



Polymer Comparison

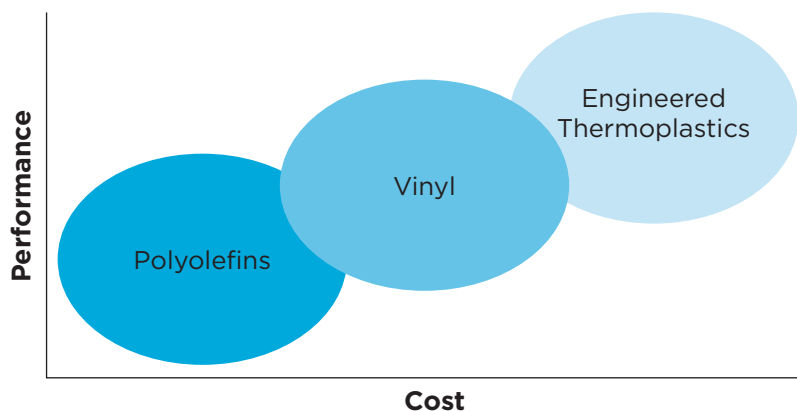
Rigid Vinyl Versus Other Flame-Resistant Polymers

With increased attention to product safety, the use of flame-resistant polymers for molded electrical enclosures is growing. Some polymers like vinyl (PVC) are inherently flame-resistant, while other polymers require additives to make them more flame-resistant. These additives can significantly alter the properties and performance of the base polymer.

When comparing different polymers, a design engineer should consider physical properties, processing considerations, and cost per volume. As shown in the table on the back, few polymers deliver the cost-performance benefits of vinyl, often making it the best choice for molded electrical applications.

VINYL IN THE VALUE CHAIN

Rigid vinyl is an excellent alternative to engineered thermoplastics, which may be over-engineered for the necessities of end-use or where polyolefins lack the physical properties required by the end-use. Rigid vinyl is also ideally suited to replace metal where design changes allow part consolidation and where corrosion resistance is a concern. The core characteristics of vinyl, such as inherent flame resistance, chemical resistance, and weatherability are combined with a wide array of performance enhancing possibilities to make vinyl a solid economic choice.



FR POLYMER COMPARISON CHART

	PVC	FR ABS	FR PC	FR PC+ABS	FR PPE+PS	FR HIPS
Physical Properties						
Tensile Strength	Good	Good	Excellent	Excellent	Good	Low
Tensile Modulus	Good	Good	Good	Good	Good	Fair
Flexural Strength	Good	Good	Excellent	Excellent	Good	Low
Flexural Modulus	Good	Good	Good	Good	Good	Good
Notched Izod Impact @ 73°F	Excellent	Fair	Excellent	Excellent	Good	Low
Heat Deflection Temp. @ 264 psi	Good	Good	Excellent	Good	Good	Good
Min Thickness for UL 94 V-O	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent
Min Thickness for UL 94 5VA	Excellent	Good	Good	Good	Good	Good
Outdoor Weatherability*	Excellent	Fair	Good	Good	Good	Fair
Indoor UV Stability*	Excellent	Fair	Excellent	Good	Fair	Fair
Appearance	Excellent	Good	Excellent	Good	Good	Fair
Chemical Resistance	Excellent	Good	Fair	Fair	Good	Good
Specific Gravity	1.33	1.19	1.21	1.19	1.13	1.16
Processing Considerations						
Melt Temperature Range (°F)	390–410	400–450	590–630	430–520	480–530	410–450
Processing Window	Narrow	Broad	Broad	Broad	Broad	Broad
Drying Conditions	None	2–4 hrs @ 180°F	3–4 hrs @ 180°F	3–4 hrs @ 175°F	3–4 hrs @ 180°F	None
Tooling Steel	Stainless Steel	P-20 Tool Steel	P-20 Tool Steel	P-20 Tool Steel	P-20 Tool Steel	P-20 Tool Steel
Plate Out	None	Yes	Yes	Yes	Yes	Yes
Mold Shrinkage (inch per inch)	0.002–0.005	0.005–0.007	0.005–0.007	0.004–0.006	0.005–0.007	0.004–0.007

* with appropriate UV protection additives

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