

# PLASTICS RESINS

A variety of plastic resins provide numerous opportunities to develop exciting packages. Alcan Packaging offers guidance regarding resin selection for packages based on product protection, appearance, economy, chemical compatibility, moisture transmission rate, pigmentation, light transmission or oxygen transmission, as well as governmental regulatory requirements. All resins employed by our processes conform to U.S. Food and Drug Administration (FDA) regulations for direct Food Contact Regulations. All color pigments conform to U.S. and European heavy metal in packaging laws.

We design and develop stock and custom packages using virtually all available thermoplastic resins:

## Low Density Polyethylene (LDPE)

Flexible. Natural milky color. Translucent. High impact strength. Excellent environmental stress crack resistance. Low water and alcohol permeability. Resistant to many chemicals

## Medium Density Polyethylene (MDPE)

Provides intermediate properties between low- and high density polyethylene. Useful in squeeze containers, where more rigidity than LDPE and less rigidity than HDPE is required.

## High Density Polyethylene (HDPE)

More rigid than LDPE and MDPE depending on density. Natural milky color. More opacity than LDPE. Good impact strength. Good environmental stress cracking. Better barrier properties than LDPE. Easy to add color to.

## Polypropylene (PP)

Choices include Homopolymer and Copolymer Polypropylene. More rigid than HDPE. Naturally yellowish-gray color. Translucent (but with contact clarity). Nucleated grades can be clear. Excellent environmental stress crack resistance. Barrier properties generally equal to HDPE. Resistant to most chemicals.

## Polyethylene Terephthalate (PET) Polyester

Rigid. Transparent. Naturally crystal clear. Fair water barrier. Good alcohol and solvent barrier. Very good oil barrier properties.



## Glycol Modified Polyethylene Terephthalate (PETG) Copolyester

Extrusion blow moldable Copolymer. Modified PET. Rigid. Transparency better than PET particularly in thick sections. Fair water barrier. Fair alcohol and solvent barrier. Very good oil barrier properties.

## Polycarbonate (PC)

Rigid. Naturally crystal clear. Transparent. Extremely high resistance to heat. Poor barrier properties. High impact strength. Often used for reusable containers.

## Cyclic Olefin Copolymer (COC)

Rigid. Transparent. Colorless. Excellent moisture barrier. Sterilization via autoclave or radiation.

## Nylon 6

Dependent on grade, from flexible to rigid. Translucent to transparent. Excellent gas barrier. Excellent chemical resistance. Poor moisture barrier. Dimensions influenced by moisture.

## Polyethylene Naphthalate (PEN)

Rigid. Transparent. Colorless. Excellent moisture and oxygen barrier. Better heat stability than PET. Sterilization via autoclave or radiation.

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## Properties of Common Resins

Many resins are available for molding plastic containers. This chart illustrates a comparison of relative properties of common resins. These resins are available in several grades that can alter and modify its properties. Please contact us for more information about specific resin grades.

Requirement	PE	PP	PET	PC	COC	PEN	PS
Lightweight	2	1	5	6	3	5	3
Clarity	3	2	1	1	1	1	1
Toughness	1	3	2	3	5-7	2-7	9
Water Absorption	2	2	3	6	1	3	4
Water vapor permeability	2	2	4	7	1	3	5
CO2 permeability	6	5	2	9	6	2	9
O2 permeability	7	6	2	8	7	2	8
Resistance to acids	2	2	4	4	2	3	4
Resistance to alkalis	2	2	3	7	2	2	2
Resistance to oils	4	3	2	4	5	2	4
Resistance to solvents	3	3	2	6	3	2	6
Resistance to humidity	1	1	1	6	1	1	1
Resistance to light	4	4	1	4	1	1	5
Resistance to heat (hot fill)	3	2	3	1	1	1	5
Resistance to cold	1	4	2	1	5-7	2-7	5

1 = best, 9 = worst

This chart is provided only as a guide. Actual compatibility of the resin and the product is the responsibility of the product manufacturer.

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