NOVVI™ DCF 281

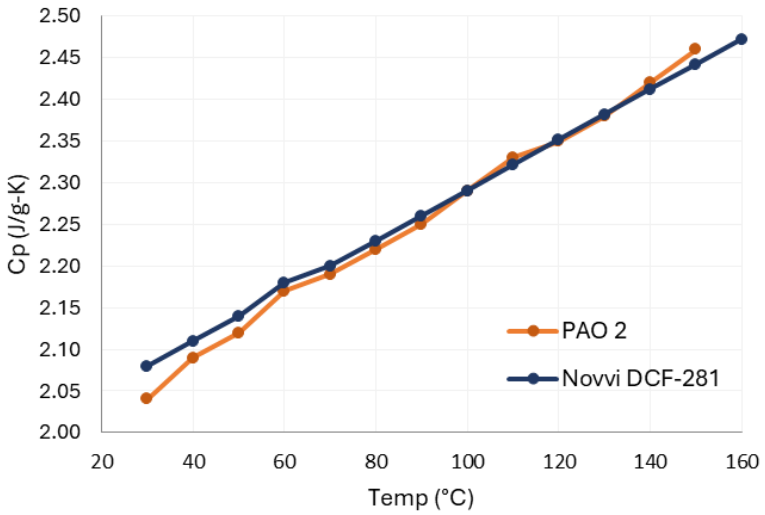
High-Performance Immersion Cooling Fluid

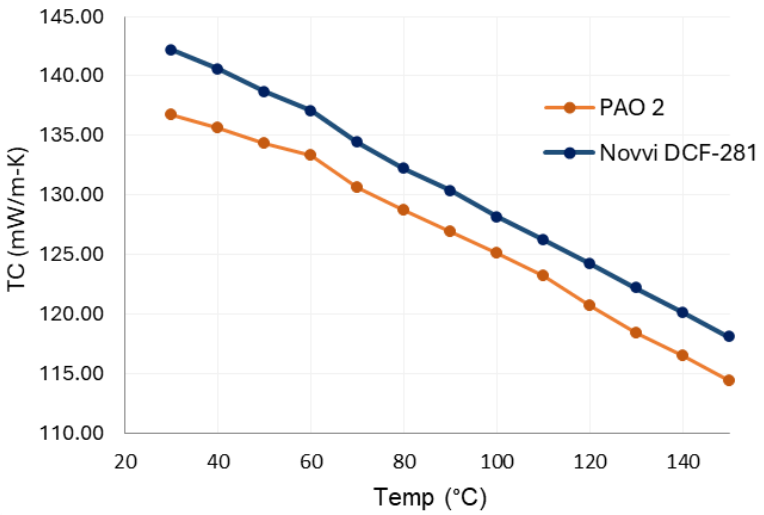
DCF 281 is an advanced dielectric insulating fluid, specifically designed for high power-density computing and data center applications utilizing immersion cooling systems. DCF 281 is formulated with a renewable synthetic base oil, delivering sustainability and minimizing environmental impact without compromising performance.

Optimal Thermal Management: DCF 281 delivers superior heat dissipation, eliminates hot spots, and guarantees even heat distribution, enhancing component performance and prolonging equipment life.

Unrivaled Chemical Stability: Resistant to oxidation and degradation, DCF 281 consistently performs under extreme operating conditions.

Broad Compatibility: Flexible and adaptable with a wide range of immersion cooling hardware and elastomers, DCF 281 is the ideal choice for energy efficient high-density computing applications.





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Novvi DCF 281 is the first fully renewable, synthetic hydrocarbon dielectric fluid precisely formulated to match or exceed the purity, chemical, electrical and thermal properties of commercial PAO and GTL-based fluids.

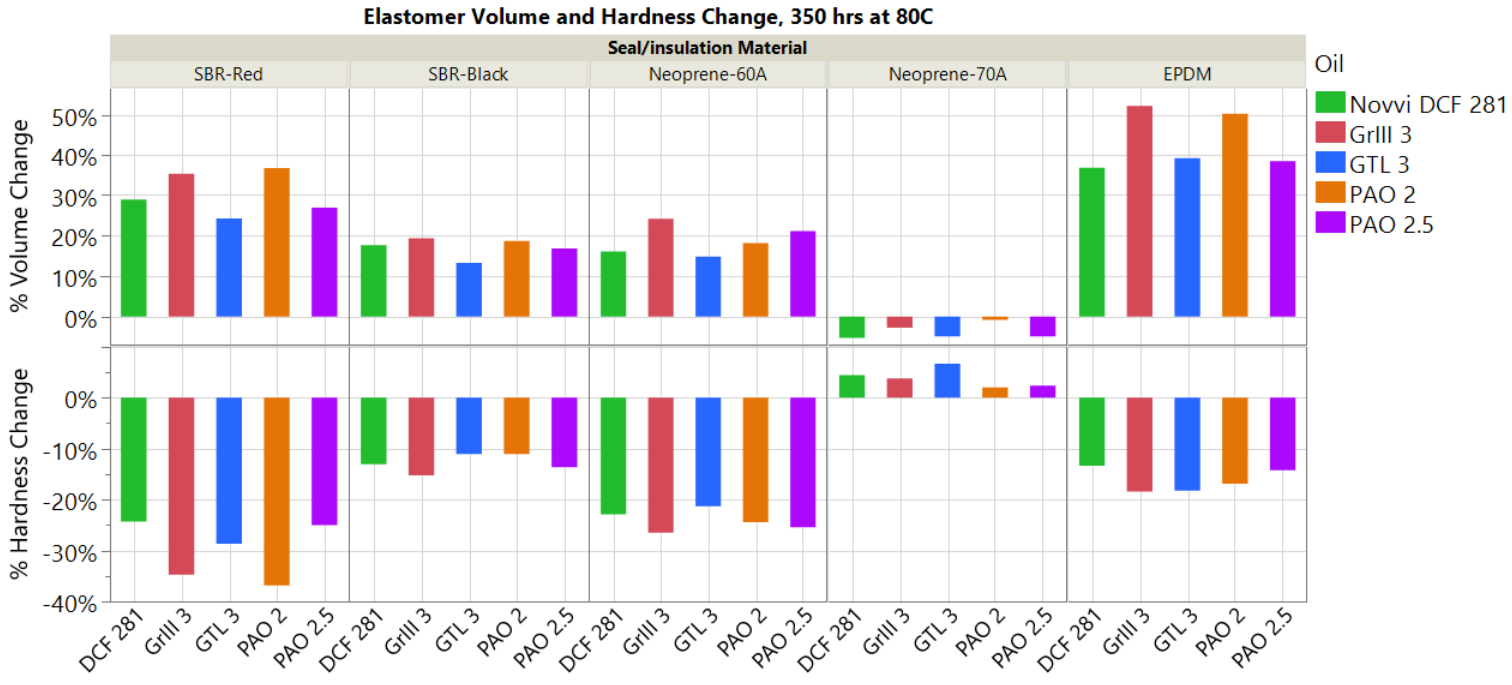
Extreme Thermal Efficiency: Achieves comparable or better heat removal than commercial low-viscosity GTL or PAO based fluids, enabling higher-density AI compute environments without thermal throttling

Stable Dielectric Performance: Minimizes signal loss at high frequencies, ensuring optimal performance for advanced AI processors and interconnects.

Maximum Server Reliability: Reduces temperature gradients and thermal stress, prolonging the lifespan of critical AI hardware, GPUs, CPUs, and accelerators.

Unrivaled Chemical Stability: Resistant to oxidation and degradation, DCF 281 consistently performs under extreme operating conditions, for extended service life up to 10 years or longer. Compatible with global regeneration and re-refining processes.

Broad Compatibility: Fully compatible with leading AI hardware vendors, standard and emerging forced convection immersion cooling systems, enabling easy integration into existing data centers.



Immersion Coolant Comparison

Commercial Immersion Fluid	Chemical Description	Kinematic Viscosity at 40°C (mm²/s)	Kinematic Viscosity at 100°C (mm²/s)	Flash Point (°C)	Biobased Carbon Value (%) D6866	Thermal Conductivity at 40°C (W/mK)	Specific Heat Capacity (J/gK)	Thermal Conductivity at 80°C (W/mK)
Exxon EMDC 3152	PAO 2	5	1.7	149	0	0.128	2.206	0.12
Compuzol IM2020	PAO 2.5	8.6	2.5	180	0	0.139	2.2	0.132
Valvoline HPC		8.01	2.4	153	0	0.1304	2	0.123
Shell XHVI3	GTL	7.5	2.72	142	0	0.137	1.9	0.129
Cargill EF 3221	Diester	7.7	2.4	203	<60	0.133	1.97	0.126
Cargill EF 7010	Mono ester	9.6	2.9	220	<60	0.139	1.95	0.13
Shell S3 X	GTL	9.9	2.7	198	0	0.139	1.9	0.131
Novvi DCF-281	PAO*	10.5	2.81	192	100%	0.1406	2.28	0.132
Cargill 3963	Diester	11.5	3.2	235	<60	0.139	1.63	0.133
Group III – Coolant	Mineral oil	12	3.2	158	0	0.124	1.69	0.119
Synmerse DC	Ester	16	3.6	247	-	0.14	1.9	0.135

DCF 281 is an advanced dielectric insulating fluid, specifically designed for high power-density computing and data center applications utilizing immersion cooling systems. DCF 281 is formulated with Novvi's sustainable synthetic base oil, and high-performance additives that minimize environmental impact without compromising performance.

Optimal Thermal Management: DCF 281 delivers superior heat dissipation, eliminates hot spots, and guarantees even heat distribution, enhancing component performance and prolonging equipment life.

Unrivaled Chemical Stability: Resistant to oxidation and degradation, DCF 281 consistently performs under extreme operating conditions.

Broad Compatibility: Flexible and adaptable with a wide range of immersion cooling hardware and elastomers, DCF 281 is the ideal choice for energy efficient high-density computing applications.

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TYPICAL PROPERTIES

Properties	Method	DCF 281
Appearance	Visual	Bright and Clear
Color	ASTM D156	+30
Density, 15°C (kg/l)	ASTM D4052	0.811
Viscosity, 40°C (cSt)	ASTM D7042	10.50
Viscosity, 100°C (cSt)	ASTM D7042	2.81
Viscosity Index	ASTM D2270	114
Pour point (°C)	ASTM D5949	-51
Flash point (°C)	ASTM D92	192
Autoignition Point (°C)	ASTM E659	325
Bromine Index	ASTM D2710	< 200
Biobased Carbon Content	ASTM D6866	100%
Thermal Conductivity @ 40°C (W/m·K)	ASTM D7896	0.1406
Thermal Conductivity @ 60°C (W/m·K)	ASTM D7896	0.1370
Thermal Conductivity @ 80°C (W/m·K)	ASTM D7896	0.1322
Specific Heat Capacity @ 40°C (J/g·K)	ASTM D7896	2.11
Dielectric Breakdown (kV)	ASTM D877	52
Volume Resistivity (Ω·cm)	ASTM D1169	$> 10^{12}$
Dielectric constant	ASTM D924	<2.1

Typical properties are average values only and do not constitute a specification. Minor variations that do not affect product performance are to be expected during normal manufacture, and at different blending locations. Product formulations are subject to change without notification.

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