



Oil & Gas

DOWTHERM™ AND SYLTHERM† HEAT TRANSFER FLUIDS



**RELIABLE, HIGH-PERFORMANCE FLUIDS
FOR THE OIL & GAS INDUSTRY**



Meeting and Exceeding Industry Standards

As a recognized leader in heat transfer chemistry, Dow offers a comprehensive range of solutions that both meet the unique demands of the oil and gas industry and drive optimal system performance. With decades of industry experience, Dow is a premier supplier of heat transfer fluids and is uniquely positioned to help customers:

- Manage energy use through engineering design optimization
- Use energy efficiently in large, integrated complexes
- Protect against internal metal corrosion to extend asset lifespan
- Minimize system design weight of offshore platforms versus similar steam boiler systems

Dow's application experience and broad distribution network enable us to provide solutions anywhere in the world. DOWTHERM™ synthetic organic heat transfer fluids and SYLTHERM[†] silicone-based polymer fluids are oil and gas industry standards for protection, performance and long-term operating economics.

DOWTHERM™ Synthetic Organic Fluids Offer Excellent Stability

Each one of the seven DOWTHERM synthetic organic fluids offers exceptional thermal stability, which translates to more efficient and consistent heat transfer, longer fluid life, lower fluid make-up rates and optimal operating economics.

DOWTHERM fluids also offer long-term advantages as an economical replacement for mineral oils in applications with moderate temperature requirements above 260°C (500°F). These fluids exhibit improved high-temperature stability, low-temperature pumpability characteristics and improved heat transfer properties over mineral oils. These benefits, combined with DOWTHERM fluids' competitive pricing, can help customers realize substantial cost savings over a heat transfer system's life.



Engineering Design Optimization with DOWTHERM™ Heat Transfer Fluids

DOWTHERM™ fluids not only help transfer heat efficiently, they can also help reduce a system's overall size and heat transfer area requirements, generating cost savings for the facility. With a 315°C (600°F) viscosity of .20 cps, DOWTHERM Q fluid has a film coefficient 50 percent higher than that of a typical mineral oil fluid. Film coefficient is the best measure of a heat transfer fluid's overall efficiency, as it accounts for all four critical fluid properties: viscosity, specific heat, density and thermal conductivity. The greater efficiency of DOWTHERM Q fluid may enable reductions in pump and heat exchanger size, requiring less equipment and a lower overall footprint. This can lead to substantial capital cost savings while optimizing heat transfer performance.

Energy Savings and Reduced CO₂ Emissions through Waste Heat Recovery

Energy efficiency is crucial in oil and gas operations, especially when the energy used to power the system comes from the product oil or gas. Recovering waste heat from a hot stream with potential high energy content and putting that energy to use increases the overall process efficiency. By improving overall energy efficiency, facilities can lower their energy consumption and thus achieve lower operating costs.



Exceptional Low-Temperature Performance with DOWTHERM™ Heat Transfer Fluids

DOWTHERM™ heat transfer fluids offer a broad range of options for different operating temperatures. For example, several DOWTHERM fluids offer exceptional low-temperature performance for conditions where systems are exposed to cold, winter or even arctic weather. Low-temperature operation requires a fluid with low viscosity and low-temperature pumpability characteristics.

The drawback of using mineral oils as a heat transfer fluid in extremely cold conditions is evident at the low end of their temperature-use range, because they have very high minimum pumpability temperatures, such as 2°C (35°F). These minimums don't often provide adequate protection to allow system startup and operation in low-temperature conditions. In addition, heat tracing, which can be costly and cumbersome, may be the only way to ensure consistent system operation.

Advanced heat transfer options, like DOWTHERM heat transfer fluids from Dow, offer substantial benefits for these cold-climate sites, because they still exhibit excellent performance in harsh, winter conditions.

Operational Benefits of Using DOWTHERM™ Fluids

With their unique physical properties, DOWTHERM™ heat transfer fluids can improve heat transfer system operations. These properties can result in reduced fluid film temperatures in the heater, low film boundary layers and reduced system heat-up times.

DOWTHERM fluids are also non-corrosive. Effective corrosion protection can improve system efficiency, extend equipment life and improve overall operating economics.

All DOWTHERM fluids feature vapor pressures that are lower than steam. Furthermore, several DOWTHERM fluids are designed to operate in non-pressurized or low-pressure heat transfer systems. This advantage decreases the safety hazards associated with high-pressure operation using steam.

Comprehensive Analytical Support

Fast, comprehensive analytical service is available with all DOWTHERM™ products, along with detailed fluid maintenance recommendations. Dow laboratories feature state-of-the-art equipment and a professional staff that can reliably meet analytical needs of facilities across the globe.

Experienced Technical Support

As one of the premier suppliers of heat transfer fluids, Dow Oil & Gas is committed to maximizing value for our customers by using our market knowledge, in-depth application experience, chemistry expertise, and advanced innovation capabilities. Our technical representatives can assist customers with fluid selection recommendations. From system design to system operation or troubleshooting, you can rely on Dow Oil & Gas.

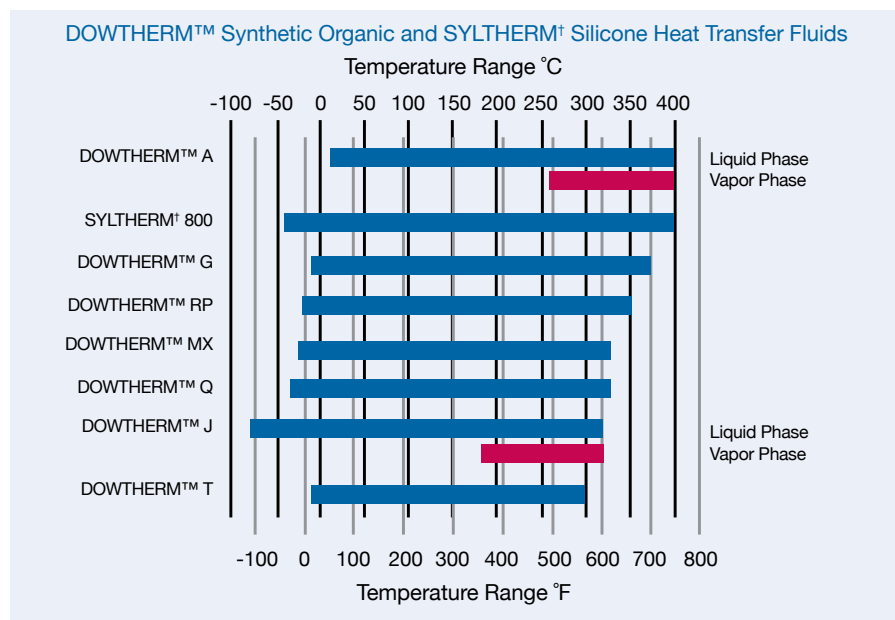


Oil & Gas Applications for DOWTHERM™ Synthetic, Organic Fluids and SYLTHERM† Silicone Fluids:

-100°C (-150°F) to 400°C (750°F)

- Offshore
 - Oil and gas platform utilities and process heating and cooling
 - Floating production units (FPSO)
- LNG
 - Liquefaction and regasification terminals
- Refining and gas processing
 - Indirect heating media
- Pipeline tracing to maintain process temperatures
- Energy recovery
- Coal gasification
- Sulfur recovery
- Environmental test chambers

DOWTHERM™ SYNTHETIC ORGANIC FLUIDS



DOWTHERM™ A

With excellent thermal stability in applications up to 400°C (750°F), this fluid's maximum recommended film temperature is 427°C (800°F). Its temperature range for recommended use in liquid phase operations is from 15°C (60°F) to 400°C (750°F), and in vapor phase from 257°C (495°F) to 400°C (750°F). With low viscosity to minimize startup problems and a freezing point of 12°C (54°F), DOWTHERM™ A heat transfer fluid can be used without steam tracing in installations protected from the weather.

DOWTHERM™ G

As the most stable, low-pressure, liquid-phase fluid, DOWTHERM™ G heat transfer fluid offers low vapor pressure with high thermal stability and pumpability at moderately low temperatures. This efficient, medium-range fluid has a recommended use temperature range of -7°C (20°F) to 360°C (680°F).

DOWTHERM™ MX

DOWTHERM™ MX heat transfer fluid is a mixture of alkylated aromatics and is designed for use as an alternative to hot oils in liquid-phase heat transfer systems. The normal operating temperature range for DOWTHERM MX fluid is -23°C (-10°F) to 330°C (625°F).

DOWTHERM™ Q

Introduced as an alternative to hot oils, DOWTHERM™ Q fluid is recommended for use in the temperature range of -35°C (-30°F) to 330°C (625°F). It combines high-temperature stability with low-temperature pumpability and exceptional heat transfer – a combination mineral oils can't match. DOWTHERM Q fluid provides several long-term economic advantages – and some potential immediate cost savings – over mineral oils, including:

- Reduced pump and exchanger size requirements
- Possible elimination of potentially costly steam tracing
- Lower fluid makeup requirements
- Reduced system fouling and related maintenance expenses
- Expanded change-out intervals
- Fluid credit program

As a result of its exceptional thermal stability and physical properties, DOWTHERM Q can offer substantial economic savings over the life of a heat transfer project. It is an ideal choice for waste heat recovery and LNG liquefaction.

DOWTHERM™ RP

DOWTHERM™ RP heat transfer fluid is a liquid-phase fluid used in no- or low-pressure systems. It is the most thermally stable low-pressure, liquid-phase heat transfer fluid on the market today and can be used in systems operating up to a maximum bulk temperature of 350°C (660°F) and a maximum film temperature of 375°C (710°F). Unlike partially hydrogenated terphenyl and dibenzyl toluene fluids, DOWTHERM RP fluid degrades primarily to low-molecular-weight products that can be easily vented from the system, reducing the need to remove high-molecular-weight material. As a result, high-boiling sludges and tars typically don't build up over time, and the fluid may never need to be changed out under normal operating conditions. In some cases, DOWTHERM RP fluid can also be used to top off other low-pressure fluids.

DOWTHERM™ T

DOWTHERM™ T heat transfer fluid is a mixture of alkyl benzenes intended for liquid-phase operation in non-pressurized systems. DOWTHERM T fluid has an optimal maximum temperature of 288°C (550°F), though it can be used to an extended bulk temperature of 316°C (600°F). Its low-temperature properties allow for low-temperature start-up and it exhibits good thermal stability at the maximum use temperature.

SYLTHERM[†] SILICONE FLUIDS

SYLTHERM[†] 800

SYLTHERM[†] 800 fluid is a highly stable, long-lasting, silicone fluid with a recommended operating temperature range of -40°C (-40°F) to 400°C (750°F) – the broadest range of any heat transfer fluid commercially available today. Operating continuously at the upper end of this range, SYLTHERM 800 fluid exhibits a lower potential for fouling and can often remain in service for 10 years or more. The fluid is essentially odorless and is very low in acute oral toxicity. Silicone heat transfer fluids such as SYLTHERM 800 fluid are not listed as reportable in the U.S. under SARA Title III, Section 313.¹

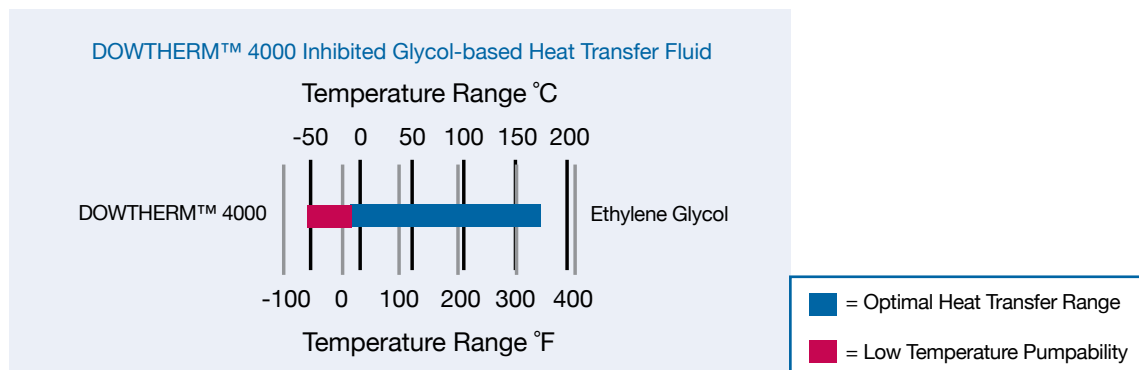
¹Compliance with similar or additional legislation in other countries may be necessary. Contact your local Dow representative for information.



DOWTHERM™ INHIBITED GLYCOL-BASED HEAT TRANSFER FLUID

DOWTHERM™ 4000

DOWTHERM™ 4000 fluid is an ethylene glycol (EG)-based fluid that features the highest maximum-use temperature of any commercially available glycol today. Operating in water-based systems between -50°C (-60°F) and 175°C (350°F), this fluid is specially formulated with inhibitors to offer greater thermal stability and corrosion protection. DOWTHERM 4000 fluid is suitable for thermally demanding operations, as well as for applications where long fluid life and extended maintenance intervals are required. The fluid's wide temperature range also makes it suitable for single-fluid process heating and cooling.



Note: At appropriate concentrations these fluids will provide burst protection to -73°C (-100°F).

A Note About Product Safety

Dow encourages its customers and potential users to review their applications from the standpoint of human health and environmental aspects. To help ensure that Dow products are not used in ways for which they are not intended or tested, Dow personnel will assist customers in dealing with environmental and product safety considerations. Dow literature, including Material Safety Data Sheets, should be consulted by customers and potential users prior to use.



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**Toll free service not available in all countries.*



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For more information, visit www.DowOilandGas.com.

** This guide is designed as a general product overview. Please contact your local Dow Oil & Gas representative for up-to-date, detailed technical information including registrations and use limitations and to discuss individual applications or requirements.

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