

NuTherm HC-50

Technical Data Sheet

NuTherm HC-50

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

Description:

NuTherm HC-50 is a high performance heat transfer fluid designed as an alternative to less effective glycol, PAG, and Calcium Chloride closed system fluids. **NuTherm HC-50** is non-toxic, non-flammable, and has a robust corrosion inhibition package making it ideal for use in closed systems down to -50°C (-58°F) and up to 218°C (425°F).

NuTherm HC-50 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-50 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-50** 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-50** corrosion tests at 80°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-50 does not produce pitting corrosion on Aluminium alloys like other Potassium Formate open bath heat transfer fluids.**

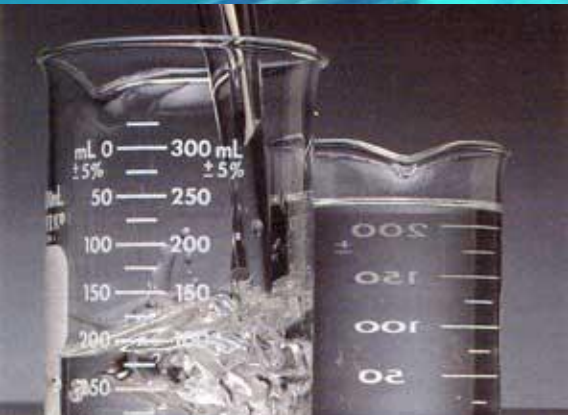
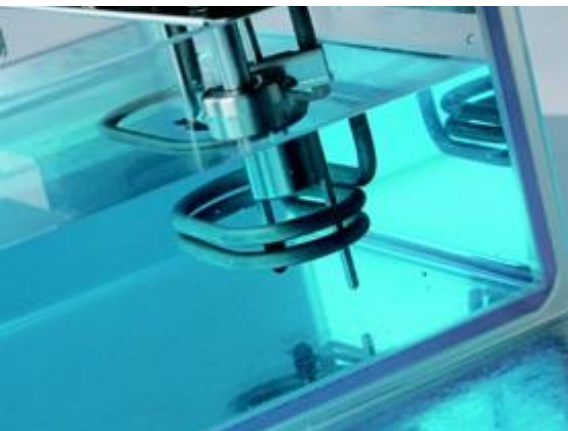
*mmpy = millimeters per year; mpy = mils per year (1 mil = 0.001 inch); In general, uniform corrosion rates less than 2 mpy are acceptable for most applications. Corrosion rates between 2 and 10 mpy are considered marginal and may impact useful life of equipment. Corrosion rates greater than 10 mpy per year 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-50 Physical Properties



NuTherm HC-50

BULK DENSITY	11.19 #/gal
SPECIFIC GRAVITY @ 20 °C	1.341 g/cm ³
TEMPERATURE RANGE (CLOSED SYSTEM)	-51 to 110°C (-60 to 230°F)
THERMAL STABILITY	HIGH
ODOR	ODORLESS
FLASH POINT (°C)	NONE
FIRE POINT (°C)	NONE
MELTING POINT / FREEZING POINT	-55°C (-67°F)
BOILING POINT	118°C (244°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-50 Properties



Temperature (°F)	Viscosity (cPs)	Thermal Conductivity (BTU/hr•ft•°F)	Specific Heat (BTU/lb•°F)	Density (lb/ft ³)
-58	38.40	0.256	0.612	85.9
-50	28.30	0.258	0.615	85.7
-40	20.40	0.262	0.617	85.6
-20	11.90	0.268	0.622	85.2
0	7.70	0.275	0.628	84.8
20	5.40	0.281	0.633	84.4
40	4.20	0.288	0.638	84.0
60	3.40	0.294	0.643	83.6
80	2.90	0.301	0.649	83.3
100	2.40	0.307	0.654	82.9
120	2.10	0.314	0.659	82.5
140	1.80	0.320	0.664	82.1
160	1.60	0.327	0.669	81.7
180	1.40	0.333	0.675	81.3
200	1.30	0.340	0.680	80.9
220	1.20	0.346	0.685	80.6
240	1.10	0.353	0.690	80.2
260	0.97	0.356	0.696	79.8
280	0.89	0.366	0.701	79.4
300	0.82	0.373	0.706	79.0
320	0.76	0.379	0.711	78.6
340	0.70	0.386	0.717	78.3
360	0.65	0.392	0.722	77.9
380	0.61	0.399	0.727	77.5
400	0.57	0.405	0.732	77.1
420	0.53	0.412	0.737	76.7
425	0.53	0.413	0.739	76.6

Temperature (°C)	Viscosity (mPa•s)	Thermal Conductivity (W/m•K)	Specific Heat (kJ/kg•K)	Density (kg/m ³)
-50	38.40	0.435	2.563	1378
-40	20.40	0.445	2.583	1373
-30	12.50	0.455	2.602	1367
-20	8.40	0.465	2.622	1362
-10	5.99	0.475	2.642	1356
0	4.70	0.485	2.661	1351
10	3.80	0.495	2.681	1345
20	3.20	0.505	2.701	1340
30	2.70	0.515	2.720	1334
40	2.40	0.525	2.740	1328
50	2.10	0.535	2.760	1323
60	1.80	0.545	2.780	1317
70	1.60	0.555	2.799	1312
80	1.50	0.565	2.819	1306
90	1.30	0.575	2.839	1301
100	1.20	0.585	2.858	1295
110	1.10	0.595	2.878	1290
120	1.00	0.605	2.898	1284
130	0.94	0.615	2.917	1279
140	0.87	0.625	2.937	1273
150	0.81	0.635	2.957	1267
160	0.76	0.645	2.977	1262
170	0.71	0.655	2.996	1256
180	0.66	0.665	3.016	1251
190	0.62	0.675	3.036	1245
200	0.58	0.685	3.055	1240
210	0.55	0.6945	3.075	1234

NuTherm HC-50 Properties



Vapor Pressure

Temperature (°C)	Temperature (°F)	Vapor Pressure (psia)
20	68	0.23
30	86	0.28
40	104	0.45
50	122	0.81
60	140	1.43
70	158	2.39
80	176	3.78
90	194	5.71
100	212	8.31
110	230	11.70
120	248	16.20
130	266	21.90
140	284	29.10
150	302	38.20
160	320	49.50
170	338	63.30
180	356	80.30
190	374	100.90
200	392	125.80
210	410	155.60
218	424	183.6

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.