

Carrier solvents and lubricant deposition using 3M™ Novec™ Engineered Fluids

Carrier and deposition solvents are among the most important materials used in lubricants, coatings and other formulations. Solvency, non-flammability, low surface tension and other physical properties impact your customer's manufacturing efficiency and safety, as well as the quality of their products. That's why 3M has developed a comprehensive family of safe, sustainable and effective solvents — 3M™ Novec™ Engineered Fluids. These performance products can replace highly regulated solvents including those with high global warming potential (GWP), high ozone depleting potential (ODP), high toxicity or flammability such as HCFC-141b, HCFC-225, HFCs, trichloroethylene (TCE) and n-Propyl Bromide (nPB).

Properties	Unit	3M™ Novec™ Engineered Fluids										
		7000	7100 / 7100DL ^a	7200 / 7200DL ^a	7300 / 7300DL ^a	7500	7700	71DA	71DE	72DA	72DE	71IPA
Formulation	% w/w	Novec 7000 (100%)	Novec 7100 / 7100DL (100%)	Novec 7200 / 7200DL (100%)	Novec 7300 / 7300DL (100%)	Novec 7500 (100%)	Novec 7700 (100%)	Novec 7100 (53%) t-DCE (45%) Ethanol (2%)	Novec 7100 (50%) t-DCE (50%)	t-DCE (68%) Novec 7200 (20%) Novec 7100 (10%) IPA (2%)	t-DCE (70%) Novec 7200 (20%) Novec 7100 (10%)	Novec 7100 (95%) IPA (5%)
Boiling Point	°C (°F)	34 93	61 142	76 169	98 208	128 262	167 333	40 104	41 106	44 111	44 111	55 131
Max Use Temp Range	°C (°F)	<150 302	<150 302	<150 302	<150 302	<200 392	<200 392	<150 302	<150 302	<150 302	<150 302	<150 302
Flash Point^b	°C (°F)	None	None	None	None	None	None	None	None	None	None	None
Vapor Pressure	kPa	65	27	16	5.9	2.1	<0.1	55	51	48	47	28
Heat of Vaporization	kJ/kg	142	112	119	102	89	83	209	200	251	200	165
Liquid Density	g/cm ³	1.4	1.51	1.42	1.66	1.61	1.79	1.33	1.37	1.28	1.27	1.48
Kinematic Viscosity	cSt	0.32	0.38	0.41	0.71	0.77	2.52	0.34	0.31	0.35	0.35	0.41
Specific Heat	J/kg•K	1300	1183	1220	1140	1128	1040	1230	1192	1242	1210	1255
Surface Tension	mN/m	12.4	13.6	13.6	15	16.2	18	16.4	16.6	18	19	14.5
Dielectric Strength Range, 0.1" gap	kV	> 25	> 25	> 25	> 25	> 25	> 25	> 15	> 25	> 25	> 25	> 10
Worker Exposure Guidelines^c	ppmv	250	750	200	100	100	TBD ^e	750/ 200/ 1000 ^f	750/ 200 ^f	200/ 200/ 750 200 ^f	200/ 200/ 750 ^f	750/ 200 ^f
Global Warming Potential^d	GWP	530	297	57	310	100	436	157	149	41	41	284
Ozone Depletion Potential	ODP	0	0	0	0	0	0	0	0	0	0	0

The above technical information and data should be considered representative or typical only and should not be used for specification purposes.

All values @ 25°C unless otherwise specified.

^a Each DL-designated product has specified maximum levels of various substances including: ions (ppb), metals (ppb) and water (ppm). Particles are monitored, but not specified. Please refer to each product's Product Information page for more information.

^b Per closed cup flash point, tested in accordance with ASTM D3278 test method.

^c (TLV/TWA) Recommended parts per million by volume (ppmv) for eight-hour average worker exposure per day as established by 90-day inhalation study. Exposure guideline was established by the American Industrial Hygiene Association.

^d GWP-100 year ITH, CO₂ = 1.0, per IPCC 2013, with the exception of Novec 7100 and 7100DL fluids and blends containing Novec 7100 fluid, which note IPCC 2007.

^e Novec 7700 fluid is low in acute toxicity and most applications have very low inhalation exposure. It is for these reasons that occupational exposure limits (OELs) have not yet been determined for this product.

^f Occupational exposure limits (OELs) are based upon individual components; Novec 7100 fluid = 750 ppmv, Novec 7200 fluid = 200 ppmv, t-DCE = 200 ppmv, EtOH = 1000 ppmv, IPA = 200 ppmv.

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With a full line of 3M™ Novec™ Engineered Fluids for your carrier solvent and lubricant deposition needs, 3M is confident that we have a solution for you. We are here to help. Your 3M technical service contact can help select a Novec fluid for your specific application.

Properties	3M™ Novec™ Engineered Fluids										
	7000	7100 / 7100DL	7200 / 7200DL	7300 / 7300DL	7500	7700	71DA	71DE	72DA	72DE	71IPA
Fluorocarbon Solubility	Medium	High	High	High	High	High	Medium	Medium	Low	Low	High
Hydrocarbon Solubility	Medium	Medium	Medium	Low	Low	Low	High	High	Very High	Very High	Medium
Silicone Solubility	Low	Medium	Medium	Low	Low	Low	High	High	High	High	Medium
Plastic Elastomer Compatibility	Very High	Very High	Very High	Very High	Very High	Very High	Requires Customer Testing	Requires Customer Testing	Requires Customer Testing	Requires Customer Testing	Very High
Applications											
Lubricant Deposition		●	●	●	●			●		●	
Silicone Deposition							●	●	●	●	●
Cleaning Solvent		●	●				●	●	●	●	●
Coating Solvent		●	●	●	●	●					●
Replacement For											
Chlorofluorocarbons (CFCs)		●	●				●	●	●	●	●
Hydrochlorofluorocarbons (HCFCs)	●	●	●	●			●	●	●	●	●
Hydrofluorocarbons (HFCs)		●	●	●				●	●	●	●
Perfluorinated chemicals (PFCs)	●	●	●	●	●	●		●			●
Perfluoropolyethers (PFPEs)				●	●	●					
Trichloroethylene (TCE)								●	●	●	
Isopropyl alcohol (IPA)											●
n-propyl bromide (nPB)			●					●		●	

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