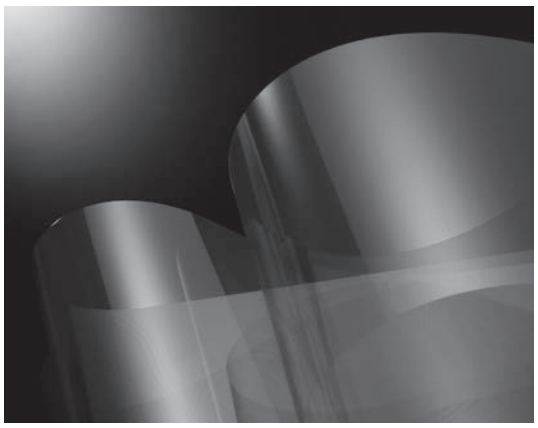
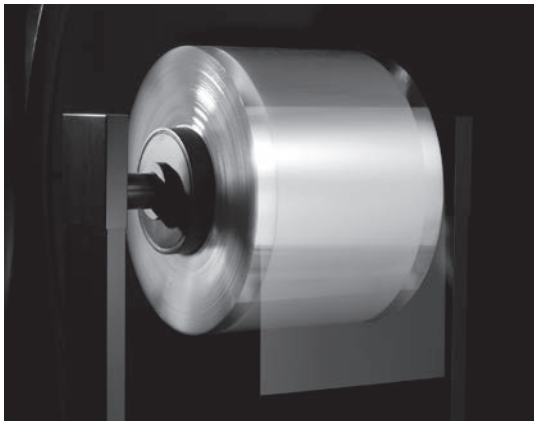
Ultra-thin Glass

Ref. No. 2210-02E

G-Leaf™

Ultra-thin glass G-Leaf™, which is under 0.2mm (200μm) thick, is a superior material formed by overflow technology. G-Leaf™ maintains the advantageous functions and reliability of glass in a film state and can therefore be applied using the roll-to-roll process. G-Leaf™ is a next-generation material that holds excellent potential for applications such as electronics, energy-related products, medical-use products, and lighting.





Rolled-up form

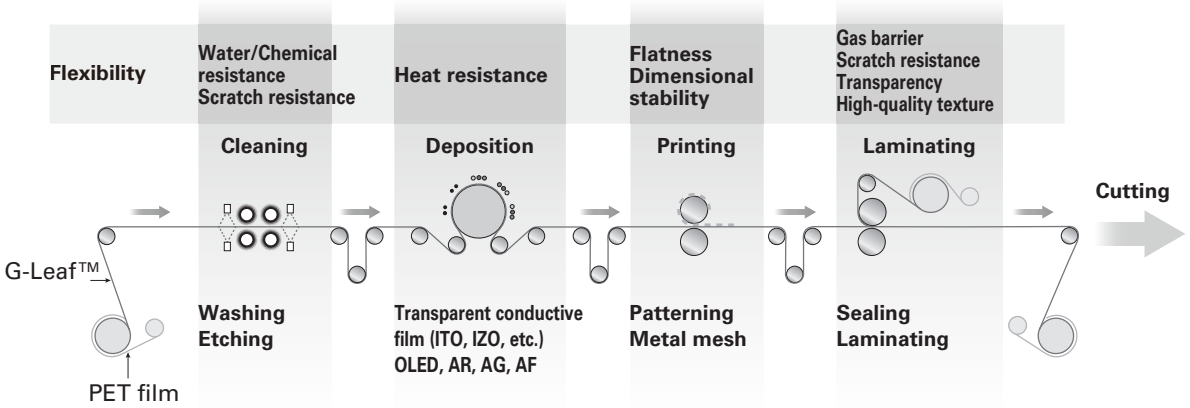
Features

- Excellent properties of glass
  - Optical properties
  - Weather resistance
  - Heat resistance
  - Gas barrier properties
  - Electrical insulation
  - Chemical durability
- Properties of overflow technology
  - Surface flatness
  - Surface smoothness
- Features unique to thin sheet forming
  - Flexibility
  - Workability
  - Lightweight
- Environmentally friendly glass that does not contain As or Sb

G-Leaf™ allows for the reduction of energy and environmental burdens at all stages of its production, from raw materials to delivery.

Roll-to-Roll manufacturing process for flexible devices using G-Leaf™

G-Leaf™, with both its glass features and flexibility, makes it possible to manufacture high-quality flexible devices with the high-productivity roll-to-roll process.



Applications

- Flexible solar cell
- Flexible display
- Flexible lighting
- Touch sensor
- Electronic paper
- Thin film battery

Thermal Properties

With its high heat resistance, low thermal expansion, and low thermal shrinkage, G-Leaf™ offers superior thermal dimensional stability.

Strain point		˚C	650
Annealing point		˚C	705
Softening point		˚C	940
Coefficient of thermal expansion	30-380˚C	× 10^{-7}/K	38

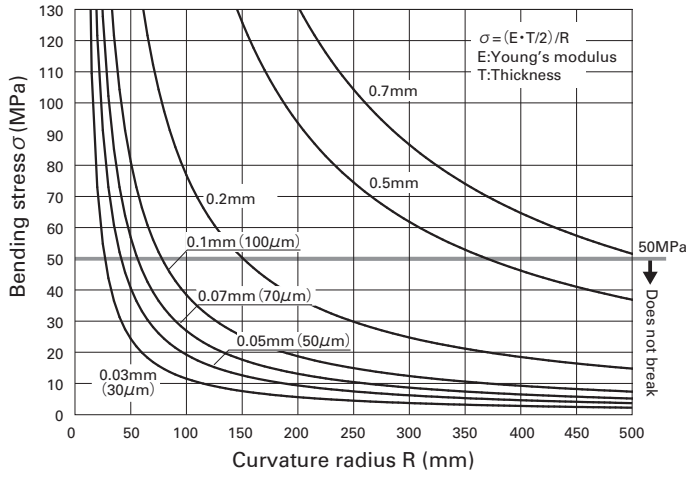
Mechanical Properties

G-Leaf™ is characterized by high elasticity and high hardness.

Density	× 10^3kg/m^3	2.46
Young's modulus	GPa	73
Poisson's ratio		0.2
Vickers hardness	Hv	600

Flexibility

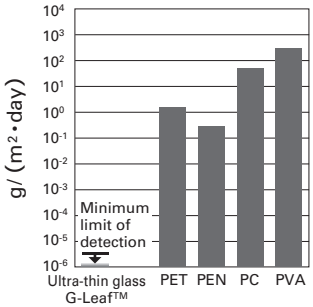
G-Leaf™ is also available in rolled-up forms.



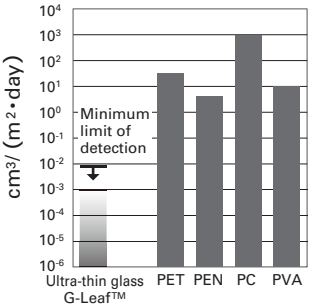
* Glass breakage depends on defects located on edges and/or surfaces of glass substrates. In the above figure, 50MPa is considered to be the boundary between "broken" and "not broken" conditions.

Gas Barrier Properties

Water vapor permeation rate



Oxygen transmittance rate



* Both the water vapor permeation rate and oxygen transmittance rate are lower than minimum limit of detection.

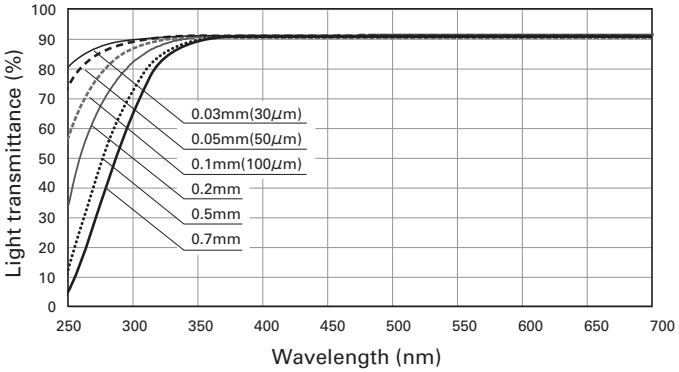
Electrical Properties

Volume resistivity Log ρ	350˚C	Ω・cm	12.0
Dielectric constant	1MHz, 25˚C		5.3
tan δ	1MHz, 25˚C		0.001

Optical Properties

G-Leaf™ has high light transmittance.

Light transmittance	λ=550nm	%	92
Refractive index (n_d)	λ=587.6nm		1.52



Chemical Properties

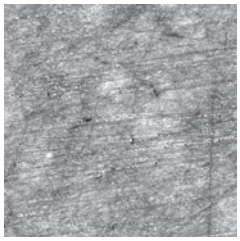
G-Leaf™ has high chemical durability. It is an ecological material and does not contain any substances that impose burdens on the environment.

Chemical durability	10% HCl (80˚C-60min)		No visual change
	63 BHF (20˚C-3min)		No visual change
Alkali content		wt %	0.1 max.
As, Sb content		wt %	less than 0.1

Surface Quality (AFM Image)

Formed by overflow technology, the product has an extremely smooth and flat surface.

G-Leaf™
Non-polished surface formed by overflow technology
Ra=0.2nm



Polished surface
Ra=0.5nm

Dimensions

Thickness	
Center	Tolerance
0.2mm(200μm)	± 10%
0.1mm(100μm)	
0.07mm(70μm)	
0.05mm(50μm)	
0.03mm(30μm)	

Both rolled-up forms and sheets are available.
Please consult us regarding thickness, size, and shape.
Laminated adhesive film with G-Leaf™ is available in order to facilitate its handling.