



DURATHERM 450FG

Rated for use up to 232°C (450°F) and ideal for applications such as blow molding, injection molding or any application where lower working temperatures are required or for applications requiring both heating and cooling cycles between between -25°C and 232°C (-12°F and 450°F).

Duratherm 450FG meets USDA requirements for incidental food contact, is NSF registered HT1, and meets the requirements of 21CFR1783570.

APPLICATION

Duratherm 450FG is specifically engineered for applications requiring a food grade thermal fluid for process heating and cooling precisely and efficiently between between -25°C and 232°C (-12°F and 450°F).

Offering precise temperature control and long life at an economical cost **Duratherm 450FG** is ideal for low temperature applications such as blow molding, injection molding, pharmaceutical manufacturing or any application requiring batch heating and cooling.

THE DIFFERENCE

Our exclusive additive package, including a proprietary dual stage anti-oxidant, ensures long trouble free operation. **Duratherm 450FG** also incorporates metal deactivators, a seal and gasket extender, de-foaming and particle suspension agents.

LASTS LONGER

In the heat transfer fluid industry cost is always a concern, however, fluid longevity and resistance to

harmful fouling are of equal importance.

Air contact is normally detrimental to a fluid. Oxidation can cripple your system and if left unchecked will ultimately cause catastrophic failure. Unscheduled downtime due to oil failure has a high cost and negative effect on production.

The Duratherm product line was developed with this in mind. Most other fluids fall short in their protection from oxidation and can quickly foul a system. Duratherm is engineered to give unsurpassed levels of protection and service life.

ENVIRONMENTAL

Duratherm 450FG is environmentally friendly, non-toxic, non-hazardous and non-reportable. Worker health and safety is of great concern, **Duratherm 450FG** poses no ill effect to worker safety. After its long service life it can easily be disposed of with other waste oils.

DURATHERM 450FG

- Maximum temperature: 232°C / 450°F
- Flash point 150°C / 302°F
- Food grade
- Great oxidation resistance
- Efficient for lower-temperature applications
- Non-toxic/non-hazardous
- Includes free fluid analysis and tech support



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TEMPERATURE RATINGS

| | | |
|------------------------|-------|-------|
| Maximum Bulk/Use Temp. | 232°C | 450°F |
| Maximum Film Temp. | 254°C | 490°F |
| Pour Point ASTM D97 | -45°C | -49°F |

SAFETY DATA

| | | |
|----------------------------|-------|-------|
| Flash Point ASTM D92 | 150°C | 302°F |
| Fire Point ASTM D92 | 163°C | 327°F |
| Autoignition ASTM E-659-78 | 329°C | 625°F |

THERMAL PROPERTIES

| | | |
|-------------------------------|-------------|-------------|
| Thermal Expansion Coefficient | 0.1016 %/°C | 0.0564 %/°F |
| Thermal Conductivity | W/m K | BTU/hr F ft |
| -18°C / 0°F | 0.135 | 0.078 |
| 38°C / 100°F | 0.131 | 0.076 |
| 121°C / 250°F | 0.124 | 0.071 |
| 232°C / 450°F | 0.114 | 0.066 |
| Heat Capacity | kJ/kg K | BTU/lb F |
| -18°C / 0°F | 2.110 | 0.504 |
| 38°C / 100°F | 2.299 | 0.549 |
| 121°C / 250°F | 2.583 | 0.617 |
| 232°C / 450°F | 2.959 | 0.707 |

PHYSICAL PROPERTIES

| | | |
|--|-------------------|--------------------|
| Appearance: colorless, clear and bright liquid | | |
| Viscosity ASTM D445 | | |
| cSt at -18°C / 0°F | 129 | |
| cSt at 40°C / 104°F | 8.34 | |
| cSt at 121°C / 250°F | 1.69 | |
| cSt at 232°C / 450°F | 0.68 | |
| Density ASTM D1298 | kg/m ³ | lb/ft ³ |
| -18°C / 0°F | 858.59 | 53.6 |
| 38°C / 100°F | 823.34 | 51.4 |
| 121°C / 250°F | 768.88 | 48 |
| 232°C / 450°F | 695.20 | 43.4 |
| Vapor Pressure ASTM D2879 | kPa | psi |
| -18°C / 0°F | 0 | 0 |
| 38°C / 100°F | 0 | 0 |
| 121°C / 250°F | 0.48 | 0.07 |
| 232°C / 450°F | 15.72 | 2.28 |
| Distillation Range ASTM D2887 | 0.1 | 289°C (516°F) |
| | 0.9 | 411°C (772°F) |
| Average Molecular Weight | 372 | |

The values quoted are typical of normal production. They do not constitute a specification.

DURATHERM 450FG

PROPERTY VS. TEMPERATURE CHART METRIC

| TEMPERATURE (Celsius) | DENSITY (kg/m ³) | VISCOSITY (Centistoke) | VISCOSITY (Centipoise) | THERMAL CONDUCTIVITY (W/m K) | HEAT CAPACITY (kJ/kg K) | VAPOUR PRESSURE (kPa) |
|--------------------------|---------------------------------|---------------------------|---------------------------|------------------------------------|-------------------------------|-----------------------------|
| -40 | 873.8 | 1026.37 | 896.84 | 0.138 | 2.034 | 0.00 |
| -30 | 867.3 | 360.52 | 312.66 | 0.137 | 2.068 | 0.00 |
| -20 | 860.7 | 153.00 | 131.69 | 0.136 | 2.102 | 0.00 |
| -10 | 854.2 | 75.30 | 64.32 | 0.135 | 2.136 | 0.00 |
| 0 | 847.6 | 41.65 | 35.30 | 0.134 | 2.170 | 0.00 |
| 10 | 841.1 | 25.27 | 21.26 | 0.133 | 2.204 | 0.00 |
| 20 | 834.5 | 16.52 | 13.78 | 0.132 | 2.238 | 0.00 |
| 30 | 828.0 | 11.45 | 9.48 | 0.132 | 2.272 | 0.00 |
| 40 | 821.4 | 8.34 | 6.85 | 0.131 | 2.306 | 0.01 |
| 50 | 814.9 | 6.26 | 5.10 | 0.130 | 2.340 | 0.02 |
| 60 | 808.3 | 4.87 | 3.93 | 0.129 | 2.374 | 0.03 |
| 70 | 801.8 | 3.89 | 3.12 | 0.128 | 2.408 | 0.05 |
| 80 | 795.2 | 3.19 | 2.54 | 0.127 | 2.442 | 0.08 |
| 90 | 788.7 | 2.67 | 2.10 | 0.126 | 2.476 | 0.13 |
| 100 | 782.1 | 2.27 | 1.78 | 0.125 | 2.510 | 0.21 |
| 110 | 775.6 | 1.96 | 1.52 | 0.124 | 2.544 | 0.32 |
| 120 | 769.0 | 1.72 | 1.32 | 0.124 | 2.578 | 0.48 |
| 130 | 762.5 | 1.52 | 1.16 | 0.123 | 2.612 | 0.71 |
| 140 | 755.9 | 1.36 | 1.03 | 0.122 | 2.646 | 1.03 |
| 150 | 749.4 | 1.23 | 0.92 | 0.121 | 2.680 | 1.47 |
| 160 | 742.8 | 1.12 | 0.83 | 0.120 | 2.714 | 2.05 |
| 170 | 736.3 | 1.03 | 0.76 | 0.119 | 2.748 | 2.83 |
| 180 | 729.7 | 0.95 | 0.69 | 0.118 | 2.782 | 3.85 |
| 190 | 723.2 | 0.88 | 0.64 | 0.117 | 2.816 | 5.17 |
| 200 | 716.6 | 0.82 | 0.59 | 0.116 | 2.850 | 6.85 |
| 210 | 710.1 | 0.77 | 0.55 | 0.116 | 2.884 | 8.97 |
| 220 | 703.5 | 0.73 | 0.51 | 0.115 | 2.918 | 11.62 |
| 230 | 697.0 | 0.69 | 0.48 | 0.114 | 2.952 | 14.90 |
| 232 | 695.6 | 0.68 | 0.47 | 0.114 | 2.959 | 15.65 |

The values quoted are typical of normal production. They do not constitute a specification.

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PROPERTY VS. TEMPERATURE CHART STANDARD

| TEMPERATURE (Fahrenheit) | DENSITY (lb/ft ³) | VISCOSITY (Centistoke) | VISCOSITY (Centipoise) | THERMAL CONDUCTIVITY (BTU/hr-F-ft) | HEAT CAPACITY (BTU/lb-F) | VAPOUR PRESSURE (Psia) |
|-----------------------------|----------------------------------|---------------------------|---------------------------|--|--------------------------------|------------------------------|
| -40 | 54.5 | 1026.37 | 896.84 | 0.080 | 0.486 | 0.00 |
| -30 | 54.3 | 559.09 | 486.50 | 0.079 | 0.490 | 0.00 |
| -20 | 54.1 | 325.00 | 281.62 | 0.079 | 0.495 | 0.00 |
| -10 | 53.9 | 199.91 | 172.50 | 0.079 | 0.499 | 0.00 |
| 0 | 53.6 | 129.20 | 111.01 | 0.078 | 0.504 | 0.00 |
| 10 | 53.4 | 87.18 | 74.59 | 0.078 | 0.508 | 0.00 |
| 20 | 53.2 | 61.09 | 52.05 | 0.078 | 0.513 | 0.00 |
| 30 | 53.0 | 44.26 | 37.55 | 0.078 | 0.517 | 0.00 |
| 40 | 52.7 | 33.02 | 27.89 | 0.077 | 0.522 | 0.00 |
| 50 | 52.5 | 25.27 | 21.26 | 0.077 | 0.526 | 0.00 |
| 60 | 52.3 | 19.79 | 16.57 | 0.077 | 0.531 | 0.00 |
| 70 | 52.1 | 15.81 | 13.19 | 0.076 | 0.535 | 0.00 |
| 80 | 51.8 | 12.86 | 10.68 | 0.076 | 0.540 | 0.00 |
| 90 | 51.6 | 10.63 | 8.79 | 0.076 | 0.544 | 0.00 |
| 100 | 51.4 | 8.92 | 7.34 | 0.076 | 0.549 | 0.00 |
| 110 | 51.1 | 7.55 | 6.18 | 0.075 | 0.553 | 0.00 |
| 120 | 50.9 | 6.45 | 5.26 | 0.075 | 0.558 | 0.00 |
| 130 | 50.7 | 5.58 | 4.53 | 0.075 | 0.563 | 0.00 |
| 140 | 50.5 | 4.87 | 3.93 | 0.074 | 0.567 | 0.00 |
| 150 | 50.2 | 4.29 | 3.45 | 0.074 | 0.572 | 0.01 |
| 160 | 50.0 | 3.80 | 3.05 | 0.074 | 0.576 | 0.01 |
| 170 | 49.8 | 3.40 | 2.71 | 0.074 | 0.581 | 0.01 |
| 180 | 49.6 | 3.06 | 2.43 | 0.073 | 0.585 | 0.01 |
| 190 | 49.3 | 2.77 | 2.19 | 0.073 | 0.590 | 0.02 |
| 200 | 49.1 | 2.52 | 1.99 | 0.073 | 0.594 | 0.02 |
| 210 | 48.9 | 2.31 | 1.81 | 0.072 | 0.599 | 0.03 |
| 220 | 48.6 | 2.12 | 1.66 | 0.072 | 0.603 | 0.04 |
| 230 | 48.4 | 1.96 | 1.52 | 0.072 | 0.608 | 0.05 |
| 240 | 48.2 | 1.82 | 1.40 | 0.072 | 0.612 | 0.06 |
| 250 | 48.0 | 1.69 | 1.30 | 0.071 | 0.617 | 0.07 |
| 260 | 47.7 | 1.58 | 1.21 | 0.071 | 0.621 | 0.09 |
| 270 | 47.5 | 1.48 | 1.13 | 0.071 | 0.626 | 0.11 |
| 280 | 47.3 | 1.39 | 1.06 | 0.070 | 0.630 | 0.14 |
| 290 | 47.1 | 1.31 | 0.99 | 0.070 | 0.635 | 0.17 |
| 300 | 46.8 | 1.24 | 0.93 | 0.070 | 0.639 | 0.20 |
| 310 | 46.6 | 1.18 | 0.88 | 0.070 | 0.644 | 0.25 |
| 320 | 46.4 | 1.12 | 0.83 | 0.069 | 0.648 | 0.30 |
| 330 | 46.1 | 1.07 | 0.79 | 0.069 | 0.653 | 0.36 |
| 340 | 45.9 | 1.02 | 0.75 | 0.069 | 0.657 | 0.43 |
| 350 | 45.7 | 0.97 | 0.71 | 0.068 | 0.662 | 0.50 |
| 360 | 45.5 | 0.93 | 0.68 | 0.068 | 0.666 | 0.60 |
| 370 | 45.2 | 0.89 | 0.65 | 0.068 | 0.671 | 0.70 |
| 380 | 45.0 | 0.86 | 0.62 | 0.068 | 0.675 | 0.82 |
| 390 | 44.8 | 0.83 | 0.59 | 0.067 | 0.680 | 0.96 |
| 400 | 44.6 | 0.80 | 0.57 | 0.067 | 0.684 | 1.12 |
| 410 | 44.3 | 0.77 | 0.55 | 0.067 | 0.689 | 1.30 |
| 420 | 44.1 | 0.75 | 0.53 | 0.066 | 0.693 | 1.50 |
| 430 | 43.9 | 0.72 | 0.51 | 0.066 | 0.698 | 1.73 |
| 440 | 43.6 | 0.70 | 0.49 | 0.066 | 0.702 | 1.99 |
| 450 | 43.4 | 0.68 | 0.47 | 0.066 | 0.707 | 2.28 |

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They do not constitute a specification.