# THERMINOL® ADX-10

heat transfer fluid

Excellent pumpability
at low temperatures

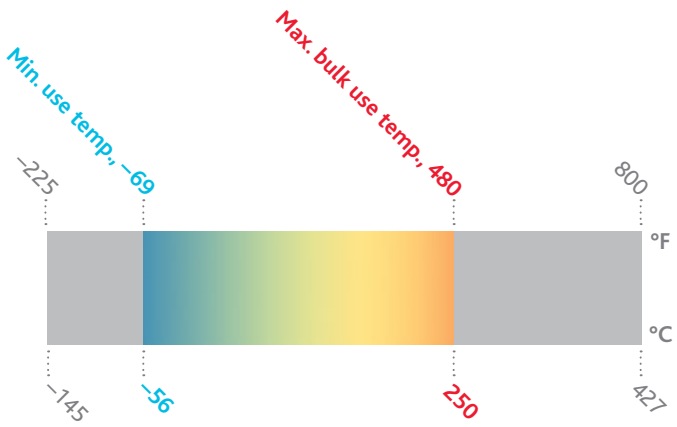
## –56°C to 250°C

## (–69° to 480°F)

THERMINOL®
Heat Transfer Fluids by Eastman

# THERMINOL® ADX-10

heat transfer fluid




Eastman Therminol® ADX-10 heat transfer fluid is a low-viscosity, synthetic organic fluid that is particularly recommended for indirect liquid phase process heating at medium temperatures up to 250°C (480°F).

Therminol ADX-10 offers a number of benefits when it is used as a single fluid in combined heating and cooling systems:

- Excellent heat transfer coefficient
- Easy start-up and shutdown at low temperatures
- Low-temperature pumpability down to temperatures of –56°C (–69°F)
- Eliminates the need for steam or other forms of heat tracing due to its low pour point (–80°C/–112°F) and excellent low-temperature viscosity
- Low fire risk at ambient temperatures

**Therminol ADX-10 is available in Europe, the Middle East, Africa, and CIS. Contact your local Eastman Therminol sales representative for more information.**

## Physical and chemical characteristics

Therminol ADX-10 fluid is designed for use in nonpressurized/low-pressure, indirect heating systems. It delivers efficient, dependable, uniform process heat with no need for high pressures. The high boiling point of Therminol ADX-10 helps reduce the volatility and fluid leakage problems associated with other fluids.

The recommended maximum bulk and film temperatures for Therminol ADX-10 are based on industry-standard thermal studies. Operation at or below these temperature maximums can provide long service life under most operating conditions.

Actual fluid life is dependent on the total system design and operation and can vary by heat transfer fluid chemistry. As fluid ages, the formation of low- and high-boiling compounds may result. Low-boiling compounds should be vented from the system as necessary to a safe location away from personnel and sources of ignition and in compliance with applicable regulations and laws. The high-boiling compounds can be very soluble in the fluid. Significant overheating or fluid contamination will accelerate decomposition and may result in increased high-boiler and solids concentrations. Excess solids can typically be filtered for removal.

Eastman recommends that systems utilizing Therminol ADX-10 fluid should be blanketed with an atmosphere of inert gas to protect against the effects of fluid oxidation on its performance and life expectancy. Pressure relief device(s) should be installed where required.

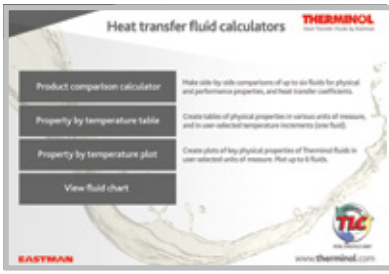
Therminol ADX-10 is noncorrosive to metals commonly used in the construction of heat transfer systems.

While Therminol ADX-10 has a relatively high flash point, it is not classified as a fire-resistant heat transfer fluid. Consequently, the use of protective devices may be required to minimize fire risk and users of Therminol ADX-10 should check with their safety and risk management experts for specific instructions.

## Typical properties[a]

| | |
|---|---|
| Appearance | Clear, pale yellow liquid |
| Composition | Synthetic aromatic hydrocarbon mixture |
| Maximum bulk temperature | 250°C (480°F) |
| Maximum film temperature | 280°C (535°F) |
| Normal boiling point | 293°C (559°F) |
| Pumpability, at 300 $mm^2/s$ (cSt) | –41°C (–41°F) |
| Pumpability, at 2000 $mm^2/s$ (cSt) | –56°C (–69°F) |
| Autoignition temperature (DIN 51794) | 327°C (621°F) |
| Pour point (ISO 3016) | –80°C (–112°F) |
| Total acidity (ASTM D-664) | <0.2 mg KOH/g |
| Average molecular weight | 236 |
| Moisture content, maximum (ASTM E-203) | 150 ppm |
| Dielectric constant @ 23°C (ASTM D-924) | 2.26 |

[a]*These data are based on samples tested in the laboratory and are not guaranteed for all samples. Contact us for complete sales specifications for Therminol ADX-10 fluid. Does not constitute an express warranty. See disclaimer on the back page of this bulletin.*




To create your own customized table
with preferred properties, units of measure,
and temperature intervals, visit
www.therminol.com/resources
and download the Therminol heat transfer fluid calculator.

**For the technical service contact in your region,
visit the CONTACT US page on our website, www.therminol.com.**

# Liquid properties of Therminol® ADX-10 heat transfer fluid by temperature[a] (SI units)

| Temperature | | Liquid density | Liquid heat capacity | Heat of vaporization | Liquid enthalpy[b] | Liquid thermal conductivity | Liquid viscosity[c] | | Vapor pressure[d] |
|---|---|---|---|---|---|---|---|---|---|
| °C | °F | kg/m³ | kJ/(kg·K) | kJ/kg | kJ/kg | W/(m·K) | cP (mPa·s) | cSt (mm²/s) | kPa |
| –56 | –69 | 909 | 1.61 | 441.5 | –64.9 | 0.1334 | 1810 | 2000 | — |
| –50 | –58 | 904 | 1.64 | 436.9 | –54.8 | 0.1326 | 783 | 866 | — |
| –40 | –40 | 898 | 1.68 | 429.5 | –38.2 | 0.1314 | 250 | 279 | — |
| –30 | –22 | 891 | 1.72 | 422.1 | –21.3 | 0.1302 | 98.9 | 111 | — |
| –20 | –4 | 884 | 1.76 | 414.8 | –3.9 | 0.1289 | 46.1 | 52.1 | — |
| –10 | 14 | 877 | 1.80 | 407.5 | 13.9 | 0.1277 | 24.5 | 27.9 | — |
| 0 | 32 | 870 | 1.84 | 400.2 | 32.0 | 0.1264 | 14.4 | 16.5 | — |
| 10 | 50 | 864 | 1.88 | 393.1 | 50.6 | 0.1252 | 9.19 | 10.6 | — |
| 20 | 68 | 857 | 1.91 | 385.9 | 69.5 | 0.1239 | 6.28 | 7.32 | — |
| 30 | 86 | 850 | 1.95 | 378.9 | 88.9 | 0.1226 | 4.52 | 5.32 | — |
| 40 | 104 | 843 | 1.99 | 371.9 | 108.6 | 0.1213 | 3.40 | 4.04 | — |
| 50 | 122 | 836 | 2.03 | 364.9 | 128.7 | 0.1200 | 2.65 | 3.17 | 0.001 |
| 60 | 140 | 829 | 2.07 | 358.0 | 149.2 | 0.1187 | 2.13 | 2.57 | 0.003 |
| 70 | 158 | 822 | 2.10 | 351.2 | 170.0 | 0.1173 | 1.75 | 2.13 | 0.008 |
| 80 | 176 | 815 | 2.14 | 344.4 | 191.3 | 0.1160 | 1.47 | 1.81 | 0.018 |
| 90 | 194 | 808 | 2.18 | 337.7 | 212.9 | 0.1146 | 1.26 | 1.56 | 0.037 |
| 100 | 212 | 801 | 2.21 | 331.1 | 234.8 | 0.1132 | 1.09 | 1.36 | 0.074 |
| 110 | 230 | 794 | 2.25 | 324.5 | 257.1 | 0.1118 | 0.956 | 1.20 | 0.139 |
| 120 | 248 | 787 | 2.29 | 317.9 | 279.8 | 0.1104 | 0.846 | 1.08 | 0.251 |
| 130 | 266 | 780 | 2.32 | 311.5 | 302.9 | 0.1090 | 0.756 | 0.969 | 0.433 |
| 140 | 284 | 772 | 2.36 | 305.0 | 326.2 | 0.1076 | 0.680 | 0.880 | 0.720 |
| 150 | 302 | 765 | 2.39 | 298.7 | 350.0 | 0.1061 | 0.615 | 0.804 | 1.16 |
| 160 | 320 | 758 | 2.42 | 292.3 | 374.0 | 0.1046 | 0.559 | 0.738 | 1.81 |
| 170 | 338 | 750 | 2.46 | 286.0 | 398.5 | 0.1031 | 0.511 | 0.681 | 2.74 |
| 180 | 356 | 742 | 2.49 | 279.8 | 423.2 | 0.1016 | 0.469 | 0.631 | 4.06 |
| 190 | 374 | 735 | 2.53 | 273.6 | 448.3 | 0.1000 | 0.431 | 0.587 | 5.87 |
| 200 | 392 | 727 | 2.56 | 267.4 | 473.7 | 0.0985 | 0.398 | 0.547 | 8.31 |
| 210 | 410 | 719 | 2.59 | 261.2 | 499.5 | 0.0969 | 0.368 | 0.512 | 11.6 |
| 220 | 428 | 711 | 2.62 | 255.0 | 525.5 | 0.0953 | 0.341 | 0.480 | 15.8 |
| 230 | 446 | 703 | 2.66 | 248.9 | 551.9 | 0.0936 | 0.317 | 0.451 | 21.2 |
| 240 | 464 | 694 | 2.69 | 242.7 | 578.7 | 0.0919 | 0.295 | 0.424 | 28.0 |
| 250 | 482 | 686 | 2.72 | 236.5 | 605.7 | 0.0902 | 0.275 | 0.400 | 36.6 |
| 260 | 500 | 677 | 2.75 | 230.3 | 633.1 | 0.0885 | 0.256 | 0.378 | 47.1 |
| 270 | 518 | 668 | 2.78 | 224.1 | 660.7 | 0.0867 | 0.239 | 0.358 | 60.0 |
| 280 | 536 | 659 | 2.81 | 217.8 | 688.7 | 0.0848 | 0.224 | 0.339 | 75.5 |
| 290 | 554 | 650 | 2.85 | 211.5 | 717.0 | 0.0829 | 0.209 | 0.322 | 94.0 |

*[a]Maximum recommended bulk temperature 250°C (480°F). These data are based on samples tested in the laboratory and are not guaranteed for all samples. Contact us for complete sales specifications for Therminol ADX-10 fluid. [b]Liquid enthalpy basis is –17.8°C (0°F). [c]1 cSt = 1 mm²/s and 1 mPa•s = 1 cP. [d]100 kPa = 1 bar.*

# Liquid properties of Therminol® ADX-10 heat transfer fluid by temperature[a] (English units)

| Temperature | | Liquid density | | Liquid heat capacity | Heat of vaporization | Liquid enthalpy[b] | Liquid thermal conductivity | Liquid viscosity[c] | | Vapor pressure[d] |
|---|---|---|---|---|---|---|---|---|---|---|
| °F | °C | lb/gal | lb/ft³ | Btu/(lb·°F) | Btu/lb | Btu/lb | Btu/(ft·h·°F) | lb/(ft·h) | cSt (mm²/s) | psia |
| –69 | –56 | 7.58 | 56.7 | 0.385 | 190.0 | –27.9 | 0.0771 | 4390 | 2000 | — |
| –60 | –51 | 7.55 | 56.5 | 0.390 | 188.3 | –24.4 | 0.0768 | 2180 | 1000 | — |
| –40 | –40 | 7.49 | 56.0 | 0.401 | 184.8 | –16.5 | 0.0760 | 606 | 279 | — |
| –20 | –29 | 7.43 | 55.6 | 0.411 | 181.2 | –8.3 | 0.0752 | 218 | 101 | — |
| 0 | –18 | 7.37 | 55.1 | 0.422 | 177.7 | 0.0 | 0.0744 | 95.9 | 44.9 | — |
| 20 | –7 | 7.30 | 54.6 | 0.433 | 174.3 | 8.5 | 0.0736 | 49.1 | 23.2 | — |
| 40 | 4 | 7.24 | 54.2 | 0.443 | 170.8 | 17.3 | 0.0728 | 28.3 | 13.5 | — |
| 60 | 16 | 7.18 | 53.7 | 0.454 | 167.4 | 26.3 | 0.0720 | 17.9 | 8.59 | — |
| 80 | 27 | 7.11 | 53.2 | 0.464 | 164.0 | 35.4 | 0.0711 | 12.1 | 5.89 | — |
| 100 | 38 | 7.05 | 52.7 | 0.474 | 160.7 | 44.8 | 0.0703 | 8.74 | 4.28 | — |
| 120 | 49 | 6.98 | 52.2 | 0.484 | 157.3 | 54.4 | 0.0695 | 6.59 | 3.25 | — |
| 140 | 60 | 6.92 | 51.8 | 0.494 | 154.0 | 64.2 | 0.0686 | 5.16 | 2.57 | — |
| 160 | 71 | 6.86 | 51.3 | 0.504 | 150.8 | 74.2 | 0.0678 | 4.16 | 2.09 | 0.001 |
| 180 | 82 | 6.79 | 50.8 | 0.514 | 147.5 | 84.3 | 0.0669 | 3.44 | 1.75 | 0.003 |
| 200 | 93 | 6.73 | 50.3 | 0.523 | 144.3 | 94.7 | 0.0660 | 2.90 | 1.49 | 0.007 |
| 220 | 104 | 6.66 | 49.8 | 0.533 | 141.2 | 105.3 | 0.0651 | 2.48 | 1.29 | 0.014 |
| 240 | 116 | 6.59 | 49.3 | 0.542 | 138.0 | 116.0 | 0.0642 | 2.16 | 1.13 | 0.028 |
| 260 | 127 | 6.53 | 48.8 | 0.552 | 134.9 | 127.0 | 0.0633 | 1.90 | 1.00 | 0.053 |
| 280 | 138 | 6.46 | 48.3 | 0.561 | 131.8 | 138.1 | 0.0624 | 1.68 | 0.898 | 0.094 |
| 300 | 149 | 6.39 | 47.8 | 0.570 | 128.8 | 149.4 | 0.0614 | 1.50 | 0.812 | 0.160 |
| 320 | 160 | 6.32 | 47.3 | 0.579 | 125.8 | 160.9 | 0.0605 | 1.35 | 0.738 | 0.262 |
| 340 | 171 | 6.25 | 46.8 | 0.588 | 122.8 | 172.6 | 0.0595 | 1.22 | 0.675 | 0.416 |
| 360 | 182 | 6.18 | 46.2 | 0.597 | 119.8 | 184.5 | 0.0585 | 1.11 | 0.621 | 0.640 |
| 380 | 193 | 6.11 | 45.7 | 0.606 | 116.8 | 196.5 | 0.0575 | 1.01 | 0.573 | 0.958 |
| 400 | 204 | 6.04 | 45.2 | 0.615 | 113.8 | 208.7 | 0.0565 | 0.929 | 0.531 | 1.40 |
| 420 | 216 | 5.96 | 44.6 | 0.624 | 110.9 | 221.1 | 0.0555 | 0.853 | 0.494 | 2.00 |
| 440 | 227 | 5.89 | 44.0 | 0.632 | 108.0 | 233.6 | 0.0544 | 0.785 | 0.460 | 2.79 |
| 460 | 238 | 5.81 | 43.5 | 0.641 | 105.0 | 246.4 | 0.0534 | 0.725 | 0.430 | 3.82 |
| 480 | 249 | 5.73 | 42.9 | 0.649 | 102.1 | 259.3 | 0.0523 | 0.670 | 0.403 | 5.15 |
| 500 | 260 | 5.65 | 42.3 | 0.658 | 99.1 | 272.4 | 0.0511 | 0.620 | 0.378 | 6.83 |
| 520 | 271 | 5.57 | 41.7 | 0.666 | 96.1 | 285.6 | 0.0500 | 0.575 | 0.356 | 8.93 |
| 540 | 282 | 5.48 | 41.0 | 0.674 | 93.1 | 299.0 | 0.0488 | 0.533 | 0.336 | 11.5 |

# TLC Total Lifecycle Care®

## In-service heat transfer fluid sample analysis

When Therminol heat transfer fluids are used within suggested temperature limits, they may provide years of trouble-free service. To help users get maximum life, Eastman offers testing of in-service heat transfer fluids to detect contamination, moisture, thermal degradation, and other conditions that may impact system performance. This comprehensive analysis includes acid number, kinematic viscosity, insoluble solids, low boilers, high boilers, and moisture content. Additional special analyses are available on request. Sample analysis includes sample collection kits that are easy to use. Most systems should be sampled annually. Users should also sample anytime a fluid-related problem is suspected.

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Results of the test are presented in a detailed report that provides suggestions for corrective action. Test results are stored in a database for future reference. Customers can access their specific test information via ***my.therminol.com***.

## Technical service hotline

Experienced technical service specialists can help answer your questions regarding heat transfer fluid selection, system start-ups, system design, and operational issues.

## System design support

Eastman regularly assists some of the world's largest engineering, chemical, and equipment manufacturing companies on the design and operation of heat transfer systems. Our liquid phase and vapor phase design guide information and system design data have been field tested in numerous installations. Eastman also conducts engineering seminars for customers, engineering firms, and equipment manufacturers to cover a wide range of heat transfer fluid system design and operation issues. Customers can request a technical service visit to audit heat transfer systems for fluid loss and leak prevention opportunities.

## Operational training

Eastman believes that by sharing our experience with customers, we can help improve system design, promote safety, and reduce overall cost. Customers can take advantage of Eastman's heat transfer system operation and product training programs. These programs are customized to suit the varied needs of frontline technicians, operations supervisors, and maintenance technicians to design engineers. Customers can also receive training assistance for dealing with important topics like fluid safety and handling.

## Safety awareness training

At Eastman, we're "All in for Safety." We provide our customers safety awareness training that focuses on the design, start-up, operation, and maintenance of heat transfer fluid systems.

## Start-up assistance

Eastman provides start-up assistance by reviewing procedures and offering suggestions to reduce typical problems. Customers can also receive help by calling their local Eastman technical specialist or through on-site assistance.

## Flush fluid and fluid refill

Liquid phase heat transfer systems can be cleaned with Therminol® FF flushing fluid. After the system is flushed, the appropriate liquid phase Therminol heat transfer fluid can be added.

## Fluid trade-in program*

As part of our commitment to sustainability and the environment, Eastman offers a trade-in program for used Therminol and competitive heat transfer fluids. Depending on the fluid and its condition, it may be turned in for potential credit towards the purchase of new Therminol heat transfer fluid.

**Available in North America. Contact your local sales representative for more information.*

THERMINOL® TLC

TOTAL LIFECYCLE CARE®

Eastman's TLC Total Lifecycle Care® program is designed to support Therminol customers throughout their systems' life cycle. This comprehensive program includes system design support, start-up assistance, training, sample analysis, flush and refill fluids, and our fluid trade-in program. In North America, call our hotline at 1-800-433-6997 or contact your local sales or technical representative.

**For more information or to find the sales or technical contact nearest you, visit the "Contact us" page on our website: www.therminol.com.**


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