               | -       |
|      | Iron Rust         | GF1866         | ○                  | ○             | ○                 | ○            |                |                 |              |                      |                       |   | 950            | -               | -       |
|      | Shiny Marble      | GF1863         | ○                  | ○             | ○                 | ○            |                |                 |              |                      |                       |   | 950            | -               | -       |
|      | Marble            | GF1802         | ○                  | ○             | ○                 | ○            |                |                 |              |                      |                       |   | 950            | -               | -       |
| P.35 | Bronze Pearl Wood | GF1865         | ○                  | ○             | ○                 | ○            |                |                 |              |                      |                       |   | 950            | -               | -       |
|      | Clear Wood        | GF1803         | ○                  | ○             | ○                 | ○            |                |                 |              |                      |                       |   | 950            | -               | -       |
|      | Lanka             | GF1869         | ○                  | ○             | ○                 | ○            |                |                 |              |                      |                       |   | 600            | -               | -       |
|      | Liina             | GF1804         | ○                  | ○             | ○                 | ○            |                |                 |              |                      |                       |   | 300            | -               | -       |
|      | Neuloo            | GF1870         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | 300            | 300             | -       |
|      | Chenille Silver   | GF1867         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | 475            | 475             | -       |
|      | Chenille Brown    | GF1868         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | 475            | 475             | -       |
|      | Risti             | GF1737         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | 233            | 615             | -       |
|      | Polaris           | GF1723         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | -              | 123             | -       |
|      | Joki              | GF1826         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | -              | 8               | -       |
| P.37 | Nagisa            | GF1730         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | -              | 20              | -       |
|      | Kitara            | GF1827         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | -              | 750             | -       |
|      | Kitara Black      | GF1828         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | -              | 750             | -       |
|      | Runo              | GF1824         | ○                  | ○             | ○                 | ○            |                |                 |              |                      |                       |   | -              | 250             | -       |
|      | Runo Black        | GF1825         | ○                  | ○             | ○                 | ○            |                |                 |              |                      |                       |   | -              | 250             | -       |
|      |                   |                |                    |               |                   |              |                |                 |              |                      |                       |   |                |                 |         |

# Product Information Overview

## Design Film

| Page                          | Category            | Product Name        | Product Number    | Product Width (mm) | Roll Length ( m )   | Total Thickness (Excluding Release Liner) ( $\mu\text{m}$ ) | Base Film Thickness ( $\mu\text{m}$ )                | Optical Properties |    |                 |    |    |                      | Thermal Properties |    |     |
|-------------------------------|---------------------|---------------------|-------------------|--------------------|---------------------|---|--|--------------------|----|-----------------|----|----|----------------------|--------------------|----|-----|
|                               |                     |                     |                   |                    |                     |   |  | Visible Light      |    | Solar Radiation |    |    | UV Transmittance (%) |                    |    |     |
|                               |                     |                     |                   |                    |                     |   |  |                    |    |                 |    |    |                      |                    |    |     |
| Reflectance (%)               | Transmittance (%)   | Reflectance (%)     | Transmittance (%) | Absorption (%)     | Shading Coefficient | Solar Heat Gain Coefficient (%)                             | Thermal Transmittance (U-value) (W/m <sup>2</sup> K) |                    |    |                 |    |    |                      |                    |    |     |
| P.37                          | Stripes / Geometric | Sade                | GF1871            | 1250               | 50                  | 65  | 50   | 11                 | 79 | 9               | 74 | 17 | < 1                  | 0.91               | 80 | 6.0 |
|                               |                     | Sade Silver         | GF1872            | 1250               | 50                  | 71  | 50   | 34                 | 58 | 32              | 53 | 15 | < 1                  | 0.66               | 58 | 6.0 |
|                               |                     | Triangle            | GF1831            | 1250               | 50                  | 71  | 50   | 19                 | 59 | 14              | 59 | 27 | < 1                  | 0.77               | 68 | 6.0 |
|                               |                     | Triangle Silver     | GF1830            | 1250               | 50                  | 71  | 50   | 27                 | 63 | 24              | 57 | 19 | < 1                  | 0.73               | 64 | 6.0 |
|                               |                     | Lumi                | GF1832            | 1250               | 50                  | 68  | 50   | 27                 | 42 | 19              | 48 | 33 | < 1                  | 0.67               | 59 | 6.0 |
|                               |                     | Lokki               | GF1833            | 1250               | 50                  | 67  | 50   | 10                 | 80 | 9               | 73 | 18 | < 1                  | 0.90               | 79 | 6.0 |
|                               |                     | Cubic               | GF1835            | 1250               | 50                  | 71  | 50   | 25                 | 45 | 19              | 48 | 33 | < 1                  | 0.68               | 60 | 6.0 |
|                               |                     | Ethico R            | GF1911            | 1000               | 50                  | 83  | 50   | 30                 | 38 | 20              | 43 | 37 | < 1                  | 0.66               | 58 | 6.0 |
| P.39                          | Japanese            | Shiraginu           | GF1836            | 1250               | 50                  | 71  | 50   | 20                 | 52 | 15              | 54 | 31 | < 1                  | 0.74               | 65 | 6.0 |
|                               |                     | Unryu               | GF1747            | 1250               | 50                  | 72  | 50   | 16                 | 60 | 12              | 63 | 25 | < 1                  | 0.82               | 72 | 6.0 |
|                               |                     | Kozue               | GF1748            | 1250               | 50                  | 72  | 50   | 13                 | 54 | 10              | 58 | 32 | < 1                  | 0.78               | 69 | 6.0 |
|                               |                     | Shirotae            | GF1746            | 1250               | 50                  | 72  | 50   | 23                 | 47 | 16              | 54 | 30 | < 1                  | 0.73               | 64 | 6.0 |
|                               |                     | Asanoha kiriko      | GF1837            | 1250               | 50                  | 68  | 50   | 19                 | 57 | 14              | 59 | 27 | < 1                  | 0.77               | 68 | 6.0 |
|                               |                     | Asanoha kuro kiriko | GF1838            | 1250               | 50                  | 68  | 50   | 6                  | 25 | 6               | 28 | 66 | < 1                  | 0.57               | 50 | 6.0 |
|                               |                     | Shippo kumohada     | GF1750            | 930                | 50                  | 72  | 50   | 18                 | 60 | 13              | 63 | 24 | < 1                  | 0.81               | 71 | 6.0 |
|                               |                     | Asanoha kumohada    | GF1752            | 930                | 50                  | 72  | 50   | 17                 | 55 | 12              | 60 | 28 | < 1                  | 0.78               | 69 | 6.0 |
|                               |                     | Ichimatsu kumohada  | GF1753            | 930                | 50                  | 72  | 50   | 21                 | 51 | 15              | 56 | 29 | < 1                  | 0.75               | 66 | 6.0 |
| P.41                          | Playful Pattern     | Repose              | GF1873            | 1250               | 50                  | 71  | 50   | 9                  | 54 | 8               | 53 | 39 | < 1                  | 0.76               | 67 | 6.1 |
|                               |                     | Kodachi             | GF1761            | 930                | 50                  | 65  | 50   | 8                  | 61 | 8               | 65 | 27 | < 1                  | 0.85               | 75 | 6.0 |
|                               | Playful Gradation   | Pop Ethico R        | GF1912            | 1000               | 50                  | 83  | 50   | 28                 | 47 | 20              | 51 | 29 | < 1                  | 0.71               | 63 | 6.0 |
|                               |                     | Poetry R            | GF1913            | 1000               | 50                  | 83  | 50   | 27                 | 46 | 20              | 49 | 31 | < 1                  | 0.70               | 61 | 6.0 |
|                               |                     | Nord R              | GF1914            | 1000               | 50                  | 83  | 50   | 22                 | 61 | 16              | 61 | 23 | < 1                  | 0.80               | 70 | 6.0 |
|                               |                     | Asanoha R           | GF1915            | 1000               | 50                  | 83  | 50   | 30                 | 40 | 21              | 45 | 34 | < 1                  | 0.67               | 59 | 6.0 |
| P.43                          | Textured Glass      | Antique             | GF1809            | 950                | 50                  | 336   | 293  | 9                  | 88 | 8               | 81 | 11 | < 1                  | 0.95               | 84 | 6.1 |
|                               |                     | Vertical            | GF1806            | 950                | 50                  | 308   | 281  | 9                  | 89 | 8               | 81 | 11 | < 1                  | 0.97               | 85 | 6.1 |
|                               |                     | River               | GF1874            | 950                | 50                  | 320   | 290  | 9                  | 88 | 9               | 79 | 12 | < 1                  | 0.97               | 85 | 6.1 |
|                               |                     | Antique Gray        | GF1811            | 950                | 50                  | 336   | 293  | 6                  | 56 | 7               | 61 | 32 | < 1                  | 0.82               | 72 | 6.1 |
|                               |                     | Vertical Gray       | GF1808            | 950                | 50                  | 308   | 281  | 6                  | 57 | 7               | 62 | 31 | < 1                  | 0.83               | 73 | 6.1 |
|                               |                     | Retro               | GF1720            | 950                | 50                  | 409   | 350  | 9                  | 88 | 9               | 81 | 10 | < 1                  | 0.97               | 85 | 6.1 |
|                               |                     | Norm                | GF1812            | 950                | 50                  | 289   | 262  | 9                  | 88 | 8               | 80 | 12 | < 1                  | 0.95               | 84 | 6.1 |
|                               |                     | Kangas              | GF1813            | 920                | 50                  | 330   | 301  | 8                  | 86 | 8               | 79 | 13 | < 1                  | 0.95               | 84 | 6.1 |
|                               |                     | Retro White         | GF1721            | 950                | 50                  | 409   | 350  | 14                 | 65 | 12              | 65 | 23 | < 1                  | 0.83               | 73 | 6.1 |
| P.45                          | Effect              | Gemstone            | GF1876            | 950                | 50                  | 326   | 296  | ※                  | ※  | ※               | ※  | ※  | < 1                  | ※                  | ※  | ※   |
|                               |                     | Aurora              | GF1875            | 950                | 50                  | 308   | 278  | ※                  | ※  | ※               | ※  | ※  | < 1                  | ※                  | ※  | ※   |
|                               |                     | Fantasy             | GF1740            | 950                | 50                  | 342   | 315  | ※                  | ※  | ※               | ※  | ※  | < 1                  | ※                  | ※  | ※   |
|                               |                     | Mosaic Cube         | GF1741            | 950                | 50                  | 347   | 316  | ※                  | ※  | ※               | ※  | ※  | < 1                  | ※                  | ※  | ※   |
|                               | Stained Glass       | Slim Block          | GF1877            | 950                | 50                  | 314   | 284  | 6                  | 12 | 6               | 18 | 76 | < 1                  | 0.50               | 44 | 6.1 |
|                               |                     | Colorful Tile       | GF1878            | 950                | 50                  | 314   | 284  | 6                  | 3  | 7               | 37 | 56 | < 1                  | 0.67               | 59 | 6.1 |
| Clear Float Glass (3mm thick) |                     |                     |                   |                    |                     |   |  | 8                  | 91 | 8               | 86 | 6  | 75                   | 1.00               | 88 | 6.0 |

\* Optical and thermal properties are measured in accordance with JIS A 5759, with the film applied to 3 mm clear float glass. The test results represent measured values and are not guaranteed.  
\* Due to the prism effect of Gemstone (GF1876), Aurora (GF1875), Fantasy (GF1740), and Mosaic Cube (GF1741), the optical and thermal properties may vary depending on the measurement location. As a result, these values are not provided.

| Page | Product Name        | Product Number | Functionality      |               |                   |              |                |                 |              |                      |                       |   | Pattern Repeat |                 |                |
|------|---------------------|----------------|--------------------|---------------|-------------------|--------------|----------------|-----------------|--------------|----------------------|-----------------------|---|----------------|-----------------|----------------|
|      |                     |                | Shatter Resistance | UV Protection | Insect Repellence | Hard Coating | Heat Rejection | Low Iridescence | Exterior Use | Reverse Installation | Other Functionalities | Green Purchasing Law-Compliant Products | Vertical (mm)  | Horizontal (mm) | Remarks        |
| P.37 | Sade                | GF1871         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | 600            | -               | -              |
|      | Sade Silver         | GF1872         | ○                  | ○             | ○                 | ○            |                |                 |              |                      |                       |   | 600            | -               | -              |
|      | Triangle            | GF1831         | ○                  | ○             | ○                 | ○            |                |                 |              |                      |                       |   | 8              | 5               | -              |
|      | Triangle Silver     | GF1830         | ○                  | ○             | ○                 | ○            |                |                 |              |                      |                       |   | 8              | 5               | -              |
|      | Lumi                | GF1832         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | 4              | 4               | -              |
|      | Lokki               | GF1833         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | 11             | 11              | -              |
|      | Cubic               | GF1835         | ○                  | ○             | ○                 | ○            |                |                 |              |                      |                       |   | 5              | 5               | -              |
|      | Ethico R            | GF1911         | ○                  | ○             | ○                 | ○            |                |                 |              |                      |                       |   | 1025           | -               | -              |
| P.39 | Shiraginu           | GF1836         | ○                  | ○             | ○                 | ○            |                |                 |              |                      |                       |   | -              | -               | -              |
|      | Unryu               | GF1747         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | 620            | 410             | -              |
|      | Kozue               | GF1748         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | 310            | 307             | -              |
|      | Shirotae            | GF1746         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | -              | -               | -              |
|      | Asanoha kiriko      | GF1837         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | 25             | 22              | -              |
|      | Asanoha kuro kiriko | GF1838         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | 25             | 22              | -              |
|      | Shippo kumohada     | GF1750         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | 58             | 58              | -              |
|      | Asanoha kumohada    | GF1752         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | 46             | 77              | -              |
| P.41 | Ichimatsu kumohada  | GF1753         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | 155            | 154             | -              |
|      | Repose              | GF1873         | ○                  | ○             | ○                 | ○            |                |                 |              |                      |                       |   | 950            | -               | -              |
|      | Kodachi             | GF1761         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | 465            | 920             | -              |
|      | Pop Ethico R        | GF1912         | ○                  | ○             | ○                 | ○            |                |                 |              |                      |                       |   | -              | 1025            | Horizontal use |
|      | Poetry R            | GF1913         | ○                  | ○             | ○                 | ○            |                |                 |              |                      |                       |   | -              | 1000            | Horizontal use |
|      | Nord R              | GF1914         | ○                  | ○             | ○                 | ○            |                |                 |              |                      |                       |   | -              | 1000            | Horizontal use |
|      | Asanoha R           | GF1915         | ○                  | ○             | ○                 | ○            |                |                 |              |                      |                       |   | -              | 950             | Horizontal use |
|      | Antique             | GF1809         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | -              | -               | -              |
| P.43 | Vertical            | GF1806         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | -              | -               | -              |
|      | River               | GF1874         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | -              | -               | -              |
|      | Antique Gray        | GF1811         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | -              | -               | -              |
|      | Vertical Gray       | GF1808         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | -              | -               | -              |
|      | Retro               | GF1720         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | -              | -               | -              |
|      | Norm                | GF1812         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | -              | -               | -              |
|      | Kangas              | GF1813         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | -              | -               | -              |
|      | Retro White         | GF1721         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | -              | -               | -              |
| P.45 | Gemstone            | GF1876         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | 300            | 300             | -              |
|      | Aurora              | GF1875         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | 306            | 460             | -              |
|      | Fantasy             | GF1740         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | 200            | 200             | -              |
|      | Mosaic Cube         | GF1741         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | 300            | 300             | -              |
|      | Slim Block          | GF1877         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | 606            | 910             | -              |
|      | Colorful Tile       | GF1878         | ○                  | ○             | ○                 |              |                |                 |              |                      |                       |   | 606            | 910             | -              |

# Precautions for Selection and Installation

## ■ Installation Notes

For indoor use only (unless marked for outdoor use).

### Handling Precautions

This product is very thin and prone to creasing or damage, so please handle it with care. Use caution during transportation as well.

When storing, roll the product tightly and avoid placing it directly on the ground.

Please note that packaging specifications may vary depending on the product.

### Installation Temperature

The recommended installation temperature range for the listed products is approximately 12–38°C, with an optimal range of around 20–25°C.

When storing the products on-site, avoid direct sunlight and keep the temperature below 38°C.

Avoid sudden temperature changes after installation, as this may lead to issues such as blistering.

### Condensation

Avoid using these products in environments with constant condensation, such as saunas or heated swimming pools. Window films do not prevent condensation on glass surfaces.

### Glass Thermal Cracking

Applying these products to outdoor-facing glass may result in thermal cracking. Window films increase solar absorption, causing temperature differences between sunlit and shaded areas. This can generate higher stress than in untreated glass.

### Iridescence Phenomenon

Reflected sunlight or indoor fluorescent lighting may occasionally produce rainbow-like patterns on the film surface (known as iridescence). This is a natural characteristic of window films.

Products marked with the Low Iridescence icon are designed to reduce the visibility of these interference patterns, though they cannot be completely eliminated.

### UV Protection

UV protection products are effective in reducing sunburn and fading, but do not offer protection against non-UV-related factors.

### Hard Coating

Products with a hard coating have a special resin applied to the surface, helping to reduce the risk of scratches during installation or cleaning. Products without a hard coating should be handled with particular care.

### Exterior Use

Products marked with the "Exterior Use" icon are suitable for installation on the exterior surface of glass. However, as they are more susceptible to environmental conditions, please confirm the suitability of the installation environment in advance.

Installation is not recommended in areas subject to harsh conditions, such as skylights, coastal locations, or environments with high levels of airborne dust.

Even when installed on the interior side, please select a product marked with the "Exterior Use" icon if the film surface will be directly exposed to ultraviolet rays — for example, on openable doors or in vestibules.

## ■ Surface Preparation

### Cleaning the Surface

Thoroughly clean both the glass surface and window frame to prevent dust or debris from becoming trapped during film application.

### Types of Surfaces

Unless otherwise specified for the selected product, these films are intended for use on smooth glass surfaces only.

### Application to Resin Panels

Applying film to resin panels such as polycarbonate or acrylic may result in bubbling or peeling and should generally be avoided. If application is necessary, use the designated underlay film (BB-348). However, please note that bubbling or peeling may still occur and cannot be entirely prevented.

## ■ Cutting & Applying

### Scratches During Cutting and Unrolling

Take care not to scratch the surface when cutting or unrolling the film.

### Reverse Installation

For certain products—such as those with metal layers or dyed finishes—joint lines may appear due to slight color differences between the left and right sides. In these cases, reverse installation is recommended. Look for the "Reverse Installation" icon to identify applicable products.

### Pattern Alignment

Some products feature repeating patterns; however, due to manufacturing characteristics, perfect alignment may not be possible. Please keep this in mind during installation.

### Lot-to-Lot Variations

Although strict quality control is maintained, slight variations may occur between production lots. Avoid using different lots on the same surface to ensure uniformity.

### Application Using the Release Liner

For films without a hard coat, protect the film surface during squeegee application by placing the original release liner over the film. Be sure to press the squeegee against the smooth side of the release liner—the side originally in contact with the adhesive—to avoid scratching.

## ■ After Installation

### Cloudiness After Installation

Moisture used during installation may become trapped between the glass and the film, causing a cloudy appearance. This cloudiness will gradually disappear as the moisture evaporates. However, in low temperatures or shaded areas, it may take several days or longer to clear completely.

Note: If the film is not installed properly, the cloudiness may not resolve.

### High Temperature & Humidity

Do not install the film in environments where the temperature consistently exceeds 50°C, underwater, or in areas with high humidity. Additionally, avoid using the film near heat sources that reach temperatures above 60°C.



## Series-specific Precautions

### Functional Film

| Page | Category  | Product Name   | Product Number   | Product Detail  |
|------|---|--|--|---|
| P.8  | Clear Heat Rejection Film                                   | Core 70  | GF1102   | <ul style="list-style-type: none"> <li>Because these products contain a metallic layer, they reflect interior lighting and other light sources when viewed from the inside. This effect is especially noticeable at night, as it can reduce visibility to the outside while making the interior more visible. Please keep this in mind.</li> </ul>  |
| P.9  | Low-E Film<br>(Heat Rejection / Thermal Insulation Film)    | Ecorim 70  | GF1206   | <ul style="list-style-type: none"> <li>Although minimal, the metallic content may interfere with radio wave transmission and could slightly reduce connectivity for mobile phones and similar devices.</li> <li>During installation, please ensure that all water is thoroughly removed.</li> </ul>   |
| P.11 | Solar Control Film<br>(Solar Adjustment / Mirror / Privacy) | Mirror 40<br>Mirror 20   | GF1106<br>GF1108   | <ul style="list-style-type: none"> <li>Because these products contain a metallic layer, they reflect interior lighting and other light sources when viewed from the inside. This effect is especially noticeable at night, as it can reduce visibility to the outside while making the interior more visible. Please keep this in mind.</li> <li>Although minimal, the metallic content may interfere with radio wave transmission and could slightly reduce connectivity for mobile phones and similar devices.</li> <li>During installation, please ensure that all water is thoroughly removed.</li> </ul>   |
|      |   | Mirage   | GF1822   | <ul style="list-style-type: none"> <li>Although this product provides a mirror-like appearance with no transparency, please note that it does not reflect images as clearly as a true mirror.</li> <li>The appearance may differ depending on whether it is viewed from the interior or exterior. Please check samples in advance before making a final selection.</li> <li>Please note that this product is not suitable for creating a completely darkened room.</li> <li>During installation, please ensure that all water is thoroughly removed.</li> </ul>   |
|      |   | Perfect White II   | GF1463   | <ul style="list-style-type: none"> <li>Due to the characteristics of this product, it does not have a hard coating finish. Please handle with care.</li> <li>When used in environments with strong external light or illumination, stepped or uneven patterns may become visible due to transmitted light.</li> </ul>   |
|      |   | Perfect White II<br>Perfect Black  | GF1463<br>GF1413   | <ul style="list-style-type: none"> <li>While these products are effective at blocking light, they cannot prevent light from leaking through joints or edges.</li> <li>Please note that these products are not suitable for creating a completely darkened room.</li> </ul>  |
| P.13 | High-range UV Protection Film                               | Unfade 90  | GF1406   | <ul style="list-style-type: none"> <li>The 380–400 nm range overlaps with the visible light spectrum, and since this product is designed to block those wavelengths as well, it may have a slight yellow tint.</li> </ul>   |
| P.14 | Security Film   | Fortis 90  | GF1464   | <ul style="list-style-type: none"> <li>For product details, please refer to the separate book on P.26.</li> <li>This product does not guarantee complete prevention of intrusion.</li> </ul>  |
| P.17 | Exterior Use Film   | Horizon EX<br>Circular EX<br>Chiaro 90EX<br>Vist 65EX<br>Mirror 20EX<br>Misty Mist 90<br>Misty Mist 30 | GF1850<br>GF1851<br>GF1105<br>GF1453<br>GF1110<br>GF1719<br>GF1849 | <ul style="list-style-type: none"> <li>These products can be installed on the exterior surface of glass; however, due to exposure to external conditions, they may deteriorate more quickly than expected. Regular replacement is recommended.</li> <li>Please refrain from installing these products on the reverse side of patterned glass or other uneven surfaces, as this may cause poor adhesion or bubbling.</li> </ul>  |
|      |   | Vist 65EX<br>Mirror 20EX   | GF1453<br>GF1110   | <ul style="list-style-type: none"> <li>Due to the characteristics of these products, they do not have a hard coating finish. Please handle with care.</li> <li>Because these products contain a metallic layer, they reflect interior lighting and other light sources when viewed from the inside. This effect is especially noticeable at night, as it can reduce visibility to the outside while making the interior more visible. Please keep this in mind.</li> <li>Although minimal, the metallic content may interfere with radio wave transmission and could slightly reduce connectivity for mobile phones and similar devices.</li> <li>During installation, please ensure that all water is thoroughly removed.</li> </ul> |
| P.18 | Low-reflection Film<br>Luclear II                           | Luclear II<br>Luclear II EX  | GF1401<br>GF1402   | <ul style="list-style-type: none"> <li>To achieve the anti-reflection effect, installation on both sides of the glass is required.</li> <li>The anti-reflection effect will not be achieved if these products are installed on glass that is exposed to strong direct sunlight, has a direct light source reflecting on it, or is made of highly reflective glass (such as insulated or solar control glass).</li> <li>After installation, the reflected color may appear slightly purple.</li> </ul>   |
|      |   | Luclear II EX  | GF1402   | <ul style="list-style-type: none"> <li>This product can be installed on the exterior surface of glass; however, exposure to external conditions may cause it to deteriorate more quickly than expected. Regular replacement is recommended.</li> </ul>  |

# Precautions for Selection and Installation

## ■ Series-specific Precautions

### Functional Film

| Page | Category                                       | Product Name                       | Product Number   | Product Detail  |
|------|--|------------------------------------|------------------|---|
| P.19 | Patterned & Frosted Glass Film<br>Free Fit III | Free Fit III<br>Free Fit III Pearl | GF1421<br>GF1456 | <ul style="list-style-type: none"> <li>When these products are installed on the textured side of patterned glass, fine bubbles may remain.</li> <li>After installation, the glass surface may appear cloudy or hazy compared to its original state.</li> <li>These products are designed for dry installation and should not be applied using water.</li> <li>Applying excessive pressure during installation may cause cloudiness or unevenness, which can affect the appearance.</li> <li>Use a soft cloth to smooth and firmly adhere the entire film evenly to the surface.</li> <li>Installation on tempered patterned glass is not recommended, as it may adversely affect the appearance.</li> <li>Although shatter-resistance tests have been conducted in accordance with JIS A 5759 using 4mm patterned glass and 5mm frosted glass.</li> </ul> |
|      |  | Free Fit III Pearl                 | GF1456           | <ul style="list-style-type: none"> <li>Because pearl ink is used, this product reflects interior lighting and other light sources when viewed from the inside.</li> </ul>   |

### Matte / Frost / Gradation

| Page | Category         | Product Name                                | Product Number                       | Product Detail  |
|------|------------------|---|--------------------------------------|---|
| P.23 | Matte / Frost    | Filmy II 85<br>Filmy II 50                  | GF1891<br>GF1892                     | <ul style="list-style-type: none"> <li>These products are intended for indoor use only. Please avoid installing them on glass surfaces exposed to the outdoors.</li> </ul>  |
|      |                  | Lumikki 30                                  | GF1715                               | <ul style="list-style-type: none"> <li>This product features surface printing on a PET base material.</li> <li>Please note that, due to the nature of this product, the printed layer may peel off when exposed to external factors such as scratching, friction, or cleaning with alcohol-based products.</li> </ul>   |
|      |                  | Lumikki R 35                                | GF1903                               | <ul style="list-style-type: none"> <li>After installation, transmitted light may appear slightly orange.</li> </ul>   |
|      |                  | White Pearl 40                              | GF1716                               | <ul style="list-style-type: none"> <li>Because pearl ink is used, this product reflects interior lighting and other light sources when viewed from the inside. Please note that visibility of the outside may be reduced, especially at night.</li> </ul>   |
| P.25 | Side Gradation   | Digitalism<br>Horizon<br>Kolmio<br>Circular | GF1817<br>GF1703<br>GF1816<br>GF1702 | <ul style="list-style-type: none"> <li>These products feature surface printing on a PET base material.</li> <li>Please note that, due to the nature of these products, the printed layer may peel off when exposed to external factors such as scratching, friction, or cleaning with alcohol-based products.</li> <li>For side-gradient products, there are corresponding all-over pattern products with the same design; however, please note that colors may not match due to differences between product lots.</li> </ul> |
| P.27 | Center Gradation | Circular Frost                              | GF1862                               | <ul style="list-style-type: none"> <li>As this product is made using inkjet printing, there may be color variations between individual sheets. Joint installation is not recommended.</li> </ul>  |
| P.29 | Fog              | Fog 2300<br>Fog 2000<br>Fog 1500S           | GF1853<br>GF1854<br>GF1861           | <ul style="list-style-type: none"> <li>As this product is made using inkjet printing, there may be color variations between individual sheets. Joint installation is not recommended.</li> </ul>  |

## Design Film

| Page | Category            | Product Name   | Product Number   | Product Detail  |
|------|---------------------|--|--|---|
| P.37 | Stripes / Geometric | Joki<br>Lokki  | GF1826<br>GF1833   | <ul style="list-style-type: none"> <li>• These products feature surface printing on a PET base material.</li> <li>• Please note that, due to the nature of these products, the printed layer may peel off when exposed to external factors such as scratching, friction, or cleaning with alcohol-based products.</li> </ul>  |
|      |                     | Ethico R   | GF1911   | <ul style="list-style-type: none"> <li>• Please be aware that when making joints during installation, precise pattern alignment cannot be guaranteed.</li> <li>• After installation, transmitted light may appear slightly orange.</li> </ul>   |
| P.41 | Playful Gradation   | Pop Ethico R   | GF1912   | <ul style="list-style-type: none"> <li>• When Pop Ethico R (GF1912) and Ethico R (GF1911) are jointed, please note that precise pattern alignment cannot be guaranteed. Also, please be aware that colors may not match due to differences between product lots.</li> </ul>   |
|      |                     | Pop Ethico R<br>Poetry R<br>Nord R<br>Asanoha R                        | GF1912<br>GF1913<br>GF1914<br>GF1915   | <ul style="list-style-type: none"> <li>• After installation, transmitted light may appear slightly orange.</li> </ul>   |
| P.43 | Textured Glass      | Antique<br>Vertical<br>River<br>Norm<br>Kangas<br>Retro<br>Retro White | GF1809•1811<br>GF1806•1808<br>GF1874<br>GF1812<br>GF1813<br>GF1720<br>GF1721 | <ul style="list-style-type: none"> <li>• Please note that products with a textured or uneven surface may retain fine bubbles due to their material characteristics.</li> <li>• At low temperatures, moisture or air bubbles may not be fully expelled during installation, which can affect the appearance. Ensure proper installation conditions on-site.</li> <li>• When removing water during installation, we recommend using a plastic squeegee wrapped in multiple layers of paper towel, or a felt squeegee. Rubber squeegees may not effectively remove water.</li> </ul>   |
| P.45 | Effect              | Mosaic Cube  | GF1741   | <ul style="list-style-type: none"> <li>• Please note that, due to the characteristics of the pattern, horizontal streaks may appear.</li> </ul>   |
| P.45 | Stained Glass       | Slim Block<br>Colorful Tile  | GF1877<br>GF1878   | <ul style="list-style-type: none"> <li>• Please note that products with a textured or uneven surface may retain fine bubbles due to their material characteristics.</li> <li>• At low temperatures, moisture or air bubbles may not be fully expelled during installation, which can affect the appearance. Ensure proper installation conditions on-site.</li> <li>• When removing water during installation, we recommend using a plastic squeegee wrapped in multiple layers of paper towel, or a felt squeegee. Rubber squeegees may not effectively remove water.</li> <li>• Please be aware that when making joints during installation, precise pattern alignment cannot be guaranteed.</li> </ul> |

## Others

| Page | Category | Product Name    | Product Number | Product Detail   |
|------|----------|-----------------|----------------|--|
| P.62 | —        | Underlayer Film | BB-348         | <ul style="list-style-type: none"> <li>• Do not apply this product to plastic panels that are exposed to direct sunlight outdoors.</li> <li>• This product cannot completely prevent bubbling or peeling under any conditions.</li> <li>• Due to the nature of the product, the underlayer film cannot be removed once installation is complete. Please be aware of this before proceeding.</li> <li>• After confirming that the substrate and the film are fully adhered, you may apply the top film.</li> <li>• The adhesion strength between the top film and the underlayer film depends on the adhesive properties of the top film.</li> <li>• Do not use a top layer made solely from PVC film.</li> </ul> |

# Precautions for Selection and Installation (Security Film)

## Functional Film

| Page | Category      | Product Name | Product Number |
|------|---------------|--------------|----------------|
| P.14 | Security Film | Fortis 90    | GF1464         |

### ■ Cutting

- Accurately measure the glass dimensions and cut the film to match. Do not attempt to trim the film after it has been applied to the glass.
- When cutting the film, use a cutting mat or similar surface. Cut from the film's surface side using a cutter to prevent curling or burrs along the edges.
- If you need to temporarily store the cut film, lay it flat. If space is limited and rolling is necessary, make sure the release liner side is facing outward and roll with a large diameter to avoid creating curl marks.

### ■ Glass Cleaning

- This film is relatively thick, so any dust or debris on the glass surface will be particularly noticeable after application. Clean the glass thoroughly before installation.

### ■ Application

- When applying the film, use greater pressure and make more passes with the squeegee than you would with standard glass films.
- Insufficient or uneven squeegeeing may cause bubbles or water pockets, resulting in a poor appearance.

### ■ After Installation

- A longer curing period is required compared to standard glass films.  
Typically, about one month is needed. In low temperatures or on shaded surfaces, curing may take up to around two months.
- Full performance will not be achieved until the curing process is complete.

Security Film Fortis 90 (GF1464) is currently undergoing the certification process<sup>2</sup> for the CP Mark<sup>1</sup>.

<sup>1</sup> CP Mark: A certification awarded only to building components listed in the "List of Building Components with Superior Anti-Crime Performance."

<sup>2</sup> Information current as of December 2024.

# Maintenance Guidelines

## ■ Maintenance Guidelines

- To prevent accelerated deterioration, avoid leaving dirt or debris on the film surface. Perform regular cleaning and maintenance.
- For cleaning, rinse with water using a soft cloth or rubber squeegee. If the film is heavily soiled, use a mild neutral detergent diluted to 1–2%. Do not use ammonia-based cleaners, chlorine-based cleaners, or organic solvents, as these may damage the film.
- When wiping the surface, always move in a single direction. Avoid scrubbing back and forth, as this may cause surface damage.
- Do not dry-wipe, as it may cause small scratches.
- Avoid applying stickers, tape, or labels to the film surface, and do not write on it with markers. Refrain from any actions that may scratch or damage the film.

## ■ Film Removal Instructions

- Generously spray the film with an application solution (mix about 5 drops of neutral detergent per 500 ml of water), then cover it with a clear polyethylene sheet to help the solution soak in. Let it sit for 2–3 hours, adding more solution as needed.
- Use a cutter to slice the film into strips several centimeters wide. Gently peel the film off strip by strip. Take care not to damage the glass surface or any sealants.
- If adhesive residue remains on the glass, spray it again with the application solution and remove it using a glass scraper.
- When disposing of film remnants as industrial waste, be sure to use a certified industrial waste disposal service.
- For small quantities of film remnants being disposed of as household garbage, please follow your local municipality's disposal regulations.

## ■ Service Life Expectancy

Glass film will naturally degrade over time. As a general guideline, the expected service life is approximately 10 years for indoor applications and about 5 years for outdoor use. However, these durations may vary depending on the installation environment. For instance, exposure to harsh weather or use on skylights may reduce the film's service life. Once the film has been in use for several years, we recommend a replacement assessment for considering film's appearance, adhesive strength, and optical properties.



# HIGH GRAFICA

Custom window films made with advanced digital printing technology.

## Order Flow

### step 01 Ink Selection

Choose between UV Frosted Ink, ideal for creating matte textures and high-opacity privacy designs, and Standard Solvent Ink, perfect for vibrant transparent colors and high-opacity designs with a white base.

#### Frosted Ink

Base Material: PET substrate  
Available Widths: 1200 mm / 1500 mm  
Maximum Print Height: 3000 mm

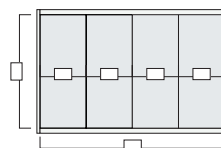
#### Standard Solvent Ink

Base Material: PET substrate (laminated type)  
Available Width: 1200 mm  
Maximum Print Height: 4000 mm

Select the ink type from page 29 ►

### step 02 Site Measurement

Please provide the exact dimensions of the glass surface where the film will be applied. The layout will be oriented based on the glass width.



\* Please provide all measurements in millimeters (mm).

### step 03 Design Selection

For further details, please contact our sales office.

#### Custom Order

Custom Order Design Options

We also accept custom orders using designs from the GRADATION, FILM PATTERN, and Digital Print Library (page 48–59).

Please provide detailed specifications regarding the pattern, color, and gradation.

Combinations of patterns and gradations are also possible.

\* Please note that depending on the design, it may not be possible to achieve the exact size requested or seamless pattern continuity across the left and right edges.

#### Full Order

We can produce fully custom-designed glass films using data provided by you. Please submit your design files via email or a file transfer service.

\* Submit files in Adobe Illustrator or Adobe Photoshop format.

\* Use CMYK color mode, and outline all text.

\* For image data, we recommend a resolution of at least 72 dpi at actual size.

\* For double-layer or three-layer ink printing, please prepare your data with each ink layer separated accordingly.

\* If the film will be installed on the inside surface of in-shop glass and viewed from the outside, the design must be mirrored (left-right reversed). In such cases, be sure to specify the correct orientation in your submitted data.

\* The appearance of translucency and color in the sample may differ from the layout drawing and the final product. Always review the physical sample for confirmation.

\* With standard solvent ink, the film is laminated. Please note that tiny particles or dust may become trapped during production.

#### Copyrights and Portrait Rights

We are unable to print any design, logo, or character without permission from the appropriate rights holder.

We also cannot take responsibility for any issues related to copyrights or portrait rights.

Please select a design from page 29 ►

### step 04 Color Selection

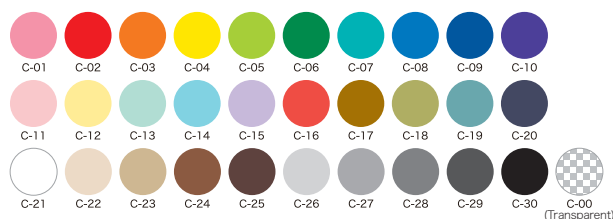
Colors can be selected from the inkjet-exclusive palette (C-01 to C-30). For custom colors, please submit a color chip or sample as a reference.

\* The base material of the glass film is transparent by default. To specify the base material, please select C-00 (transparent).

\* Pale colors may not be accurately printed on the glass film.

\* Color appearance may vary depending on the type of ink used.

\* Gold and silver cannot be reproduced using digital printing.



### step 05 Sample/Layout Drawing Creation & Approval

Once the design is finalized, we will provide a sample to confirm the color, and texture, along with a layout drawing.

The lead time is approximately 1 to 2 weeks from the time your data is submitted.

\* Please note that additional fees apply for second and subsequent prototypes.

\* A fee may also be charged for the first prototype, depending on the quantity and size.

### step 06 Final Design Confirmation Production & Delivery

Delivery will take approximately 2 to 3 weeks after submission of the finalized data.

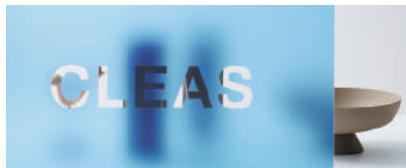
\* Please note that the delivery time may vary depending on the quantity and specific requirements of your order. For more detailed information, please contact our sales office.

## Frosted Ink



**Frosted Clear** Single-layer Ink Process

Ideal for achieving a matte finish with high opacity, making it suitable for privacy applications. Also compatible with Frosted Color.



**Frosted Color** Single-layer Ink Process

Offers a matte finish and high opacity, perfect for privacy applications that require both function and color. Also compatible with Frosted Clear.



**Frosted White** Double-layer Ink Process

Combines Frosted Clear ink and white ink in a double-layer process. Enables sign graphics with cut-out lettering effects and smooth gradients, all on a single film.

## Standard Solvent Ink



**Standard White** Single-layer Ink Process

Ideal for creating vivid color effects, even with transparent layers. Increasing the density of the Standard White ink boosts its opacity. It can also be mixed with Standard Color inks. When used this way, the blend is referred to as Standard White Color.



**Standard Color** Single-layer Ink Process

Ideal for achieving subtle, transparent color effects. It can also be mixed with Standard White ink. When used this way the blend is referred to as Standard White Color.



**Standard White Color** Double-layer Ink Process

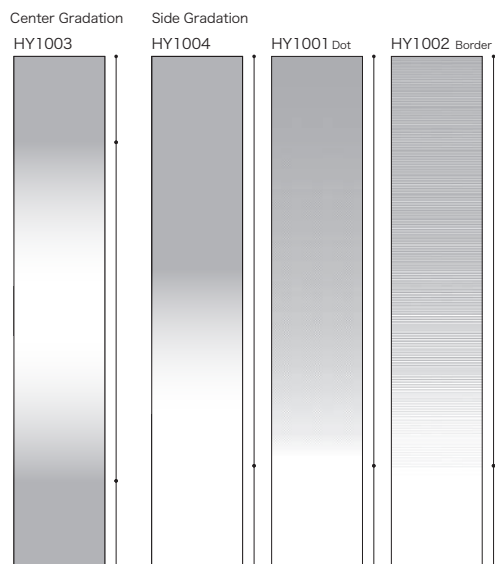
By layering Standard Color ink over Standard White ink, this method achieves highly opaque color expression. This double-layer ink process creates different appearances on the front and back sides of the glass. Installation side: Front (Colored) / Back (White)

\* For a three-layer ink process that provides the same color appearance on both sides, please contact our sales office.

## Custom Order Design Content

### GRADATION

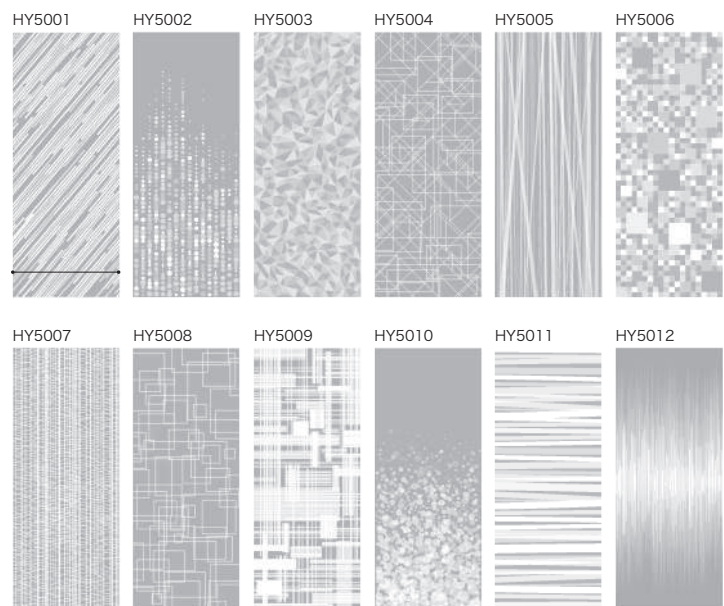
Gradient size and density can be customized



- \* Please specify the 100% density area and the gradient width.
- \* Center gradients can also be replaced with dot or horizontal stripes.
- \* The gray background represents C-00 (transparent).

### FILM PATTERN

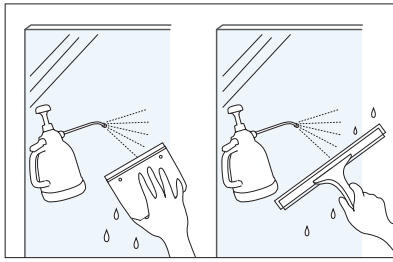
Original geometric design patterns



- \* → is shown at a scaled size, based on glass dimensions of H3000mm x W1200mm (aspect ratio 2.5:1).
- \* The pattern can be enlarged or reduced; however, depending on the specified size, parts of the pattern may be cut off.
- \* A layout drawing will be provided for your confirmation.
- \* Compatible with wallpaper and decorative films with adhesive backing.
- \* Can also be combined with gradient designs.
- \* Wallpaper and Self Adhesive Vinyl Film are also available.
- \* Gradients can also be combined.

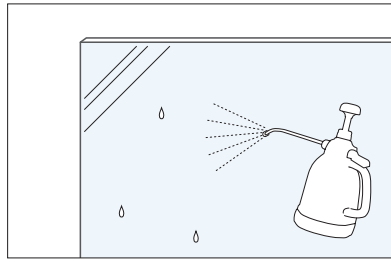
# Installation Method

## Wet Application Method



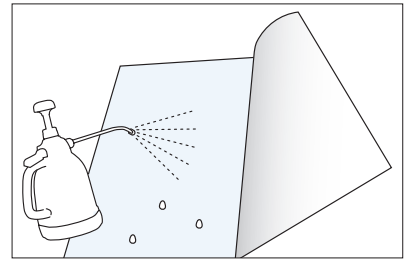
### 1. Glass Cleaning

Prepare a solution of neutral detergent (approximately 5 drops per 500 cc of water; adjust according to seasonal conditions or installation environment). Spray the solution onto the glass surface and clean thoroughly. For stubborn or adhered debris, use a glass scraper.



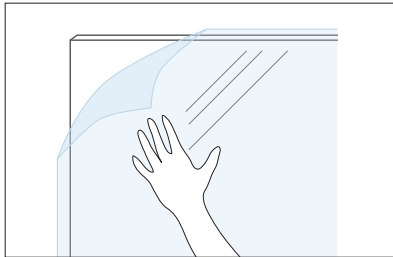
### 2. Spraying the Glass Surface

After cleaning, generously spray the glass surface again with the solution. If the ambient temperature is low, warm the glass to ensure proper film adhesion.



### 3. Film Cutting

Pre-cut the window film to dimensions slightly larger than the glass surface. Carefully peel off the release liner to avoid creasing or damaging the film. As you peel, continuously spray the adhesive side of the film with the solution to prevent static buildup and ensure smooth application.

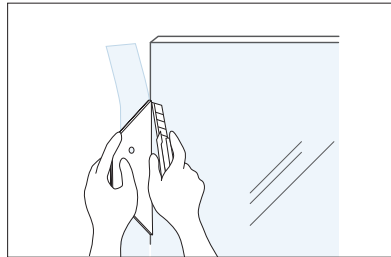


### 4. Applying the Glass Film - Part 1

Position the film approximately 2 mm inside the window frame. Spray the solution onto the front (non-adhesive) surface of the film to reduce friction. Using a squeegee, press outward from the center in small, firm strokes to remove any trapped water. Take care to avoid scratching the film.

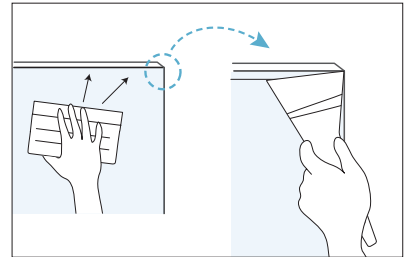
#### Precautions

- On textured surfaces, apply firm pressure, particularly along the edges.



### 5. Applying the Glass Film - Part 2

Once the film is in place, trim any excess material so the edges are approximately 2 mm inside the window frame. If installing multiple film segments, trim and align the edges in advance. Maintain a gap of approximately 1 mm between seams to ensure a clean finish and prevent overlap.



### 6. Final Finishing

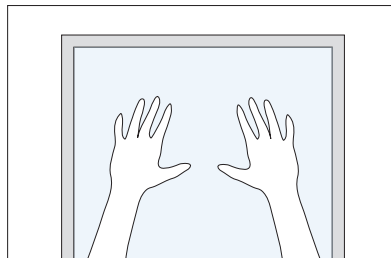
Spray the surface of the applied film once more with the solution. Use a squeegee to remove any remaining moisture. Then, use a plastic spatula wrapped in a paper towel to press out water from along the edges of the film for a complete seal.

## Recommended Application Method for Free Fit III (GF1421) and Free Fit III Pearl (GF1456)



### 1. Glass Cleaning

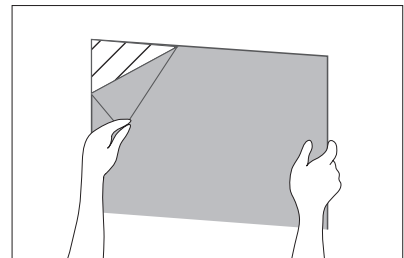
Prepare a solution of neutral detergent (approximately 5 drops per 500 cc of water; adjust according to seasonal conditions or installation environment).



### 2. Film Cutting

Hold the film against the glass to confirm sizing. Trim as necessary to ensure a proper fit.

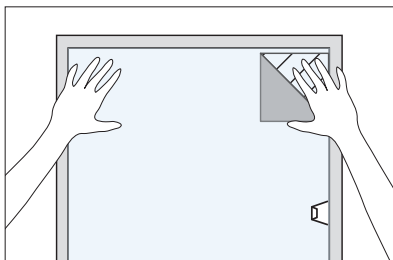
\* Cutting the film during installation is difficult, so please pre-cut it in advance to match the window dimensions.



### 3. Peeling Off the Release Liner

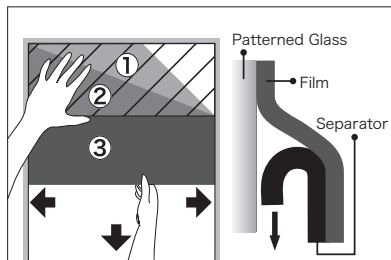
From one corner, peel back the release liner in a triangular shape, approximately 5 cm, and fold it back.

\* Be careful not to touch the adhesive side.



### 4. Applying the Glass Film - Part 1

After carefully positioning the film, align the adhesive side with the top edge of the glass. Lightly press the surface of the film with your fingers to temporarily hold it in place.

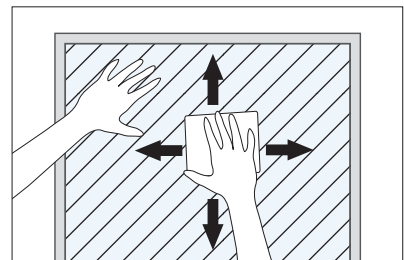


### 5. Applying the Glass Film - Part 2

Gradually peel the release liner downward in stages (① → ② → ③), applying the film to the glass progressively from the top down. From step ③ onward, continue to peel and apply in a straight downward motion.

\* Be sure to check that both side edges and the bottom edge of the film remain properly aligned as you work.

\* Keep the release liner level as you peel to avoid bending or creasing.



### 6. Finishing

Use a soft cloth to evenly press the adhesive side of the film against the glass surface.

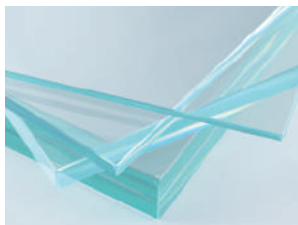
\* If necessary, use a plastic squeegee wrapped in several layers of paper towel to smooth and finish the film.

#### Precautions

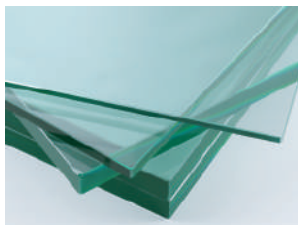
- This is a dry-application product — do not use any installation solution. Ensure that all moisture is completely removed after cleaning.
- The adhesive is very strong, so take care to avoid contact between the adhesive side and any surface other than the intended one.
- If any part of the film is peeled off after application, that area may become cloudy and the adhesive strength may be reduced.

# Introduction to Highly Transparent Glass OPTIWHITE

Optiwhite



Float Glass



Optiwhite



Float Glass



Optiwhite, developed by Nippon Sheet Glass Co., Ltd., is a highly transparent glass with reduced iron content, offering exceptional clarity and significantly less of the bluish tint commonly found in standard float glass. It enjoys strong popularity overseas. Optiwhite integrates beautifully with show windows and display cases, and is also ideal for use as a luminous wall that emits a soft, elegant glow. Thanks to its lack of bluish tint, Optiwhite is particularly well-suited for use with glass films. White ink designs—such as matte/frosted finishes, gradations, or traditional washi-style patterns—appear especially vivid and refined when applied to Optiwhite.

\* Optiwhite is a registered trademark of Nippon Sheet Glass Co., Ltd.





# Product Number Search List

Check the listing page from the product number.

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**CLEAS** Glass Film