PLASTIC MATERIAL SELECTION GUIDELINES

Properties of Common Plastic Materials

Properties	High Impact Polystyrene	Polypropylene	Polyethylene	Amorphous Polyethylene Terephthalate	Ethylene/Vinyl Alcohol
Common Name	HIPS	PP	PE	APET	EVOH
Strength	Good	Fair	Fair	Good	Good
Stiffness	Excellent	Good	Good	Excellent	Good
Stress Crack Resistance	Good	Excellent	Excellent	Excellent	Good
Chemical Resistance	Poor	Excellent	Excellent	Excellent	Excellent
Oxygen Barrier	Poor	Poor	Poor	Good	Excellent
Water Barrier	Poor	Very Good	Very Good	Good	Good
Forming Ability	Excellent	Fair	Poor	Good	Good
Clarity	Poor	Good	Poor	Excellent	Good
Heat Transfer	Moderate	Slow	Slow	Fast	Moderate
Linear Mold Shrinkage	Low	High	High	Low	High
Heat Deflection Temperature (° F)	160-180	200-240	150-180	158	200-250
High Temperature Applications	Fair	Good	Poor	Poor	Good
Frozen Applications	Poor	Fair	Good	Poor	Poor
Refrigerated Applications	Good	Good	Good	Good	Good
Microwave Applications	Poor-Fair	Good	Good	Poor	Good

Winpak Plastic Materials

Winpak offers a variety of plastic material choices to meet today's demanding packaging applications. The company extrudes and thermoforms a variety of monolayer materials as well as a wide variety of coextruded and barrier materials. Rigid plastic materials are available in preformed containers or in rolled sheet for use on form/fill/seal packaging equipment.

The chart to the left compares the properties of common plastic materials used in packaging. The information in the chart can be used as a guideline in determining the relative characteristics of the various materials. **However, it should be noted that the information in the chart is typical and may vary depending upon the exact formulation of the material resin from the supplier, the grade of the resin, the addition of additives, and the processing of the material.**

For instance, HIPS resins contain rubber as an additive to improve the impact characteristics of polystyrene. Polystyrene material suppliers offer different resins with varying amounts of rubber to achieve the desired impact characteristics. Other additives can modify the typical properties of a specific material to produce a material more suitable to the packaging application. For example, certain resin grades and additives are available that are more suited towards frozen applications. Winpak's experienced technical staff is always available to help customers with specific packaging material requirements.

This data should be used for typical material properties and not as a specification. This data is offered for informational purposes and does not represent any type of guarantee or warranty of performance. Winpak assumes no responsibility for any incidents that may arise from use of this data. Material suitability for specific packaging applications should be verified prior to selection.

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PLASTIC MATERIAL SELECTION GUIDELINES

Selecting The Right Material For Your Application

Plastic materials each have individual properties and processing characteristics. Selection of a specific plastic material is based upon an analysis of the properties and cost of the material to ensure the material is suitable for the packaging application. Also, multiple layers of different plastic materials can be combined to take advantage of the properties of different plastic materials. This is a common practice when producing multilayer materials suitable for barrier applications. Selected properties of common barrier materials are shown in the table below.

The type of material used for a particular packaging application is dependent upon many factors. Once a package material has been selected, testing is required to verify suitability for the packaging application. Each of the following should be considered when selecting a material suitable for a specific application:

- Material Properties
- Material Process Ability
- Material Cost
- Barrier Requirements
- Product Compatibility
- Product Filling Conditions
- Package Storage Conditions
- Package Heating
- Package Transport
- Package Use
- Sealing Characteristics
- Package Recycling

Select Properties of Common Coextruded Barrier Materials

Properties	PP/EVOH/PP	PP/EVOH/PE	PP/PE	PS/EVOH/PE	PS/PE/PS	PS/PE
Stress Crack Resistance	Excellent	Excellent	Excellent	Good	Fair	Good
Oxygen Barrier	Excellent	Excellent	Poor	Excellent	Poor	Poor
Water Barrier	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent
Taste/Odor Transfer Resistance	Excellent	Excellent	Good	Excellent	Good	Good
Clarity	Good	Good	Good	Fair	Fair	Fair
Sealing	Excellent	Excellent	Excellent	Excellent	Good	Excellent
Hot Fill Applications	Excellent	Good	Good	Poor	Poor	Poor
Retort Applications	Good	Good	Good	Poor	Poor	Poor

About Barrier Materials

Barrier materials use sophisticated coextrusion and/or lamination technologies to bond together layers of high-performance plastic resins. The resulting multilayer materials safeguard products from the effects of oxygen, moisture, and ultra-violet light; depending on specific requirements. These barrier materials can then be used in various practical applications, including keeping food products fresh longer.

Layer by layer… Winpak materials protect and package products.

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