

GENERAL

DMSO, dimethyl sulfoxide (CH₃)₂SO, is an odorless, water white, biodegradable and non toxic solvent. It is versatile and powerful. DMSO dissolves a very wide range of organic and inorganic substances and is miscible with most common organic solvents such as alcohols, ethers, chlorinated solvents and aromatics.

MATERIAL COMPATIBILITY

1. Metal and alloys (cf. table 1) :

DMSO is slightly corrosive to mild steel. Hence, stainless steel is recommended for storage capacities and piping. Above 100-120°C, stainless steel is also corroded by DMSO ; its use is not recommended for pieces of equipment which are subjected to prolonged heating, such as distillation boiler or reactor.

Zinc, lead, copper or brass all resist well to DMSO corrosion ; however, the solvent becomes colored after prolonged contact with these metals.

304 and 316 stainless steels are the best materials for storing DMSO with no influence either on its purity or its discoloration. Aluminum is also suitable when pH remains close to neutrality.

2. Polymers (cf. table 2) :

Given its solvent properties, DMSO interacts with functional polymers.

A few polymers can be recommended for prolonged contact with DMSO : polyethylene, polypropylene, pentafluoroethylene (PTFE), Kalrez. For other polymers it is advisable to undertake compatibility tests.

Because of the wide variety of available materials and grades, compatibility tests before final selection of the construction materials are recommended.

Table 1 : Corrosion data for DMSO and its mixtures with water for different grades of steel and titanium

Material	DMSO conc. (wt-%)	Temperature (°C)	Corrosion rate (mm/y)	Observations
Carbon steel	100	20	Not detected	No effect
ASTM A106 grade B	100	80	0.34	Corrosion by pitting with formation of a black deposit and DMSO discoloration
304 stainless steel	100	20	0.001	No effect
	100	80	0.03	No effect
	100	180	0.3	General pitting with formation of a deposit
316 stainless steel	100	90	0.06	No effect
	80	90	0.08	No effect
	50	90	0.001	No effect
	100	180	0.3	General pitting with formation of a deposit
316 Ti stainless steel	100	80	0.005	No effect
	100	130		Small craters with rust formation ; DMSO discoloration
Titanium	100	90	0.007	No effect
	80	90	0.004	No effect
	50	90	0.002	No effect

Table 2 : Compatibility of polymers and resins with DMSO
S = soluble, Sw = swelling, I = inert

Polymer	Example	Behavior
Polyacrylic		
Polyacrylonitrile	Orlon, DuPont Creslan, Am. Cyanamid/BASF	S S
Ethylene acrylic copolymer	Vamac, DuPont	Amb : Sw 100°C : S
Polymethyl-methacrylate	Altuglas, AtoHaas	Amb : I 100°C : Sw
Polyamides		
6, 6-6, 6-10		Amb : I 140°C : S
11	Rilsan, Atofina	I
12	Orgasol 2002D, Atofina	Amb : I 140°C : S
Polyimides		
Bismaleimide copolymers	Kerimid 353, Rhodia Kerimid 711, Rhodia	Sw S
Polyaminobismaleimide	Kerimid 601, Rhodia	I
Polyetherimide	Ultem 1000, General Electric	Sw
Polyamide imide	Torlon 4203L, BP	I
Polyesters		
Polyethylene terephthalate		I
Polybutylene terephthalate		I
Polyether polyester copolymers		I
Epoxies		
Epoxy resin (DGEBA based)	Epikote 1004, Resolution	S
Crosslinked epoxy resins	TGDDM base + anhydride DGEBA base + anhydride DGEBA base + amine	Sw Sw
Fluorinated resins		
Polytetrafluoroethylene	Teflon, DuPont	I
Polyvinylidene fluoride	Forafon, Atofina	Sw
Fluorocarbonated elastomer	Viton DF801, DuPont	Sw
Surfluorinated fluorocarbon	Viton DF809, DuPont	Sw
Perfluorinated elastomer	Kalrez 4079, DuPont	I
Chlorinated resins		
Chloroprene rubber	Butaclor MC30, Distugil	Sw
Chlorinated polyethylene	CM 3630, Bayer	Sw
Chlorosulphonated polyethylene	Hypalon, DuPont	Sw
Sulfur containing resins		
Polyphenylene sulfide	Ryton V107, Phillips	Sw
Polyether sulfone	Victrex 600 Ultrason E3000, BASF	S S
Chlorosulphonated polyethylene	Hypalon DH70, DuPont	Sw
Thioplast	Crosslinked P2 Permapol, PRC	Sw
Phenoplasts		
Crosslinked Novolac	Vyncolite RX611/3A, Vynckier	I
Modified Novolac	R7522, Ceca R7550, Ceca	S S
Norsophen resin PH 13	Atofina	S
Aminoplast		
Melamine formol	INILAM 3250, Ceca	S
Urea formol	Tempolite, Ceca	S
Miscellaneous resins		
Polyethylene		I
Polypropylene		I
Polystyrene		I 130°C : S
Poyether etherketone	PEEK, ICI	I
Furanic resin	QUACCOOR 1001, Quaker Oats	Sw
Special butyl rubber	D706, Le Joint Français (Hutchinson)	I

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The values given in this document have been obtained in laboratory tests conforming to standard procedures ; they should be regarded as mean values given as an indication to customers of the best ways of using our products. They do not imply any undertaking on our part.

