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18 december, 2023

Fulton Boiler

thermal fluid

heater Dear Sirs:

Thank you for your interest in our company and to Fulton Boiler thermal fluid heater, below we will answer questions that where made in our last meeting:

- The FT-0320C thermal fluid heater has a turn down of 5:1, that means that can work down to 20% with modulating capacity 650,000 Btu/hr
    - Warranty from section V of the Instalation Operation and Maintannce manual: COIL WARRANTY: FIVE (5) YEAR (60 MONTH) PRORATED MATERIAL AND WORKMANSHIP WARRANTY
- PARTS AND OTHER COMPONENTS WARRANTY : Fulton will repair or replace F.O.B. factory any part of the equipment of our manufacture that is found to be defective in workmanship or material within one (1) year of shipment from the factory provided this equipment has been installed, operated and maintained by the buyer in accordance with approved practices and recommendations made by both Fulton and the component manufacturers.
- Operating temperature 165°C attached Paratherm thermal fluid oils mineral oils HE and NF and syntactic oil HR with different chemical composition, behavior and price, see attached literature
- Importing, freight door to door, insurance about $18,000.00 USD plus VAT due to changing pricing is only estimate
    - Instalation and start up is pending for more detail

Paratherm HE®

Heat Transfer Fluid

Paratherm HE® heat transfer fluid is an economical, highly-refined, mineral-oil based heat transfer fluid formulated for service in closed-loop heat transfer systems to 590°F.

Applications include:

- Municipal sludge dryers
- Thermal oil heated laundries
- Asphalt plants and terminals
- Continuous chemical processing
- Paper and pulp

Lack of color does make a difference

An shown by its almost water-white appearance, Paratherm HE has an extremely low level of impurities. This is the result of the extended processing required to achieve it's HT1 Rating—approved for incidental food contact by NSF—which removes the impurities that can catalyze fluid degradation.

These impurities (such as aromatics, asphaltenes and sulfur bearing compounds) give lesser quality mineral-oil based fluids a slight to moderate yellow color.

Low vapor pressure equals greater stability in vented expansion tanks

Any vapors that are given off by a heat transfer fluid inside a vented expansion tank will react with air to produce the acids that eventually can cause sludge formation and fluid gelling. The higher the vapor pressure, the more vapor is produced and the greater the rate of oxidation. Paratherm HE has a negligible vapor pressure that produces almost no reaction with air in vented expansion tanks.

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 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.

Visit http://paracalc.paratherm.com for detailed properties in a choice of temperature increments.

Paratherm
HEAT TRANSFER FLUIDS

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Physical Properties

Temperature °F	Temperature °C	Viscosity cPs	Viscosity cSt	Viscosity lb/ft-hr	Density g/cc	Density lb/gal	Density lb/ft^3	Thermal Conductivity BTU/hr-ft-°F	Specific Heat BTU/lb-°F	Vapor Pressure mmhg	Vapor Pressure psia
35	2	325	373	786	0.87	7.3	55	0.076	0.43		
50	10	189	218	458	0.87	7.3	55	0.076	0.44		
75	24	73	84	176	0.86	7.2	54	0.075	0.45		
100	38	38	45	93	0.85	7.1	53	0.075	0.47		
125	52	21	25	50	0.84	7.0	52	0.074	0.48		
150	66	13	16	31	0.83	6.9	52	0.074	0.49		
175	79	9	10	21	0.82	6.8	51	0.073	0.50		
200	93	6	7.4	15	0.82	6.8	51	0.073	0.51		
225	107	4.4	5.5	11	0.81	6.8	51	0.072	0.53		
250	121	3.4	4.2	8.2	0.80	6.7	50	0.072	0.54		
275	135	2.7	3.4	6.6	0.79	6.6	49	0.071	0.55		
300	149	2.2	2.9	5.4	0.78	6.5	49	0.071	0.56		
325	163	1.9	2.4	4.5	0.77	6.4	48	0.070	0.57		
350	177	1.6	2.1	3.8	0.76	6.3	47	0.070	0.59		
375	191	1.4	1.8	3.3	0.75	6.3	47	0.069	0.60		
400	204	1.2	1.6	2.8	0.74	6.2	46	0.069	0.61		
425	218	1.0	1.4	2.5	0.74	6.2	46	0.068	0.62		
450	232	0.9	1.2	2.2	0.73	6.1	46	0.068	0.63		
475	246	0.8	1.1	1.9	0.72	6.0	45	0.067	0.65		
500	260	0.71	1.0	1.7	0.71	5.9	44	0.067	0.66		
525	274	0.64	0.91	1.50	0.70	5.8	43	0.066	0.67		
550	288	0.57	0.83	1.40	0.69	5.8	43	0.066	0.68	21	0.4
575	302	0.52	0.76	1.30	0.68	5.7	43	0.065	0.69	33	0.6
600	316	0.47	0.70	1.10	0.67	5.6	42	0.065	0.71	52	1.0
625	329	0.43	0.65	1.00	0.66	5.5	41	0.064	0.72	79	1.5

Visit http://paracalc.paratherm.com for detailed properties in a choice of temperature increments.

Paratherm™ NF

Heat Transfer Fluid

The Paratherm™ NF Heat Transfer Fluid is a food grade, mineral-oil based heat transfer fluid designed for extended trouble-free service in closed-loop liquid-phase systems up to 600°F (316ºC) in fuel-fired heaters and 630°F (332ºC) in electric immersion heaters.

Applications include:

- Chemical reactors
- Food processing
  - Portable electric temperature control units
- Electric heaters

Food Grade Means Less Maintenance

The food grade level of quality is not only important for food processing, it also makes Paratherm NF Heat Transfer Fluid one of the lowest maintenance fluids on the market. Impurities that naturally occur in crude oil (such as asphaltenes and sulfur compounds) tend to break down first in the heater and, if severely overheated, can form coke deposits on the heater surfaces. The extensive refining process that makes Paratherm NF food grade removes these impurities so degradation-induced maintenance is reduced.

Low Viscosity Promotes Fast Startups

Minimum startup temperature is a realistic Liquid-phase systems should be brought up to temperature slowly until the fluid is in fully turbulent flow. This prevents localized fluid overheating. Once viscosity decreases enough that turbulent flow is achieved, the outlet temperature can be increased as fast as the equipment can handle. The lower the temperature when that transition occurs, the faster the system will reach operating temperature. Paratherm NF has the lowest viscosity range of any mineral-oil based fluid.

High Heat Transfer Coefficients Extend Fluid Life

In heat transfer fluids, the most important advantage of a high heat transfer coefficient is that it reduces the heater surface temperature required to achieve set-point temperature.

Lower temperature means less thermal degradation which means longer life. Paratherm NF has the highest heat transfer coefficient of any mineral oil based fluid.

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.

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Paratherm™ HR

Heat Transfer Fluid

Paratherm HEAT TRANSFER FLUIDS

OVERVIEW

Paratherm™ HR is an alkylated aromatic fluid engineered for high performance in closed-loop liquid phase heating systems to 650°F (343°C) in fired heaters and 675°F (357°C) in solid fuel-fired heat recovery and full convection heaters.

OPERATING RANGE

9°F (-13°C) to 675°F (357°C)

PERFORMANCE FEATURES

- Best-in-class thermal stability and efficiency
- Wide operating range / excellent pumpability
- Unique formulation resists thermal decomposition and fouling at high temperatures

TYPICAL INDUSTRIES

- Chemical Processing
- Biofuel Processing
- Oil & Gas Processing
- Alternative Energy & Emerging Technologies

TYPICAL PROPERTIES

Product Chemistry	Alkylated Aromatic
Appearance	Water-White Liquid
Odor	Slight Hydrocarbon
Maximum Film Temperature	705°F (375°C)
Maximum Operating Temperature (Fired Heaters)	650°F (343°C)
Maximum Operating Temperature (Other Heaters)	675°F (357°C)
Minimum Operating Temperature, 20 cPs (20 mPa-s)	78°F (26°C)
Minimum Start-Up Temperature, 300 cPs (300 mPa-s)	9°F (-13°C)
Kinematic Viscosity, cSt @ 40°C (104°F)	11
Kinematic Viscosity, cSt @ 100°C (212°F)	2.3
Kinematic Viscosity, cSt @ 343°C (650°F)	0.34
Density @ 60°F/15.5°C, lb/gal (kg/m3)	8.0 (959)
Pensky-Martens Closed Cup Flash Point (ASTM D93)	> 315°F (>157°C)
Average Boiling Point (14.7 psia/101 kPa)	608°F (320°C)
Vapor Pressure @ Maximum Operating Temperature, psia (kPa)	18 (124)
% Volumetric Expansion Over Operating Range, per 100°F (°C)	5.5 (9.9)
Average Molecular Weight	240

*These are typical laboratory values and do not represent a specification. Full engineering properties can be found at www.paratherm.com

ADDITIONAL PRODUCT HIGHLIGHTS

Paratherm HR offers superior thermal stability vs. competitive aromatic fluids rated to the same temperatures. Thermal stability testing per ASTM D6743 shows that Paratherm HR experiences nearly half the degradation as its closest competitor when held at 700°F for 500 hours. Additionally, Paratherm HR offers low viscosity which means better low temperature pumpability and efficiency vs. other synthetic aromatics in its class. These properties are advantageously combined to provide many years of consistent, reliable performance.

CUSTOMER SUPPORT

Paratherm specializes in the supply and support of heat transfer fluid technologies. As such, our business is structured to meet the unique needs of our customers. Multiple distribution sites and 24/7 response ensure product is at your facility when you need it with no minimum order quantity. We provide expert support by phone, email, or on-site visits when necessary.

EXTENDING FLUID LIFETIME

When Paratherm fluids are used as recommended they can provide many years of reliable service. Systems using Paratherm fluids should be designed and installed by qualified engineers and should be maintained as any other critical production asset. Fluid oxidation is the leading cause of the most serious maintenance issues associated with closed-loop heat transfer systems– including cold spots, heater coking, plugged pressure sensors and ultimately fluid gelling. Paratherm recommends installation of a nitrogen blanket on the expansion tank to prevent oxidation of the fluid. All systems may benefit from side-stream filtration to promote long-term fluid and system reliability.

FLUID ANALYSIS SERVICES

Paratherm offers a comprehensive fluid monitoring service to help keep systems running at their best. Our state-of-the-art laboratory is certified to ISO 9001:2015 and well-equipped to run all critical tests. Annual testing is recommended and can identify system issues before they become catastrophic. The fluid in new systems should be tested within 9 to 12 months of start-up. New fluid in existing systems should be tested within the first month of operation to establish a base line for future testing, and annually thereafter.

REPLACING FLUID

Replacement should be preceded by analysis of the fluid to determine if cleaning or flushing of the system is recommended prior to introducing new heat transfer fluid. Newly commissioned systems typically do not require cleaning before filling. Paratherm recommends installation of a Y-strainer with a minimum 60-mesh screen up-stream of the pump to catch any residues from manufacturing and construction of system components.

FLUID STORAGE

Drums and totes should be stored indoors to prevent environmental contamination. If sealed drums must be left outdoors, provisions should be made to prevent water from pooling on their tops. While unopened totes are considered weatherproof, Paratherm recommends they not be stacked when stored outdoors. If the fluid is below its minimum pumpable temperature, the containers may be moved indoors to warm up before charging into the system. Refer to the product safety data sheet (SDS) for additional handling and storage recommendations.