

CLEAS vol.3

Glass Film 2025-2028

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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

P.11



Steam Bronze 20 / GF1411

P.11



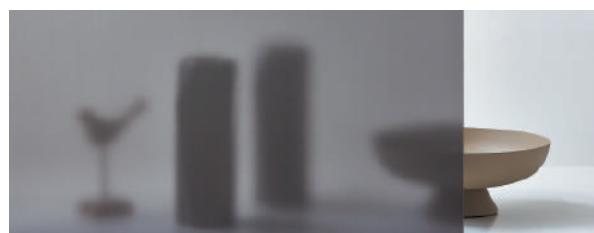
Shadow 20 / GF1114

P.11



Mirror 40 / GF1106

P.11



Steam Shadow 20 / GF1410

P.11



Mirror 20 / GF1108

P.11



Bronze 50 / GF1111

P.11



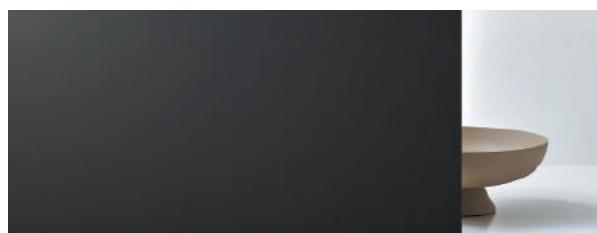
Perfect White II / GF1463

P.11



Bronze 20 / GF1112

P.11



Perfect Black / GF1413

P.11

Exterior Use Film



Mirror 20EX / GF1110

P.17

Matte / Frost



Filmy II 85 / GF1891

P.23



Misty Mist 90 / GF1719

P.17



Filmy II 50 / GF1892

P.23



Misty Mist 30 / GF1849

P.17



Diffuse 90 / GF1819

P.23



Pilvi 70 / GF1712

P.23



Lumikki 30 / GF1715

P.23

Matte / Frost | Center Gradation | Fog



Lumikki R 75 / GF1901

P.23



Steam 35 / GF1821

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Lumikki R 50 / GF1902

P.23



White Pearl 40 / GF1716

P.23



Lumikki R 35 / GF1903

P.23



Neo Grain 600 / GF1906

P.27

Neo Grain 400 / GF1904

* 100% concentration



Steam 85 / GF1718

P.23



Circular Frost / GF1862

P.27

* 100% concentration



Steam 80 / GF1717

P.23



Fog 2300 / GF1853

P.29

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



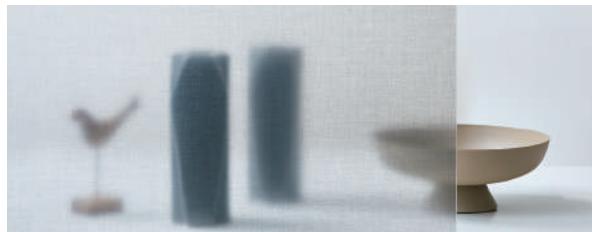
Clear Wood / GF1803

P.35



Chenille Brown / GF1868

P.35



Lanka / GF1869

P.35



Risti / GF1737

P.35



Liina / GF1804

P.35



Neuloa / GF1870

P.35

Stripes / Geometric



Polaris / GF1723

P.37



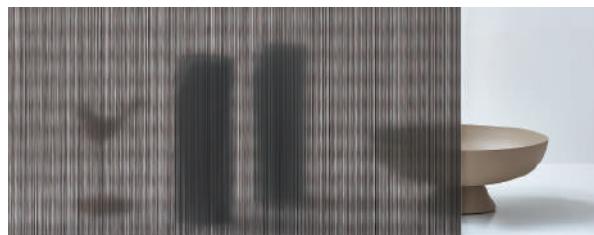
Runo / GF1824

P.37



Joki / GF1826

P.37



Runo Black / GF1825

P.37



Nagisa / GF1730

P.37



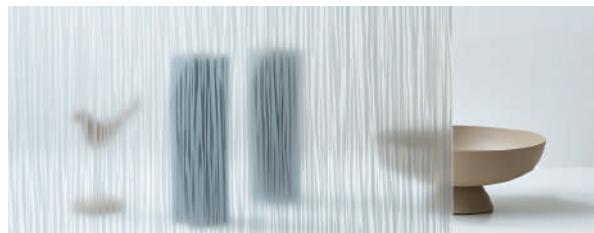
Sade / GF1871

P.37



Kitara / GF1827

P.37



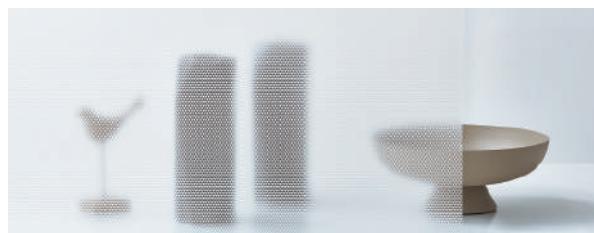
Sade Silver / GF1872

P.37



Kitara Black / GF1828

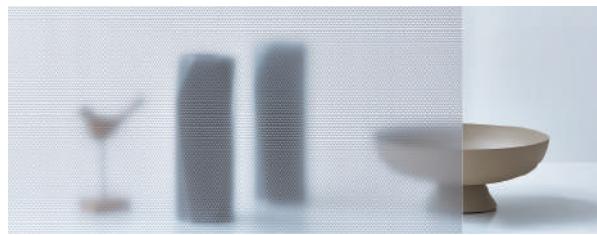
P.37



Triangle / GF1831

P.37

Stripes / Geometric



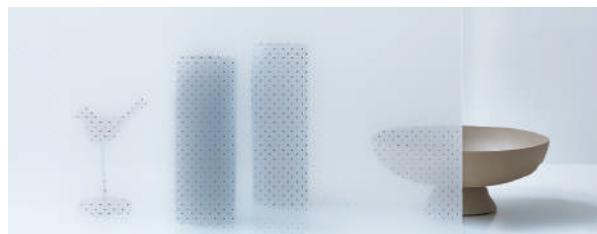
Triangle Silver / GF1830

P.37



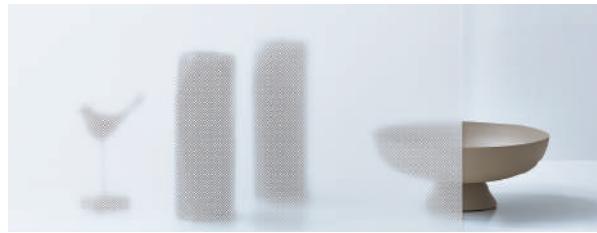
Lumi / GF1832

P.37



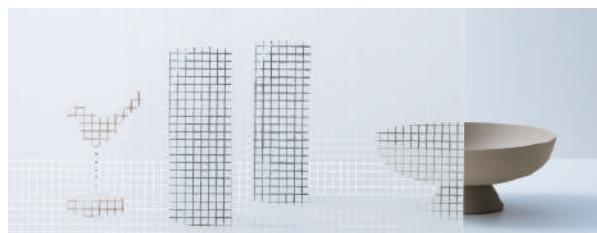
Lokki / GF1833

P.37



Cubic / GF1835

P.37



Ethico R / GF1911

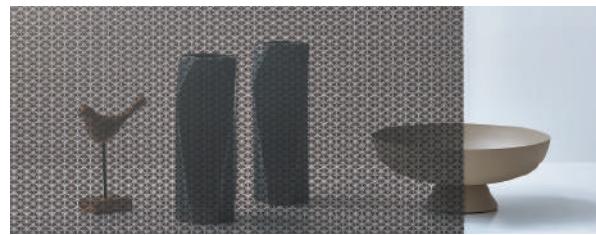
P.37

Japanese



Shiraginu / GF1836

P.39



Asanoha kuro kiriko / GF1838

P.39



Unryu / GF1747

P.39



Shippo kumohada / GF1750

P.39



Kozue / GF1748

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Asanoha kumohada / GF1752

P.39



Shirotae / GF1746

P.39



Ichimatsu kumohada / GF1753

P.39



Asanoha kiriko / GF1837

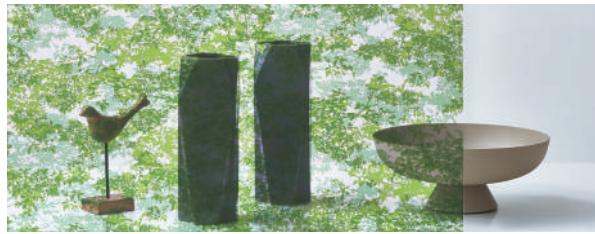
P.39

Playful Pattern



Repose / GF1873

P.41



Kodachi / GF1761

P.41

Textured Glass



Antique / GF1809

P.43



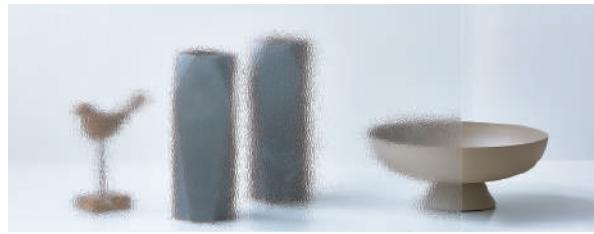
Retro / GF1720

P.43



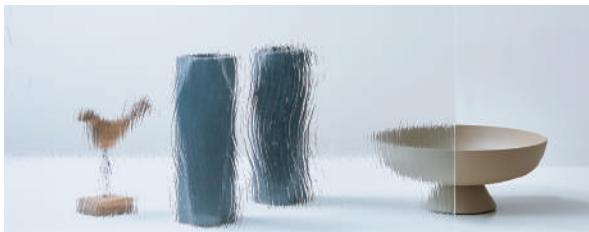
Vertical / GF1806

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

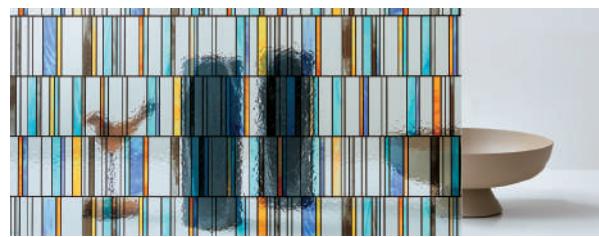
P.43

Effect



Gemstone / GF1876

Stained Glass



Slim Block / GF1877

P.45



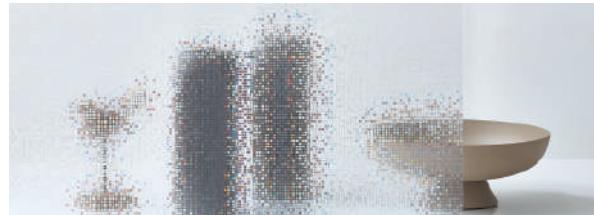
Aurora / GF1875

P.45



Colorful Tile / GF1878

P.45



Fantasy / GF1740

P.45



Mosaic Cube / GF1741

P.45

Digital Print Library



Frosted Clear Single-layer Ink Process

P.61



Standard White Single-layer Ink Process

P.61



Frosted Color Single-layer Ink Process

P.61



Standard Color Single-layer Ink Process

P.61



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



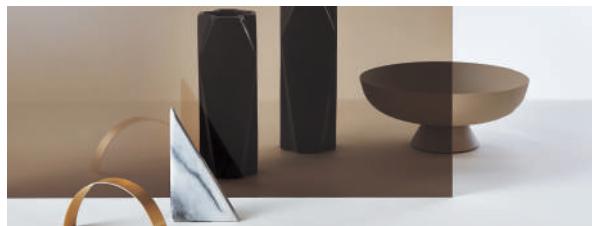
Bronze 50 / GF1111

P.11



Perfect Black / GF1413

P.11



Bronze 20 / GF1112

P.11



White Pearl 40 / GF1716

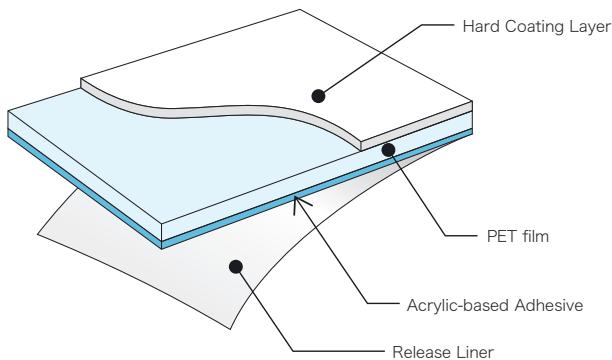
P.23



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 ² 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 ² K 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/m²K)
								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
		Perfect Black	GF1413	1524	30	86	75	5	0	5	0	95	< 1	0.37	33	5.9
P.12	Recycled PET Transparent Shatter-resistant Film	Recycled PET Transparent Shatter-resistant Film CLE/CEA 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	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/m²K)
								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 Indecence	ExteriorUse	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 Indecence	ExteriorUse	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	○	○	○	○				○			-	-	-
	Plivi 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) (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/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/m² 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 Indecence	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
	Circular Black	GF1818	○	○	○	○							-	-	Horizontal use
P.27	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 Indecence	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	-	-
	Neuloa	GF1870	○	○	○								300	300	-
	Chenille Silver	GF1867	○	○	○								475	475	-
	Chenille Brown	GF1868	○	○	○								475	475	-
	Risti	GF1737	○	○	○								233	615	-
P.37	Polaris	GF1723	○	○	○								-	123	-
	Joki	GF1826	○	○	○								-	8	-
	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) (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/m²K)	
								Reflectance (%)	Transmittance (%)	Reflectance (%)	Transmittance (%)	Absorption (%)						
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

Page	Product Name	Product Number	Functionality									Pattern Repeat			
			Shatter Resistance	UV Protection	Insect Repellence	Hard Coating	Heat Rejection	Low Indecence	Exterior Use	Reverse Installation	Other Functionalities	Green Purchasing Lev-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	-
P.39	Ethico R	GF1911	○	○	○	○							1025	-	-
	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	-
	Ichimatsu kumohada	GF1753	○	○	○								155	154	-
P.41	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
P.43	Antique	GF1809	○	○	○								-	-	-
	Vertical	GF1806	○	○	○								-	-	-
	River	GF1874	○	○	○								-	-	-
	Antique Gray	GF1811	○	○	○								-	-	-
	Vertical Gray	GF1808	○	○	○								-	-	-
	Retro	GF1720	○	○	○								-	-	-
	Norm	GF1812	○	○	○								-	-	-
	Kangas	GF1813	○	○	○								-	-	-
	Retro White	GF1721	○	○	○								-	-	-
	Gemstone	GF1876	○	○	○								300	300	-
P.45	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"> 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.
P.9	Low-E Film (Heat Rejection / Thermal Insulation Film)	Ecorim 70	GF1206	<ul style="list-style-type: none"> Although minimal, the metallic content may interfere with radio wave transmission and could slightly reduce connectivity for mobile phones and similar devices. During installation, please ensure that all water is thoroughly removed.
P.11	Solar Control Film (Solar Adjustment / Mirror / Privacy)	Mirror 40 Mirror 20	GF1106 GF1108	<ul style="list-style-type: none"> 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. Although minimal, the metallic content may interfere with radio wave transmission and could slightly reduce connectivity for mobile phones and similar devices. During installation, please ensure that all water is thoroughly removed.
		Mirage	GF1822	<ul style="list-style-type: none"> 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. 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. Please note that this product is not suitable for creating a completely darkened room. During installation, please ensure that all water is thoroughly removed.
		Perfect White II	GF1463	<ul style="list-style-type: none"> Due to the characteristics of this product, it does not have a hard coating finish. Please handle with care. When used in environments with strong external light or illumination, stepped or uneven patterns may become visible due to transmitted light.
		Perfect White II Perfect Black	GF1463 GF1413	<ul style="list-style-type: none"> While these products are effective at blocking light, they cannot prevent light from leaking through joints or edges. Please note that these products are not suitable for creating a completely darkened room.
P.13	High-range UV Protection Film	Unfade 90	GF1406	<ul style="list-style-type: none"> 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.
P.14	Security Film	Fortis 90	GF1464	<ul style="list-style-type: none"> For product details, please refer to the separate book on P.26. This product does not guarantee complete prevention of intrusion.
P.17	Exterior Use Film	Horizon EX Circular EX Chiaro 90EX Vist 65EX Mirror 20EX Misty Mist 90 Misty Mist 30	GF1850 GF1851 GF1105 GF1453 GF1110 GF1719 GF1849	<ul style="list-style-type: none"> 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. 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.
		Vist 65EX Mirror 20EX	GF1453 GF1110	<ul style="list-style-type: none"> Due to the characteristics of these products, they do not have a hard coating finish. Please handle with care. 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. Although minimal, the metallic content may interfere with radio wave transmission and could slightly reduce connectivity for mobile phones and similar devices. During installation, please ensure that all water is thoroughly removed.
P.18	Low-reflection Film Luclear II	Luclear II Luclear II EX	GF1401 GF1402	<ul style="list-style-type: none"> To achieve the anti-reflection effect, installation on both sides of the glass is required. 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). After installation, the reflected color may appear slightly purple.
		Luclear II EX	GF1402	<ul style="list-style-type: none"> 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.

Precautions for Selection and Installation

■ Series-specific Precautions

Functional Film

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

Matte / Frost / Gradation

Page	Category	Product Name	Product Number	Product Detail
P.23	Matte / Frost	Filmy II 85 Filmy II 50	GF1891 GF1892	<ul style="list-style-type: none"> These products are intended for indoor use only. Please avoid installing them on glass surfaces exposed to the outdoors.
		Lumikki 30	GF1715	<ul style="list-style-type: none"> This product features surface printing on a PET base material. 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.
		Lumikki R 35	GF1903	<ul style="list-style-type: none"> After installation, transmitted light may appear slightly orange.
		White Pearl 40	GF1716	<ul style="list-style-type: none"> 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.
P.25	Side Gradation	Digitalism Horizon Kolmio Circular	GF1817 GF1703 GF1816 GF1702	<ul style="list-style-type: none"> These products feature surface printing on a PET base material. 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. 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.
P.27	Center Gradation	Circular Frost	GF1862	<ul style="list-style-type: none"> As this product is made using inkjet printing, there may be color variations between individual sheets. Joint installation is not recommended.
P.29	Fog	Fog 2300 Fog 2000 Fog 1500S	GF1853 GF1854 GF1861	<ul style="list-style-type: none"> As this product is made using inkjet printing, there may be color variations between individual sheets. Joint installation is not recommended.

Design Film

Page	Category	Product Name	Product Number	Product Detail
P.37	Stripes / Geometric	Joki Lokki	GF1826 GF1833	<ul style="list-style-type: none"> These products feature surface printing on a PET base material. 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.
		Ethico R	GF1911	<ul style="list-style-type: none"> Please be aware that when making joints during installation, precise pattern alignment cannot be guaranteed. After installation, transmitted light may appear slightly orange.
P.41	Playful Gradation	Pop Ethico R	GF1912	<ul style="list-style-type: none"> 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.
		Pop Ethico R Poetry R Nord R Asanoha R	GF1912 GF1913 GF1914 GF1915	<ul style="list-style-type: none"> After installation, transmitted light may appear slightly orange.
P.43	Textured Glass	Antique Vertical River Norm Kangas Retro Retro White	GF1809•1811 GF1806•1808 GF1874 GF1812 GF1813 GF1720 GF1721	<ul style="list-style-type: none"> Please note that products with a textured or uneven surface may retain fine bubbles due to their material characteristics. 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. 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.
P.45	Effect	Mosaic Cube	GF1741	<ul style="list-style-type: none"> Please note that, due to the characteristics of the pattern, horizontal streaks may appear.
P.45	Stained Glass	Slim Block Colorful Tile	GF1877 GF1878	<ul style="list-style-type: none"> Please note that products with a textured or uneven surface may retain fine bubbles due to their material characteristics. 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. 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. Please be aware that when making joints during installation, precise pattern alignment cannot be guaranteed.

Others

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

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 process² for the CP Mark¹.

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

² 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

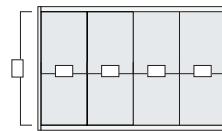
Select the ink type from page 29 ►

Standard Solvent Ink

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

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.

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

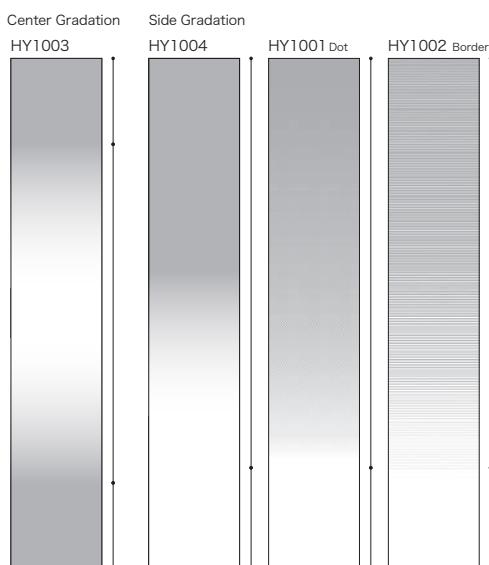
By layering Standard Color ink over Standard White ink, this method achieves highly opaque color expression. This double-layer ink process creates different appearances on the front and back sides of the glass. Installation side: Front (Colored) / Back (White)

* 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

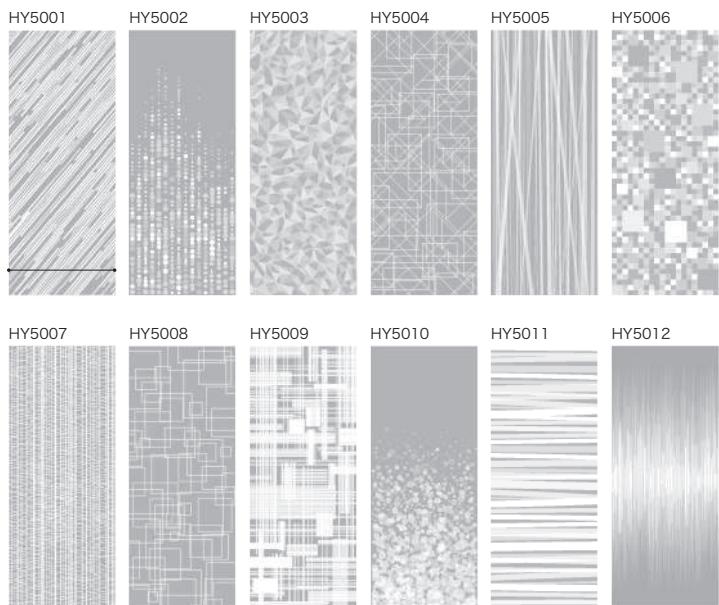
Gradient size and density can be customized



* 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

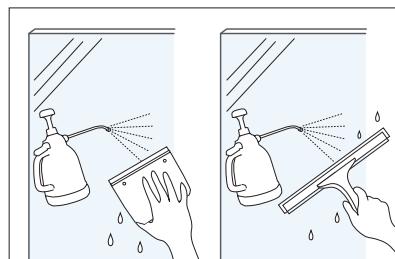
Original geometric design patterns



- * → 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.

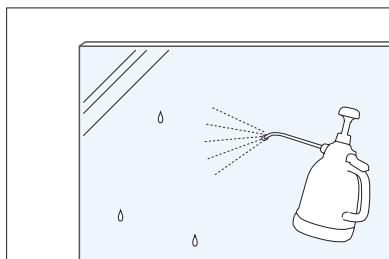
Installation Method

■ Wet Application Method



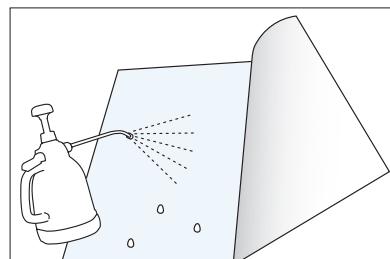
1. Glass Cleaning

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.

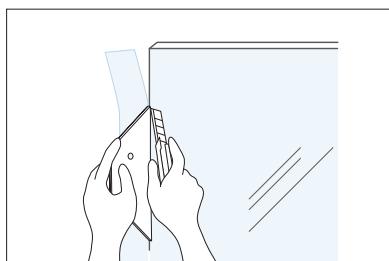


4. Applying the Glass Film – Part 1

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.

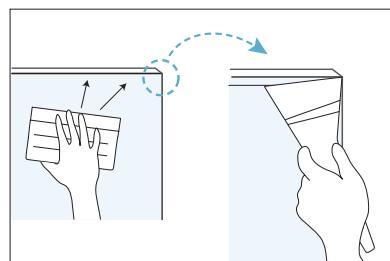
Precautions

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



5. Applying the Glass Film – Part 2

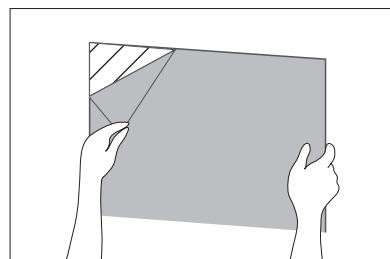
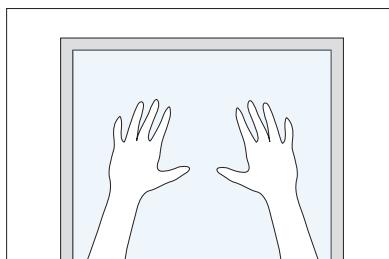
Once the film is in place, trim any excess material so the edges are approximately 2 mm inside the window frame. If installing multiple film segments, trim and align the edges in advance. Maintain a gap of approximately 1 mm between seams to ensure a clean finish and prevent overlap.



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)



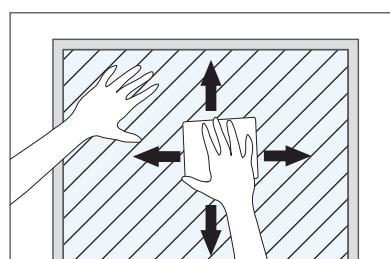
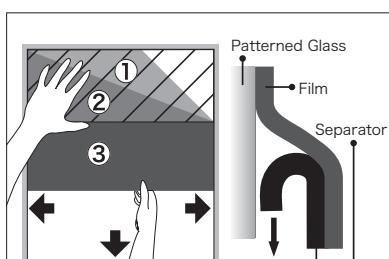
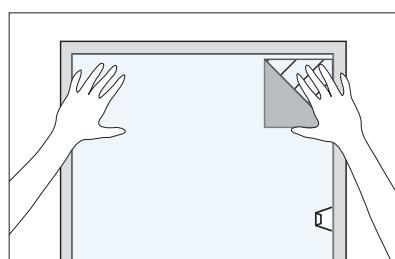
1. Glass Cleaning

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.



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.

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.

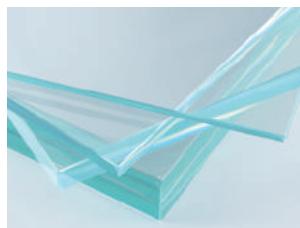
6. Finishing

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.

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.

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Check the listing page from the product number.

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CLEAS Glass Film