

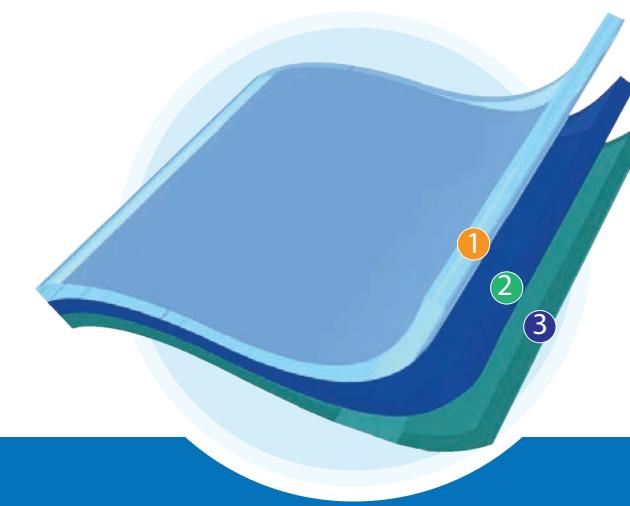
THE CLEAR ADVANTAGE IN TRANSPARENT HIGH BARRIER FILMS



TOPPAN
TOPPAN USA, INC.

GL FILM STRUCTURE

This transparent barrier film has the world's highest level barrier performance that is suitable for a wide range of application. This film has many outstanding properties due to the use of Toppan's original transparent vapor deposition and coating technologies.



GL FILM consists of a ① transparent base layer (PET, PE, PP), an ② inorganic high quality vapor deposition layer (AlOx or SiOx), and a ③ proprietary barrier coat layer.

GL FILM FEATURES

EXCELLENT BARRIER PERFORMANCE

- ✓ GL FILM offers an alternative to AL Foil, and an improvement over Metallized Films, PVDC, an EVOH

VERSATILE LINEUP

- ✓ Maintaining barrier performance under high temperature and humidity

ENVIRONMENTALLY FRIENDLY

- ✓ High Transparency, enhance product appeal and display content

- ✓ Different Grades are suitable for dry & liquid content as well as various types of sterilization including hot fill, boiling, retort.

- ✓ When replacing aluminum, packaging may be downgauge (source reduction)

- ✓ Suitable for Metal Detection & Microwavable

- ✓ Films contain no chlorine

TARGETED INDUSTRIES

FOOD & BEVERAGE / MEDICAL & PHARMACEUTICAL

HEALTH & BEAUTY / ELECTRONICS / INDUSTRIAL

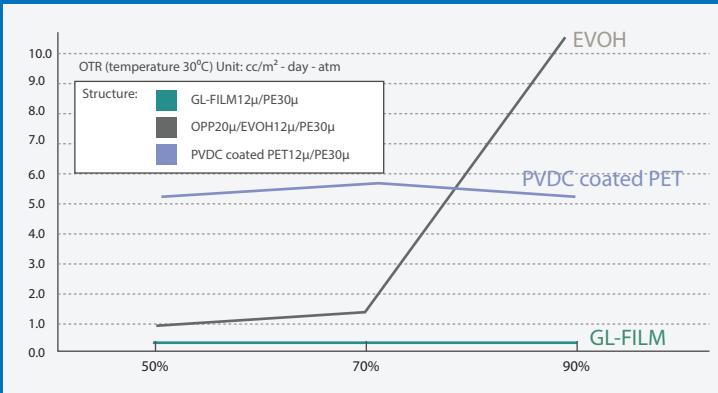


Performance Comparison GL FILM vs other barrier films



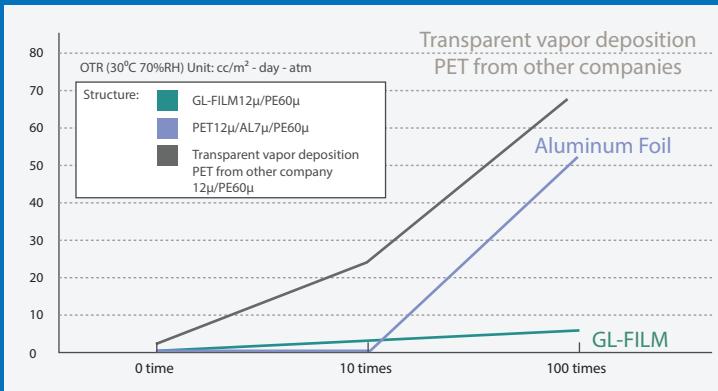
HUMIDITY DEPENDENCE

Demonstrates stable barrier performance that is not affected by humidity and the surrounding environment.



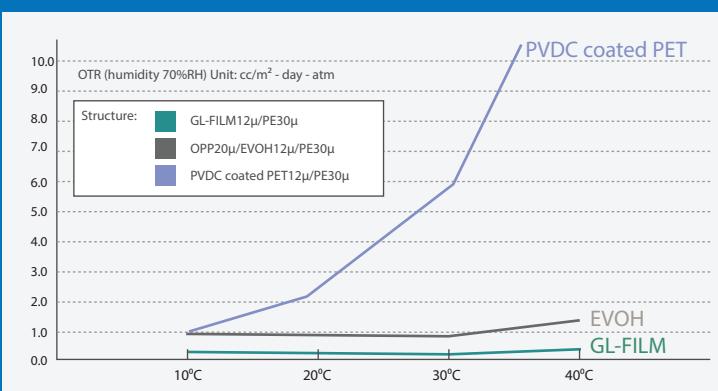
FLEX RESISTANCE

(OTR) Barrier properties are maintained even after repeated bending.



TEMPERATURE DEPENDENCE

Demonstrates stable barrier performance that is not affected by temperature and the surrounding environment.



GL FILM LINEUP

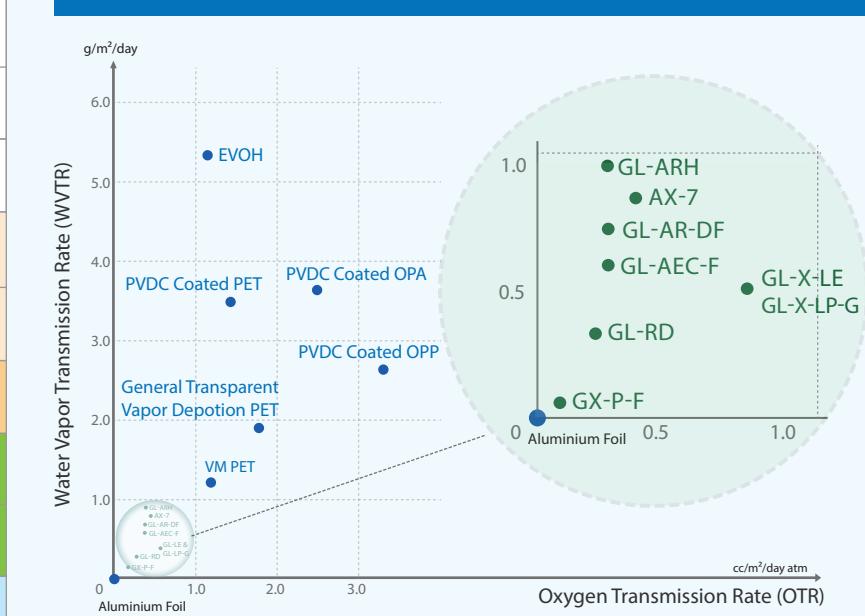
TYPE	GRADE	Base Film	OTR Metric / Imperial	WVTR Metric / Imperial	APPLICATION
Standard	AX-7	PET 48ga	0.5/0.032	1.0/0.065	Dry Content
	GX-P-F	PET 48ga	0.1/0.006	0.05/0.003	Medical & Electronics
Hot-Filling (Boiling)	GL-AEC-F	PET 48ga	0.3/0.019	0.7/0.045	Hot Fill / Liquid Content
Retort Autoclave	GL-AR-DF	PET 48ga	0.3/0.019	1.0/0.065	Boiling / Retort
	GL-ARH	PET 48ga	0.3/0.019	1.3/0.084	Standard to High Retort
	GL-RD	PET 48ga	0.2/0.013	0.3/0.019	Enhanced Post-Retort
Recyclable	GL-LE-G	PE 125ga	1.0/0.065	0.5/0.032	Dry Content
Recyclable	GL-LP-G	PP 68ga	1.0/0.065	0.5/0.032	Dry Content

cc/m²/day (30°C, 70%RH)
cc/100in²/day (86°F, 70%RH)

g/m²/day (40°C, 90%RH)
g/100in²/day (104°F, 90%RH)

*All values are typical

COMPARISON OF BARRIER FILM PERFORMANCE



VISION STATEMENT

Toppan USA is committed to creating a sustainable future by improving our environmental, social and corporate influence. Our contribution includes allocating resources to develop new and innovative products that provide advantages to consumers and brand owners while making the world a greener place.



Brand Enhancement



Minimal Emissions
in production



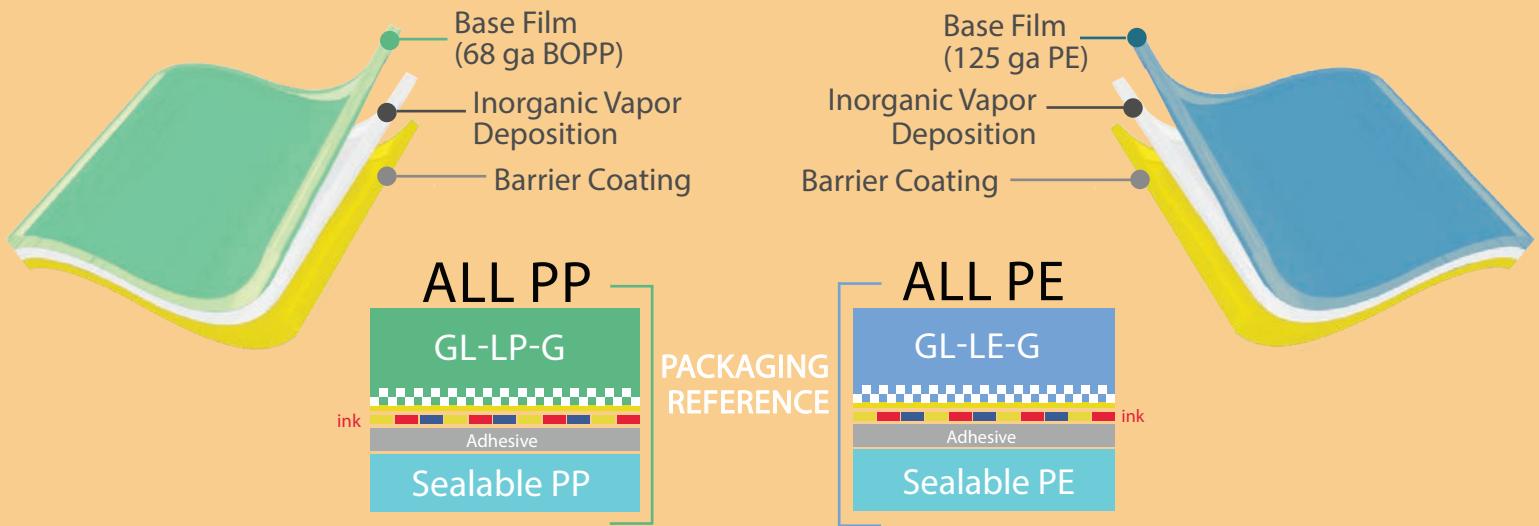
Reduce Waste
in Landfill



Easier to Recycle

Our newly launched PP and PE Transparent barrier films are recyclable when laminated to a similar base film making a "Mono-Material" structure, with exceptional shelf life and reducing the overall packaging material content.

Our goal is to be a leader in flexible packaging and help guide the universal recycling principles in an effort to align the packaging industry to one that offers more sustainable solutions.



TOPPAN USA,

GEORGIA, USA PLANT

Toppan USA's Georgia Plant officially opened on April 8, 2016. As the flexible packaging market continues to expand in North America, Toppan Printing decided to meet this growing demand by establishing a state of the art production facility. It became the premier transparent film supplier of (GL FILM) in the US, South America and Europe.



GLOBAL HIGH BARRIER FILM SUPPLIER

Toppan has 3 manufacturing facilities that produce & supply transparent high barrier films. This allows us to respond to the needs of our customers by providing shorter lead times, local product development, technical assistance, stable supply and an unmatched level of quality to the market.



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