

# Plastics technology | overview of chemical resistance

<b>E-CTFE</b>	Ethylene-chlorotrifluorethylene (Halar)	<b>PA</b>	Polyamide	<b>PSU</b>	Polysulfone
<b>FEP</b>	Fluorinated ethylene-propylene (Teflon, FEP)	<b>PC</b>	Polycarbonate	<b>PTFE</b>	Polytetrafluoroethylene
<b>PETG</b>	Polyethyleneterephthalate	<b>PFA</b>	Perfluoro-alkoxy (Teflon, PFA)	<b>PVC</b>	Polyvinylchlorid
<b>FPM/FKM</b>	Fluoroelastomer (Viton)	<b>PMP</b>	Polymethylpentene (TPX)	<b>PVDF</b>	Polyvinylidenefluoride
<b>HDPE</b>	High-density polyethylene	<b>PP</b>	Polypropylene	<b>SAN</b>	Styrene-acrylnitrile
<b>LDPE</b>	Low-density polyethylene	<b>PS</b>	Polystyrene	<b>SI</b>	Silicone rubber

Plastics abbreviations	Temperature		steam <sup>4)</sup> 121°C	Sterilization <sup>5)</sup>			chemical formalin, ethanol	Transparency	Flexibility	Specific weight g/cm <sup>3</sup>	Water absorption %
	max. <sub>1)</sub> °C	min <sub>2)</sub> °C		gas ethyleneoxide	radiation 2.5 kGy						
E-CTFE	+ 150°	- 100°	yes	yes	no	yes	transparent	moderate	1.70	< 0.10	
FEP	+ 205°	- 255°	yes	yes	no	yes	transparent	very good	2.15	< 0.01	
FPM	+ 200°	- 20°					black	good	1.90		
HDPE	+ 110°	- 50°	no	yes	yes	yes	transparent	stiff	0.95	0.01	
LDPE	+ 95°	- 50°	no	yes	yes	yes	transparent	excellent	0.92	0.01	
PA	+ 90°	- 0°	no	yes	yes	yes	transparent	stiff	1.13	1.30	
PC	+ 135°	- 135°	yes	yes	yes	yes	clear	rigid	1.20	0.35	
PFA	+ 250°	- 270°	yes	yes	no	yes	transparent	excellent	2.15	0.03	
PMP	+ 175°	- 150°	yes	yes	yes	yes	glass-clear	stiff	0.83	0.01	
PP	+ 135°	0°	yes	yes	no	yes	transparent	stiff	0.90	0.02	
PS	+ 70°	- 20°	no	no	yes	yes	glass-clear	stiff	1.05	0.05	
PSU	+ 165°	- 100°	yes	yes		yes	clear	stiff	1.24	0.30	
PTFE	+ 270°	- 270°	yes	yes	no	yes	white	excellent	2.25	< 0.01	
PVC	+ 70°	- 30°	no <sup>3)</sup>	yes	no	yes	clear	stiff	1.35	0.06	
PVDF	+ 160°	- 4°	yes	yes	yes	yes	transparent	stiff	1.78	0.04	
SAN	+ 95°	- 40°	no	yes	no	yes	glass-clear	stiff	1.03	0.05	
SI	+ 180°	- 60°	yes	yes	no	yes	transparent	excellent	1.10		
PETG	+ 70°	+ 5°	no	?	?	yes	glass-clear	stiff	1.78	0.70	

<sup>1)</sup> Even higher for short periods

<sup>2)</sup> Brittle temperature

<sup>3)</sup> Except PVC hoses, which can be sterilized with steam at a temperature of 121 °C

<sup>4)</sup> Frequent steam sterilization reduces mechanical stability!

<sup>5)</sup> Clean apparatus with distilled water first (to avoid stress cracking corrosion). In the case of closed vessels, remove or slightly open lid, do not close lid tight again until the vessel has cooled down.

Substance class at 20 °C	ABS	ECTFE	HDPE	LDPE	PA	PC	PMP	PP	PS	PTFE/FEP/PFA	PVC	SAN	SI
Aldehydes	-	+	+	+	0	0	0	+	-	+	-	-	0
Alcohols aliphatic	+	+	+	+	0	+	+	+	+	+	+	+	+
Esters	-	+	0	0	+	-	0	0	-	+	-	-	0
Ethers	-	+	0	-	+	-	-	-	-	+	-	-	-
Ketones	-	0	0	0	+	-	0	0	-	+	-	-	-
Carbohydrates													
aliphatic	-	+	+	0	+	0	0	+	-	+	+	-	-
aromatic	-	+	+	0	+	-	-	0	-	+	-	-	-
halogenated	-	+	0	-	0	-	-	0	-	+	-	-	-
Acids, weak/dilute	0	+	+	+	0	0	+	+	0	+	+	0	0
Acids, strong/concentrated	-	+	+	+	-	-	+	+	0	+	+	-	-
Acids, oxidising	-	0	0	0	-	-	0	0	-	+	-	-	-
Bases	0	+	+	+	0	-	+	+	-	+	+	+	+

**+ = excellent chemical resistance**

The substance does not result in any damage to the plastic after 30 days of permanent contact. The plastic may remain resistant for years.

**0 = good/limited chemical resistance**

Within 7 to 30 days of permanent contact, the substance provokes minor damage which may be reversible (softening, swelling, reduction of mechanical strength, discolourations).

**- = low chemical resistance**

Not suitable for permanent contact with this substance. Damage to the plastic may occur immediately (reduction of mechanical strength, deformation, discolourations, splits, dissolution, risk of breakage).