

Low electrical conductivity, water-based fuel cell coolants with nanoparticles

Process Applications

- PEM fuel cell coolant
- Electronics cooling
- Portable fuel cell systems
- Computer cooling
- Battery cooling
- Electric vehicle coolant

■ Dynalene FC Overview

Developed with the help of a US Department of Energy grant, Dynalene FC is specially designed to maintain an electrical conductivity of less than 10 $\mu\text{S}/\text{cm}$ for use in fuel cell, electronics, and other cooling applications. This fluid has been demonstrated to maintain a low electrical conductivity for at least 5000 hours of continuous operation, while providing excellent heat transfer properties.

Dynalene FC is primarily used for cooling PEM fuel cells and electronics. It helps your system maintain the highest efficiency by scavenging rogue ions and eliminating electrical shorts which can hinder component performance. This ion suppression and scavenging mechanism eliminates the need for deionizing filters, reducing the weight, size, and cost of your system.

Dynalene FC can be formulated with 1,3-propanediol (FC-Bio) or ethylene glycol (FC-EG). Both formulas are non-flammable, and FC-Bio can be produced with renewable materials. FC uses the power of nanotechnology to achieve the most important property criteria (low electrical conductivity) set forth by the fuel cell industry. Dynalene FC fluids come pre-mixed to provide optimum dispersion of the nanoparticles.

■ FC Nanotechnology

Dynalene FC is designed to suppress the formation of ions by two mechanisms: (1) using non-ionic corrosion inhibitors that reduce the corrosion rate of material components and (2) utilizing highly charged nanoparticles which scavenge and bond to free ions, thus maintaining very low electrical conductivity even after years of service.

■ Dynalene's Fluid Care Program

Coupling our Dynalene fluids with a fluid care program can extend the life of your systems significantly. We offer yearly testing of the heat transfer fluid in your system and can track changes in the fluid year to year so adjustments can be made to keep your system working at its best.

Recommended Temperature Range:

Closed System:

-30°C (-22°F) to 80°C (176°F)

■ Properties of Dynalene FC

A comprehensive list of all thermo-physical properties of Dynalene FC can be found on page 2. For health and safety information or to request a Safety Data Sheet, contact our Dynalene sales representatives.

Composition:	Glycol, water, inhibitors, nanoparticles
Appearance:	Milky white
Odor:	Faint
Freezing Point:	FC-Bio: < -40°C (< -40°F) FC-EG: -33.9°C (-29°F)
Boiling Point:	>100°C (>212°F)
Flash Point:	None
Autoignition Temp:	None
Electrical Conductivity:	<10 $\mu\text{S}/\text{cm}$

■ Benefits of Choosing Dynalene FC

- Maintains low electrical conductivity
- Uses non-ionic corrosion inhibitor package
- Enhances fuel cell performance
- Non-toxic (FC-Bio)
- Non-flammable
- Available worldwide
- Cost-effective
- Total fluid care option
- Proven performance

■ Quantity & Availability

Dynalene FC products are offered in 1, 2.5, 5, 30, and 55-gallon containers. Pricing depends on quantity, and Dynalene, Inc. will work with you to try to fit your budget.

General Properties

Dynalene FC-Bio (non-toxic 1,3-propanediol base)

Temp °F	Viscosity cP	Thermal Cond. BTU/hr-ft.°F	Specific Heat BTU/lb.°F	Density lb/ft ³	Vapor Pressure psia
-40	681.5	0.188	0.847	67.62	
-30	681.5	0.188	0.847	67.27	
-20	396.5	0.191	0.851	66.91	
-10	237.0	0.194	0.855	66.54	
0	146.5	0.196	0.859	66.17	
10	93.1	0.199	0.864	65.80	
20	61.3	0.201	0.868	65.42	
30	41.5	0.204	0.872	65.03	
40	29.0	0.206	0.877	64.63	
50	20.8	0.208	0.881	64.23	
60	15.3	0.210	0.886	63.82	
70	11.5	0.211	0.890	63.40	
80	8.82	0.213	0.894	62.98	
90	6.89	0.214	0.899	62.55	
100	5.50	0.215	0.908	62.12	
120	3.67	0.218	0.916	61.23	1.5
140	2.60	0.220	0.925	60.32	2.5
160	1.93	0.221	0.934	59.38	4.1
180	1.49	0.221	0.943	58.41	6.5
200	1.19	0.220	0.951	57.42	9.9
220	0.98	0.222	0.960	56.41	14.8
240	0.83	0.222	0.967	55.36	21.4

Dynalene FC-EG (ethylene glycol base)

Temp °F	Viscosity cP	Thermal Cond. BTU/hr-ft.°F	Specific Heat BTU/lb.°F	Density lb/ft ³	Vapor Pressure psia
-20	40.4	0.193	0.730	69.26	
-10	27.3	0.197	0.735	69.12	
0	19.3	0.200	0.740	68.97	
10	14.3	0.204	0.745	68.82	
20	10.9	0.207	0.751	68.66	
30	8.48	0.210	0.756	68.49	
40	6.77	0.212	0.761	68.32	
50	5.50	0.215	0.766	68.14	
60	4.55	0.218	0.772	67.96	
70	3.81	0.220	0.777	67.77	
80	3.23	0.223	0.782	67.58	
90	2.76	0.225	0.781	67.38	
100	2.39	0.227	0.793	67.17	
120	1.82	0.230	0.803	66.74	1.3
140	1.43	0.233	0.814	66.28	2.2
160	1.15	0.236	0.824	65.80	3.6
180	0.94	0.238	0.835	65.30	5.8
200	0.78	0.240	0.845	64.78	9.0
220	0.66	0.242	0.856	64.23	13.4
240	0.60	0.244	0.866	63.70	19.5

Product Disclaimer

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