

Technical Data Sheet

Dimethylacetamide (DMAC)

Chemical Synonym

Dimethylacetamide; DMAC

Applications

- Fibers
- Htf - pharmaceutical processing
- Process solvents

Product Description

Dimethylacetamide (DMAC) is a colorless, high boiling, polar, hygroscopic liquid. DMAC is a good solvent for a wide range of organic and inorganic compounds and it is miscible with water, ethers, esters, ketones and aromatics compounds. It is used in the production of polyacrylonitrile and polyurethane based fibers, films and coatings. The polar nature of DMAC enables it to act as a combined solvent and reaction catalyst in many reactions producing high yields and pure product in short time periods.

DMAC is a dipolar aprotic solvent used for many organic reactions and industrial applications. It is a versatile solvent due to its high boiling point and good thermal and chemical stability.

1. Acrylic fibres

DMAC is applied as solvent in wet spinning processes for the production of acrylic fibres.

2. Elasthane fibres

In the production of polyurethane-based elasthane fibres, DMAC is the solvent of choice given its evaporation speed, whether it is used in wet or dry spinning processes.

3. Pharmaceuticals

DMAC can be used both as a solvent and as a reagent in the production of various pharmaceuticals. In the production of novel x-ray contrast media, DMAC is used as a solvent. Cephalosporins, which are among one of the leading classes of antibiotics, are partly produced from derivatives of 7-ADCA (7-aminodeacetoxy-cephalosporanic acid). DMAC is used in the manufacturing process.

4. Various polymers

DMAC is a good solvent for polyimide resins, both in coating and film production. It is also the ideal solvent for the production of dialyser membranes, based on polysulfones. A mixture of DMAC and lithium chloride is a useful solvent for cellulose fibres in several applications.

Typical Properties

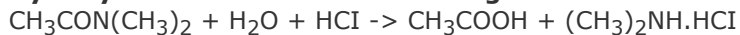
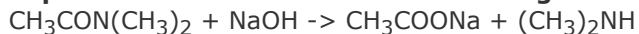
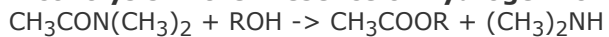
Property	Typical Value, Units
General	
Molecular Formula	C ₄ H ₉ NO
Molecular Weight	87.12 g/mol
Autoignition Temperature	345 °C
Boiling Point	166 °C
Density	
@ 20°C	0.942 g/cm ³

@ 40°C	0.923 g/cm ³
Dielectric Constant	
10 kHz @ 25°C	37.8
Dipole moment	3.7 D (debye)
Dissociation constant, pKa	
@ 25°C	-0.19
Evaporation Rate ^a	172
Flash Point	
Closed Cup	64 °C
Free energy of formation	
@ 25°C	288 kJ/mol
Freezing Point	-20 °C
Hansen solubility parameters @ 25°C	
Dispersion	7.87 (MPa) _{1/2}
Hydrogen Bonding	10.2 (MPa) _{1/2}
Polar	11.5 (MPa) _{1/2}
Total	22.7 (MPa) _{1/2}
Heat of Combustion	25.45 kJ/mol
Heat of Vaporization	
@ 25°C	53.2 kJ/mol
Octanol-water partition coefficient, log Pow	
@ 25°C	-0.77
pH	
@ 200 g/l	4-7
Refractive Index	1.4380
Specific Heat	
@ 20°C	0.175 kJ/mol.K
Surface Tension	
@ 20°C	33.8 mN/m
@ 40°C	30.9 mN/m
@ 60°	28.3 mN/m
Thermal Conductivity	
@ 20°C	169.2 mW/m.K
@ 40°C	161.2 mW/m.K
@ 60°C	153.3 mW/m.K
Vapor Density	
(air = 1)	3.02
Vapor Pressure	
@ 20°C	1.78 hPa
@ 21.7°C	2 hPa
@ 40°C	6.6 hPa
@ 60°C	20.16 hPa
Viscosity	
@ 20°C	1.02 mPa·s
@ 25°C	0.92 mPa·s
@ 40°C	0.78 mPa·s
@ 60°C	0.62 mPa·s
Water solubility	Miscible

^aDIN 53170, ether=1

Principal chemical properties

The chemical reactions of DMAc are typical of those of disubstituted amides. Under suitable conditions, DMAc will react as follows:

Hydrolysis in the Presence of Strong Acids**Saponification in the Presence of Strong Bases****Alcoholysis in the Presence of Hydrogen Ions****Viscosities of resins in DMAc**

Coating resins	Viscosity (at 25°C, 15w% solution (mPa.s= cP))
Acrylic resins	
Acryloid® ^(a)	
A-21	23
A-107	23
B-72	20
Lucite® ^(b)	
44	26
45	38
46	30
Epoxy resins	
Epon® ^(c)	
1001	5
1002	6
1004	7
1007	10
Cellulose resins	
Half sec butyrate	555
EAB-500-1 ^(d)	950
EAS-171-2 ^(d)	1275
Urea-Formaldehyde	
Uformite® ^(e)	
F-222	20
Melamine-Formaldehyde	
MM-55	15
Vinyl resins	

VYHH ^(f)	52
VAGH ^(f)	53
VMCH ^(f)	48
Geon® 121 ^(g)	230
Geon® 101 ^(g)	3500
Nitrocellulose resins	
HB-14 Nitrocellulose	18

- (a) Rohm and Haas
(b) Reduced to 5%w%
(c) DuPont
(d) Shell Chemicals
(e) Cytec Technology Corp.
(f) Union Carbide
(g) BF Goodrich

Compatibility and Solubility

DMAC is completely miscible with water, ethers, esters, ketones and aromatic compounds. Unsaturated aliphatics are highly soluble but saturated aliphatics have a limited solubility.

Solvent	Solubility (25°C)
Iso-octane	33 g / 100 g DMAC
Di-isobutylene	Completely miscible
N-Hexane	Completely miscible
N-heptane	31 g / 100 g DMAC
Cyclohexane	Completely miscible
Cyclohexene	Completely miscible
Kerosene	16 g / 100 g DMAC

Packaging

- Bulk
- PE drums (200 kg net)
- Iron drums (195 kg net)

- IBC containers (950 kg net)

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