RSC BIO SOLUTIONS | FUTERRA

FUTERRA™ LV HTF 2.8

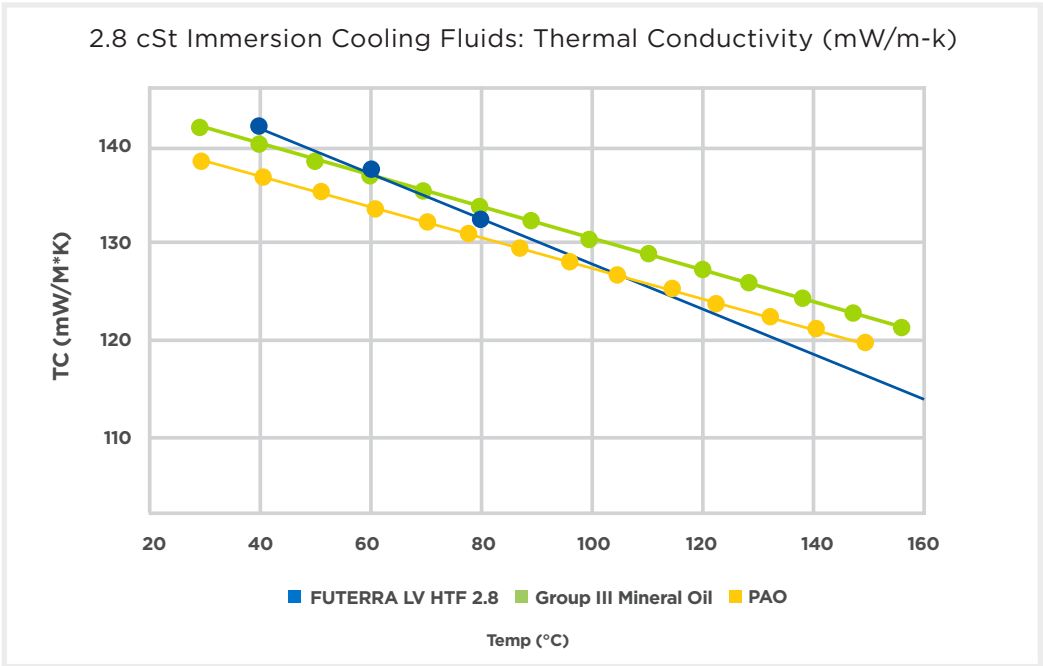
High-Performance, Sustainable Immersion Cooling Fluid

FUTERRA LV HTF 2.8 is the only immersion cooling fluid with increased performance and longevity with a negative cradle-to-gate carbon footprint. FUTERRA™ LV HTF 2.8 was designed to improve heat capacity and thermal conductivity in applications where direct cooling with a dielectric fluid will allow for more compact thermal management designs.

When compared to Group III Mineral Oil and PAO-based fluids, FUTERRA™ LV HTF 2.8 offers:

- **Superior thermal conductivity** providing the most efficient heat transfer away from equipment components.
- **Increased heat capacity** for more efficient energy transfer away from components.
- **Improved oxidized stability** resulting in longer service life and greater value of the fluid.
- **Superior compatibility** with all elastomers, polymers, seals and metal components.
- **Reduced fluid volatility** resulting in less fluid loss due to evaporation over time.

FUTERRA™ LV HTF 2.8 has improved thermal conductivity over immersion cooling fluids using petroleum based (Grp III) or PAO-based synthetic hydrocarbons (PAO).



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Optimized Materials Compatibility

While lowering viscosity generally improves convective heat transfer, elastomer compatibility is crucial for reliability in immersion cooled data centers. Very low viscosity oils lead to greater volume and hardness change in the dielectric insulating elastomer materials and increased leaching of process oils used in these elastomers into the fluid. With FUTERRA™ LV HTF 2.8, the viscosity and thermal properties have been optimized to enable the highest cooling efficiency without excess degradation of critical elastomeric components. FUTERRA™ LV HTF 2.8 is compatible with metals including brass, copper, aluminum, steel and stainless steel.

Typical Physical Properties

PHYSICAL PROPERTY	TEST METHOD	FUTERRA™ LV HTF 2.8
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 @ 25°C	ASTM D924	< 2.1

Tests conducted according to International Standards Test Methods are routinely verified to be in compliance with the latest published versions. Minor changes may be made when they have no material impact on test schedules and are necessitated by reasons such as safety, environmental standards, and method effectiveness.

FUTERRA™ LV HTF 2.8 is an example of a range of formulations developed to showcase the benefits of RSC BIO's renewable-based technologies as an immersion cooling fluid. Please inquire if you have specifications or requirements which differ from this specific formulation.

RSC BIO SOLUTIONS

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