

The Glass Polymer™
family of cosmetic materials

EASTMAN



...affordable luxury

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family of cosmetic materials



Affordable luxury demands packaging that reflects the quality of the product inside.

The advantage is clear.

Packaging material that conveys luxury with high performance, design freedom, and processing flexibility turns ordinary containers into extraordinary shelf appeal. That's why many of the world's leading brands and top manufacturers prefer The Glass Polymer™ family of cosmetic materials.

What can The Glass Polymer do for you?

From mass market to prestige products, only The Glass Polymer offers crystal clarity and chemical resistance that has a luxurious feel. This powerful combination gives you the most versatility for the widest range of products and processes.

The look and feel of glass . . . *without the breakage.*

Luxury is more affordable than you may think. While unit cost savings of The Glass Polymer are a possibility versus glass, the greater cost savings opportunities are downstream in secondary processes for color and decoration, breakage, and shipping costs.

Many popular secondary processes, such as hot stamping, can cost up to 50% more per unit with glass. When you consider the total system cost, The Glass Polymer is clearly more cost-effective. Here's why . . .

The Glass Polymer saves you more.

Systems cost savings:

The Glass Polymer is 100 times tougher and easier to process and decorate, reducing the total systems cost of use.

Cost models* available for EBM, ISBM, and injection molding		Copolyester		Glass	
		(Inj. molding)	(ISBM)	Clear	Colored
Base cost	16 cav (Inj.) 6 cav (ISBM)	\$0.21	\$0.24	\$0.15	\$0.32
Decorating	Hot stamping	\$0.04	\$0.03	\$0.08	\$0.08
Breakage	Filler line shutdown	\$0.00	—	\$0.01	\$0.01
	Rework	\$0.00	—	\$0.01	\$0.01
Lead times	Working capital	\$0.01	\$0.01	\$0.04	\$0.04
Total cost per unit	Hot stamped	\$0.26	\$0.28	\$0.29	\$0.46

*Cost models are for illustrative purposes only and not indicative of actual cost.



The weighty feel of glass without the heaviness

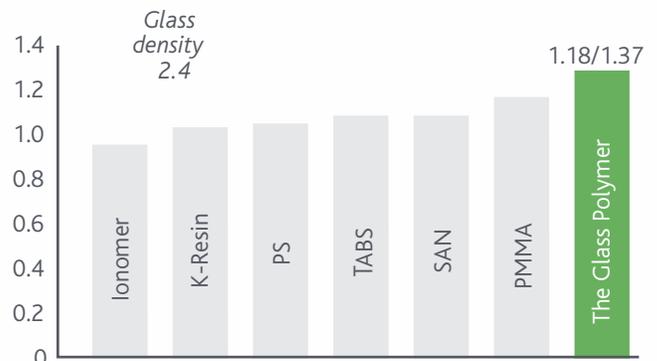
The Glass Polymer saves on total system costs plus opens a whole new world of special effects that simply can't be achieved with glass.

Incredible clarity at unbelievable thickness . . . *clearly brilliant.*

It doesn't have to be glass to perform like glass. In fact, The Glass Polymer performs better! Even on jars and bottles, The Glass Polymer can be molded up to 32-mm thick and is every bit as sparkling clear as glass. No other polymer looks and feels more like glass. See for yourself . . .

High density:

- Customers generally associate weight with quality.
- The density of copolyesters allows a feel of glass while still reducing the overall package weight.



Crystal clarity even at extreme thickness

Water-clear material:

- Superior optical properties at dramatic thickness
- Molded parts up to 32 mm

	Haze %	Transmission %
The Glass Polymer	0.3	92
PMMA	0.2	92
SAN	0.5	84
K-Resin	3.9	88
lonomer	13.1	89
Tabs	15.0	63

Design without limits ... *clearly inspirational.*

With The Glass Polymer, the only limit is your imagination. Go beyond visual appeal to create multisensory designs that invite consumers to experience your brand like never before.

Sleek and sexy, soft and silky, fun and playful, and so much more—The Glass Polymer enables you to clearly differentiate your brand.

"The Glass Polymer was really the only material that was capable of achieving the clarity, wall thickness, and chemical resistance required to produce the bottle."

—Jim Bigham
Director Sales and Marketing
Risdon



Safeguarding your product and the consumer . . . *clearly sustainable.*

The Glass Polymer™ family of cosmetic materials now includes sustainable solutions for your newest packaging innovations. With the introduction of Tenite™ cellulosics to the portfolio, Eastman now offers a polymer that is made from 45% sustainably harvested softwood trees and cotton.¹ This is a great addition to a group of materials that, compared to glass, already weighed 50% less,² reduced breakage waste by approximately 2%, and reduced the amount of secondary packaging.

All products in The Glass Polymer™ family of cosmetic materials are bisphenol A (BPA) free and do not contain substances such as halogens, sulfur, nitrogen, lead, mercury, cadmium, or hexavalent chromium.

¹Tenite™ cellulosics for cosmetics packaging is made from softwood trees harvested under a program of sustainable yield that represents environmentally responsible management of our natural resources.

²Based on soda-lime (for containers) density of 2.52 g/cm³ and an average Glass Polymer density of 1.24 g/cm³.

"The face of sustainable luxury packaging has changed dramatically in the last few years. With the advent of new technology, there are now innovative and exciting ways to make sustainable materials part of a brand's proposition without sacrificing brand equity or overall aesthetic impression. Beauty brands have always possessed a special place in the heart of the consumer, and designers are now making creative choices to introduce more sustainable pathways from brand ideation to final product."

—Kevin Marshall
VP/Group Creative Director
Marc Rosen Associates



Less is more when it comes to sustainable materials.

For every 500 MT (1.1 Mlb) of The Glass Polymer family of copolyesters used over acrylic (PMMA), the energy saved could power over 545 homes and take almost 100 cars off the road every year.

Ecodesign freedom

Thanks to multiple intrinsic material benefits like mechanical resistance, barrier properties, and chemical compatibility, The Glass Polymer family of copolyesters enables lightweighting by reducing thickness and by minimizing the number of parts while keeping the same functionality. Thanks to its performance durability, the product parts can be reused multiple times. This

provides the opportunity to reduce overall environmental impacts like the consumption of valuable resources. Using The Glass Polymer is a perfect solution for innovative and functional ecodesign.

Energy valorization

The Glass Polymer family of copolyesters is made up of straight-chain and ring compounds of carbon, hydrogen, and oxygen. A polyester material burned in excess air at the appropriate combustion temperature and throughput yields products of water vapor and carbon dioxide. These polymers contain no halogens, chlorides, styrenes, or nitriles that may cause acid rains.



“The Glass Polymer has many advantages of glass but with none of the drawbacks. I am delighted to say that the new packaging in The Glass Polymer is a complete success.”
—Robert Wallock
CEO
Matis

Mold more . . . *clearly versatile.*

The Glass Polymer works with a broad range of processes from injection and injection blow molding to injection stretch and extrusion blow molding. With so many options, even the most intricate designs can be achieved without compromise.

Meet aggressive deadlines with speed and agility . . . *clearly effective.*

The Glass Polymer reduces overall cycle times with excellent flow rates and mold-fill capability. And even better news for cost-competitive processors—The Glass Polymer can often utilize existing tooling and machinery with very little modification.

With this level of efficiency, The Glass Polymer is ideal for large-volume as well as quick-turn low-volume seasonal or limited edition items.

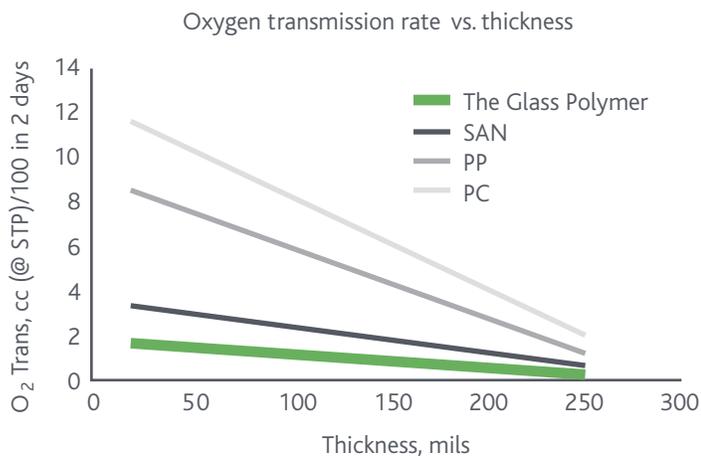
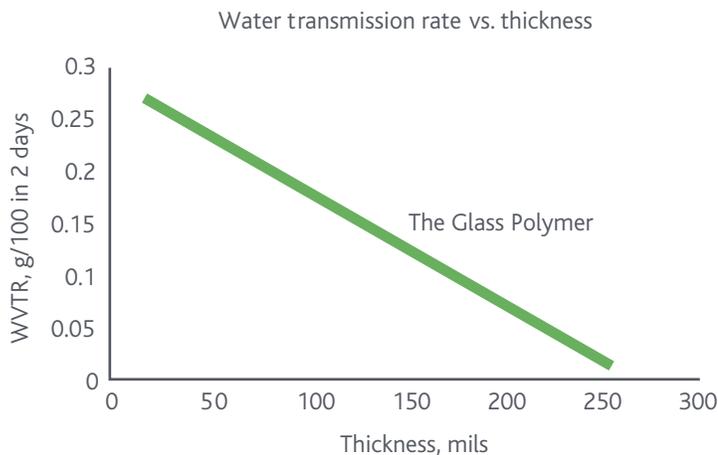


Extended shelf life ... clearly appealing.

The Glass Polymer increases product shelf life too. How? It's a fact . . . thick-wall containers keep contents fresher. The Glass Polymer optimizes wall thickness without sacrificing clarity, giving you more shelf appeal with longer shelf life.

The Glass Polymer provides an excellent barrier to water and oxygen.

Increased product shelf life:
Wall thickness makes the difference.



Cutaway of bottle shows the thickness that can be achieved by molding with The Glass Polymer.

Eastman's team can help provide input to drive the best packaging solution for your needs.



An open and shut case ... clearly functional.

The Glass Polymer delivers added confidence on mechanical parts including snap-fit and clip-on caps and closures. With very low shrink rates—0.2%–0.5%—you can depend on The Glass Polymer for a snug fit that keeps contents fresh and contained for the life of the product, even with daily usage.

Shatter resistant ... clearly tough.

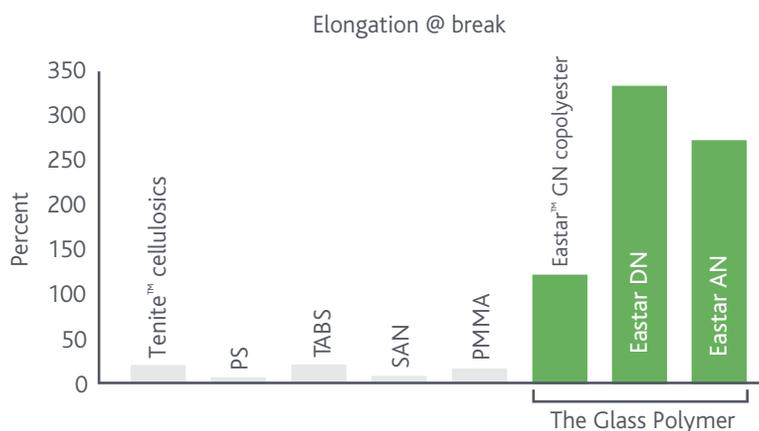
The Glass Polymer goes a long way toward safeguarding the contents and consumer. From retail store to bathroom floor, no other material endures the dropping, squeezing, or stuffing into handbags and luggage like containers made from The Glass Polymer.

Plus, The Glass Polymer resists tough cosmetic ingredients including oils and fats, alcohols . . . even aliphatic hydrocarbons like isododecane. Individual formulation testing is suggested.



The Glass Polymer has more than 10 times the shatter resistance of other plastics!

Shatter-resistant packaging:



The Glass Polymer collection

Extrusion blow molding

	Thin-walled bottle			Thin- & thick-walled bottle	
Typical application					
The Glass Polymer	Eastar 6763	Eastar GN071	Tritan LX101	Eastar EB062	Tritan LX500
Water clarity	★	★★	★★	★★★★	★★
Thickness	★★	★★	★★	★★★★	★★★★
Chemical resistance	★★	★★	★★★★★	★★★★	★★★★★
Melt strength	★★	★★	★★	★★★★	★★★★
Drop impact	★★	★★	★★★★	★★★★	★★★★
Size	up to 750 mL	up to 750 mL	up to 750 mL	up to 2 L	up to 2 L

Injection blow molding

	Thin-walled bottle, thin-walled jar	Thick-walled bottle, thick-walled jar
Typical application		
The Glass Polymer	Eastar EN076	Eastar AN001
Water clarity	★★	★★★★
Thickness	★★	★★★★
Whitening at gate	★★	★★★★

- ★ Good
- ★★ Better
- ★★★ Best
- ★★★★ Exceptional



"Prestige packaging is about creating signature presence of luxury and distinctiveness . . . resulting from sophistication of form, color, and graphics . . ."

—John Fling
VP
Estée Lauder

Injection molding

	Fragrance cap, fragrance housing, compact	Facial care cap and jar, lip gloss	Housing, compact, care jar	Fragrance cap, facial care jar, fragrance housing, lip gloss	Fragrance cap, facial care jar, lip gloss	Airless system, serum face cream			
Typical application									
The Glass Polymer	Eastar EN067	Cristal 400/401	Eastar GN071/ GN007	Eastar DN010/ DN011	Eastar AN001/ AN004	Eastar AN011/ AN014	Eastar CN005/ CN015	Tenite 375	Tritan LX151HF
Water clarity	★	★★★★★	★★	★★★★	★★★★	★★★★	★★★★★	★	★★
Thickness	★	★★★★	★★★★	★★★★	★★	★★	★★★★	★★	★★★★
Chemical resistance	★★	★	★★★★	★★★★	★★★★★	★★★★	★★	★★★★★	★★★★★
Mold release	No	No/Yes	No/Yes	No/Yes	No/Yes	No/Yes	No/Yes	No	Yes
Flow	★★★★	★★★★	★	★★	★★★★★	★★★★★	★★★★★	★★★★	★★★★★
Whitening at gate	★	★★★★	★★★★	★★	★★	★★	★★	★★★★	★★★★
Blush at gate	★★★★	★	★	★★	★★	★★★★	★★	★★★★	★★

★ Good
 ★★ Better
 ★★★ Best
 ★★★★★ Exceptional

Technical assistance ... clearly valuable.

Our technical experts can help you transform concepts into containers more effectively. Applying design for manufacture analysis, our specialists team up with design and production to:

- Optimize tooling
- Enhance part design
- Conduct mold-flow analysis
- Advise on secondary processes including welding, printing, assembling, coating, and more
- Provide analytical testing, including chemical resistance



Learn more about what The Glass Polymer can do for you.
 Visit www.TheGlassPolymer.com.

EASTMAN

The results of insight™

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