

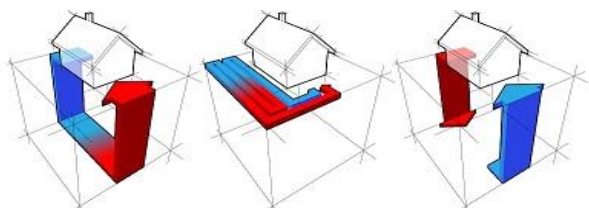


Heat Transfer Fluids

Kilfrost GEO

Technical Data Sheet

The advanced low viscosity non-toxic heat transfer fluid engineered for higher efficiency and safer cooling. This document lists the physical data for Kilfrost GEO use in ground and water source heat pump systems.



Volume ratio, freezing point and refractive index

%v/v	Freezing Point (°C)	Refractive Index
24	-10	1.3631
32	-15	1.3727
35	-17.5	1.3769
39	-20	1.3811
50	-30	1.3949
60	-40	1.4063

Density (g/cm³) of dilutions with temperature

T (°C)	Dilution %v/v					
	24%	32%	35%	39%	50%	60%
20	1.0997	1.1300	1.1442	1.1576	1.2047	1.2411
15	1.1017	1.1322	1.1464	1.1599	1.2073	1.2439
10	1.1037	1.1342	1.1485	1.1621	1.2098	1.2466
5	1.1055	1.1362	1.1506	1.1643	1.2122	1.2493
0	1.1073	1.1382	1.1526	1.1663	1.2145	1.2519
-5	1.1091	1.1401	1.1545	1.1683	1.2168	1.2545
-10	-	1.1419	1.1564	1.1703	1.2190	1.2570
-15	-	-	1.1582	1.1722	1.2212	1.2594
-20	-	-	-	-	1.2233	1.2618
-25	-	-	-	-	1.2253	1.2641
-30	-	-	-	-	-	1.2663

Kinematic viscosity (mm²/s) of dilutions with temperature

T (°C)	Dilution %v/v					
	24%	32%	35%	39%	50%	60%
20	1.7556	2.1594	2.3872	2.6435	4.0102	6.1348
15	2.0030	2.4796	2.7494	3.0547	4.6992	7.3187
10	2.3105	2.8801	3.2038	3.5723	5.5795	8.8641
5	2.6985	3.3890	3.7829	4.2348	6.7247	10.921
0	3.1958	4.0467	4.5339	5.0978	8.2453	13.720
-5	3.8439	4.9117	5.5256	6.2440	10.310	17.622
-10	-	6.0703	6.8602	7.7972	13.186	23.211
-15	-	-	8.6877	9.9429	17.301	31.461
-20	-	-	-	-	23.358	44.060
-25	-	-	-	-	32.499	64.080
-30	-	-	-	-	-	97.619
-35	-	-	-	-	-	159.32

Dynamic viscosity (mPa.s) of dilutions with temperature

T (°C)	Dilution %v/v					
	24%	32%	35%	39%	50%	60%
20	1.930	2.442	2.733	3.062	4.826	7.616
15	2.205	2.809	3.154	3.545	5.667	9.106
10	2.548	3.269	3.682	4.154	6.743	11.053
5	2.980	3.853	4.355	4.934	8.144	13.647
0	3.534	4.608	5.229	5.950	10.005	17.180
-5	4.256	5.601	6.383	7.300	12.535	22.112
-10	-	6.933	7.936	9.130	16.062	29.183
-15	-	-	10.064	11.660	21.115	39.630
-20	-	-	-	-	28.558	55.593
-25	-	-	-	-	39.804	80.972
-30	-	-	-	-	-	123.56
-35	-	-	-	-	-	202.42



**Specific heat (kJ/kg.°K)
of dilutions with temperature**

T (°C)	Dilution %v/v					
	24%	32%	35%	39%	50%	60%
20	3.503	3.308	3.217	3.129	2.827	2.615
15	3.487	3.289	3.196	3.108	2.805	2.596
10	3.471	3.270	3.176	3.087	2.782	2.577
5	3.455	3.251	3.156	3.066	2.760	2.557
0	3.439	3.232	3.136	3.045	2.738	2.538
-5	3.425	3.214	3.117	3.025	2.717	2.519
-10	-	3.197	3.098	3.005	2.695	2.499
-15	-	-	-	2.985	2.674	2.480
-20	-	-	-	-	2.653	2.461
-25	-	-	-	-	2.632	2.443
-30	-	-	-	-	-	2.424

**Thermal conductivity (W/m.°K) of dilutions
temperature**

T (°C)	Dilution %v/v					
	24%	32%	35%	39%	50%	60%
20	0.460	0.451	0.447	0.443	0.423	0.386
15	0.454	0.445	0.441	0.437	0.418	0.381
10	0.448	0.439	0.435	0.431	0.412	0.376
5	0.442	0.433	0.429	0.425	0.407	0.371
0	0.436	0.427	0.423	0.419	0.401	0.366
-5	0.430	0.421	0.417	0.413	0.395	0.361
-10	-	0.414	0.411	0.407	0.390	0.356
-15	-	-	0.405	0.401	0.384	0.351
-20	-	-	-	-	0.378	0.346
-25	-	-	-	-	0.373	0.341
-30	-	-	-	-	-	0.336

Materials compatibility

Kilfroast GEO is shown to be compatible with the following elastomers under the standard operating temperatures of a thermal fluid in closed loop cooling systems;

Butyl Rubber	(IIR)
Ethylene	(EPDM)
Epoxy Resins	(EP)
Fluorocarbon Elastomers	(FPM)
Nitrile Rubber	(NBR)
Polyamides	(PA)
Polyethylene	(L/HDPE)
Polypropylene	(PP)
Polytetrafluoroethylene	(PTFE)
Polyvinyl Chloride	(PVC)
Styrene Butadiene	(SBR)

Please note, aside from coolant composition, the quality and grade of elastomeric seals will also have an impact on compatibility. In particular, the quantity and type of filling agents and the processing techniques used in the production of the elastomeric components will affect the resulting compatibility with any coolant. Please contact Kilfroast for information on compatibility with any elastomer not listed in this guide.

Further information available from:
Kilfroast.com