

Chemical resistance

Chemicals	Formula	CAS-No.	Concentration	Hazard note	Inflammable	Plastics																							
						HDPE	LDPE	PA	PC	PETG	PMP	POM	PP	PS	PSU	PVC HARD	PVC SOFT	SAN	ECTFE/ETFE	FEP	PTFE	PVDF	EPDM	FFM/FKM	NBR	SI	AL	AISI 304	AISI 316 L
Acetone	C ₃ H ₆ O	000067-64-1		F, Xi	X	1/1	3/3	1/0	4/4	4/4	2/3	1/3	1/3	4/4	4/4	4/4	0/0	4/4	2/3	(1)	1/1	3/4	1/0	4/4	4/4	0/0	1/1	1/1	1/1
Calcium chloride	CaCl ₂	010043-52-4	aqueous	Xi		1/1	1/1	1/0	1/0	1/0	1/1	(3)	1/1	1/1	1/0	1/3	1/0	1/1	1/1	1/1	1/1	1/1	1/0	1/1	1/1	0/0	3/3	1/2L	1/2L
Chlorine	Cl ₂	007782-50-5	10 % wet	T		3/4	3/4	4/4	2/3	4/4	2/4	4/4	4/4	4/4	4/4	1/2	0/0	4/4	1/1	1/1	1/1	(2)	2/0	3/0	4/4	0/0	4/4	4/4	4/4
Chloroform	CHCl ₃	000067-66-3	100 %	Xn		3/4	4/4	3/4	4/4	4/4	4/4	4/4	3/4	4/4	4/4	4/4	4/4	4/4	2/3	1/1	1/1	1/1	4/4	3/4	4/4	0/0	(3)	1/1	1/1
Developer for fotos	—	—		?		1/3	1/1	4/4	(2)	1/0	0/0	1/3	1/2	0/0	1/0	1/3	1/0	0/0	0/0	(1)	1/1	1/1	3/0	1/0	1/0	0/0	1/1	1/0	1/0
Ethyl alcohol	C ₂ H ₅ O	000064-17-5	96 %	F	X	1/0	1/3	1/0	1/3	1/1	1/2	1/2	1/1	3/4	1/2	1/3	3/0	1/3	1/1	1/1	1/1	1/1	1/0	3/0	3/3	0/0	1/1	1/1	1/1
Formaldehyde solution	CH ₂ O	000050-00-0	40 %	T		1/2	2/3	1/3	1/2	1/0	1/2	1/2	1/2	4/4	2/3	2/3	3/3	0/4	1/1	1/1	1/1	1/1	1/0	3/0	(3)	0/0	1/1	1/1	1/1
Formic acid	CH ₂ O ₂	000064-18-6	98-100 %	C		1/1	1/2	4/4	3/4	0/0	1/3	4/4	1/3	3/4	3/3	3/4	1/3	3/4	1/1	(1)	1/1	1/1	3/4	4/4	4/4	0/0	1/0	1/3	1/2
Fuel oil	—	—		Xn		3/3	3/4	1/0	3/3	1/0	2/3	1/1	1/3	3/4	1/2	1/1	3/3	1/1	1/1	1/1	1/1	1/1	4/4	1/1	1/1	0/0	1/1	1/1	1/1
Gasoline	C ₈ H ₁₈ , C ₁₀ H ₂₂	086290-81-5		F, Xn, N	X	2/3	3/4	1/0	3/3	(2)	2/3	1/2	3/4	4/4	3/3	2/4	0/0	0/4	1/1	1/1	1/1	1/1	4/4	(1-3)	3/0	0/0	1/1	1/1	1/1
Hydrogen chloride	HCl	007647-01-0	35 %	C		1/1	1/1	4/4	4/4	(4)	1/2	4/4	1/2	3/3	1/1	2/3	3/3	1/3	1/1	1/1	1/1	1/1	3/0	1/2	4/4	0/0	4/4	4/4	4/4
Hydrogen fluoride	HF	007664-39-3	70 %	T+, C		0/0	1/3	4/4	4/4	4/4	0/0	4/4	1/3	4/4	4/4	1/4	3/0	0/0	0/0	(1)	1/1	1/1	3/4	(3)	4/4	0/0	4/4	4/4	4/4
Isopropyl alcohol	C ₃ H ₈ O	000067-63-0	techn. pure	F	X	1/1	1/1	1/0	1/2	1/0	1/2	1/0	1/1	2/2	1/2	1/2	4/4	1/4	1/1	1/1	1/1	1/1	1/0	1/1	3/3	0/0	(2)	(1)	(1)
Methyl ethyl ketone (MEK)	C ₄ H ₁₀ O	000078-93-3		F	X	1/3	3/4	1/0	4/4	4/4	4/4	1/2	1/3	4/4	4/4	4/4	4/4	4/4	2/3	1/1	1/1	3/4	3/0	4/4	4/4	0/0	(1)	(1)	(1)
Nitric acid	HNO ₃	007697-37-2	50 %	C+		2/4	3/4	4/4	4/4	(2)	2/4	4/4	3/4	4/4	2/3	2/3	0/0	0/3	1/1	1/1	1/1	1/1	4/4	1/0	4/4	0/0	4/4	1/2	1/2
Nitrohydrochloric acid	HNO ₃ + HCl	008007-56-5		C		4/4	4/4	4/4	4/4	4/4	3/3	4/4	4/4	4/4	4/4	4/4	4/4	3/4	1/1	(2)	1/1	3/0	4/4	4/4	4/4	0/0	4/4	4/4	4/4
Phosphoric acid	H ₃ PO ₄	007664-38-2	85 %	C		1/1	1/1	4/4	1/2	0/0	1/2	4/4	1/2	1/2	1/1	1/2	1/1	1/2	1/1	1/1	1/1	1/1	3/0	1/1	4/4	0/0	4/4	2/4	1/3
Sodium hydroxide	NaOH	001310-73-2	50 %	C+		1/1	1/1	1/0	4/4	4/4	1/1	1/3	1/1	2/2	1/1	1/2	0/0	0/3	1/1	1/1	1/1	3/3	1/0	3/4	3/3	0/0	4/4	1/3	1/3
Spirits of Turpentine	—	008006-64-2		Xn	X	2/2	3/4	1/0	4/4	1/0	3/3	1/1	4/4	4/4	4/4	2/3	4/4	3/3	1/1	1/1	1/0	1/3	4/4	1/1	3/3	0/0	1/1	1/1	1/1
Sulfuric acid	H ₂ SO ₄	007664-93-9	95 %	C+		3/4	3/4	4/4	4/4	4/4	2/2	4/4	3/4	4/4	4/4	2/4	0/0	4/4	1/1	1/1	1/1	1/1	4/4	1/1	4/4	0/0	4/4	1/3	1/3
Tetrachloroethylene	C ₂ Cl ₄	000127-18-4		Xn		4/4	4/4	4/4	4/4	3/4	4/4	1/3	4/4	4/4	4/4	4/4	4/4	3/3	1/1	1/1	1/1	1/1	4/4	2/3	4/4	0/0	(3)	0/0	0/0
Trichloroethylene (TRI)	C ₂ HCl ₃	000079-01-6	100 %	Xn		3/4	4/4	3/0	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	0/4	1/2	1/1	1/0	1/1	4/4	1/3	4/4	0/0	1/3	1/1L	1/1L
Vinegar	C ₂ H ₄ O ₂	000064-19-7		(Xi)		1/1	1/3	4/4	1/2	1/1	1/0	1/3	1/1	1/0	1/0	1/0	3/0	1/1	1/1	1/1	1/1	1/1	1/0	3/3	3/3	0/0	1/3	1/2	1/2
Xylene	C ₈ H ₁₀	001330-20-7		(F), Xn	X	3/4	3/4	1/0	4/4	0/0	3/4	1/2	4/4	4/4	4/4	4/4	4/4	4/4	1/2	1/1	1/0	1/3	4/4	1/3	4/4	0/0	1/1	1/1	1/1

Two values are given per substance, left number = value at + 20 °C, right number = value at + 50 °C.

1 = resistant, 2 = practically resistant, 3 = partially resistant, 4 = not resistant, 0 = no data available.

K = no general information available; L = danger of pitting or stress-cracking corrosion, values in parentheses are estimated values.

Hazard notes: C = caustic; F = inflammable; F+ = highly inflammable; O = fire-promoting; T = poisonous; T+ = very poisonous; Xn = slightly poisonous; Xi = irritant

Plastics technology | overview of chemical resistance

EPDM Ethylene propylene diene monomer
FEP Fluorinated ethylene-propylene (Teflon, FEP)
PETG Polyethyleneterephthalate
FPM/FKM Fluoroelastomer (Viton)
HDPE High-density polyethylene
LDPE Low-density polyethylene

PA Polyamide
PC Polycarbonate
PFA Perfluoro-alkoxy (Teflon, PFA)
PMP Polymethylpentene (TPX)
PP Polypropylene
PS Polystyrene

PSU Polysulfone
PTFE Polytetrafluoroethylene
PVC Polyvinylchlorid
PVDF Polyvinylidenfluoride
SAN Styrene-acrylnitrile
SI Silicone rubber

Plastics abbreviations	max. °C 1)	Temperature min °C 2)	steam 121°C 4)	gas ethyleneoxide	Sterilization radiation 2.5 kGy 3)	chemical formalin, ethanol	Transparency	Flexibility	Specific weight g/cm³	Water absorption %
EPDM	+ 120°	- 30°	yes	no	yes	yes	transparent	excellent	1.40	0.01
FEP	+ 205°	- 255°	yes	yes	no	yes	transparent	very good	2.15	< 0.01
FPM	+ 200°	- 20°	no	no	no	no	black	good	1.90	0.20
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°	+ 5°	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	yes	clear	stiff	1.24	0.30
PTFE	+ 270°	- 270°	yes	yes	no	yes	white	excellent	2.25	< 0.01
PVC	+ 70°	- 30°	no ¹⁾	yes	no	yes	clear	stiff	1.35	0.06
PVDF	+ 160°	- 40°	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	n/a
PETG	+ 65°	- 35°	no	yes	yes	yes	glass-clear	stiff	1.27	0.20

¹⁾ Even higher for short periods

²⁾ Brittle temperature

³⁾ Except PVC hoses, which can be sterilised with steam at a temperature of 121 °C

⁴⁾ Frequent steam sterilization reduces mechanical stability!

⁵⁾ 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).