

DSM Engineering Plastics - *Chemical Resistance*

DISCLAIMER

The following information is based upon current knowledge and experience. Because of the many influencing factors during processing and application, processors are not relieved of their responsibility to carry out any test or experiment to prove the polymers used are suitable for a specific purpose. All information given relates to unreinforced and unmodified base grades. Reinforced, impact modified or stress crack modified grades might behave different.

GENERAL INFORMATION

Akulon[®] 6 and 66

Polyamides are known for their resistance to a wide range of chemicals. Akulon[®] has good resistance to different types of oils and greases. Like other polyamides Akulon is attacked by strong mineral acids and absorbs polar solvents. As for all polyamides, absorption of moisture acts reversibly from the environment until it reaches an equilibrium. Absorbed water acts as a plasticiser leading to reduced strengths and moduli and an increase in toughness. Under high humidity conditions, PA6 will absorb more water compared to PA66.

Arnite[®] (PET and PBT)

Due to its chemical nature and being a crystalline plastic, the chemical resistance of polyesters is very good. PBT and PET compounds exhibit very low moisture absorption in particular compared to polyamides. In general the resistivity against (polar) solvents and greases is good whereas polyesters are attacked by strong mineral acids and bases.

Arnitel[®]

In general the polyester/-ether based thermoplastics are sensitive towards concentrated acids. Chemical resistance against bases is good. Only at higher temperatures degradation takes place. The resistance against automotive fluids (greases, oils and fuels) is, with some exceptions, quite good. In some halogenated hydrocarbons, Arnitel[®] dissolves. The chemical resistance increases with increasing hardness.

Stanyl[®]

As with Akulon[®], Stanyl[®] reversibly absorbs moisture from the environment until it reaches equilibrium. Its chemical resistance is similar and in some cases even better compared to Akulon[®]. Especially at elevated temperatures its resistance to oils and greases is very good. Stanyl[®] will be attacked by strong acids and absorbs polar solvents.

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Xantar® and Stapron®

Polycarbonate and blends have very poor resistance against bases, halogenated hydrocarbons and aromatic hydrocarbons. The resistance to acids, greases and oils in general is good. Polar solvents attack the polycarbonate.

Influencing parameters

Bear in mind that the resistance of polymers to chemical agents is a relative conception.

The performance of a material not only depends on its nature, but also on the:

- composition and concentration of the surrounding media
- temperature
- exposure time
- level of inherent or applied stress and strain.

Types of damages

Different types of media (chemical agents) can give different types of damage. The following damages can be recognized:

- dissolution
- swelling
- stress cracking
- molecular degradation
- oxidative damage

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EXPLANATION OF THE COLUMNS

Type	Chemicals	%-w/w	°C	Polyamides	Polyesters	Polycarbonates	Polye(s)ter esters
Name of chemical group the specified agent belongs to.	Name of the chemical agent.	The concentration in weight-% of an aqueous solution (unless otherwise stated) of the agent. A blank means that it relates to the pure substance.	The temperature in degrees centigrade at which the given data is valid. No data means "room temperature" and is assumed to be between +15°C and +35°C.	The polyamides are divided into PA6, PA66 and PA46.	Here a distinction is made between PET and PBT.	PC and its blends are mentioned here.	An overview of TPE -E, -P and -U is given.
<i>acid</i> : inorganic acids <i>acid-org</i> : organic acids <i>alc</i> : alcohols <i>ald/ket</i> : aldehydes or ketones <i>amide</i> : amides <i>amine</i> : amines <i>arom</i> : aromatics <i>base</i> : inorganic hydroxides <i>base-org</i> : organic hydroxides <i>ester</i> : esters <i>ether</i> : ethers <i>halo</i> : halogenides <i>hc</i> : hydrocarbon <i>hc-halo</i> : halogenated hydrocarbon <i>phen</i> : phenols <i>rest</i> : general media <i>salt</i> : salts							

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RATING

The symbols used to describe the chemical resistance are as follows:

- +** **Resistant**
Only slight changes to weight, dimensions or properties.
The medium does not cause any irreversible damage to the polymer.

- O** **Limited resistance**
Noticable change in properties.
A prolonged time of exposure might cause irreversible damage
(eg polymerdegradation).

- **Not resistant**
The agent attacks the polymer and/or causes stress cracking.
Irriversible damage.

- S** **Dissolverating**
The polymer is dissolved by the chemical agent.

Resistance of DSM Engineering Plastics to Chemicals

+ = Resistant; O = Limited resistance - = Not resistant S = Dissolve

TYPE	CHEMICALS	%w/w	°C	POLYAMIDES			POLYESTERS		POLYCARBONATES		POLYE(S)TER ESTERS		
				PA6	PA66	PA46	PBT	PET	PC	PC-blends	TPE-E	TPE-P	TPE-U
<i>ald/ket</i>	Acetaldehyde	40		O	O	+		+	-	-			
<i>amide</i>	Acetamide	50		O	O	O							
<i>amide</i>	Acetamide	50	>140	S	S	S							
<i>acid-org</i>	Acetic acid	10		O	O	O	-	+	+	+	+	O	+
<i>acid-org</i>	Acetic acid	10	100	-	-	-	-	-					
<i>acid-org</i>	Acetic acid	95		-	-	-	-	-					
<i>ald/ket</i>	Acetone			+	+	+	O	+	-	-	+	O	+
<i>ald/ket</i>	Acetophenone			+	+	+	+						
<i>hc-halo</i>	Acetyl chloride			-	-	-							
<i>hc</i>	Acetylene			+	+	+	+		+	+			
<i>acid-org</i>	Acrylic acid			S	S	S		+					
<i>hc</i>	Acrylonitril								-	-			
<i>amine</i>	Aliphatic amines			+	+	+	+	+					
<i>hc</i>	Aliphatic hydrocarbons			+	+	+	+	+					
<i>arom</i>	Alkylbenzenes			+	+	+		+					
<i>alc</i>	Allyl alcohol			O	O	O	+	+	O	O			
<i>salt</i>	Aluminium acetate	sat.		+	+	+	+						
<i>salt</i>	Aluminium chloride	10		+	+	+							
<i>base</i>	Aluminium hydroxide	sat.		+	+	+	+	+					
<i>salt</i>	Aluminium salts of mineral acids	sat.		O	O	O	+	+	+	+			
<i>salt</i>	Aluminium trichloride	10		+	+	+							
<i>acid-org</i>	Amino acids	sat.		+	+	+	+						
<i>base</i>	Ammonia			+	+	O	O	O	-	-			
<i>salt</i>	Ammonium chloride	35		+	+	+							
<i>salt</i>	Ammonium chloride	35	100	O	O	O							
<i>salt</i>	Ammonium fluoride	sat.							-	-			
<i>base</i>	Ammonium hydroxide	10									O	-	+
<i>salt</i>	Ammonium salts of mineral acids	10		+	+	+	+	+	+	+			
<i>salt</i>	Ammonium salts of mineral acids	10	50	O	O	O							
<i>salt</i>	Ammonium sulphide	sat.							-	-			
<i>salt</i>	Ammonium thiocyanate	sat.		+	+	+		+					
<i>ester</i>	Amyl acetate			+	+	+	+	+	-	-			
<i>ester</i>	Amyl acetate		100	-	-	-	-	-					
<i>alc</i>	Amyl alcohol			+	+	+	+	+					
<i>base-org</i>	Aniline			-	-	O	O	O	-	-			
<i>rest</i>	Anise								-	-			
<i>rest</i>	Anodizing liquid (HNO3/H2SO4)			O	O	O	O	O					
<i>salt</i>	Antimony trichloride	sat.		-	-	-			+	+			
<i>acid</i>	Aqua Regina (HCL/HNO3)			-	-	-	-	-					
<i>arom</i>	Aromatic hydrocarbons			+	+	+	O	O					
<i>rest</i>	ASTM 1										+	+	+
<i>rest</i>	ASTM 3					O					+	+	+
<i>salt</i>	Bariumsalts of mineral acids			O	O	O	+	+					
<i>ald/ket</i>	Benzaldehyde			O	O	O		+	-	-			
<i>arom</i>	Benzene			+	+	+	+	+	-	-			
<i>arom</i>	Benzene		80	+	+	+	-	-					
<i>acid-org</i>	Benzoic acid	20		O	O	O	-	+					

Resistance of DSM Engineering Plastics to Chemicals

+ = Resistant; O = Limited resistance - = Not resistant S = Dissolve

TYPE	CHEMICALS	%w/w	°C	POLYAMIDES			POLYESTERS		POLYCARBONATES		POLYE(S)TER ESTERS		
				PA6	PA66	PA46	PBT	PET	PC	PC-blends	TPE-E	TPE-P	TPE-U
<i>acid-org</i>	Benzoic acid	sat.		-	-	-	+	+	-	-			
<i>alc</i>	Benzyl alcohol			O	O	O		-	-	-			
<i>alc</i>	Beverages			+	+	+	+	+	+	+			
<i>rest</i>	Bleaching agent (NaOCl)			-	-	-	+	+	+	+			
<i>rest</i>	Blood								+	+			
<i>acid-org</i>	Boric acid	10		O	O	O	+	+	+	+			
<i>salt</i>	Boron trifluoride			-	-	-	-						
<i>rest</i>	Brake fluids (DOT 3/4)			O	O	+	+		-	-	-	-	+
<i>halo</i>	Bromine water	sat.		-	-	-	-		-	-			
<i>hc-halo</i>	Bromobenzene								-	-			
<i>hc-halo</i>	Bromochlorodifluoromethane			+	+	+	+						
<i>hc-halo</i>	Bromotrifluoromethane			+	+	+	+						
<i>rest</i>	Burnishing oil								+	+			
<i>hc</i>	Butadiene			+	+	+	+	+					
<i>hc</i>	Butane			+	+	+	+	+	+	+			
<i>alc</i>	Butanediols			+	+	+	+	+					
<i>alc</i>	Butanediols		>140	O	O	O	-						
<i>alc</i>	Butanols			+	+	+	+	O	+	+			
<i>alc</i>	Butene glycol			+	+	+	+		+	+			
<i>alc</i>	Butene glycol		>160	O	O	O	-						
<i>hc</i>	Butene-1			+	+	+	+	+					
<i>hc</i>	Butter			+	+	O	+						
<i>ester</i>	Butyl acetate			+	+	+	O	+	-	-			
<i>hc</i>	Butyl acrylate			+	+	+	O						
<i>hc</i>	Butyl glycolate			+	+	+	+						
<i>hc</i>	Butyl phthalate			+	+	+	+						
<i>acid-org</i>	Butyric acid	20		O	O	O	+	+	-	-			
<i>hc</i>	Butyrolactone			+	+	+							
<i>hc</i>	Butyrolactone		>90	O	O	O							
<i>salt</i>	Calcium chloride	10		+	+	+					O	O	O
<i>salt</i>	Calcium chloride	10	100	O	O	O							
<i>salt</i>	Calcium chloride	sat.		+	+	+	+	+	+	+			
<i>salt</i>	Calcium chloride	sat.	60	O	O	O							
<i>salt</i>	Calcium chloride	sat.	100	-	-	-							
<i>salt</i>	Calcium chloride (alcoholic)	20		O	O	O							
<i>base</i>	Calcium hydroxide	sat.		+	+	+	+	+					
<i>salt</i>	Calcium hypochloride	sat.		-	-	-	O	O	+	+			
<i>hc</i>	Camphor (alcoholic)	50		+	+	+	+		-	-			
<i>hc</i>	Caprolactam	50		+	+	+	+						
<i>hc</i>	Caprolactam	50	>150	O	O	O							
<i>rest</i>	Carbon dioxide (moist)								+	+			
<i>rest</i>	Carbon disulfide			+	+	+		+					
<i>rest</i>	Carbon disulfide		60	-	-	-							
<i>hc-halo</i>	Carbon tetrachloride			+	+	+		+	O	O			
<i>rest</i>	Casein			+	+	+	+	+					
<i>rest</i>	Castor oil								+	+			
<i>hc-halo</i>	Chloral hydrate			-	-	-							

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				PA6	PA66	PA46	PBT	PET	PC	PC-blends	TPE-E	TPE-P	TPE-U
<i>hc-halo</i>	Chloramines	10		-	-	-	-	-					
<i>hc-halo</i>	Chlorinated biphenyls		80	O	O	O							
<i>halo</i>	Chlorine gas (dry)								O	O			
<i>halo</i>	Chlorine gas (moist)								-	-			
<i>halo</i>	Chlorine water			-	-	-	-	-					
<i>acid-org</i>	Chloroacetic acid	10		-	-	-	-	-					
<i>hc-halo</i>	Chlorobenzene			+	+	+	+	+	-	-			
<i>hc-halo</i>	Chlorobenzene		50	+	+	+	-	-	-	-			
<i>hc-halo</i>	Chlorobromomethane			O	O	O	+						
<i>hc-halo</i>	Chlorodifluoroethane			+	+	+	+	+					
<i>hc-halo</i>	Chlorodifluoromethane			+	+	+	+	+					
<i>hc-halo</i>	Chlorofluoroethylene			+	+	+	+						
<i>hc-halo</i>	Chloroform			-	-	-	-	-	S	S	-	-	-
<i>acid</i>	Chlorosulfonic acid	10		-	-	-	-	-					
<i>acid</i>	Chromic acid	1		O	O	O							
<i>acid</i>	Chromic acid	10		-	-	-	O	O	+	+			
<i>rest</i>	Chromyl chloride			-	-	-		-					
<i>rest</i>	Cinnamon								+	+			
<i>hc</i>	cis-2-butene			+	+	+	+	+					
<i>acid-org</i>	Citric acid	10		+	+	O	+	+	+	+			
<i>acid-org</i>	Citric acid	20	80	O	O								
<i>salt</i>	Cobalt salt	20		O	O	O		+					
<i>salt</i>	Copper sulphate	10		+	+	+			+	+			
<i>salt</i>	Copper(II) salt	10		O	O	O	+		+	+			
<i>phen</i>	Cresols			S	S	S	S	-					
<i>alc</i>	Cycloalcohols (incl their esters)			+	+	+	+	+	O	O			
<i>hc</i>	Cycloalkanes			+	+	+	+	+	O	O			
<i>ald/ket</i>	Cycloalkanones			+	+	+	+	O	-	-			
<i>alc</i>	Cyclohexanol			O	O								
<i>rest</i>	Decalin			+	+	+	O	O	+	+			
<i>rest</i>	Developer (photografic)			+	+	+	+	+					
<i>ester</i>	Diamyl phthalate								-	-			
<i>ester</i>	Dibutyl phthalate			+	+	+	+	+	-	-			
<i>ester</i>	Dibutyl phthalate		60	+	+	+	O	O					
<i>hc-halo</i>	Dichlorobenzene			+	+	+	+	+					
<i>hc-halo</i>	Dichloroethane			+	+	+	-	-					
<i>hc-halo</i>	Dichloroethylene			+	+	+	-	-					
<i>hc-halo</i>	Dichlorofluoromethane			+	+	+	+	+					
<i>hc-halo</i>	Dichlorotetrafluoroethane			+	+	+	+	+					
<i>ether</i>	Diethyl ether			+	+	+	+	+	-	-	O	O	+
<i>alc</i>	Diethylene glycol			+	+	+		+	+	+			
<i>alc</i>	Diethylene glycol		>140	S	S	S	-						
<i>hc-halo</i>	Difluoromethane			+	+	+	+						
<i>amide</i>	Dimethyl acetamide			+	+	+							
<i>amide</i>	Dimethyl acetamide		>150	-	-	-							
<i>ether</i>	Dimethyl ether			+	+	+	+	+					
<i>amine</i>	Dimethylamine			+	+	+	+						

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				PA6	PA66	PA46	PBT	PET	PC	PC-blends	TPE-E	TPE-P	TPE-U
<i>amide</i>	Dimethylformamide			+	+	+	+	+	S	S			
<i>amide</i>	Dimethylformamide		90	O	O	O							
<i>rest</i>	Dimethylsilane			+	+	+							
<i>rest</i>	Dimethylsulfoxide			+	+	+	+						
<i>rest</i>	Dimethylsulfoxide		125	S	S	S							
<i>ester</i>	Dinonyl phtalate								O	O			
<i>ester</i>	Diocetyl phtalate			+	+	+	+	+	O	O			
<i>ether</i>	Dioxan			+	+	+	+	+	S	S			
<i>ether</i>	Dioxan		60	+	+	+	-	-					
<i>ether</i>	Diphenyl ether		80	+	+	+	-	-					
<i>ether</i>	Dipropyl ether			+	+	+	+	-					
<i>rest</i>	Drilling oil								-	-			
<i>rest</i>	Duck grease								-	-			
<i>rest</i>	Edible fats waxes and oils		100	+	+	O	+	+	+	+			
<i>rest</i>	Electroplating bath (acidic)			-	-	-	+						
<i>rest</i>	Electroplating bath (alkali)			+	+	+	O						
<i>rest</i>	Essential oil								-	-			
<i>hc</i>	Ethane			+	+	+	+	+					
<i>alc</i>	Ethanol			+	+	+	+	+	+	+	O	O	+
<i>ester</i>	Ethyl acetate			+	+	+	O	O	O	O	O	O	O
<i>amine</i>	Ethyl amine								-	-			
<i>hc-halo</i>	Ethyl bromide								-	-			
<i>hc-halo</i>	Ethyl chloride			+	+	+							
<i>hc</i>	Ethylene			+	+	+	+	+					
<i>salt</i>	Ethylene carbonate		50	+	+	+	-	-					
<i>salt</i>	Ethylene carbonate		100	-	-	-	-	-					
<i>hc-halo</i>	Ethylene chloride								-	-			
<i>hc-halo</i>	Ethylene chlorohydrin			O	O	O							
<i>alc</i>	Ethylene glycol			+	+	+		+	+	+			
<i>alc</i>	Ethylene glycol		100	-	-	-							
<i>hc</i>	Ethylene oxide			+	+	+	+	+					
<i>hc</i>	Ethylene oxide		>80	-	-	-							
<i>amine</i>	Ethylenediamine			+	+	+							
<i>acid-org</i>	Fatty acids			+	+	+	+	+					
<i>alc</i>	Fatty alcohols			+	+	+	+						
<i>salt</i>	Ferric chloride	2,5		O	O								
<i>salt</i>	Ferric chloride	2,5	100	-	-								
<i>rest</i>	Fish oil								+	+			
<i>rest</i>	Fixer (photografic)			+	+	+	+						
<i>hc-halo</i>	Fluorinated hydrocarbons		70	+	+	+	+	+					
<i>halo</i>	Fluorine			-	-	-	-	-					
<i>ald/ket</i>	Formaldehyde		30	+	+	+	+	+					
<i>amide</i>	Formamide			+	+	+		+					
<i>amide</i>	Formamide		>150	S	S	S							
<i>acid-org</i>	Formic acid	10		-	-	-	+	+					
<i>acid-org</i>	Formic acid	10	50	-	-	S	O	O					
<i>acid-org</i>	Formic acid	30							O	O			

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TYPE	CHEMICALS	%w/w	°C	POLYAMIDES			POLYESTERS		POLYCARBONATES		POLYE(S)TER ESTERS		
				PA6	PA66	PA46	PBT	PET	PC	PC-blends	TPE-E	TPE-P	TPE-U
<i>rest</i>	Fruit juices			+	+	O	+	+	+	+			
<i>rest</i>	Fuel; Diesel		85	+	+	+	+		O	O	+	+	+
<i>rest</i>	Fuel; FAM 1A			+	+	+			-	-			
<i>rest</i>	Fuel; FAM 2A			+	+	O			-	-			
<i>rest</i>	Fuel; Gasoline		85	+	+	+			O	O			
<i>rest</i>	Fuel; LPG					+			-	-			
<i>ald/ket</i>	Furfural			+	+	+	+	+					
<i>alc</i>	Furfuryl alcohol			+	+	+	+	O					
<i>rest</i>	Glucose								+	+			
<i>alc</i>	Glycerol		170				+		O	O			
<i>alc</i>	Glycerol		170	S	S	S	-						
<i>acid-org</i>	Glycolic acid	30		-	-	-							
<i>alc</i>	Glycols			+	+	O	+	+			O	O	+
<i>rest</i>	Grease (based on ester oils)		<100	O	O	O	+	+					
<i>rest</i>	Grease (based on metal soaps)		<100	+	+	+	+	+	+	+			
<i>rest</i>	Grease (based on polyphenylester)		<100	+	+	+							
<i>rest</i>	Hardening oils			+	+	+	+						
<i>rest</i>	Heating oils			+	+	+	+						
<i>hc</i>	Heptane			+	+	+	+	+	+	+			
<i>hc-halo</i>	Hexachlorobenzene		80	+	+	+							
<i>hc-halo</i>	Hexachloroethane			+	+	+							
<i>hc-halo</i>	Hexafluoroisopropanol			S	S	S	S	S					
<i>amine</i>	Hexamethylenetetramine						+						
<i>hc</i>	Hexane			+	+	+	+	+	+	+			
<i>rest</i>	Hydraulic fluids		100	+	+	+	+	+					
<i>acid</i>	Hydrobromic acid	10		-	-	-	O	+					
<i>acid</i>	Hydrochloric acid	10		-	-	-					+	O	O
<i>acid</i>	Hydrochloric acid	20		-	-	-	O	+	+	+			
<i>acid</i>	Hydrochloric acid	conc.		-	-	-			-	-			
<i>acid</i>	Hydrofluoric acid	5		-	-	-			+	+			
<i>acid</i>	Hydrofluoric acid	40		+	+	-	+	-					
<i>rest</i>	Hydrogen			+	+	+	+	+					
<i>ester</i>	Hydrogen peroxide	0.5		O	O	+	+	+					
<i>ester</i>	Hydrogen peroxide	1		-	-	-							
<i>ester</i>	Hydrogen peroxide	3		-	-	-	+	+					
<i>ester</i>	Hydrogen peroxide	30		-	-	-	+	+	+	+	O	O	O
<i>ester</i>	Hydrogen sulphide	10		O	O	O	+	+					
<i>acid</i>	Hydroiodic acid			-	-	-	O						
<i>phen</i>	Hydroquinone	5		-	-	-	+	+					
<i>rest</i>	Impregnating oils			+	+	+	+						
<i>rest</i>	Ink			+	+	+	+						
<i>halo</i>	Iodine (alcoholic)			-	-	-							
<i>salt</i>	Iron(III)chloride	sat.		-	-	-			+	+			
<i>salt</i>	Iron(III)chloride (acidic)	10		-	-	-							
<i>salt</i>	Iron(III)chloride (neutral)	10		+	+	O	+						
<i>salt</i>	Iron(III)thiocyanate	10		O	O	O							
<i>alc</i>	isoamylalcohol								O	O			

Resistance of DSM Engineering Plastics to Chemicals

+ = Resistant; O = Limited resistance - = Not resistant S = Dissolve

TYPE	CHEMICALS	%w/w	°C	POLYAMIDES			POLYESTERS		POLYCARBONATES		POLYE(S)TER ESTERS		
				PA6	PA66	PA46	PBT	PET	PC	PC-blends	TPE-E	TPE-P	TPE-U
<i>hc</i>	Isocyanates (aromatic)			+	+	+	+						
<i>hc</i>	Isooctane		80	+	+	+	+		O	O			
<i>alc</i>	Isopropanol			+	+	+	+	O	O	O			
<i>alc</i>	Isopropanol		60	+	+	+	O						
<i>ald/ket</i>	Ketones (aliphatic)			+	+	+	O	-					
<i>acid-org</i>	Lactic acid		10	+	+	+	+	+	+	+			
<i>acid-org</i>	Lactic acid		90	-	-	-							
<i>salt</i>	Lead acetate	10		+	+	+	+						
<i>rest</i>	Linseed oil			+	+	+	+	+					
<i>salt</i>	Lithium bromide	10		O	O	O	+						
<i>salt</i>	Lithium chloride	20		S	S	S							
<i>base</i>	Lithium hydroxide	10		+	+	+	+						
<i>base</i>	Lithium hydroxide	10	80	-	-	-	-						
<i>rest</i>	Lubricating oil (gear)		<130	+	+	+	+	+	+	+			
<i>rest</i>	Lubricating oil (hydraulics)		<130	+	+	+	+	+	+	+			
<i>rest</i>	Lubricating oil (transformers)		<130	+	+	+	+	+	+	+			
<i>base</i>	Magnesium hydroxide	10		+	+	O							
<i>salt</i>	Magnesium salts	10		+	+	+	+	+	+	+			
<i>acid-org</i>	Maleic acid	25		O	O	O							
<i>acid-org</i>	Maleic acid	sat.		+	+	+	+						
<i>salt</i>	Manganese salts	10		+	+	+	+		+	+			
<i>rest</i>	Mercury			+	+	+	+	+	+	+			
<i>salt</i>	Mercury(II)chloride	sat.		-	-	-			+	+	+	+	
<i>hc</i>	Methane			+	+	+	+	+	+	+			
<i>alc</i>	Methanol			+	+	O	+	+	-	-			
<i>ester</i>	Methyl acetate			+	+	+	O	O					
<i>salt</i>	Methyl chloride			+	+	+		O					
<i>ald/ket</i>	Methyl ethyl ketone			+	+	+	+	O	-	-			
<i>rest</i>	Methyl formate			+	+	+	+						
<i>alc</i>	Methyl glycol			+	+	+							
<i>amine</i>	Methylamine			+	+	+			-	-			
<i>hc</i>	Methylaniline			+	+	+							
<i>hc-halo</i>	Methylbromide			+	+	+							
<i>hc-halo</i>	Methylene chloride			O	O	O	-	-	S	S			
<i>ald/ket</i>	Methylpyrrolidone			+	+	+		+					
<i>rest</i>	Milk			+	+	O	+						
<i>arom</i>	Naphtha			+	+	+	+	+					
<i>arom</i>	Naphthalene			+	+	+	+	+					
<i>acid-org</i>	Naphthalenesulfonic acids			-	-	-							
<i>acid-org</i>	Naphthenic acids			+	+	+	+						
<i>alc</i>	Naphthols			-	-	-							
<i>ether</i>	n-Butyl ether			+	+	+	+						
<i>alc</i>	n-butyl glycol			+	+	+	+	+					
<i>salt</i>	Nickel nitrate	10		O	O	O							
<i>salt</i>	Nickel salts	10		+	+	+	+						
<i>acid</i>	Nitric acid	conc.		-	-	-	O	-					
<i>acid</i>	Nitric acid	2		-	-	-	+	+	+	+			

Resistance of DSM Engineering Plastics to Chemicals

+ = Resistant; O = Limited resistance - = Not resistant S = Dissolve

TYPE	CHEMICALS	%w/w	°C	POLYAMIDES			POLYESTERS		POLYCARBONATES		POLYE(S)TER ESTERS		
				PA6	PA66	PA46	PBT	PET	PC	PC-blends	TPE-E	TPE-P	TPE-U
<i>acid</i>	Nitric acid	10		-	-				+	+	+	O	O
<i>acid</i>	Nitric acid	20		-	-				-	-			
<i>arom</i>	Nitrobenzene		>100	O	O	O	+	O	-	-			
<i>arom</i>	Nitrobenzene			S	S	S							
<i>rest</i>	Nitrocellulose lacquers (alcoholic)			O	O	O	O						
<i>rest</i>	Nitrocellulose lacquers (non-alcoholic)			+	+	+	O						
<i>rest</i>	Nitrogen oxides			O	O	O	+						
<i>hc</i>	Nitromethane			O	O	O							
<i>hc</i>	Nitropropane			O	O	O							
<i>arom</i>	Nitrotoluene			O	O	O	+	+					
<i>arom</i>	Nitrotoluene		>100	S	S	S							
<i>acid</i>	Nitrous fumes			O	O	O	O		-	-			
<i>rest</i>	Nitrous oxide			+	+	+	+						
<i>hc</i>	Octane			+	+	+	+	+					
<i>hc</i>	Octene			+	+	+	+	+					
<i>rest</i>	Oil (Burmah TAF 21)					+							
<i>rest</i>	Oil (Castrol TAF)					+							
<i>rest</i>	Oil (Shell 10W40)			+	+	+		+					
<i>rest</i>	Oil (Shell Dexron ATF)					+							
<i>rest</i>	Oil (Shell Spirax EP90)					O							
<i>rest</i>	Oil (transformers, switchgear)		50	+	+	+	+	+					
<i>rest</i>	Oils (vegetable, mineral, ethereal)			+	+	+	+	+					
<i>acid-org</i>	Oleic acid			+	+	+	+	+					
<i>acid</i>	Oleum (H2SO4+SO3)			S	S	S	-	-					
<i>acid-org</i>	Oxalic acid	10		O	O	O	+	+	+	+			
<i>acid-org</i>	Oxalic acid	10	80	-	-	-							
<i>rest</i>	Ozone			-	-	-	-	O	+	+			
<i>rest</i>	Paint solvents			+	+	+	O						
<i>acid-org</i>	Palmitic acid		80	+	+	+	+	+					
<i>hc</i>	Paraffin			+	+	+	+	+	+	+			
<i>hc</i>	Pentane								+	+			
<i>rest</i>	Pentasin CHF 11 (S)					+							
<i>rest</i>	Pentasin CHF 7.1					O							
<i>acid-org</i>	Peracetic acid			-	-	-							
<i>acid-org</i>	Perchloric acid			-	-	-			+	+			
<i>acid-org</i>	Perchloric acid	conc.							O	O			
<i>hc-halo</i>	Perchloro ethylene								-	-			
<i>rest</i>	Petroleum			+	+	+	+	+	O	O			
<i>rest</i>	Petroleum ether and solvents		80	+	+	+	+	+	O	O			
<i>phen</i>	Phenol		>40	S	S	S	-	-	-	-			
<i>phen</i>	Phenol	conc.		S	S	S	-	-	-	-			
<i>phen</i>	Phenol (alc. sol.)	70		O	O	O	-		-	-			
<i>ether</i>	Phenyl ether			-	-	-							
<i>alc</i>	Phenyl ethyl alcohol			O	O	O			-	-			
<i>alc</i>	Phenyl ethyl alcohol		>160	S	S	S			-	-			
<i>salt</i>	Phosphate sol. (neutral, alkaline)	10		+	+	+	+						
<i>rest</i>	Phosphine			+	+	+	+						

Resistance of DSM Engineering Plastics to Chemicals

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TYPE	CHEMICALS	%w/w	°C	POLYAMIDES			POLYESTERS		POLYCARBONATES		POLYE(S)TER ESTERS			
				PA6	PA66	PA46	PBT	PET	PC	PC-blends	TPE-E	TPE-P	TPE-U	
<i>acid</i>	Phosphoric acid	3	70				+	+	+	+				
<i>acid</i>	Phosphoric acid	10		-	-	-	-	+	+	+		+	O	O
<i>acid</i>	Phosphoric acid	conc.		S	S	S	-	+						
<i>acid</i>	Phosphorous acid	conc.								+	+			
<i>hc-halo</i>	Phosphorous oxychloride									-	-			
<i>hc-halo</i>	Phosphorous trichloride									-	-			
<i>acid-org</i>	Phthalic acid	sat.		O	O	O	+	+						
<i>alc</i>	Polyols			+	+	+	+							
<i>salt</i>	Potassium bromide	10		O	O	O	+	+						
<i>salt</i>	Potassium bromide	sat.								+	+			
<i>salt</i>	Potassium carbonate	sat.								+	+			
<i>salt</i>	Potassium chloride	10		+	+	+	+	+						
<i>salt</i>	Potassium chloride	10		+	+	+	-	+						
<i>salt</i>	Potassium chloride	sat.								+	+			
<i>rest</i>	Potassium cyanide									-	-			
<i>salt</i>	Potassium dichromate	5		O	O	O	O	O						
<i>salt</i>	Potassium dichromate	sat.								+	+			
<i>base</i>	Potassium hydroxide	50		O	O	O	-	-		-	-			
<i>salt</i>	Potassium nitrate	10		+	+	+	+	+						
<i>salt</i>	Potassium perchlorate	10								+	+			
<i>salt</i>	Potassium permanganate	1	-	-	-	+	+		+	+				
<i>salt</i>	Potassium permanganate	10							+	+				
<i>salt</i>	Potassium persulphate	10							+	+				
<i>salt</i>	Potassium rhodanide	sat.							+	+				
<i>salt</i>	Potassium thiocyanate	sat.	-	-	-									
<i>hc</i>	Propane		+	+	+	+	+		+	+				
<i>alc</i>	Propanol		+	+	+	+	+		+	+				
<i>alc</i>	Propanol		>100	S	S	S	-	-						
<i>hc</i>	Propene		+	+	+	+	+		+	+				
<i>acid-org</i>	Propionic acid	5	+	+	+	+	+		+	+				
<i>acid-org</i>	Propionic acid	20							+	+				
<i>acid-org</i>	Propionic acid	50	-	-	-				-	-				
<i>base-org</i>	Pyridine		+	+	+									
<i>base-org</i>	Pyridine		80	O	O	O			-	-				
<i>rest</i>	Pyrocatechol			-	-									
<i>base-org</i>	Pyrrolidone			+	+	+								
<i>acid-org</i>	Pyruvic acid	10		O	O	O	+							
<i>rest</i>	Rainwater (acidic)			+	+	+								
<i>rest</i>	Rapeseed oil								+	+				
<i>rest</i>	Refrigerator oil			+	+	+								
<i>phen</i>	Resorcinol (alcoholic)	1							+	+				
<i>phen</i>	Resorcinol (alcoholic)	50		-	-	-	-							
<i>salt</i>	Road salts			+	+	+								
<i>rest</i>	SAE 80					+								
<i>acid-org</i>	Salicylic acid	sat.		+	+	+	+	O						
<i>rest</i>	Seawater			+	+	+								
<i>rest</i>	Sewing machine oil								+	+				

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TYPE	CHEMICALS	%w/w	°C	POLYAMIDES			POLYESTERS		POLYCARBONATES		POLYE(S)TER ESTERS			
				PA6	PA66	PA46	PBT	PET	PC	PC-blends	TPE-E	TPE-P	TPE-U	
<i>rest</i>	Silane			+	+	+	+							
<i>hc</i>	Silicone oils		<80	+	+	+	+	+	+					
<i>hc</i>	Silicone oils		>100	O	O	O								
<i>salt</i>	Silver nitrate	10		+	+	+		+						
<i>rest</i>	Soap solution	10	80	+	+	O	+							
<i>salt</i>	Sodium bichromate	5		+	+									
<i>salt</i>	Sodium bichromate	10		+	+									
<i>salt</i>	Sodium bromide	10		O	O	O								
<i>salt</i>	Sodium cabonate	20	100	O	O									
<i>salt</i>	Sodium carbonate	10		+	+	+	+	+						
<i>salt</i>	Sodium carbonate	sat.							+	+				
<i>salt</i>	Sodium chlorate	10		+	+	+	+	+						
<i>salt</i>	Sodium chlorate	sat.							+	+				
<i>salt</i>	Sodium chloride	10		+	+	+		+	+	+				
<i>salt</i>	Sodium chloride	sat.		+	+				+	+				
<i>salt</i>	Sodium chlorite	10		O	O	O								
<i>salt</i>	Sodium cyanide	10		+	+	+		+						
<i>salt</i>	Sodium dichromate	10		+	+	+		O						
<i>salt</i>	Sodium dodecylbenzenesulfonate			+	+	+	+							
<i>salt</i>	Sodium hydrogen carbonate	10		+	+	+	+							
<i>salt</i>	Sodium hydrogen sulfate	10		+	+	+	+							
<i>salt</i>	Sodium hydrogen sulfite	10		+	+	+	+							
<i>base</i>	Sodium hydroxide	10		+	+	O	+	O	-	-	+	O	+	
<i>base</i>	Sodium hydroxide	50		O	O	-	-	-	-	-				
<i>base</i>	Sodium hydroxide	10	80	-	-	-	-	-	-	-				
<i>salt</i>	Sodium hypochlorite	5							+	+				
<i>salt</i>	Sodium hypochlorite	10		O	O	O	O	O						
<i>salt</i>	Sodium hypophosphite	10		+	+	+	+							
<i>salt</i>	Sodium lauryl sulfate	30		+	+	+								
<i>salt</i>	Sodium lignosulfonate			+	+	+	+							
<i>salt</i>	Sodium nitrilotriacetate	10		+	+	+	+							
<i>salt</i>	Sodium oleate			+	+	+	+							
<i>salt</i>	Sodium pentachlorophenolate			+	+	+								
<i>salt</i>	Sodium pyrosulfite	10		+	+	+								
<i>salt</i>	Sodium salts (nitrate, sulfate)	10		+	+	+	+							
<i>salt</i>	Sodium salts (nitrate, sulfate)	sat.							+	+				
<i>salt</i>	Sodium sulfate	sat.							O	O				
<i>rest</i>	Soldering fluid			-	-	-	+							
<i>rest</i>	Steam			O	O	O	-	-						
<i>hc</i>	Stearate			+	+	+	+	+						
<i>acid-org</i>	Stearic acid			+	+	+	+	+						
<i>arom</i>	Styrene		80	+	+	+	+	O	-	-				
<i>rest</i>	Sulfonates	10		+	+	+	+							
<i>rest</i>	Sulfur			+	+	+	+	+	+	+				
<i>rest</i>	Sulfur dioxide (dry)			+	+	+	+		O	O				
<i>rest</i>	Sulfur dioxide (moist)			O	O	O	+							
<i>rest</i>	Sulfur hexafluoride			+	+	+	+	+						

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TYPE	CHEMICALS	%w/w	°C	POLYAMIDES			POLYESTERS		POLYCARBONATES		POLYE(S)TER ESTERS		
				PA6	PA66	PA46	PBT	PET	PC	PC-blends	TPE-E	TPE-P	TPE-U
<i>acid</i>	Sulfuric acid	30		-	-						+	O	O
<i>acid</i>	Sulfuric acid	50		-	-				+	+			
<i>acid</i>	Sulfuric acid	concl.		S	S	S	-	-	-	-			
<i>acid</i>	Sulfuric acid	2		-	-	-	+	+	+	+			
<i>acid</i>	Sulfurous acid	sat.		O	O	O	+	+	-	-			
<i>acid</i>	Sulfurous acid	10							-	-			
<i>halo</i>	Sulfuryl chloride								-	-			
<i>acid-org</i>	Tartaric acid	10		+	+	+	+		+	+			
<i>acid-org</i>	Tartaric acid	50		O	O	O	+						
<i>hc-halo</i>	Tetrachloroethylene		80	O	O	O	O	-			O	-	-
<i>hc-halo</i>	Tetrachloroethylene			-	-	-	-	-					
<i>hc-halo</i>	Tetrachloromethane			+	+	+	+						
<i>hc</i>	Tetraethyllead								O	O			
<i>hc-halo</i>	Tetrafluoromethane			+	+	+							
<i>hc-halo</i>	Tetrafluoropropanol			-	-	-							
<i>hc</i>	Tetrahydrofuran			+	+	+	+	O	-	-			
<i>rest</i>	Tetralin			+	+	+	+	+	-	-			
<i>rest</i>	Tetramethylenesulfone			+	+	+	+						
<i>arom</i>	Thiophene								-	-			
<i>arom</i>	Toluene		100	+	+	+	+	+	-	-	+	O	O
<i>arom</i>	Toluene			+	+	+	-	-	-	-			
<i>rest</i>	Transformer oil			+	+	+		+			-	O	+
<i>amine</i>	Trichloro ethyl amine								-	-			
<i>rest</i>	Trichloroacetic acid	10							O	O			
<i>acid-org</i>	Trichloroacetic acid	50		-	-	-	-	-					
<i>ester</i>	Trichloroacetic acid ethyl ester			O	O	O	-	-					
<i>hc-halo</i>	Trichloroethane		45	+	+	+	+	-					
<i>alc</i>	Trichloroethanol			-	-	-	-	-					
<i>hc-halo</i>	Trichloroethyl phosphate								O	O			
<i>hc-halo</i>	Trichloroethylene		>40	O	O	O	-	O	-	-	-	-	-
<i>hc-halo</i>	Trichloroethylene			-	-	-	-	-	-	-			
<i>hc-halo</i>	Trichlorotrifluoroethane			+	+	+	+	+					
<i>hc</i>	Tricresyl phosphate								-	-			
<i>amine</i>	Trietanolamine			+	+	+	+	+					
<i>alc</i>	Trifluoroethanol			-	-	-	-	-					
<i>amine</i>	Trimethylamine			+	+	+							
<i>rest</i>	Turpentine oil			+	+	+	+	+	O	O			
<i>rest</i>	Turpentine substitute			+	+	+	+		+	+			
<i>salt</i>	Uranium fluoride			-	-	-	-						
<i>rest</i>	Urea	20		+	+	+		+					
<i>acid-org</i>	Uric acid	20		+	+	+	+	+					
<i>rest</i>	Urine			+	+	+	+	+					
<i>rest</i>	Vanillin								+	+			
<i>rest</i>	Varnish								O	O			
<i>rest</i>	Vaseline (acid free)			+	+	+	+	+					
<i>rest</i>	Vegatable oils								+	+			
<i>rest</i>	Vegatables								+	+			

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				PA6	PA66	PA46	PBT	PET	PC	PC-blends	TPE-E	TPE-P	TPE-U
<i>hc-halo</i>	Vinyl bromide			+	+	+	+	+					
<i>hc-halo</i>	Vinyl chloride			+	+	+	+	+					
<i>hc-halo</i>	Vinyl fluoride			+	+	+	+	+					
<i>rest</i>	Water			+	+	+	+	+	+	+	+	+	+
<i>rest</i>	Water (chlorinated)		80	+	+	+	O	+					
<i>rest</i>	Wax		80	+	+	+	+	+					
<i>arom</i>	Xylene			+	+	+	O	+	-	-			
<i>arom</i>	Xylene		100	+	+	+	-	-	-	-			
<i>rest</i>	Yeast			+	+	+	+						
<i>salt</i>	Zinc bromide	30		-	-	-	+						
<i>salt</i>	Zinc chloride			+	+	+	+	+					
<i>salt</i>	Zinc chloride	10		O	O	-	+				+	O	O
<i>salt</i>	Zinc chloride	37		-	-	-	+		+	+			
<i>salt</i>	Zinc iodide	30		-	-	-	+						
<i>salt</i>	Zinc nitrate	30		-	-	-	+						
<i>salt</i>	Zinc sulfate	sat.							+	+			
<i>salt</i>	Zinc thiocyanate	30		-	-	-	+						
<i>salt</i>	Zinc(II)salts of mineral acids	10		O	O	O	+						