



Heat transfer fluids

THERMERA®



Thermera® AC is an antifreeze and heat transfer fluid specially formulated for heating, geothermal and heat pump systems. It contains an organoleptic in accordance with French regulatory requirements for domestic hot water applications.

Thermera® R is an antifreeze and coolant specially formulated for refrigeration systems.

Based on a natural component derived from sugar production (betaine), it is non-toxic and has an extremely low impact on the environment. It meets the requirements of heating, ventilation and air conditioning systems for buildings, as well as those of the food processing and refrigeration industries.

At concentrations above 20%, betaine inhibits microbial growth. **Thermera®** has excellent anti-corrosion properties, low viscosity and high thermal and microbiological stability.

Thermera® is available in 6 designated concentrations with their freezing points:

- **Thermera® -15° (or Thermera® AC)**
- **Thermera® -20°**
- **Thermera® -25°**
- **Thermera® -30°**
- **Thermera® -35° (or Thermera® AC)**
- **Thermera® -40°**

Thermera® AC is **90% to 100% biodegradable** in 28 days, with ultimate intrinsic biodegradability without preadaptation and primary intrinsic biodegradability according to OCDE 302B criteria extrapolated to a finished product.

1. HOW TO USE

Thermera® is ready to use and must never be diluted.

Heat transfer fluids should never be used in an open circuit, as evaporation will alter their concentration and the oxygen dissolved in the solution will cause oxygen corrosion.

Thermera® can be heated to a maximum continuous temperature of +100°C. Above this temperature, the solution will degrade slowly but will remain non-corrosive.

Compatibility: **Thermera®** is compatible with the usual metals: copper, brass, tin, cast iron, carbon steel and stainless steel. Galvanised steel, zinc and coated steel are not permitted.

It is compatible with standard pumps, elastomers and seals used in traditional systems with glycol-based solutions, such as neoprene, hypalon, EPDM, viton, buna N, HDPE, PP, PTFE (Teflon), PVDF, TS (Nitrile).

It is advisable to install "under-pressure" air vents in the circuit, or at least a manual air vent, ball valves, and welded and flanged joints. Filters must be cleanable.



It is advisable to clean the system before filling with **Thermera®**.

If the system is scaled or heavily oxidised with incrustations, clean with **Deoxyclean**, then rinse with Dispersant D.

If the system contains non-incrusted metal oxide deposits, clean with **Dispersant D**.

(see product data sheets available at www.climalife.dehon.com).

Never leave the system empty after cleaning and fill with **Thermera®** as soon as possible.

Fill via the valve located in the lower zone of the system and test operation.

In the event of leaks, the areas where **Thermera®** leaks will show slight white deposits made up of non-toxic and harmless crystals which can be wiped off with a damp cloth.

Annual monitoring by APC* analysis is recommended to check the condition and correct operation of the installation and the **Thermera®**.

Thermera® must be stored in its original hermetically sealed packaging in a closed, covered room.

2. PHYSICO-CHEMICAL PROPERTIES OF THERMERA®

2.1 Principal characteristics

Specifications	Thermera® -15	Thermera® -20	Thermera® -25	Thermera® -30	Thermera® -35	Thermera® -40
Appearance	Clear caramel-brown liquid					
pH à 20°C	8 - 10					
Alkaline reserve over 20ml	1 ml					
Boiling temperature (°C)	104	105	106	107	108	109
Density at 20°C (kg/dm³)	1.066	1.074	1.082	1.086	1.093	1.097

2.2 Thermera® corrosion protection

Thermera® is additivated to protect against corrosion. These tests were carried out on **Thermera®** -15.

Metal	Mass variation (mg / test piece)	Standard limits NF R 15-601	Standard limites ASTM D 3306
Copper	± 3	[- 5 ; +5]	[- 10 ; +10]
Brass	± 3	[- 5 ; +5]	[- 10 ; +10]
Solder	± 3	[- 5 ; +5]	[- 30 ; +30]
Cast Aluminium	± 2	[- 10 ; +20]	[- 30 ; +30]
Cast Iron	± 2	[- 4 ; +4]	[- 10 ; +10]
Steel	± 1	[- 2,5 ; +2,5]	[- 10 ; +10]

Normative reference ASTM 1384 test method, at a temperature of 50°C.

2.3 Property tables

Density (kg/m³)

Thermera®	-15	-20	-25	-30	-35	-40	
Temperature (°C)	FREEZING ZONE						
- 35							1120
- 30							1118
- 25							1116
- 20							1114
- 15							1112
- 10	1077	1086	1095	1099	1106	1110	
- 5	1075	1084	1093	1097	1104	1108	
0	1074	1082	1091	1095	1102	1106	
5	1072	1080	1089	1093	1100	1104	
10	1070	1078	1087	1091	1097	1102	
15	1068	1076	1085	1089	1095	1099	
20	1066	1074	1082	1086	1093	1097	
25	1064	1072	1080	1084	1090	1095	
30	1062	1070	1078	1081	1088	1092	
35	1060	1068	1075	1079	1086	1090	
40	1058	1065	1073	1076	1083	1087	
45	1055	1063	1070	1073	1081	1085	
50	1052	1060	1068	1070	1078	1082	
55	1050	1058	1065	1067	1076	1080	
60	1047	1055	1063	1064	1073	1077	
65	1044	1053	1060	1060	1071	1074	
70	1041	1050	1057	1057	1069	1072	
75	1038	1047	1055	1054	1066	1069	
80	1034	1045	1052	1050	1064	1066	
85	1031	1042	1050	1046	1062	1064	
90	1027	1039	1047	1043	1059	1061	
95	1024	1037	1045	1039	1057	1058	
100	1020	1034	1042	1035	1055	1056	

*bibliographical data



Kinematic viscosity (mm²/s)

Thermera®	-15	-20	-25	-30	-35	-40				
Temperature (°C)	FREEZING ZONE									
- 35							161.84			
- 30							87.18	105.89		
- 25							40.93	60.10	72.35	
- 20							26.07	29.93	42.96	51.30
- 15							13.97	19.73	22.53	31.67
- 10	9.36	11.00	15.30	17.39	23.99	28.25				
- 5	7.54	8.84	12.12	13.72	18.60	21.77				
0	6.19	7.24	9.79	11.04	14.73	17.14				
5	5.16	6.01	8.04	9.03	11.88	13.75				
10	4.36	5.07	6.70	7.50	9.73	11.21				
15	3.72	4.32	5.65	6.32	8.09	9.28				
20	3.22	3.73	4.83	5.38	6.81	7.78				
25	2.81	3.25	4.17	4.64	5.80	6.61				
30	2.48	2.86	3.64	4.03	5.00	5.67				
35	2.20	2.53	3.20	3.54	4.34	4.91				
40	1.97	2.26	2.84	3.13	3.81	4.29				
45	1.77	2.04	2.53	2.79	3.36	3.78				
50	1.60	1.84	2.28	2.50	2.99	3.35				
55	1.46	1.67	2.06	2.26	2.68	3.00				
60	1.34	1.53	1.87	2.05	2.42	2.69				
65	1.23	1.41	1.71	1.87	2.19	2.43				
70	1.14	1.30	1.57	1.71	1.99	2.21				
75	1.05	1.20	1.45	1.58	1.83	2.02				
80	0.98	1.12	1.34	1.46	1.68	1.85				
85	0.92	1.04	1.24	1.35	1.55	1.71				
90	0.86	0.98	1.16	1.26	1.43	1.58				
95	0.81	0.92	1.09	1.18	1.33	1.46				
100	0.76	0.87	1.02	1.10	1.24	1.36				

*bibliographical data



Heat by mass (kJ/kgK)

Thermera®	-15	-20	-25	-30	-35	-40
Temperature (°C)	FREEZING ZONE					
- 35						2.669
- 30					2.763	2.690
- 25				2.894	2.783	2.711
- 20			2.960	2.911	2.803	2.732
- 15		3.039	2.972	2.929	2.822	2.752
- 10	3.112	3.051	2.985	2.947	2.841	2.771
- 5	3.122	3.063	2.999	2.965	2.860	2.790
0	3.132	3.075	3.013	2.983	2.879	2.809
5	3.143	3.086	3.028	3.001	2.897	2.827
10	3.153	3.097	3.043	3.019	2.915	2.845
15	3.164	3.108	3.058	3.036	2.933	2.863
20	3.174	3.118	3.073	3.054	2.950	2.880
25	3.184	3.128	3.088	3.071	2.967	2.896
30	3.194	3.137	3.103	3.087	2.983	2.912
35	3.204	3.147	3.117	3.103	2.999	2.928
40	3.213	3.156	3.130	3.119	3.015	2.943
45	3.222	3.164	3.143	3.134	3.029	2.957
50	3.230	3.172	3.155	3.148	3.044	2.971
55	3.237	3.180	3.166	3.161	3.057	2.985
60	3.244	3.188	3.176	3.174	3.070	2.998
65	3.250	3.195	3.184	3.186	3.083	3.011
70	3.255	3.201	3.191	3.196	3.095	3.023
75	3.259	3.208	3.197	3.206	3.106	3.035
80	3.262	3.214	3.200	3.214	3.116	3.046
85	3.264	3.220	3.202	3.221	3.125	3.057
90	3.265	3.225	3.201	3.227	3.134	3.067
95	3.264	3.230	3.198	3.231	3.142	3.077
100	3.262	3.235	3.193	3.234	3.149	3.086

*bibliographical data



Conductivity (W/m, °C)

Thermera®	-15	-20	-25	-30	-35	-40
Temperature (°C)	FREEZING ZONE					
- 35						0.332
- 30					0.346	0.333
- 25				0.356	0.348	0.335
- 20			0.365	0.358	0.349	0.336
- 15		0.384	0.367	0.359	0.351	0.338
- 10	0.404	0.386	0.369	0.361	0.352	0.339
- 5	0.406	0.388	0.371	0.362	0.354	0.341
0	0.408	0.390	0.373	0.364	0.355	0.342
5	0.410	0.392	0.375	0.365	0.357	0.344
10	0.412	0.394	0.377	0.367	0.358	0.345
15	0.414	0.396	0.379	0.368	0.360	0.347
20	0.416	0.398	0.381	0.370	0.361	0.348
25	0.418	0.400	0.383	0.371	0.363	0.350
30	0.420	0.402	0.385	0.373	0.364	0.351
35	0.422	0.404	0.387	0.374	0.366	0.353
40	0.424	0.406	0.389	0.376	0.367	0.354
45	0.426	0.408	0.391	0.377	0.369	0.356
50	0.428	0.410	0.393	0.379	0.370	0.357
55	0.430	0.412	0.395	0.380	0.372	0.359
60	0.432	0.414	0.397	0.382	0.373	0.360
65	0.434	0.416	0.399	0.383	0.375	0.362
70	0.436	0.418	0.401	0.385	0.376	0.363
75	0.438	0.420	0.403	0.386	0.378	0.365
80	0.440	0.422	0.405	0.388	0.379	0.366
85	0.442	0.424	0.407	0.389	0.381	0.368
90	0.444	0.426	0.409	0.391	0.382	0.369
95	0.446	0.428	0.411	0.392	0.384	0.371
100	0.448	0.430	0.413	0.394	0.385	0.372

*bibliographical data

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