

## A Guide to the general properties of the resins used

Thermoplastic resins are meltable resins with linear structure instead of lattice. During molding operations, they are transformed without a chemical modification into objects thus giving a reversible formation process that can be repeated without changing their thermoplastic properties.

### POLYOLEFINS

This group of resins includes: conventional and linear polyethylene, polypropylene and polymethylpentene (TPX). All are unbreakable, non-toxic, non-contaminating. These are the only non-expanded plastics lighter than water. They easily withstand exposure to nearly all chemicals at room temperature for up to 24 hours. Strong oxidizing agents eventually make it brittle. All polyolefins can be damaged by long exposure to ultra-violet light.

LDPE (low density polyethylene):	HDPE (high density polyethylene):
ERACLENE LD	ERACLENE HD
LUPOLEN	HOSTALEN
ALATON	MOPLEN RO
ALKATHENE	ELTEX
FERTENE	SIRTENE

The polymerization of ethylene results in an essentially straight-chained, high molecular weight hydrocarbon. Branching (side chain formation) occurs to some extent and can be controlled. Minimum branching results in "linear" polyethylene also called "high density" polyethylene (HDPE) because of its closely packed molecular chains. More branching gives a less compact solid known as "conventional" or "low density" polyethylene (LPDE). In general, HPDE has greater chemical resistance than LPDE and it is more rigid.

Like other paraffins, polyethylene is chemically unreactive. Strong oxidizing agents will eventually cause some oxidation. Some solvents will cause softening or swelling, but there is no known solvent for the polyethylene at room temperature.

PP (polypropylene):	
PROPATHENE	MOPLEN
KASTILENE	HOSTALEN P
NOVOLEN	

It is similar to polyethylene, but each unit of the chain has a methyl group attached. It is translucent, autoclavable, and has no known solvent at room temperature. It is slightly more susceptible to strong oxidizing agents than conventional polyethylene because of its many branches (methyl groups, in this case).

### POLYMETHYLPENTENE (TPX)

Polymethylpentene is similar to polypropylene, but has an isobutyl group attached to each unit of the chain instead of a methyl group. It is softened by some hydrocarbons and chlorinated solvents and strong oxidizing agents will attack it over a period of time. Its excellent transparency, rigidity and chemical resistance, plus its resistance to impact and to high temperatures make PMP a superior material for lab ware. PMP withstands repeated autoclaving even at 150°C. It can be used intermittently up to 175°C

### STYRENE RESINS

PS (polystyrene):	
POLYSTYROL	EDISTIR
LUSTREX	
HIPS (High-impact polystyrene):	
RESTOROLO	HOSTYREN
LUSTREX	

These resins are obtained by polymerization of styrene: rigid and transparent, they have superior resistance to impact and an extremely good dimensional stability. Highly resistant to aqueous solutions.

ABS acrylonitrile:	
KRALASTIC	CYCOLAC
RAVIKRAL	RESTIRAN
TERLURAN	URTAL
NOVODUR	LUSTRAN

These are resins obtained by coprecipitation of thermoplastic copolymer latex as styrene acrylonitrile (SAN) and of elastomers. They have superior mechanical, thermic and chemical resistance and can therefore be used in many fields of application.

SAN (styrene acrylonitrile):	
LURAN	LUSTRAN A
KOSTIL	

### VINYL RESINS

They are similar in structure to polyethylene but each unit contains a chlorine atom. The chlorine atom renders them more resistant to some solvents, but also makes it more resistant in many applications (PVC has extremely good resistance to oils and very low permeability to most gases). Polyvinyl chloride is transparent and has a slight bluish cast. When blended with phthalate esters plasticizers, PVC becomes soft and pliable, providing tubing of any dimension.

PVC (polyvinyl chloride):	
RAVINIL	ULTRYL
LUSTOFAN	SICRON
HOSTALIT	

### ACETALS

Due to their chemical composition regular and highly crystalline structure, these resins have physical properties that cannot be obtained either with metals or with other plastic material. In addition, these resins have high mechanical resistance and stiffness together with low coefficient of friction and high wear resistance.

POM (polyoximethylene polyformaldehyde):	
DELTRIN	HOSTAFORM
POLYCARBONATES	MAKROLON LEXAN

### POLYCARBONATE

It is a special type of polyester, in which dihydric phenols are joined through carbonate linkages (O-CO-O). These linkages are subject to chemical reactions with bases, concentrated acids, etc., and make PC soluble in various organic solvents. PC is window-clear, amazingly strong and rigid. It is autoclavable, non-toxic, and the toughest of all thermoplastics. PC maintains its resistance to impact in a wide range of temperatures and even under very severe environmental conditions. It withstands both low and high temperatures from -50°C to 135°C and has extremely good optical properties together with a high resistance to sunlight exposure (UV radiation.)