



Technical Data Sheet

DOWFROST™ LC Heat Transfer Fluid

Product Type

Inhibited propylene glycol-based heat transfer fluid.

Application

Heat management and corrosion protection in datacenter direct-to-chip liquid cooling applications.

Recommended Use Temperature Range

0°F¹(-20°C) to 195°F (90°C)

¹Lowest operating temperature is normally considered ~0°F (-20°C) due to the viscosity increase at this temperature. Freeze protection down to 14°F (-10°C) can be achieved using DOWFROST™ LC 25 Heat Transfer Fluid or down to -40°F (-40°C) using DOWFROST™ LC 55 Heat Transfer Fluid.

Description

With continual advancements of micro-processor technology, leading to increasingly higher heat loads, DOWFROST™ LC Heat Transfer Fluid is the optimal fluid for efficient heat removal in Datacom Equipment Cooling Systems (DECS). With a customized inhibitor package, DOWFROST™ LC Heat Transfer Fluid provides superior corrosion protection for liquid cooled, direct-to-chip applications with high surface area copper components.

Typical Product Specifications¹ of DOWFROST™ LC Heat Transfer Fluids

Fluid Parameter	Units	DOWFROST™ LC 25 Heat Transfer Fluid (PG25)	DOWFROST™ LC 55 Heat Transfer Fluid (PG55)
Propylene Glycol Concentration	Volume %	25	55
Freezing Point	°F	14	-40
	°C	-10	-40
pH		8.0–10.5	8.0–10.5
Reserve Alkalinity	mL 0.1N HCl	> 6.0	> 6.0
Thermal Conductivity	W/mK at 50°C	0.485	0.336
Specific Heat	kJ/kg-K at 50°C	3.94	3.43
Viscosity	mPa sec at 20°C	2.8	8.8
	mPa sec at 50°C	1.3	2.9
Volume Expansion	% from -40 to 90°C	5.2	7.7
Boiling Point	°C at 760 mmHg	101.4	105
Electrical Conductivity	micromho/cm	> 2,000	> 2,000

1. Typical properties, not to be construed as specifications.

Freezing Point¹ of DOWFROST™ LC Heat Transfer Fluid based on Glycol Concentration and Refractive Index¹

The propylene glycol concentration and, therefore, freezing point can be determined by measuring refractive index and consulting the table below. DOWFROST™ LC 25 Heat Transfer Fluid contains 25% propylene glycol, by volume, while DOWFROST™ LC 55 Heat Transfer Fluid contains 55% propylene glycol, by volume. Fluids should be used as-is and not further diluted.

Freezing Point		Propylene Glycol		Refractive Index	
°F	°C	Weight %	Volume %	20°C	25°C
15.6	-9.1	24.0	23.5	1.3622	1.3613
14.7	-9.6	25.0	24.5	1.3634	1.3625
13.7	-10.2	26.0	25.5	1.3646	1.3637
12.6	-10.8	27.0	26.5	1.3658	1.3649
11.5	-11.4	28.0	27.5	1.3670	1.3661

Freezing Point		Propylene Glycol		Refractive Index	
°F	°C	Weight %	Volume %	20°C	25°C
-36.7	-38.2	53.0	52.8	1.3949	1.3936
-39.7	-39.8	54.0	53.8	1.3960	1.3947
-42.8	-41.6	55.0	54.8	1.3971	1.3957
-46	-43.3	56.0	55.9	1.3982	1.3968
-49.3	-45.2	57.0	56.9	1.3993	1.3979

1. Typical properties, not to be construed as specifications.

Physical Properties¹ of DOWFROST™ LC 25 Heat Transfer Fluid

Temperature °C	Density kg/m ³	Specific Heat kJ/kg K	Thermal Conductivity W/mK	Viscosity mPa sec	Vapor Pressure kPa
-5	1041.9	3.81	0.425	7.80	0.004
0	1040.5	3.82	0.432	6.32	0.006
5	1038.8	3.83	0.438	5.13	0.009
10	1036.9	3.84	0.444	4.17	0.012
15	1034.9	3.85	0.450	3.42	0.017
20	1032.7	3.87	0.456	2.84	0.023
25	1030.3	3.88	0.462	2.39	0.031
30	1027.8	3.89	0.467	2.05	0.042
35	1025.2	3.90	0.472	1.78	0.055
40	1022.5	3.92	0.476	1.58	0.072
45	1019.7	3.93	0.481	1.41	0.093

1. Typical properties, not to be construed as specifications.

Physical Properties of DOWFROST™ LC 25 Heat Transfer Fluid (Cont.)

Temperature °C	Density kg/m ³	Specific Heat kJ/kg K	Thermal Conductivity W/mK	Viscosity mPa sec	Vapor Pressure kPa
50	1016.8	3.94	0.485	1.27	0.119
55	1013.7	3.95	0.488	1.15	0.152
60	1010.6	3.97	0.492	1.04	0.191
65	1007.3	3.98	0.495	0.93	0.239
70	1003.9	3.99	0.497	0.83	0.297
75	1000.4	4.00	0.500	0.75	0.367
80	996.7	4.01	0.502	0.69	0.450

Physical Properties¹ of DOWFROST™ LC 55 Heat Transfer Fluid

Temperature °C	Density kg/m ³	Specific Heat kJ/kg K	Thermal Conductivity W/mK	Viscosity mPa sec	Vapor Pressure kPa
-40	1085.9	2.98	0.280	1413.58	
-35	1083.9	3.01	0.283	703.58	
-30	1081.9	3.03	0.287	376.40	
-25	1079.8	3.06	0.291	214.54	0.001
-20	1077.5	3.08	0.294	129.29	0.001
-15	1075.1	3.11	0.298	81.85	0.002
-10	1072.7	3.13	0.302	54.11	0.002
-5	1070.1	3.16	0.305	37.18	0.004
0	1067.4	3.18	0.309	26.42	0.005
5	1064.7	3.21	0.312	19.36	0.007
10	1061.8	3.23	0.315	14.57	0.010
15	1058.8	3.26	0.318	11.23	0.015
20	1055.7	3.28	0.321	8.84	0.020
25	1052.5	3.30	0.324	7.09	0.027
30	1049.2	3.33	0.327	5.79	0.036
35	1045.8	3.35	0.329	4.80	0.048
40	1042.2	3.38	0.332	4.03	0.062
45	1038.6	3.40	0.334	3.43	0.081
50	1034.9	3.43	0.336	2.95	0.104
55	1031	3.45	0.338	2.56	0.132
60	1027.1	3.48	0.339	2.24	0.167

1. Typical properties, not to be construed as specifications.

Physical Properties of DOWFROST™ LC 55 Heat Transfer Fluid (Cont.)

Temperature °C	Density kg/m ³	Specific Heat kJ/kg K	Thermal Conductivity W/mK	Viscosity mPa sec	Vapor Pressure kPa
65	1023	3.50	0.341	1.98	0.209
70	1018.9	3.53	0.342	1.76	0.260
75	1014.6	3.55	0.343	1.58	0.320
80	1010.2	3.58	0.344	1.42	0.395

Product Stewardship

The Dow Chemical Company and its subsidiaries ("Dow") has a fundamental concern for all who make, distribute, and use its products, and for the environment in which we live. This concern is the basis for our Product Stewardship philosophy by which we assess the safety, health, and environmental information on our products and then take appropriate steps to protect employee and public health and our environment. The success of our Product Stewardship program rests with each and every individual involved with Dow products—from the initial concept and research, to manufacture, use, sale, disposal, and recycle of each product.

Safety Considerations

Material Safety Data (MSD) sheets are available from The Dow Chemical Company. MSD sheets are provided to help customers satisfy their own handling, safety and disposal needs and those that may be required by locally applicable health and safety regulations. MSD sheets are updated regularly, therefore, please request and review the most current MSD sheet before handling or using any product. These are available from the nearest Dow sales office.

Customer Notice

Dow encourages its customers to review their application of Dow products from the standpoint of human health and environmental quality. To help ensure that Dow products are not used in ways for which they were not intended or tested, Dow personnel will assist customers in dealing with ecological and products safety. Your Dow sales representative can arrange the proper contacts.

Contact:

www.dow.com/contact

NOTICE: No freedom from infringement of any patent owned by Dow or others is to be inferred. Because use conditions and applicable laws may differ from one location to another and may change with time, Customer is responsible for determining whether products and the information in this document are appropriate for Customer's use and for ensuring that Customer's workplace and disposal practices are in compliance with applicable laws and other government enactments. The product shown in this literature may not be available for sale and/or available in all geographies where Dow is represented. The claims made may not have been approved for use in all countries. Dow assumes no obligation or liability for the information in this document. References to "Dow" or the "Company" mean the Dow legal entity selling the products to Customer unless otherwise expressly noted. NO WARRANTIES ARE GIVEN; ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED.

