Heat transfer fluids

THERMERA®

Non contractual photo

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 2 designated concentrations with their freezing points:

- **Thermera® AC** (-15°)
- **Thermera R®** (-35°C)

Thermera® 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.

The maximum temperature for continuous use of all **Thermera®** products is +110°C. Above this temperature, betaine degrades slowly and above 150°C, the process accelerates. Betaine degradation products are non-corrosive and harmless to humans and the environment.

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.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® R	Thermera® AC
Appearance	Clear, caramel-brown liquid	
pH at 20°C	8 - 10	
Alkaline reserve over 20ml	1 ml	
Boiling temperature (°C)	104	108
Density at 20°C (kg/dm³)	1.066	1.093

2.2Property tables

Density (kg/m³)

Temperature (°C)	Thermera® AC	Thermera® R
- 30	-	1113
- 25	-	1112
- 20	-	1110
- 15	-	1108
- 10	1076	1106
- 5	1075	1104
0	1073	1102
5	1072	1100
10	1070	1097
15	1068	1095
20	1066	1093
25	1064	1090
30	1062	1088
35	1060	1086
40	1058	1083
45	1055	1081
50	1052	1078
55	1050	1076
60	1047	1073
65	1044	1071

*bibliographical data

Kinematic viscosity (mm²/s)

Temperature [°C]	Thermera® AC	Thermera® R
-30	-	87.18
-25	-	60.10
-20	-	42.96
-15	-	31.67
-10	9.36	23.99
-5	7.54	18.60
0	6.19	14.73
5	5.16	11.88
10	4,36	9.73
15	3.72	8.09
20	3.22	6.81
25	2.81	5.80
30	2.48	5.00
35	2.20	4.34
40	1.97	3.81
45	1.77	3.36
50	1.60	2.99
55	1.46	2.68
60	1.34	2.42
65	1.23	2.19

*bibliographical data

Heat by mass (kJ/kgK)

Temperature [°C]	Thermera® AC	Thermera® R
-30	-	2.763
-25	-	2.783
-20	-	2.803
-15	-	2.822
-10	3.112	2.841
-5	3.122	2.860
0	3.132	2.879
5	3.143	2.897
10	3.153	2.915
15	3.164	2.933
20	3.174	2.950
25	3.184	2.967
30	3.194	2.983
35	3.204	2.999
40	3.213	3.015
45	3.222	3.029
50	3.230	3.044
55	3.237	3.057
60	3.244	3.070
65	3.250	3.083

*bibliographical data

Conductivity (W/m, °C)

Temperature [°C]	Thermera® AC	Thermera® R
-30	-	0.346
-25	-	0.348
-20	-	0.349
-15	-	0.351
-10	0.386	0.352
-5	0.388	0.354
0	0.390	0.355
5	0.392	0.357
10	0.394	0.358
15	0.396	0.360
20	0.398	0.361
25	0.400	0.363
30	0.402	0.364
35	0.404	0.366
40	0.406	0.367
45	0.408	0.369
50	0.410	0.370
55	0.412	0.372
60	0.414	0.373
65	0.416	0.378

*bibliographical data

1.3 Thermera® corrosion protection

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

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.