



DOWTHERM RP Heat Transfer Fluid

RP



*Minimize system downtime
and reduce operating costs
with the most thermally stable
low-pressure fluid available*



DOWTHERM RP Fluid Is the Thermally Stable Low-Pressure Fluid That Can Help You Reduce Engineering and Operating Costs

It's the most thermally stable low-pressure fluid you can buy

DOWTHERM* RP fluid is a high purity diaryl alkyl that provides excellent performance in liquid phase heat transfer systems operating between -4°F and 660°F (-20°C and 350°C). With an atmospheric boiling point of 667°F (353°C), DOWTHERM RP fluid is a low-pressure, liquid phase heat transfer fluid up to its maximum use temperature (see Figure 1). DOWTHERM RP fluid has a maximum recommended film temperature of 710°F (375°C) and is the most thermally stable low-pressure liquid phase heat transfer fluid available.

The advantages of low-pressure fluids

Unpressurized systems are less expensive to engineer and to operate than pressurized systems. Instead of designing and constructing a pressurized system for high-temperature operation, you can take advantage of the high boiling point of DOWTHERM RP fluid in a more economically installed low-pressure system—and still get excellent heat transfer performance up to 660°F (350°C).

Higher thermal stability means better performance, lower operating costs

High operating temperatures accelerate the rate of fluid degradation, shortening fluid life and increasing the frequency of fluid changeouts. The exceptional thermal stability of DOWTHERM RP fluid means it lasts longer than conventional low-pressure fluids in high-temperature applications. In fact, under normal operating conditions, you may never need to change it out. That not only reduces or eliminates fluid replacement costs, but minimizes system downtime and maintenance expenses, as well.



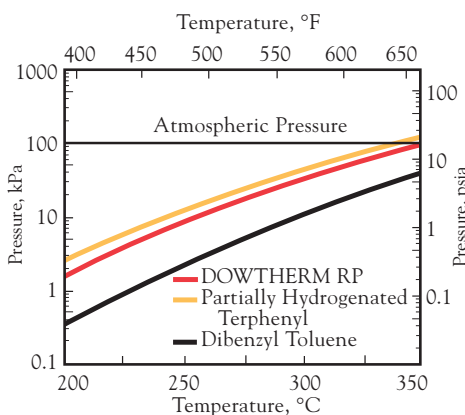
DOWTHERM RP Fluid

Partially Hydrogenated Terphenyl Fluid

Dibenzyl Toluene Fluid

The exceptional thermal stability of DOWTHERM RP fluid is demonstrated in this photo of fluids that have been subjected to a temperature of 700°F (370°C) for three weeks. Testing at this temperature accelerates the degradation rate, but is indicative of degradation that would be seen in systems operated at lower temperatures for longer periods of time. Note the high boiling sludges that have developed in the two fluids on the right. In contrast, any degradation of DOWTHERM RP fluid that occurs under normal use conditions produces almost exclusively low boiling materials that vent from the system, so high boiling sludges do not build up over time.

Figure 1. Fluid Vapor Pressure Comparison



The vapor pressure of DOWTHERM RP fluid is lower than atmospheric pressure over its entire temperature range. Since the boiling point of DOWTHERM RP fluid is greater than its maximum use temperature, it can be used in non-pressurized systems up to 660°F (350°C).

*Trademark of The Dow Chemical Company

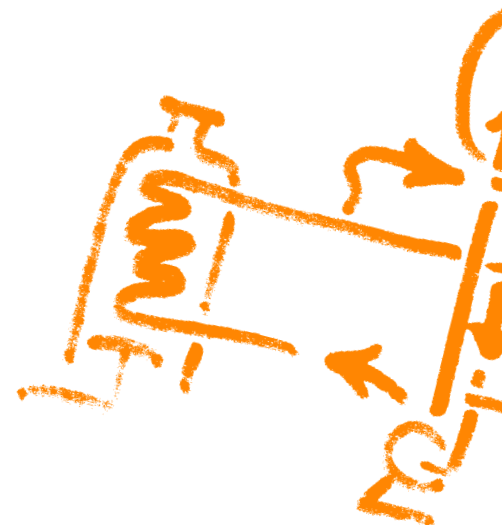


Figure 2. Degradation Rate of Three Low-Pressure Fluids

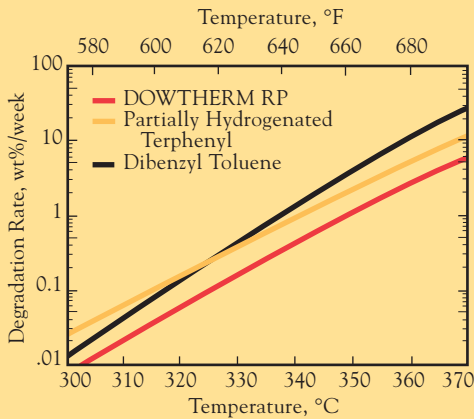
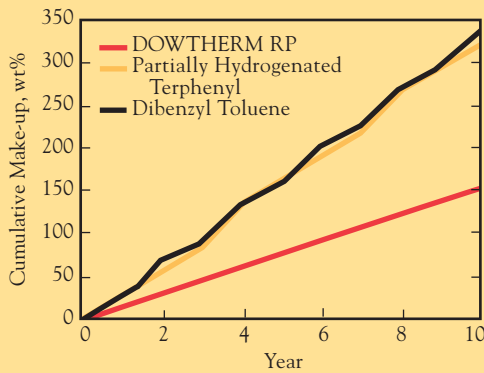


Figure 2 compares the degradation rates of three low-pressure fluids. Note that degradation rate increases exponentially with temperature. DOWTHERM RP fluid is significantly more stable than other commonly used low-pressure fluids.

Figure 3. Cumulative Fluid Make-Up Requirements



As seen above, the lower degradation rate of DOWTHERM RP fluid translates into a significant fluid cost advantage over the life of a typical heat transfer project. Data are for a system operating at a bulk temperature of 650°F (343°C).

DOWTHERM RP fluid stands up to accidental overheating

Thanks to its superior thermal stability, DOWTHERM RP fluid minimizes problems resulting from accidental overheating. Unlike partially hydrogenated terphenyl and dibenzyl toluene fluids formulated for low-pressure applications, DOWTHERM RP fluid effectively resists thermal breakdown resulting from flame impingement, improper heater firing, inadequate circulation, or other causes—even when temperatures reach as high as 710°F (375°C).

No sludge build-up

Any degradation of DOWTHERM RP fluid that occurs under normal use conditions produces almost exclusively low boiling materials that vent from the system, so high boiling sludges don't build up over time.

Low-temperature flow characteristics minimize start-up and shutdown problems

With a viscosity of 249 cP at 30°F (221 mPa sec at 0°C), DOWTHERM RP fluid exhibits excellent pumpability at low temperatures. So start-up and shutdown problems are minimized and the need for costly heat tracing can often be avoided.

High closed cup flash point

The 381°F (194°C) closed cup flash point of DOWTHERM RP fluid compares favorably with the closed cup flash points of other liquid phase fluids. In addition, the 725°F (385°C) auto-ignition temperature of DOWTHERM RP fluid is well above its maximum recommended use temperature.

Dow's fluid return program enhances your fluid investment even more

In the unlikely event you need to change out your DOWTHERM RP fluid, you can take advantage of our fluid return program to receive credit toward the purchase of your new fluid charge. The Dow fluid return program permits customers to minimize their

heat transfer fluid investment, handling downtime, and inventory, making DOWTHERM RP even more economical, and assuring that replacement fluid is of the highest quality.

Free support from the heat transfer fluid experts

DOWTHERM RP fluid is part of a broad line of organic heat transfer fluids developed and manufactured by Dow. With more than 60 years in the heat transfer business, Dow has pioneered the development of fluids for a wide range of heat transfer applications in industries including chemical and hydrocarbon processing, textiles, and pharmaceuticals. Dow heat transfer experts are equipped to help you identify, evaluate, and select the right fluid for your application. Our complete range of supporting services includes system design assistance and free analytical testing to monitor fluid condition.

DOWTHERM RP fluid offers these advantages...

- Lower system engineering costs
- Greater thermal stability for longer life
- Low pressure requirements
- Reduced operating costs
- Less system downtime
- Resists accidental overheating
- Eliminates sludge build-up
- Excellent low-temperature pumpability
- Eliminates ambient temperature fire hazard
- Fluid return program reduces fluid expense
- Expert fluid advice and system support available

Call to learn more

For more information about DOWTHERM RP fluid, expert system design assistance, or other heat transfer system support, call the number for your area listed on the back page of this brochure.

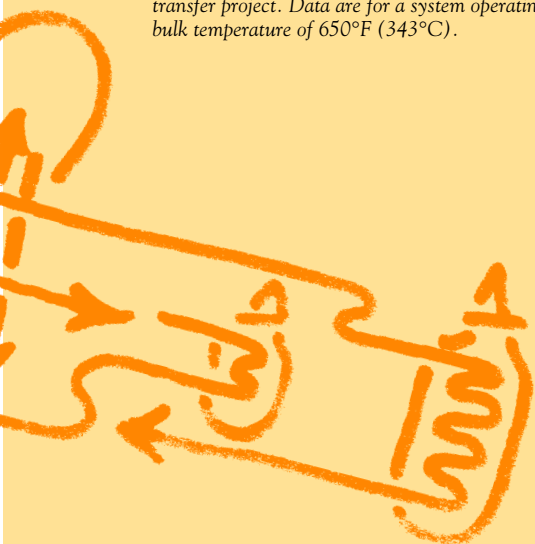




Table 1. Physical Properties of DOWTHERM RP Fluid[†]

Composition: Diaryl Alkyl		Color: Clear Colorless Liquid	
Property	English Units	SI Units	
Crystal Point	..... Below 30°F	..... Below 0°C	
Boiling Point	..... 667°F	..... 353°C	
Flash Point ¹	..... 381°F	..... 194°C	
Autoignition Temperature ²	..... 725°F	..... 385°C	
LFL, vol % ³	..... 0.33% @ 392°F	..... 0.33% @ 200°C	
UFL, vol % ³	..... 4.66% @ 464°F	..... 4.66% @ 240°C	
Estimated Critical Constants:			
T _c	..... 1066°F	..... 575°C	
P _c	..... 20.4 atm.	..... 20.7 bar	
V _c	..... 0.0552 ft ³ /lb	..... 3.446 l/kg	
Average Molecular Weight	..... 236.4		
Density at 75°F	..... 8.56 lb/gal	..... 1026.6 kg/m ³	
Density at 25°C	..... 8.55 lb/gal	..... 1025.8 kg/m ³	

¹ Closed cup ² ASTM E 659-78 ³ ASTM E 681-85



Table 2. Saturation Properties of DOWTHERM RP Fluid[†]

English Units					
Temp.°F	Specific Heat Btu/(lb)(°F)	Density lb/ft ³	Therm. Cond. Btu/(hr)(ft ²)(°F/ft)	Viscosity cP	Vapor Pressure psia
50	0.380	64.76	0.0766	88.17	
150	0.420	62.33	0.0725	6.10	
250	0.459	59.88	0.0683	1.94	
350	0.499	57.38	0.0642	0.99	0.09
450	0.538	54.82	0.0600	0.62	0.71
550	0.578	52.18	0.0558	0.43	3.49
650	0.617	49.41	0.0517	0.32	12.20

SI Units					
Temp.°C	Specific Heat kJ/(kg)(K)	Density Kg/m ³	Therm. Cond. W/(m)(K)	Viscosity (mPa)(s)	Vapor Pressure bar
10	1.591	1036.2	0.1327	88.17	
70	1.769	994.2	0.1249	5.39	
130	1.948	951.7	0.1171	1.71	
190	2.126	908.3	0.1093	0.87	0.01
250	2.305	863.8	0.1016	0.54	0.09
310	2.483	817.4	0.0938	0.38	0.41
370	2.662	768.1	0.0860	0.29	1.40

[†] Not to be construed as specifications.

For more information, call...

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<http://www.dow.com/specialty/heat/heat.html>

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