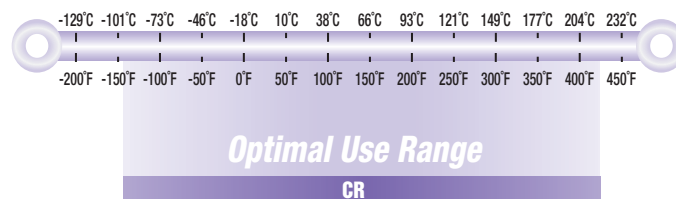


Paratherm-CR®

Heat Transfer Fluid



Low-Temperature Process Cooling to -96°C (-140°F)

ENGINEERING BULLETIN CR 809

Paratherm CR® heat transfer fluid is a unique blend of synthetic components formulated to provide superior cooling performance in closed-loop heat-transfer systems operating down to -96°C (-140°F) yet is capable of maintenance free operation up to 210°C (425°F).

Applications include:

- Fine and specialty chemical processing
- Pharmaceutical production
- Environmental test chambers

Increased capacity in existing systems

In the cryogenic temperature range, Paratherm CR has significantly lower viscosity than silicone based heat transfer fluids. Simply replacing existing fluid with Paratherm CR can increase the cooling output of the system by up to 50% at -70°C and up to 70% at -90°C.

Easier to work with

Paratherm CR will not leave a slippery residue on surfaces if it leaks out. Water will not accelerate fluid degradation or cause significant changes in the freeze point. Testing has shown that Paratherm CR will not cause copper tubing to oxidize if water is present, thus offering designers more flexibility in material selection.

Fluid storage

Drums should be stored inside to prevent water from getting into the heat transfer fluid. If sealed drums must be left outdoors, they should be stored on their sides. While unopened totes are weatherproof, they should not be stacked if left outdoors. If the fluid is to be stored outside below its minimum pumpable temperature, the containers should be moved indoors to warm up before charging the fluid into the system.

Replacing existing fluid

In many cases, changing fluid involves a straightforward drain and fill. There are very

Typical Properties*

Product Name	Paratherm CR
Chemical Name	Synthetic Hydrocarbon Blend
Appearance	Water White Liquid
Odor	Sweet Odor
Maximum Recommended Film Temperature	550°F/288°C
Maximum Recommended Operating Temperature-Fired Heaters	Not Recommended
Maximum Recommended Operating Temperature-All Others	425°F/218°C
Minimum Operating Temperature 20 cPs (20 mPa-s)	-140°F/-96°C
Minimum Start-up Temperature 300 cPs (300 mPa-s)	-185°F/-121°C
Viscosity at 60°F/15.5°C cSt (mm ² /sec)	1.1
Density at 60°F/15.5°C lb/gal (kg/m ³)	6.94 (831)
Flash Point Pensky-Martens Closed Cup (D93)	>103°F/40°C
Autoignition Temperature (maximum 10 sec ignition delay)	>430°F/221°C
Vapor Pressure @ maximum operating temperature psia (kPa)	21.8 (150)
Average Volume Expansion, %/100°F (100°C)	8.7 (15.7)
Average Molecular Weight	130
Dielectric Breakdown voltage D1816-04 (kV, 0.1" gap)	36.11
Dielectric Constant (1 KHz) D924-04	2.59
Dissipation Factor (1 KHz) D924-04	0.00145
Volume Resistivity at 100V (Ω-cm) D257-07	8.3X10 ¹¹
Heat of Combustion (approximate) BTU/lb (kJ/kg)	17,000 (39,400)
Heat of Vaporization (approximate) BTU/lb (kJ/kg)	148 (343)
Pour Point D97	<-193°F/-125°C

* These are typical laboratory values, and are not guaranteed for all samples

few fluids that are so incompatible that 10-15% residue will affect the new Paratherm. If you have any questions, contact us.

Charging new systems

Unless required for product-quality reasons, new systems do not need to be cleaned before Paratherm is charged. The amount of chemical coatings, oils, and other manufacturing residues are usually not enough to affect the fluid life. All that is necessary is to install a Y-strainer with a minimum 60-mesh screen upstream of the pump to catch any metal or welding residue. The screen can be removed once the system has been cycled twice through its operating temperature.

Fluid analysis

The fluid in new systems should be tested within the 9 to 12 months of start-up. New fluid in existing systems should be tested within the first month of operation to establish a baseline for future testing.



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Paratherm CR® Heat Transfer Fluid

Physical Properties

°F	°C	Specific Gravity	Density		Viscosity			Specific Heat BTU/(lb-°F)	Thermal Conductivity BTU/(hr-ft-°F/ft)	Vapor Pressure	
			lb/gal	lb/ft³	cSt	cP	lb/(hr-ft)			mm Hg	psia
-150	-101	0.9492	7.93	59.32	37.9	36.0	87.1	0.3512	0.0863		
-100	-73	0.9212	7.70	57.57	5.51	5.08	12.3	0.3759	0.0851		
-50	-46	0.8932	7.46	55.82	2.75	2.46	5.95	0.4006	0.0838		
0	-18	0.8653	7.23	54.08	1.83	1.58	3.82	0.4252	0.0825	0.01	
50	10	0.8373	7.00	52.33	1.09	0.91	2.21	0.4499	0.0814	2.51	0.05
100	38	0.8093	6.76	50.58	0.82	0.66	1.60	0.4745	0.0802	10.0	0.19
150	66	0.7813	6.53	48.83	0.66	0.52	1.25	0.4992	0.0791	33.0	0.64
200	93	0.7534	6.29	47.08	0.56	0.42	1.02	0.5239	0.0779	89.0	1.72
250	121	0.7254	6.06	45.34	0.50	0.36	0.87	0.5485	0.0766	210	4.06
300	149	0.6974	5.83	43.59	0.45	0.31	0.76	0.5732	0.0752	450	8.70
350	177	0.6695	5.59	41.84	0.42	0.28	0.68	0.5978	0.0739	737	14.3
400	204	0.6415	5.36	40.09	0.39	0.25	0.61	0.6225	0.0727	953	18.4

Note: The information and recommendations in this literature are made in good faith and are believed to be correct as of the below date. You, the user or specifier, should independently determine the suitability and fitness of Paratherm heat transfer fluids for use in your specific application. We warrant that the fluids conform to the specifications in Paratherm literature. Because we have no control over the fluid's end use or the conditions under which it will be used, we make no other warranties—expressed or implied, including the warranties of merchantability or fitness for a particular use or purpose (recommendations in this bulletin are not intended nor should be construed as approval to infringe on any existing patent). The user's exclusive remedy, and Paratherm's sole liability is limited to refund of the purchase price or replacement of any product proven to be otherwise than as warranted. Paratherm Corporation will not be liable for incidental or consequential damages of any kind.