# THERMINOL® ADX10

Heat Transfer Fluids By SOLUTIA™

Applied Chemistry, Creative Solutions

ADX10

## Optimum Cost Performance Excellent Pumpability Heat Transfer Fluid

## -45°C to 250°C

+400°C
+350°C
+300°C
+250°C
+200°C
+150°C
+100°C
+50°C
+0°C
-50°C
-100°C

TM

Therminol ADX10 is a low viscosity synthetic organic heat transfer fluid particularly recommended for indirect liquid phase process heating at medium temperatures up to 250°C.

The excellent low temperature pumpability and heat transfer coefficient of this fluid also lead to a number of benefits when it is used as a single fluid in combined heating and cooling systems - for example in switch condensers and in reactors for pilot plant or industrial batch processing systems - offering :

- easy start-up and shutdown at low temperatures
- low fire risk at ambient temperatures
- low pour point (-80°C) and excellent low temperature viscosity eliminating the need for steam or other forms of heat tracing
- excellent low temperature pumpability down to temperatures of -50°C

It may also be used in solar heating and solar power generating systems in place of water-glycol solutions.

# Thermal Stability

The thermal stability of a heat transfer fluid is one of the most important considerations in the selection of a fluid for operation under specific heat transfer conditions.

Fluid decomposition, for both mineral oil and synthetic hydrocarbon based heat transfer fluids, generally results in the formation of volatile products (low boilers) and polymeric high viscosity fractions (high boilers). The relative proportion of low and high boiler formation, and the solubility of the high boiling fraction, may vary widely and are critical factors when evaluating fluid performance, predicting top-up costs, and the overall risk of deposits or coking.

**The chemical composition of Therminol ADX10 has been carefully selected to minimise the formation of low boilers and eliminate the risk of insoluble high boiler formation and fouling, provided proper attention is given to system design and operation within the maximum bulk and film temperatures specified below.**

# Typical Physical, Chemical and Thermal Properties of Therminol ADX10

| | | |
|---|---|---|
| Composition | | Synthetic aromatic hydrocarbon mixture |
| Appearance | | Clear pale yellow liquid |
| Max. bulk temperature | | 250°C |
| Max. film temperature | | 280°C |
| Kinematic viscosity @ 40°C | DIN 51562 - 1 | 4.03 $mm^2/s$ (cSt) |
| Density @ 15°C | DIN 51757 | 861 $kg/m^3$ |
| Flash point | DIN 51376 | 136°C |
| Fire point | ISO 2592 | 140°C |
| Autoignition temperature | DIN 51794 | 327°C |
| Pour point | ISO 3016 | -80°C |
| Boiling point @ 1013 mbar | | 293°C |
| Coefficient of thermal expansion | | 0.00108/°C |
| Moisture content | DIN 51777 - 1 | < 150 ppm |
| Total acidity | DIN 51558 - 1 | << 0.2 mg KOH/g |
| Chlorine content | DIN 51577 - 3 | < 10 ppm |
| Copper corrosion | EN ISO 2160 | << 1a |
| Average molecular weight | | 236 |

Note: Values quoted are typical values obtained in the laboratory from production samples. Other samples might exhibit slightly different data. Specifications are subject to change. Write to Solutia for current sales specifications.

# Properties of Therminol® ADX10 vs Temperatures

| Temperature °C | Density kg/m³ | Thermal Conductivity W/m.K | Heat Capacity kJ/kg.K | Viscosity | | Vapour pressure (absolute) kPa* |
|---|---|---|---|---|---|---|
| | | | | Dynamic mPa.s | Kinematic mm²/s** | |
| -50 | 904 | 0.133 | 1.64 | 783.26 | 866.64 | - |
| -40 | 898 | 0.131 | 1.68 | 250.49 | 278.94 | - |
| -30 | 891 | 0.130 | 1.72 | 98.95 | 111.05 | - |
| -20 | 884 | 0.129 | 1.76 | 46.10 | 52.15 | - |
| -10 | 877 | 0.128 | 1.80 | 24.46 | 27.89 | - |
| 0 | 871 | 0.126 | 1.84 | 14.39 | 16.52 | - |
| 10 | 864 | 0.125 | 1.88 | 9.19 | 10.64 | - |
| 20 | 857 | 0.124 | 1.91 | 6.28 | 7.33 | - |
| 30 | 850 | 0.123 | 1.95 | 4.52 | 4.76 | - |
| 40 | 843 | 0.121 | 1.99 | 3.40 | 4.03 | - |
| 50 | 836 | 0.120 | 2.03 | 2.25 | 3.17 | - |
| 60 | 829 | 0.119 | 2.07 | 2.13 | 2.57 | - |
| 70 | 822 | 0.117 | 2.10 | 1.75 | 2.13 | - |
| 80 | 815 | 0.116 | 2.14 | 1.47 | 1.80 | - |
| 90 | 808 | 0.115 | 2.18 | 1.26 | 1.56 | - |
| 100 | 801 | 0.113 | 2.21 | 1.09 | 1.36 | - |
| 110 | 794 | 0.112 | 2.25 | 0.97 | 1.22 | - |
| 120 | 787 | 0.110 | 2.29 | 0.85 | 1.08 | - |
| 130 | 780 | 0.109 | 2.32 | 0.76 | 0.97 | - |
| 140 | 772 | 0.108 | 2.36 | 0.68 | 0.88 | 1 |
| 150 | 765 | 0.106 | 2.39 | 0.61 | 0.80 | 2 |
| 160 | 758 | 0.105 | 2.42 | 0.56 | 0.74 | 2 |
| 170 | 750 | 0.103 | 2.46 | 0.51 | 0.68 | 3 |
| 180 | 743 | 0.102 | 2.49 | 0.47 | 0.63 | 4 |
| 190 | 735 | 0.100 | 2.53 | 0.43 | 0.59 | 6 |
| 200 | 727 | 0.098 | 2.56 | 0.40 | 0.55 | 8 |
| 210 | 719 | 0.097 | 2.59 | 0.37 | 0.51 | 12 |
| 220 | 711 | 0.095 | 2.62 | 0.34 | 0.48 | 16 |
| 230 | 703 | 0.094 | 2.66 | 0.32 | 0.46 | 21 |
| 240 | 694 | 0.092 | 2.69 | 0.29 | 0.42 | 28 |
| 250 | 686 | 0.090 | 2.72 | 0.27 | 0.39 | 37 |
| 260 | 677 | 0.088 | 2.75 | 0.26 | 0.38 | 47 |
| 270 | 668 | 0.087 | 2.78 | 0.24 | 0.36 | 60 |
| 280 | 659 | 0.085 | 2.81 | 0.22 | 0.33 | 75 |
| 290 | 650 | 0.083 | 2.85 | 0.21 | 0.32 | 94 |

* 1 bar = 100 kPa - ** 1 mm²/s = 1 cSt

Note: Values quoted are typical values obtained in the laboratory from production samples. Other samples might exhibit slightly different data. Specifications are subject to change. Write to Solutia for current sales specifications.

# Physical Property Formulae

Density (kg/m³) = $870.297 - 0.684497 * T(°C) + 5.18441 * 10^{-5} * T^2(°C) - 1.0695 * 10^{-6} * T^3(°C)$

Heat Capacity (kJ/kg.K) = $0.00392 * T(°C) - 1.5 * 10^{-6} * T^2(°C) + 1.8363$

Thermal Conductivity (W/m.K) = $-0.000123 * T(°C) - 9.161 * 10^{-8} * T^2(°C) + 0.1265$

Kinematic Viscosity (mm²/s) = $e^{\left(\frac{645.13}{T(°C)+117.8} - 2.662\right)}$

Vapour Pressure (kPa) = $e^{\left(\frac{-4132.91}{T(°C)+149} + 13.93\right)}$

# The Therminol® Range

Therminol ADX10 is one of the Solutia synthetic heat transfer fluids covering an operating range from -85°C to +400°C, suitable for most process heating or waste heat recovery applications, and capable of operation at or near atmospheric pressure within their recommended operating temperature range.

As a user's process temperature demands change there is always a Therminol fluid capable of meeting the new requirements. In addition, Therminol fluids are often interchangeable allowing conversion by a simple top-up procedure where this is preferred.

Solutia also has a standard DP-DPO eutectic, Therminol VP-1.

# Quality Management

All our manufacturing units have obtained ISO 9002 quality control certification. This registration means that plant procedures, quality control systems, material sampling, product storage, handling, packaging, shipping, product literature and characteristic data, record keeping and other company procedures are in line with the quality requirements of the ISO 9002 standards and its other national equivalents.

**This is your quality assurance.**

# Health, Safety and Environmental Information

Please contact the Solutia Europe/Africa HQ for the Material Safety Data Sheet, or if any other information concerning health, safety and environmental issues is required during filling or operation of your heat transfer system with this product.


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