

General Information for the Lab

Chemical Resistance of Various Materials

	PS 20°C	PS 50°C	PP 20°C	PP 50°C	HDPE 20°C	HDPE 50°C	LDPE 20°C	LDPE 50°C
Acetic acid 10%	1	1	1	1	1	1	1	1
Acetic acid 50%	2	2	1	1	1	1	1	1
Acetic acid 90%	4	4	1	2	1	1	1	2
Acetone	4	4	1	3	1	1	3	3
Acetonitrile	4	4	3	4	1	1	1	1
Ammonia 25%	2	2	1	1	1	1	1	1
Ammonium acetate	1	1	1	1	1	1	1	1
Amyl alcohol	1	1	1	1	1	1	1	2
Ascorbic acid	-	-	1	1	1	-	1	-
Benzene	4	4	4	4	4	4	4	4
Benzyl alcohol	4	4	4	4	3	4	4	4
Boric acid 10%	1	1	1	1	1	1	1	1
Carbon tetrachloride	4	4	4	4	3	4	4	4
Carbonic acid	1	1	1	1	1	3	1	1
Chloroform 100%	4	4	3	4	3	-	3	-
Citric acid 10%	1	1	1	1	1	1	1	1
Cyclohexanol	3	3	1	3	1	1	1	1
Detergents	-	-	1	1	-	-	-	-
Dichloroacetic acid	-	-	1	1	1	1	-	-
Diethyl ether	4	4	4	4	3	4	4	4
Dimethyl acetamide	4	4	1	1	1	1	3	4
Dimethylsulfoxide (DMSO)	1	2	1	1	1	1	1	1
Emulsifier	-	-	1	1	-	-	-	-
Ethanol 50%	1	1	1	-	1	1	1	2
Ethanol 96%	1	1	1	1	1	-	1	-
Ether	4	4	4	4	3	4	4	4
Formaldehyde 10%	3	4	1	1	1	1	1	1
Formaldehyde 40%	4	4	1	2	1	2	2	3
Formamide	1	1	1	1	1	1	1	1
Formic acid 50%	3	3	1	2	1	1	1	2
Glucose	1	1	1	1	1	1	1	1
Glycerine	1	1	1	1	1	1	1	1
Heptane	4	4	3	3	2	3	3	4
Hexanol	-	-	1	-	1	-	1	-
Hydrochloric acid 20%	1	1	1	1	1	1	1	1
Hydrochloric acid conc.	3	3	1	1	1	1	1	1
Hydrogen peroxide 3%	1	1	1	1	1	1	1	1
Hydroquinone	4	4	1	-	-	-	1	3
Isoamyl alcohol	1	1	-	-	-	-	-	-
Isobutanol	2	2	1	1	1	1	1	1
Isopropanol	2	2	1	1	1	1	1	1
Isopropyl acetate	4	4	2	3	1	2	2	3
Isopropyl benzene	4	4	3	4	2	3	3	4
Isopropyl ether	4	4	4	4	4	4	4	4
Lactic acid 3%	2	2	1	2	1	1	1	2
Lactic acid 85%	2	2	1	2	1	1	1	1
Liquid paraffin	1	1	1	3	1	1	1	3
Methanol	3	4	1	1	1	1	1	1
Methyl propyl ketone	4	4	2	3	1	2	2	3
Methyl acetate	4	4	2	3	3	3	3	4

1 = resistant 2 = limited resistant 3 = moderate resistant 4 = no resistance

This table is a general guide only. As many factors can affect the chemical resistance of a given product, its suitability for a specific application should be tested.

Technical appendix is subject to error and technical modifications.

Chemical Resistance of Various Materials

	PS 20°C	PS 50°C	PP 20°C	PP 50°C	HDPE 20°C	HDPE 50°C	LDPE 20°C	LDPE 50°C
Methyl phenyl ether 100%	4	4	3	-	-	-	3	-
Methylamine 32%	-	-	1	-	1	-	1	-
Methylene chloride	4	4	3	4	4	4	4	4
Naphthalene	-	-	1	-	1	3	-	-
Nitrobenzene	4	4	4	4	3	4	4	4
Oxalic acid	1	1	1	1	1	1	1	1
Ozone	3	3	1	2	1	1	1	2
Palmitic acid	1	1	3	4	3	-	2	-
Phenol 10%	4	4	1	1	1	1	1	1
Phenol 100%	4	4	1	1	2	3	3	3
Phosphoric acid 1 – 5%	2	2	1	1	1	1	1	1
Phosphoric acid 85%	1	1	1	2	1	1	1	1
Phthalic acid	1	1	1	1	1	1	1	1
Potassium carbonate	1	1	1	1	1	1	1	1
Potassium chromate	1	1	1	1	1	1	1	-
Potassium permanganate	2	3	1	1	1	1	1	1
Propanol	3	3	1	1	1	1	1	1
Sodium hypochloride	1	1	2	3	2	3	2	3
Sodium acetate	2	2	1	1	1	1	1	1
Sodium hydroxide 30%	1	1	1	1	1	1	1	1
Sodium hydroxide 45%	1	1	1	1	1	1	1	1
Sodium hydroxide 60%	1	1	1	1	-	-	-	-
Sodium permanganate	2	3	1	1	1	1	1	1
Sodium thiosulfate	1	1	1	1	1	1	1	1
Sodium chloride	1	1	1	1	1	1	1	1
Stearic acid	1	2	1	1	1	1	1	1
Sulphuric acid 1 – 6%	1	2	1	1	1	1	1	1
Sulphuric acid 60%	2	4	1	3	1	3	1	3
Sulphuric acid conc.	4	4	4	4	4	4	4	4
Tannin acid	1	1	1	1	-	-	-	-
Terpentine oil	-	-	-	-	3	4	3	4
Tetrahydrofuran	4	4	3	4	3	4	4	4
Toluene	4	4	3	4	3	4	3	4
Trichloroacetic acid	4	4	3	4	3	3	3	4
Urea	1	2	1	1	1	1	1	1
Uric acid	-	-	1	-	1	-	1	-
Urine	3	3	1	1	1	1	1	1
Xylene	4	4	4	4	2	3	2	4

1 = resistant 2 = limited resistant 3 = moderate resistant 4 = no resistance

This table is a general guide only. As many factors can affect the chemical resistance of a given product, its suitability for a specific application should be tested.

Chemical Resistance of Cycloolefin (COC) Microplates

	Cycloolefin	Cycloolefin	Cycloolefin
Acetic acid 99%	1	Detergents	1
Acetone	1	DMSO	1
Ammonia 33%	1	Ethanol 50%	1
Benzaldehyde	3	Ethanol 96%	1
Benzene	4	Fatty acid	4
Benzene	4	Heptane (n-Heptane)	4
Butanon	1	Hexane	4
Chloroform	4	Hydrochloric acid (HCl) 36%	1
		Isopropanol	1
		Methanol	1
		Methylene chloride	4
		Nitric acid (HNO ₃)	1
		Pentane	4
		Sodium hydroxide (NaOH 50%)	1
		Sulphuric acid (H ₂ SO ₄) 40%	1

1 = resistant 2 = limited resistant 3 = moderate resistant 4 = no resistance

This table is a general guide only. As many factors can affect the chemical resistance of a given product, its suitability for a specific application should be tested.

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Chemical Resistance of UV-Star® Microplates

	UV-Star®		UV-Star®		UV-Star®
Acetic acid 99%	1	Detergents	1	Isopropanol	1
Acetone	1	DMSO	1	Methanol	1
Ammonia 33%	1	Ethanol 50%	1	Methylene chloride	4
Benzaldehyde	3	Ethanol 96%	1	Nitric acid (HNO ₃)	1
Benzine	4	Fatty acid	4	Pentane	4
Benzene	4	Heptane (n-Heptane)	4	Sodium hydroxide (NaOH 50%)	1
Butanon	1	Hexane	4	Sulphuric acid (H ₂ SO ₄) 40%	1
Chloroform	4	Hydrochloric acid (HCl) 36%	1		

1 = resistant 2 = limited resistant 3 = moderate resistant 4 = no resistance

This table is a general guide only. As many factors can affect the chemical resistance of a given product, its suitability for a specific application should be tested.

Chemical Resistance of Polyethylene Terephthalate (PET) Capillary Pore Membranes (ThinCert™ Cell Culture Inserts)

Acetaldehyde	1	Ethanol	1	Monochlorbenzene	1
Acetic acid (10%)	1	Ethyl acetate	1	Nitric acid (30%)	1
Acetic acid (100%)	3	Ethyl ether	1	Nitrobenzene	1
Acetone	1	Ethylendichloride	1	Nitropropane	1
Ammonium hydroxide (5%)	1	Ethylene glycol	1	n-Propanol	1
Amyl acetate	1	Fluoric acid (35%)	1	Pentane	1
Amyl alcohol	1	Formaldehyde	1	Perchlorethylene	1
Aniline	1	Formic acid (50%)	1	Petroleum ether	1
Benzene	3	Freon	1	Phosphoric acid (85%)	3
Benzyl alcohol	1	Glutaraldehyde	1	Potassium hydroxide	4
Benzyl benzoate	1	Glycerol	1	Propyl acetate	1
Boric acid (5%)	1	H ₂ O ₂ (30%)	1	Pyridine	1
Butanol	1	Halogenated phenoles	4	Silicon oil	1
Butyl acetate	1	Hexane	1	Sodium hydroxide	4
Butyl cellulose	1	Hydrochloric acid (20%)	1	Sulphuric acid (25%)	1
Carbon tetrachloride	1	i-Propanol	1	Terpentine oil	1
Chloroform	1	Isopropyl myristate	1	Tetrahydrofurane	1
Concentrated strong acids	4	Methanol	1	Tetraline	1
Cyclohexane	1	Methyl acetate	1	Toluene	3
Cyclohexanone	3	Methyl cellulose	1	Trichlorbenzene	1
Dekaline	1	Methylenchloride	3	Trichlorethylene	1
Dimethylacetamide	1	Methylethylketone	1	Triethanolamin	1
Dimethylformamide	1	Methylglycol acetate	1	Trikresyl phosphate	1
Dimethylsulfoxide	1	Methylisobutylketone	1	Xylene	3
Dioxane	1	Mineral oils	1		

For the solvents effecting slight changes the user should test the compatibility under the specific application conditions. All tests have been performed at RT. Please be aware that ThinCert™ cell culture inserts are made of PET membranes sealed on polystyrene housings. Therefore, solvents shown compatible with PET membranes in the above table might be incompatible with the polystyrene housing. Please check solvent compatibility with polystyrene on page A I 6 f.

Resistance scale from 1 to 4

1 = resistant

i.e. the plastics may be treated with the chemical compound at mentioned temperature over several years without any significant alterations in its physical, optical and chemical properties

2 = limited resistant

i.e. the plastics may be treated with the chemical compound at mentioned temperature over several weeks without any significant alterations in its physical, optical and chemical properties

3 = moderate resistant

i.e. the plastics may be treated with the chemical compound at mentioned temperature for short time only (several minutes to one hour) without any alterations in physical, optical and chemical properties (mixing and measuring is possible)

4 = no resistance

i.e. treating the plastics with the substance named may cause alterations in physical, optical and chemical properties within seconds

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Chemical Resistance of Sealers

	EASYseal™ (Cat.-No. 676 001)	VIEWseal™ (Cat.-No. 676 070)	AMPLIseal™ (Cat.-No. 676 040)	SILVERseal™ (Cat.-No. 676 090)
Acetone	4	4	4	3
Acetonitrile	3	3	4	1
Acetic acid 1%	1	1	4	3
Glacial acetic acid	1	3	4	3
Chloroform	4	4	4	4
DMSO	3	3	3	1
Ethanol	3	1	1	1
Hydrochloric acid 32%	3	1	3	4
Isopropanol	3	1	1	1
Methanol	3	1	4	1
Phenol	3	3	4	3
Sulphuric acid 0.5 M	1	1	1	1

- 1 = Stable** no visible change in the sealer after one week's incubation
3 = Moderately stable after one week, optical and physical changes in the sealer (clouding tears on removal)
4 = Unstable adhesive and foil are dissolved, wells not leak-tight

This table can only be used as an orientation aid for the suitability of the respective sealers, since their behaviour against chemicals depends on the respective application. Tests under practical conditions are absolutely essential in many cases.

Temperature Stability of Sealers

	Temperature Stability
EASYseal™	-20°C to + 60°C
VIEWseal™	-80°C to + 110°C
AMPLIseal™	-80°C to + 110°C
SILVERseal™	-80°C to + 110°C
BREATHseal™	-80°C to + 60°C
	Evaporation rate 4200 g H ₂ O/m ² in 24 h

This table can basically be used as an orientation aid for the temperature stability of the respective sealers, since the behaviour of the product depends on the respective application. Tests under practical conditions are absolutely essential in many cases.

Physical Properties of Various Materials

Material	Sterilisation by				Autoclavability	Thermal Stability [°C]	Transparency	Gas Permeability [cc x mm/m ² x 24 h x Bar]			WVTR (at 37°C, 90% humidity) [g x mm/m ² x 24 h x Bar]
	gamma irradiation	chemicals (formalin, ethanol)	dry heat	gas*				O ₂	N ₂	CO ₂	
Polystyrene	yes	yes	no	yes	no	- 20 to + 60	clear	4.7	853	17.8	108 – 155
Poly-propylene	yes	yes	no	yes	yes	- 196 to + 121	translucent	3.7	744	12.4	3.9
HDPE	yes	yes	no	yes	no	- 50 to + 100	translucent	2.9	651	9	4.6 – 6.2
LDPE	yes	yes	no	yes	no	- 50 to + 80	translucent	7.8	2.8	41.9	15.5 – 23.3
UV-Star®	yes	-	no	yes	no	- 80 to + 60	clear	-	-	-	-
PETG	yes	yes	no	yes	no	- 40 to + 70	clear	388	155	1.2	62
PET	yes	some	no	yes	no	- 60 to + 150	clear	46.5	10.9	236	15 – 20
COC	yes	-	no	yes	no	- 80 to + 120	clear	-	-	-	-

Exemptions are mentioned in the respective product data sheets.

* Ethylene oxide, formaldehyde

Material	Refractive Index
Polystyrene	1.59
UV-Star®	1.53
Glass	1.53

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