

# NuTherm HC-10

## Technical Data Sheet

## NuTherm HC-10

High performance, Potassium Formate/Water-based closed system heat transfer fluid ideal for low temperature applications

### Description:

**NuTherm HC-10** is a high performance heat transfer fluid designed as an alternative to less effective glycol, PAG, and Calcium Chloride open bath fluids. **NuTherm HC-10** is non-toxic, non-flammable, and has a robust corrosion inhibition package making it ideal for use in closed systems down to  $-10^{\circ}\text{C}$  ( $14^{\circ}\text{F}$ ) and up to  $218^{\circ}\text{C}$  ( $425^{\circ}\text{F}$ ).

**NuTherm HC-10** has superior thermophysical properties in comparison to traditional closed system heat transfer fluids, including higher thermal conductivity and specific heat, as well as lower viscosity, making it an extraordinarily more efficient closed system coolant within its operational temperature range. **NuTherm HC-10** is non-hazardous, biodegradable, CFC-free, antimicrobial, and has exceptional thermal stability at high temperatures in comparison to glycols, PAG's, Calcium Chloride, Trichloroethylene and Methylene Chloride (Dichloromethane) making it an intelligent alternative. **NuTherm HC-10** is formulated with an incredibly robust and efficient corrosion inhibition package, allowing the product to be used on most metals including Stainless Steel, Carbon Steel, Cast Steel, Copper and its alloys (Brass & Bronze), Monel, Nickel, Hastelloy, Inconel, Tantalum, Titanium, Titanium alloys (Ti6Al4V), Aluminium and Cast Iron. Do not use on Zinc, Zinc-plated or galvanized metals, Magnesium. **NuTherm HC-10** corrosion tests at  $80^{\circ}\text{C}$  show incredible results of x mmpy (x mpy) on C260 Brass alloys, x mmpy (x mpy) on 304L Stainless Steel, and x mmpy (x mpy) on AL1100 Aluminium. **NuTherm HC-10 does not produce pitting corrosion on Aluminium alloys like other Potassium Formate open bath heat transfer fluids.**

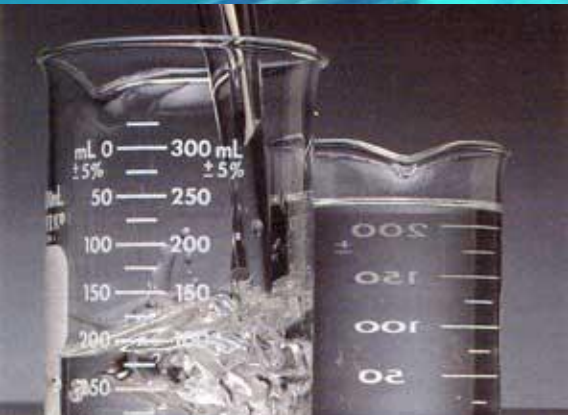
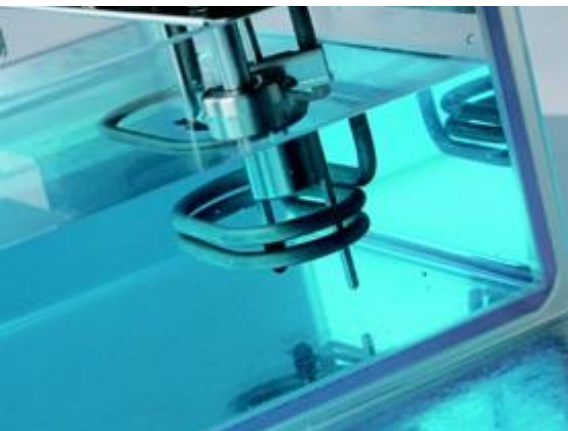
\*mmpy = millimeters per year; mpy = mils per year (1 mil = 0.001 inch); In general, uniform corrosion rates less than 2 mpy are acceptable for most applications. Corrosion rates between 2 and 10 mpy are considered marginal and may impact useful life of equipment. Corrosion rates greater than 10 mpy are unacceptable.



## Product Benefits

- High thermal conductivity
- High specific heat
- Low viscosity
- Non-toxic, non-flammable
- High metal compatibility
- Biodegradable
- Environmentally friendly (CFC-free)
- Robust corrosion inhibition
- Economical
- Pre-mixed solutions

# NuTherm HC-10 Physical Properties



## NuTherm HC-10

BULK DENSITY	9.93 #/gal
SPECIFIC GRAVITY @ 20 °C	1.190 g/cm <sup>3</sup>
TEMPERATURE RANGE (CLOSED SYSTEM)	-10 to 218°C (14 to 425°F)
THERMAL STABILITY	HIGH
ODOR	ODORLESS
FLASH POINT (°C)	NONE
FIRE POINT (°C)	NONE
MELTING POINT / FREEZING POINT	-20°C (-58°F)
BOILING POINT	108°C (226°F)
pH	8.0 to 8.5
APPEARANCE and COLOR	CLEAR, COLORLESS to AMBER

**Availability:** 5-gallon pails, 55-gallon drums, 275-gallon tote-bins, and bulk tankers.

**Shipment:** Non-Hazardous for transport via DOT, IMDG, and IATA.

**Storage:** Keep out of direct sunlight. Keep from freezing. Store between 4 to 38°F (40-100°F).

**Disposal:** Dispose of in accordance with local, state, and federal regulations.

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### EMERGENCY OVERVIEW:

This product may cause serious irritation to the eyes.

### SAFETY:

Please make sure you have read and understand the product label and SDS before using this product. Use proper chemical hygiene when handling product. Wash thoroughly after handling. Observe label precautions. This product is classified and labeled according to the Globally Harmonized System (GHS).

# NuTherm HC-10 Properties



Temperature (°F)	Viscosity (cPs)	Thermal Conductivity (BTU/hr•ft•°F)	Specific Heat (BTU/lb•°F)	Density (lb/ft <sup>3</sup> )
14	3.00	0.291	0.776	75.0
20	2.80	0.293	0.778	74.9
40	2.30	0.299	0.784	74.6
60	1.90	0.306	0.791	74.3
80	1.60	0.312	0.797	74.0
90	1.50	0.316	0.801	73.8
100	1.40	0.319	0.804	73.6
120	1.20	0.326	0.811	73.3
140	1.00	0.332	0.817	73.0
160	0.90	0.339	0.824	72.7
180	0.79	0.345	0.830	72.4
200	0.71	0.352	0.837	72.1
220	0.63	0.358	0.843	71.8
240	0.57	0.365	0.850	71.5
260	0.52	0.371	0.857	71.1
280	0.47	0.378	0.863	70.8
300	0.44	0.384	0.870	70.5
320	0.40	0.391	0.876	70.2
340	0.37	0.397	0.883	69.9
360	0.34	0.404	0.890	69.6
380	0.32	0.410	0.896	69.3
400	0.30	0.417	0.903	68.9
420	0.28	0.424	0.909	68.6
425	0.28	0.425	0.911	68.6

Temperature (°C)	Viscosity (mPa•s)	Thermal Conductivity (W/m•K)	Specific Heat (kJ/kg•K)	Density (kg/m <sup>3</sup> )
-10	3.00	0.494	3.246	1204
-0	2.50	0.504	3.271	1199
10	2.10	0.514	3.296	1195
20	1.80	0.524	3.320	1190
30	1.50	0.534	3.345	1186
40	1.30	0.544	3.370	1181
50	1.20	0.554	3.395	1177
600	1.00	0.564	3.420	1172
70	0.91	0.574	3.444	1167
80	0.81	0.584	3.469	1163
90	0.73	0.594	3.494	1158
100	0.66	0.604	3.519	1154
110	0.60	0.614	3.544	1149
120	0.55	0.624	3.568	1145
130	0.51	0.634	3.593	1140
140	0.47	0.644	3.618	1136
150	0.43	0.654	3.643	1131
160	0.40	0.664	3.668	1127
170	0.37	0.674	3.692	1122
180	0.35	0.684	3.717	1118
190	0.33	0.694	3.742	1113
200	0.31	0.704	3.767	1109
210	0.29	0.714	3.792	1104
218	0.28	0.722	3.811	1101

# NuTherm HC-10 Properties



## Vapor Pressure

Temperature (°C)	Temperature (°F)	Vapor Pressure (psia)
20	68	0.33
30	86	0.42
40	104	0.69
50	122	1.24
60	140	2.16
70	158	3.57
80	176	5.62
90	194	8.47
100	212	12.3
110	230	17.4
120	248	24.0
130	266	32.4
140	284	43.1
150	302	56.6
160	320	73.3
170	338	93.9
180	356	119.0
190	374	149.6
200	392	186.5
210	410	230.6
218	424	271.9

## Gasket & Polymer Compatibility

Material	Compatibility
Nitrile / NBR	Excellent to 150°F, Good above 150°F
Hydrogenated Nitrile / HNBR	Excellent
Ethylene Propylene / EP, EPDM	Excellent
Chloropropene	Good
Isobutylene / IIR Latex	Good
Synthetic Isoprene / NR (Natural Rubber)	Good / Excellent
Natural Isoprene / NR (Natural Rubber)	Good / Excellent
Chemraz Kalrez / FFKM	Excellent
PTEF / FEP (Teflon)	Excellent
Gylon Style 3500,3504, 3510	Excellent
Nylon / Polyamide	Good / Excellent
Polyvinyl Chloride / PVC	Good / Excellent
Polyethylene	Excellent
Polypropylene	Excellent
Epoxy	Good / Excellent
Graphite	Excellent

## Metals Compatibility (Closed System)

Material	Compatibility
Aluminium*	Compatible
Cast Steel	Compatible
Monel	Compatible
Brass	Compatible
Copper	Compatible
Nickel	Compatible
Bronze	Compatible
Hastelloy	Compatible
Stainless Steel	Compatible
Carbon Steel	Compatible
Inconel	Compatible
Tantalum	Compatible
Cast Iron*	Compatible
Incoloy 825	Compatible
Titanium	Compatible
Ti6Al4V	Compatible
Zinc**	Incompatible
Zinc Plating**	Incompatible
Galvanized Surfaces**	Incompatible
Magnesium**	Incompatible

\*Recommended for use only in closed, airtight systems that have been purged with an inert gas, such as Nitrogen, in the headspace.

\*\*May be used for support framing, electrical conduit, and structural components. If product spills or splashes on any metals, rinse immediately with water to prevent surface discoloration.