

Heat Transfer Applications using 3M™ Novec™ Engineered Fluids

Balancing the demand for thermal management performance with worker safety and low environmental impact has never been more important. 3M recognizes your need for a long-term heat transfer fluid with low greenhouse gas emissions and has meticulously engineered the solution – a comprehensive portfolio of 3M™ Novec™ Engineered Fluids. You can reduce greenhouse gases by up to 99 percent in your application by replacing perfluorocarbon (PFC) or perfluoropolyether (PFPE) heat transfer fluids with Novec fluids. Now that’s a sustainable solution.

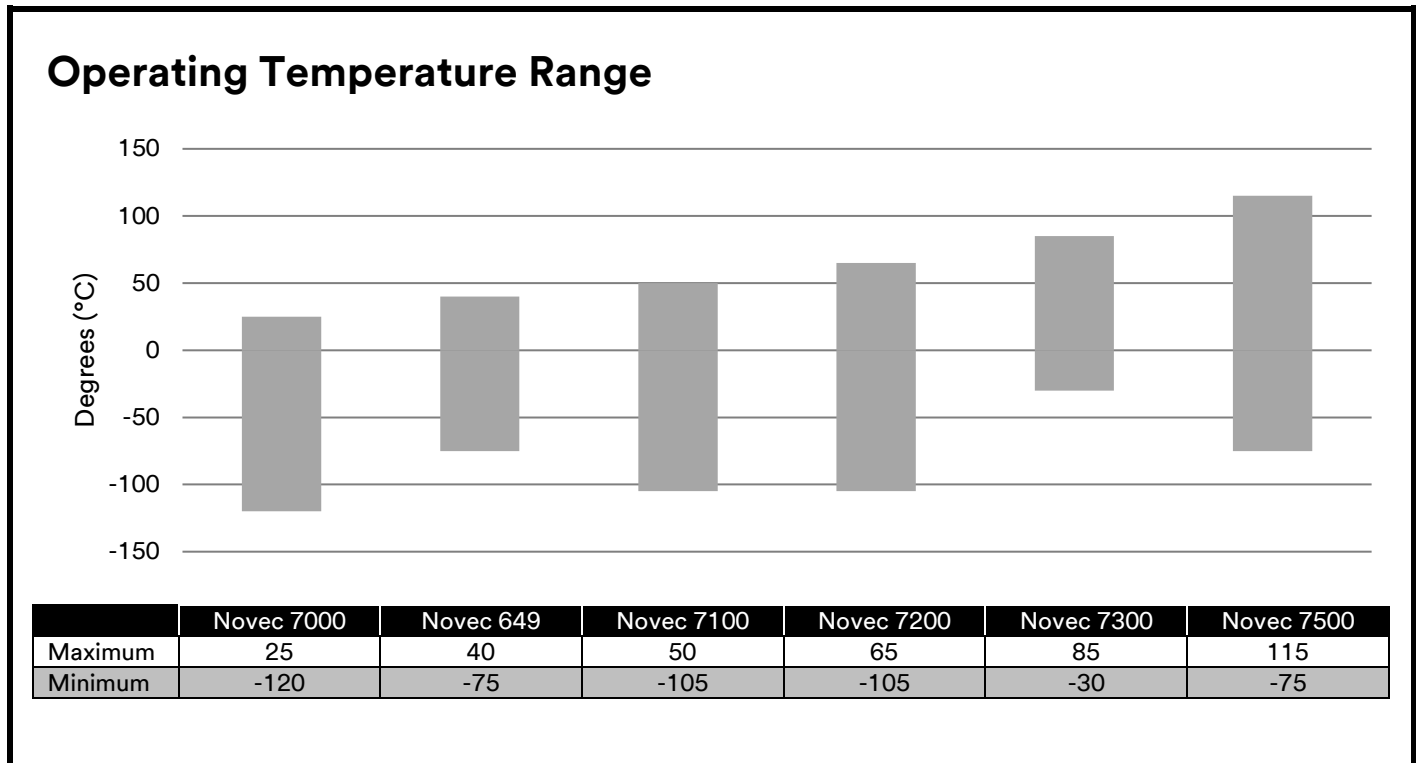
Properties	Unit	3M™ Novec™ Engineered Fluids					
		7000	649	7100	7200	7300	7500
Boiling Point	°C	34	49	61	76	98	128
Pour Point	°C	-122	-108	-135	-138	-38	-100
Molecular Weight	g/mol	200	316	250	264	350	414
Critical Temperature	°C	165	169	195	210	243	261
Critical Pressure	MPa	2.48	1.88	2.23	2.01	1.88	1.55
Vapor Pressure	kPa	65	40	27	16	5.9	2.1
Heat of Vaporization	kJ/kg	142	88	112	119	102	89
Liquid Density	kg/m ³	1400	1600	1510	1420	1660	1614
Coefficient of Expansion	K ⁻¹	0.0022	0.0018	0.0018	0.0016	0.0013	0.0013
Kinematic Viscosity	cSt	0.32	0.40	0.38	0.41	0.71	0.77
Absolute Viscosity	cP	0.45	0.64	0.58	0.58	1.18	1.24
Specific Heat	J/kg-K	1300	1103	1183	1220	1140	1128
Surface Tension	mN/m	12.4	10.8	13.6	13.6	15.0	16.2
Solubility of Water in Fluid	ppm by weight	~60	20	95	92	67	45
Solubility of Fluid in Water	ppm or ppb by weight	<5 ppm	-	12 ppm	<5 ppm	<295 ppb	<4 ppb
Dielectric Strength Range, 0.1" gap	kV	>25	>40	>25	>25	>25	>25
Dielectric Constant @ 1kHz	-	7.4	1.8	7.4	7.3	6.1	5.8
Volume Resistivity	Ohm-cm	10 ⁸	10 ¹²	10 ⁸	10 ⁸	10 ¹¹	10 ⁸
Global Warming Potential ¹	GWP	530	<1	297	57	310	100

Not for specification purposes. All values @ 25°C unless otherwise specified

¹ GWP 100-year ITH, CO₂ =1.0, per IPCC 2013, with the exception of Novec 7100 fluid, which notes IPCC 2007.

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Recommended Operating Temperature Range for Pumped Single Phase Systems*



*For two phase systems, contact your 3M technical service representative.

We are confident that 3M has the right solution for your heat transfer application. To learn more about 3M™ Novec™ Engineered Fluids, visit [3M.com/Novec](https://www.3m.com/Novec). You can also explore our other perfluorocarbon liquids for heat transfer, 3M™ Fluorinert™ Electronic Liquids, at https://www.3m.com/3M/en_US/data-center-us/applications/immersion-cooling/fluorinert-electronic-liquids/.

Have questions? Need technical assistance? Contact your 3M technical service representative. We're here to help.

Safety Data Sheet: Consult Safety Data Sheet before use.

Regulatory: For regulatory information about this product, contact your 3M representative.

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Electronics Materials Solutions Division
3M Center, Building 224-3N-11
St. Paul, MN 55144-1000
www.3M.com/novec

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