

# PLASTIC SHRINKAGE

## SYNOPSIS

- During the injection molding process, after molten resin is injected into the mold, it begins to cool and harden. As it does, the part experiences volumetric contraction or shrinkage (i.e., a reduction in size), which can continue for hours or even days, depending on material type and atmosphere.
- All polymers experience shrinkage. Crystalline materials tend to shrink more, and amorphous materials tend to shrink less.
- The expected shrinkage rate must be considered when designing parts, building molds, and establishing the molding process, particularly for parts requiring tight tolerances.
- Shrinkage associated with excessive or differential wall thickness can result in sink marks, voids and part warpage. Multiple processing parameters can affect shrinkage, too.
- The following chart contains the typical shrinkage rates for the most common types of thermoplastics.

MATERIAL	TYPICAL SHRINKAGE (mm/mm)	MATERIAL	TYPICAL SHRINKAGE (mm/mm)
ABS	0.127	PEI [Ultem]	0.1524
ASA	0.1016-0.1778	PET [Dacron]	0.0508
EVA	0.1778-0.508	PMMA [Acrylic]	0.0508-0.1524
HDPE [High Density Polyethylene]	0.635-0.889	POM [Acetal; Celcon; Delrin]	0.4572-0.889
HIPS [High Impact Polystyrene]	0.0762-0.1778	PP [Copolymer]	0.254-0.635
LDPE [Low Density Polyethylene]	0.381-0.6604	PP [Homopolymer]	0.254-0.635
LLDPE [Linear LDPE]	0.381-0.889	PPE	0.1524
NYLON 6	0.2286-0.3048	PPS [Ryton]	0.0762-0.254
NYLON 66	0.381-0.508	PS [Polystyrene; GPPS]	0.0762-0.1778
NYLON 66 30% Glass Filled	0.0762-0.2032	PVC	0.0508
PBT [Polyester; Valox]	0.3048-0.5842	SAN	0.0508-0.127
PC [Polycarbonate; Lexan]	0.127-0.1778	TPE [Thermoplastic Elastomer]	0.4318-1.1938
PC+ABS	0.127-0.1778	TPU [Thermoplastic Polyurethane]	0.3048-0.4318
PEEK	0.254-0.508	TPV [Santoprene]	0.254-1.27