MODERN plastics
"Setting the Standards in Plastics Distribution"™
ISO 9001:2008 and ISO 13485:2003 Certified

Phone: 203.333.3128
Email: sales@modernplastics.com

How to Identify Plastics

Here is a preliminary guide that will help you to identify many of the basic types of plastics using simple techniques and readily available tools. Naturally, these tests should be used only for tentative identification because some complex plastic compounds require a rigorous analysis for identification.

To initially determine whether a material is thermoset or thermoplastic, heat a stirring rod (to about 500°F/260°C, the material is a thermoplastic; if not, it is probably a thermoset.

Next, hold the sample to the edge of a flame until it ignites. (Hold in the flame for about 10 seconds if no flame is produced immediately.) If the material burns, note the nature of the smoke, the presence of soot in the air and, if while burning, the sample drips.

Next, extinguish the flame and cautiously smell the fumes. (In identifying the odor, a known sample is most helpful for comparison.) Finally, check your observations against the known characteristics of each plastic given on page 93. Once you have made a tentative identification, it is usually desirable to make one additional test to confirm the results of the original identification. Remember additives may affect results; for example, flame retardants would mask the polymer's normal burning characteristics.

Materials	No Flame	Burns, but Extinguishes on Removal of Flame Source			Continues to Burn after removal of Flame Source				Remarks
	Odor	Odor	Color of Flame	Drips	Odor	Color of Flame	Drips	Speed of Burning	
THERMOPLASTICS									
ABS		Acrid	Yellow, blue edges	No	Acrid	Yellow, blue edges	Yes	Slow	Black smoke with soot in air
Acetals	-	-	-	-	Formaldehyde	Blue, no smoke	Yes	Slow	
Acrylics	-	-	-	-	Fruity	Blue, yellow tip	No (cast) Yes (molded)	Slow	Flame may spurt if rubber modified
Cellulosics									
Acetate	-	Vinegar	Yellowwith sparks	No	Vinegar	Yellow	Yes	Slow	Flame may spark
Acetate Butyrate	-	-	-	-	Rancid butter	Blue,yellow tip	Yes	Slow	Flame may spark
Ethyl Cellulose	-	-	-	-	Burnt sugar	Yellow,blue edges	Yes	Rapid	-
Nitrate	-	-	-	-	camphor	White	No	Rapid	-
Propionate	-	-	-	-	Burnt sugar	Blue,yellow tip	Yes	Rapid	-
Chlorinated Polyether	-		Green,yellow tip	No	-	-	-	-	Black smokewith soot in air
Fluorocarbons									
FEP	Faint odor ofburnt hair	-	-	-	-	-	-	-	Deforms;no combustion, but drips
PRTFE	Faint odor ofburnt hair	-	-	-	-	-	-	-	Deforms;does not drip
CTFE	faint odor ofacetic acid	-	-	-	-	-	-	-	Deforms;no combustion, but drips
PVF	acidic	-	-	-	-	-	-	-	Deforms
Nylons									
Type 6	-	-	-	-	Burnt wool	Blue,yellow tip	Yes	Slow	-
Type 6/6	-	Burnt wool or hair	Blue, yellow tip	Yes	-	-	-	Slow	More rigid than Type 6 nulon
Phenoxies	-	Acrid[d]	Yellow[c]	No[c]	Acrid[d]	Yellow[d]	Yes[d]	Slow[d]	Black smoke with soot in air
Polycarbonates	-	Faint, sweet aromatic ester	Orange	Yes	-	-	-	-	Black smoke with soot in air
Polyethylenes	-	-	-	-	Paraffin	Blue, yellow tip	Yes	Slow	Floats in water
Polyphenylene									
Oxides (PPO)	-	Phenol	Yellow-orange	No	-	-	-	-	Flame spurts; very difficult to ignite
Modified Grade	-	Phenol	Yellow-orange	No	-	-	-	-	flame spurts; difficult to ignite, soot in air
Polyimides	[b]	-	-	-	-	-	-	-	Chars; material very rigid
Polypropylenes	-	Acrid[a]	Yellow[a]	Yellow[a]	Sweet	Blue, yellow tip	Yes	Slow	Floats in water; more difficult to scratch than polyethylene
Polystyrenes	-	-	-	-	Illuminating Gas	Yellow	Yes	Rapid	Dense black smoke with soot in air
Polysulfones	-	[b]	Orange	Orange	-	-	-	-	Black smoke
Polyurethanes	-	-	-	-	[b]	Yellow	No	Slow	Black smoke
Vinyls Flexible	-	Hydrochloric acid	Yellow with green spurts	No	-	-	-	-	Chars, melts
Rigid	-	Hydrochloric acid	Yellow with green spurts	No	-	-	-	-	Chars, melts
Polyblends									
ABS/Polycarbonate	-	-	-	-	[b]	Yellow, blue edges	No	-	Black smoke with soot in air
ABS/PVC	-	Acrid	Yellow, blue edges	No	-	-	-	-	Black smoke with soot in air
PVC/Acrylic	-	Fruity	Blue, yellow tip	No	-	-	-	-	
THERMOSETS									
Alkyds	-	-	-	-	-	-	-	-	-
Diallyl Phthalates	-	-	-	-	Phenolic	Yellow	No	Slow	Black smoke, cracks
Diglycol Carbonate	-	-	-	-	Acrid	Yellow	No	Slow	Black smoke with soot
Epoxies	-	-	-	-	Phenol	Black smoke	No	Slow	Black smoke with soot in air
Melamines	Formaldehyde and fish		-	-	-	-	-	-	-
Phenolics	Formaldehyde and phenol[c]	Phenol and wood or paper[d]	Yellow[d]	No	-	-	-	-	May crack
Polyesters	-	Hydrochloric acid[a]	Yellow[a]	No[a]	[b]	Yellow, blue edges	No	Slow	Cracks and breaks
Silicones	[b]	-	-	-	-	-	-	-	Deforms
Ureas	Formaldehyde	-	-	-	-	-	-	-	-

[a]Flame retardant[b]Nondescript[c] Inorganic filler[d]Organic filler

Ref: Materials Engineering, Penton/IPC, Cleveland,Ohio