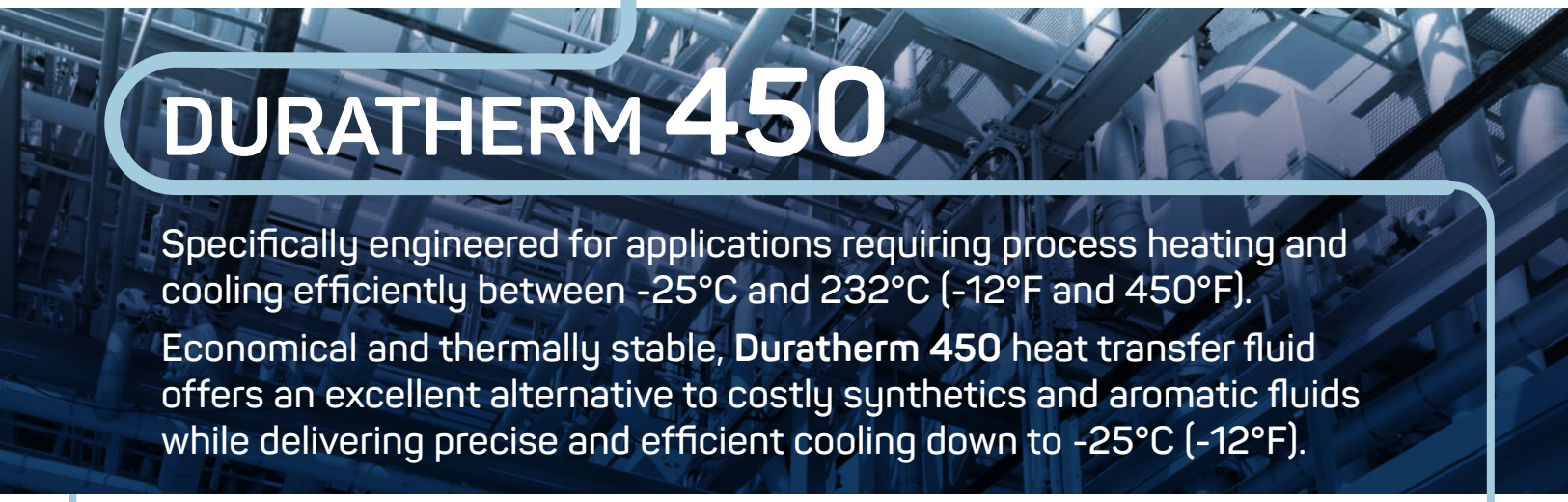
DURATHERM
Heat Transfer Fluids

DURATHERM 450



Specifically engineered for applications requiring process heating and cooling efficiently between -25°C and 232°C (-12°F and 450°F).

Economical and thermally stable, **Duratherm 450** heat transfer fluid offers an excellent alternative to costly synthetics and aromatic fluids while delivering precise and efficient cooling down to -25°C (-12°F).

APPLICATION

Duratherm 450 is specifically engineered for applications requiring process heating and cooling efficiently between -25°C and 232°C (-12°F and 450°F).

Economical and thermally stable, **Duratherm 450** offers an excellent alternative to costly synthetics and aromatic fluids while delivering precise and efficient cooling down to -25°C (-12°F). **Duratherm 450** is an oxidative and thermally stable, high performance, long lasting, environmentally friendly heat transfer fluid. Offering precise temperature control and long life at an economical cost.

THE DIFFERENCE

Duratherm 450 contains the industry's most effective and resilient blend of additives to ensure long-lasting, trouble-free service.

Our exclusive system includes a proprietary, dual stage anti-oxidant and a special blend of metal deactivators, extenders, and other agents that prolong fluid life and help keep systems clean. That also means longer life for parts like pumps and rotary seals.

LASTS LONGER

Oxidation can cripple your system. Left unchecked, it will ultimately cause catastrophic failure and costly downtime. That's why **Duratherm 450** offers unsurpassed levels of protection against oxidation, and a service life that other fluids simply can't match.

RUNS CLEANER

Duratherm 450 delivers superior resistance to sludging, a problem plaguing most other fluids. That makes it the best defense against extreme oxidation found in many of today's demanding manufacturing environments, including plastics processing, molding, casting, asphalt, paint, chemical and a wide variety of other applications.

In fact, our exclusive additive technology makes **Duratherm 450** the perfect solution for all applications, large or small requiring precise temperature control up to 232°C (450°F).

ENVIRONMENTAL

Duratherm 450 is environmentally friendly, non-toxic, non-hazardous and non-reportable. It poses no ill effect to worker safety and does not require special handling. After its long service life, **Duratherm 450** can easily be disposed of with other waste oils.

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DURATHERM 450

- Maximum temperature: 232°C / 450°F
- Flash point 150°C / 302°F
- Non-toxic/non-hazardous
- Runs longer, keeps systems cleaner
- Great oxidation resistance
- Efficient for lower-temperature applications
- 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
-40°C / -40°F	0.148	0.085
-18°C / 0°F	0.146	0.085
38°C / 100°F	0.142	0.082
121°C / 250°F	0.136	0.079
232°C / 450°F	0.129	0.074
Heat Capacity	kJ/kg K	BTU/lb F
-40°C / -40°F	1.905	0.455
-18°C / 0°F	1.972	0.472
38°C / 100°F	2.142	0.512
121°C / 250°F	2.394	0.572
232°C / 450°F	2.731	0.653

PHYSICAL PROPERTIES

Appearance: colorless, clear and bright liquid		
Viscosity ASTM D445		
cSt at -40°C / -40°F	104.00	
cSt at -18°C / 0°F	29.98	
cSt at 40°C / 104°F	4.61	
cSt at 121°C / 250°F	1.42	
cSt at 232°C / 450°F	0.67	
Density ASTM D1298	kg/m3	lb/ft3
-40°C / -40°F	905.54	56.53
-18°C / 0°F	890.50	55.58
38°C / 100°F	852.23	53.21
121°C / 250°F	795.51	49.66
232°C / 450°F	722.38	44.92
Vapor Pressure ASTM D2879	kPa	psi
-40°C / -40°F	0.00	0.00
-18°C / 0°F	0.00	0.00
38°C / 100°F	0.58	0.08
121°C / 250°F	2.13	0.31
232°C / 450°F	20.62	3.00
Distillation Range ASTM D2887	10%	263°C (505°F)
	90%	508°C (947°F)
Average Molecular Weight	372	

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

DURATHERM 450

PROPERTY VS. TEMPERATURE CHART
METRIC

TEMPERATURE (Celsius)	DENSITY (kg/m^3)	KINEMATIC VISCOSITY (Centistoke)	DYNAMIC VISCOSITY (Centipoise)	THERMAL CONDUCTIVITY (W/m-K)	HEAT CAPACITY (kJ/kg-K)	VAPOR PRESSURE (kPa)
-40	905.54	104.00	94.18	0.148	1.905	0.00
-35	902.12	74.54	67.24	0.148	1.921	0.00
-30	898.70	54.99	49.42	0.147	1.936	0.00
-20	891.87	32.24	28.76	0.146	1.966	0.00
-10	885.03	20.52	18.16	0.146	1.997	0.00
0	878.20	13.94	12.24	0.145	2.026	0.00
10	871.36	9.98	8.70	0.144	2.057	0.26
20	864.53	7.46	6.45	0.143	2.088	0.37
30	857.70	5.78	4.96	0.143	2.118	0.48
40	850.86	4.61	3.92	0.142	2.148	0.60
50	844.03	3.77	3.18	0.141	2.179	0.70
60	837.19	3.14	2.63	0.141	2.209	0.82
70	830.36	2.67	2.22	0.140	2.239	0.95
80	823.53	2.30	1.90	0.139	2.269	1.12
90	816.69	2.01	1.64	0.138	2.300	1.30
100	809.86	1.78	1.44	0.138	2.330	1.52
110	803.02	1.59	1.28	0.137	2.360	1.78
120	796.19	1.43	1.14	0.136	2.391	2.08
130	789.35	1.30	1.03	0.136	2.421	2.54
140	782.52	1.19	0.93	0.135	2.451	3.12
150	775.69	1.10	0.85	0.134	2.482	3.83
160	768.85	1.02	0.78	0.133	2.512	4.71
170	762.02	0.95	0.72	0.133	2.543	5.78
180	755.18	0.89	0.67	0.132	2.573	7.10
190	748.35	0.84	0.63	0.131	2.603	8.72
200	741.51	0.79	0.59	0.131	2.634	10.70
210	734.68	0.75	0.55	0.130	2.664	13.12
220	727.85	0.71	0.52	0.129	2.695	16.13
230	721.01	0.68	0.49	0.129	2.725	19.82
232	719.55	0.67	0.48	0.128	2.733	20.68

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PROPERTY VS. TEMPERATURE CHART
STANDARD

TEMPERATURE (Fahrenheit)	DENSITY (lb/ft^3)	KINEMATIC VISCOSITY (Centistoke)	DYNAMIC VISCOSITY (Centipoise)	THERMAL CONDUCTIVITY (BTU/hr-F-ft)	HEAT CAPACITY (BTU/lb-F)	VAPOR PRESSURE (Psia)
-40	56.53	104.00	94.23	0.085	0.455	0.00
-30	56.29	71.97	64.93	0.085	0.459	0.00
-20	56.06	51.59	46.35	0.085	0.463	0.00
-10	55.82	38.14	34.12	0.085	0.467	0.00
0	55.58	28.98	25.81	0.085	0.472	0.00
10	55.35	22.55	20.00	0.084	0.476	0.00
20	55.11	17.92	15.83	0.084	0.480	0.00
30	54.87	14.51	12.76	0.084	0.484	0.00
40	54.63	11.95	10.46	0.084	0.488	0.00
50	54.40	9.98	8.70	0.083	0.492	0.04
60	54.16	8.45	7.34	0.083	0.496	0.05
70	53.92	7.24	6.26	0.083	0.500	0.06
80	53.69	6.27	5.40	0.083	0.504	0.07
90	53.45	5.48	4.70	0.082	0.508	0.07
100	53.21	4.84	4.13	0.082	0.512	0.08
110	52.98	4.30	3.65	0.082	0.516	0.09
120	52.74	3.85	3.25	0.082	0.520	0.10
130	52.50	3.47	2.92	0.082	0.524	0.11
140	52.26	3.14	2.63	0.081	0.528	0.12
150	52.03	2.87	2.39	0.081	0.532	0.13
160	51.79	2.63	2.18	0.081	0.536	0.14
170	51.55	2.42	2.00	0.081	0.540	0.16
180	51.32	2.23	1.84	0.080	0.544	0.17
190	51.08	2.07	1.70	0.080	0.548	0.19
200	50.84	1.93	1.57	0.080	0.552	0.20
210	50.61	1.80	1.46	0.080	0.556	0.21
220	50.37	1.69	1.37	0.079	0.560	0.23
230	50.13	1.59	1.28	0.079	0.564	0.26
240	49.89	1.50	1.20	0.079	0.568	0.28
250	49.66	1.42	1.13	0.079	0.572	0.31
260	49.42	1.34	1.06	0.079	0.576	0.34
270	49.18	1.28	1.01	0.078	0.580	0.38
280	48.95	1.22	0.95	0.078	0.584	0.43
290	48.71	1.16	0.91	0.078	0.588	0.48
300	48.47	1.11	0.86	0.078	0.592	0.54
310	48.23	1.06	0.82	0.077	0.596	0.60
320	48.00	1.02	0.78	0.077	0.600	0.68
330	47.76	0.98	0.75	0.077	0.605	0.76
340	47.52	0.94	0.72	0.077	0.609	0.86
350	47.29	0.91	0.69	0.076	0.613	0.96
360	47.05	0.88	0.66	0.076	0.617	1.08
370	46.81	0.85	0.64	0.076	0.621	1.21
380	46.58	0.82	0.61	0.076	0.625	1.35
390	46.34	0.79	0.59	0.076	0.629	1.52
400	46.10	0.77	0.57	0.075	0.633	1.70
410	45.86	0.75	0.55	0.075	0.637	1.91
420	45.63	0.73	0.53	0.075	0.641	2.13
430	45.39	0.71	0.52	0.075	0.645	2.39
440	45.15	0.69	0.50	0.074	0.649	2.68
450	44.92	0.67	0.48	0.074	0.653	3.00

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