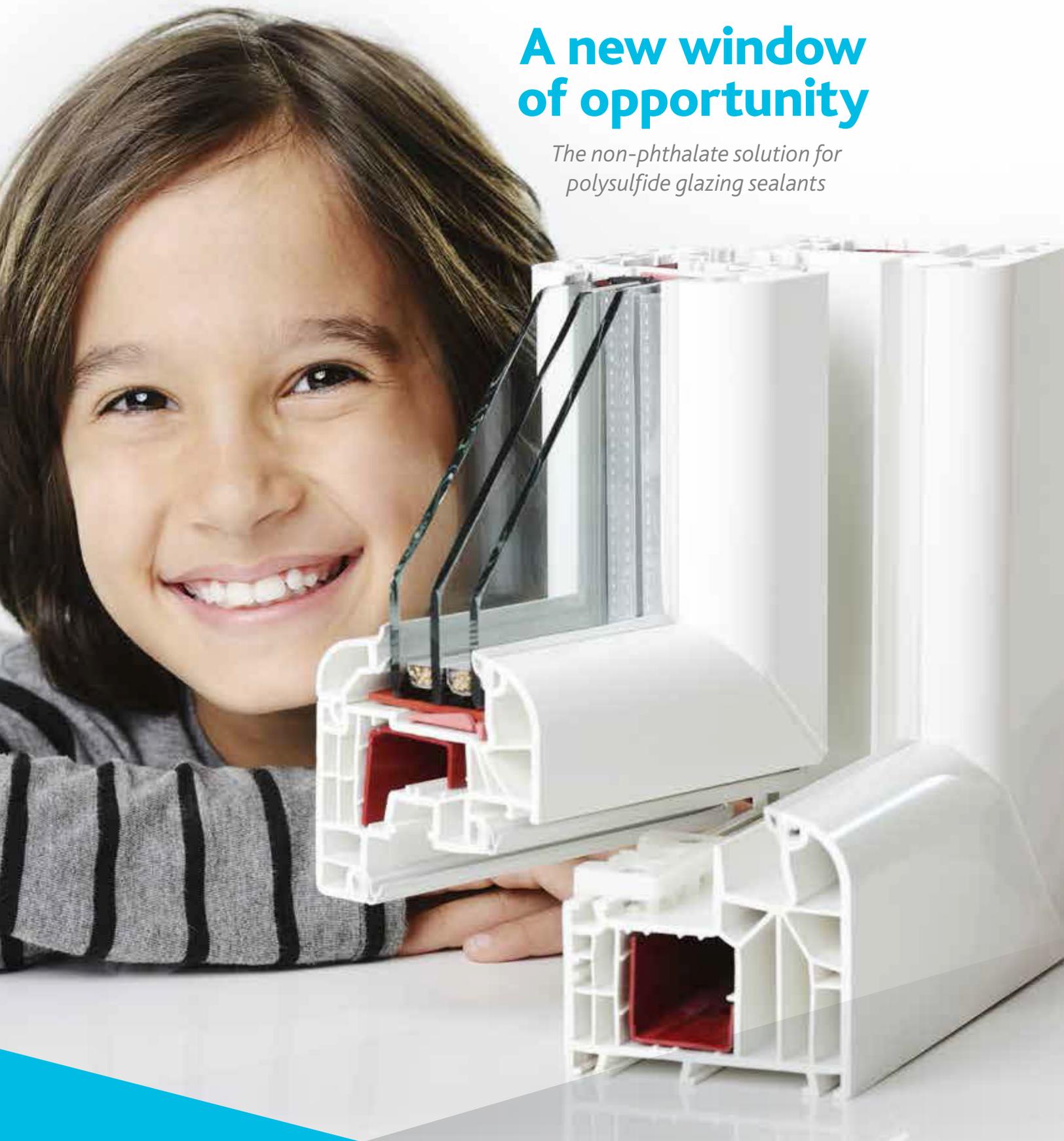


**EASTMAN**

# A new window of opportunity

*The non-phthalate solution for  
polysulfide glazing sealants*



*Eastman VersaBond™ plasticizer*

## Your primary plasticizer for secondary sealants

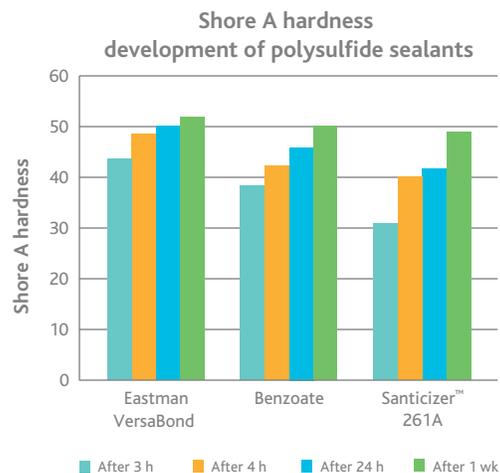
Emerging insulated glass (IG) technology has ushered in a new era in architectural thermal efficiency by better protecting the integrity of the inner chambers and any encapsulated gases. But an insulated window will only work as well as the sealants that bond the glass panes. . . . And a sealant will only work as well as its plasticizer.

Today's window manufacturers typically use two types of sealants on (double-sealed) IG units—the primary thermoplastic butyl sealant applied to the shoulder of the spacer bar and the critical secondary sealant to adhere the unit. Polysulfide-based sealants are one of the premium elastic sealants used as a secondary seal and remain the market leader in mainland Europe.

Eastman has been a reliable supplier of benzoate ester plasticizers to the IG market for more than 10 years, with trusted non-phthalate options for polysulfide sealants. Building on this history and application knowledge, Eastman VersaBond™ plasticizer is an efficient and easy replacement for phthalate-based plasticizers that are coming under increased regulatory scrutiny.

When compared with both phthalate and benzoate plasticizers, VersaBond has comparable or better performance for Shore A hardness, viscosity, and tensile strength, as shown in Figure 1. And it performs measurably better than phthalates for water uptake.

Figure 1



With the enactment in the European Union of REACH (Registration, Evaluation, Authorisation, and Restriction of Chemicals) regulations, manufacturers are now adopting non-phthalate options for their polysulfide insulated glass sealants. As a near drop-in replacement for phthalate-based plasticizers, VersaBond:

- Represents a direct substitution that requires little to no reformulation—saving months of development, approval, and changeover time
- Complies with the known current and upcoming regulatory initiatives for plasticizers
- Outperforms other non-phthalate options
- Is backed by Eastman's reliable technical support, market expertise, and global manufacturing resources

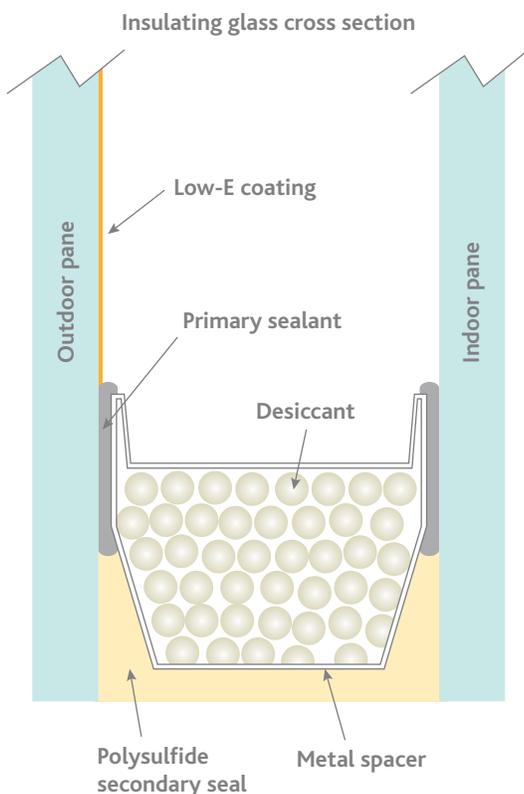
## Why use double-sealed insulating glass units?

New European thermal efficiency standards mean that double-sealed insulating glass units will be required to meet increasingly demanding regulations. Traditionally, the primary sealant (Figure 2) is butyl rubber, which is applied to reduce water vapor and gas permeability of the edge seal. In essence, it helps keep moisture from getting in and gases from getting out.

The strength of the butyl rubber used in the primary seal decreases rapidly as temperature increases, so a butyl rubber seal alone cannot guarantee the structural integrity of an IG unit. Additionally, its adhesion to the glass and spacer is not resistant to continuous water exposure, so a secondary sealant must be applied around the perimeter of the glass as shown in Figure 2. The outer or secondary seal functions as an adhesive and holds the unit together.

Secondary sealants can be based on different materials. Aside from commercial façade and structural glazing, where silicone is dominant, one of the leading materials for elastic insulating glass units is polysulfide. Secondary polysulfide sealants provide a high level of moisture and gas diffusion resistance, while accommodating any glass movement.

Figure 2



## Why polysulfide sealants?

Polysulfide sealants exhibit low viscosity and nonsag flow behavior, which give them a special rheology well suited for insulated glass. They are easy to apply both manually and on fast-moving robotic lines; they demonstrate rapid modulus and strength development; and they exhibit good adhesion to glass and aluminum.

The high reactivity of polysulfide sealants makes them fast curing, while still having a prolonged pot life. Well-formulated secondary sealants can achieve 80% of their final hardness after four hours curing at room temperature. In addition, polysulfide insulated glass sealants achieve full adhesion within four hours of curing at room temperature. As shown in Figure 3, formulations with VersaBond achieve desired viscosity at the same rate as a competing phthalate plasticizer, Santicizer™ 261A. After one week, polysulfide sealant formulations with VersaBond show very good adhesion to glass compared to other plasticizers (Figure 4). This is a major advantage over other technologies, because faster adhesion reduces the risk of problems during transportation of IG units.

Figure 3

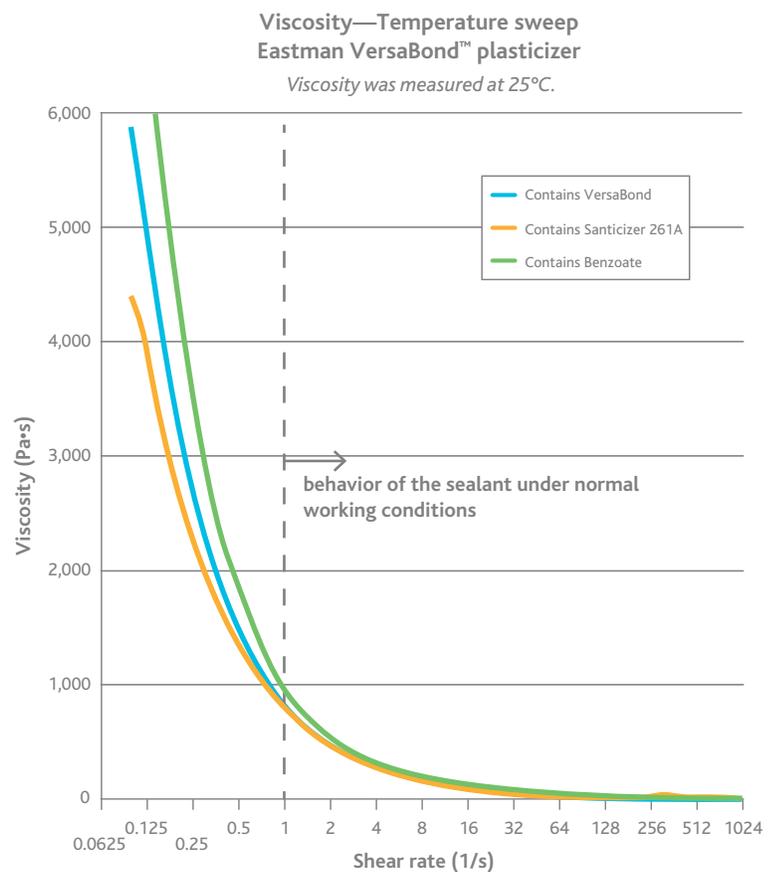
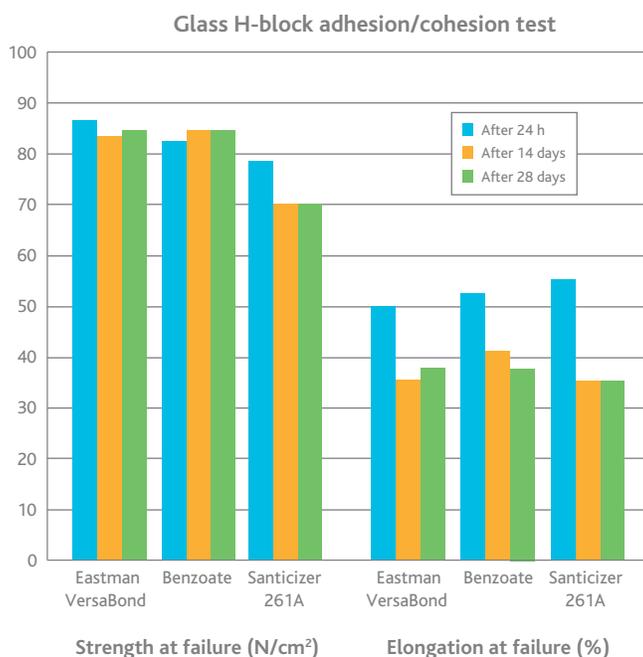


Figure 4



Polysulfide sealants are also preferred for their low vapor transmission rate and low diffusion rate for gases. They are resistant to water, solvents, and UV radiation through glass. And because they are flexible over a wide temperature range, polysulfide sealants are also resistant to induced stress due to temperature fluctuations and wind load.

## Seal the deal

VersaBond represents a near drop-in replacement for phthalate plasticizers, saving months of development and reformulation time, while enhancing the integrity of IG glazing sealants. To be sure what's inside your formulated products—and what's not—specify Eastman VersaBond by name.

To find out more about Eastman VersaBond™ plasticizer as a non-phthalate alternative for polysulfide sealants, call your Eastman representative today or visit [www.EastmanPlasticizers.com](http://www.EastmanPlasticizers.com).

# EASTMAN

The results of insight™

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