



## Technical Data Sheet

**DOWTHERM™ A****Product Type** Synthetic organic heat transfer fluid – Liquid and Vapor Phase Data**Applications**

- Indirect heat transfer

**Recommended Use Temperature Range**

Liquid phase: 15°C (60°F) to 400°C (750°F)  
Vapor phase: 257°C (495°F) to 400°C (750°F)

**Description**

DOWTHERM™ A heat transfer fluid is a eutectic mixture of two very stable compounds, biphenyl ( $C_{12}H_{10}$ ) and ( $C_{12}H_{10}O$ ). These compounds have practically the same vapor pressures, so the mixture can be handled as if it were a single compound. DOWTHERM A fluid may be used in systems employing either liquid phase or vapor phase heating.

**Typical Properties<sup>†</sup>**

Composition		
Diphenyl Oxide/Biphenyl Blend		
Color	Clear to light yellow	
<b>Property</b>	<b>SI Units</b>	<b>English Units</b>
<b>Freeze Point</b>	12.0°C	53.6°F
<b>Atmospheric Boiling Point</b>	257.1°C	494.8°F
<b>Flash Point<sup>1</sup></b>	113°C	236°F
<b>Fire Point<sup>2</sup></b>	118°C	245°F
<b>Autoignition Temperature<sup>3</sup></b>	599°C	1110°F
<b>Density at 25°C (75°F)</b>	1056 kg/m <sup>3</sup>	66.0 lb./ft. <sup>3</sup>
<b>Surface Tension in Air at:</b>		
20°C (68°F)	40.1 Dynes/cm	40.1 Dynes/cm
40°C (104°F)	37.6 Dynes/cm	37.6 Dynes/cm
60°C (140°F)	35.7 Dynes/cm	35.7 Dynes/cm
<b>Estimated Critical Temperature</b>	497°C	927°F
<b>Estimated Critical Pressure</b>	31.34 bar	30.93 atm
<b>Estimated Critical Volume</b>	3.17 l/kg	0.0508 ft. <sup>3</sup> /lb.
<b>Average Molecular Weight</b>		166.0
<b>Heat of Combustion</b>	36,053 kJ/kg	15,500 Btu/lb.

<sup>†</sup>Not to be construed as specifications.<sup>1</sup>SETA<sup>2</sup>C.O.C.<sup>3</sup>ASTM E659-78

**Saturated Liquid Properties of DOWTHERM™ A Fluid (English Units)**

Temperature °F	Specific Heat Btu/lb. °F	Density lb./ft. <sup>3</sup>	Thermal Conductivity Btu/hr. ft. <sup>2</sup> (°F/ft.)	Viscosity (cP)	Vapor Pressure (psia)
60	0.373	66.37	0.0805	4.91	0.000
120	0.396	64.72	0.0775	2.12	0.003
180	0.418	63.03	0.0744	1.22	0.028
240	0.441	61.30	0.0713	0.81	0.16
300	0.463	59.51	0.0682	0.59	0.64
360	0.485	57.65	0.0651	0.45	2.03
420	0.507	55.72	0.0620	0.35	5.38
480	0.529	53.70	0.0590	0.28	12.25
540	0.552	51.57	0.0559	0.23	24.72
600	0.575	49.29	0.0528	0.19	45.31
660	0.599	46.82	0.0497	0.16	76.89
720	0.627	44.08	0.0466	0.14	122.7
780	0.665	40.93	0.0436	0.12	186.4

**Saturated Liquid Properties of DOWTHERM™ A Fluid (SI Units)**

Temperature °C	Specific Heat kJ/kg K	Density kg/m <sup>3</sup>	Thermal Conductivity W/mK	Viscosity mPa sec	Vapor Pressure (bar)
15	1.558	1063.5	0.1395	5.00	0.00
65	1.701	1023.7	0.1315	1.58	0.00
105	1.814	990.7	0.1251	0.91	0.01
155	1.954	947.8	0.1171	0.56	0.06
205	2.093	902.5	0.1091	0.38	0.28
255	2.231	854.0	0.1011	0.27	0.97
305	2.373	801.3	0.0931	0.20	2.60
355	2.527	742.3	0.0851	0.16	5.80
405	2.725	672.5	0.0771	0.12	11.32

**Saturated Vapor Properties of DOWTHERM™ A Fluid (English Units)**

Temperature °F	Vapor Pressure (psia)	Liquid Enthalpy Btu/lb.	Latent Heat Btu/lb.	Vapor Enthalpy Btu/lb.	Vapor Density lb./ft. <sup>3</sup>	Vapor Viscosity cP	Vapor Thermal Cond. Btu/hr. ft. <sup>2</sup> (°F/ft.)	Z <sub>vapor</sub>	Specific Heat (c <sub>p</sub> ) Btu/lb. °F	Ratio of Specific Heats c <sub>p</sub> /c <sub>v</sub>
60	0.000	2.5	175.1	177.6		0.0054	0.0044	1.000	0.250	1.050
120	0.003	26.2	167.3	193.5		0.0060	0.0055	1.000	0.279	1.045
300	0.64	103.0	148.0	251.1	0.0130	0.0079	0.0092	0.996	0.361	1.035
360	2.03	131.1	142.0	273.1	0.0388	0.0086	0.0106	0.989	0.385	1.034
420	5.38	160.6	135.8	296.3	0.0967	0.0092	0.0120	0.977	0.409	1.034
480	12.25	191.4	129.2	320.5	0.2100	0.0098	0.0135	0.959	0.433	1.035
540	24.72	223.5	122.1	345.5	0.4102	0.0105	0.0150	0.932	0.456	1.039
600	45.31	256.9	114.2	371.1	0.7389	0.0166	0.0166	0.895	0.480	1.045
660	76.89	291.7	105.3	397.0	1.254	0.0183	0.0183	0.848	0.505	1.055
720	122.7	327.9	95.0	422.9	2.045	0.0200	0.0200	0.789	0.534	1.073
780	186.4	365.9	82.5	448.4	3.270	0.0219	0.0219	0.714	0.571	1.108

### Saturated Vapor Properties of DOWTHERM™ A Fluid (SI Units)

Temperature °F	Vapor Pressure (bar)	Liquid Enthalpy kJ/kg	Latent Heat kJ/kg	Vapor Enthalpy kJ/kg	Vapor Density Kg/m³	Vapor Viscosity mPa·s	Vapor Thermal Cond. W/mK	Z <sub>vapor</sub>	Specific Heat (c <sub>p</sub> ) kJ/kg K	Ratio of Specific Heats c <sub>p</sub> /c <sub>v</sub>
15	0.00	4.9	407.2	412.1	0.0054	0.0075	1.000	1.044	1.050	
65	0.00	88.1	380.9	469.4	0.0040	0.0063	0.0104	1.000	1.227	1.043
105	0.01	158.1	362.7	520.9	0.0341	0.0071	0.0129	0.999	1.366	1.038
155	0.06	251.2	341.5	592.7	0.2583	0.0080	0.0163	0.995	1.528	1.035
205	0.28	351.2	320.2	671.5	1.179	0.0090	0.0200	0.982	1.681	1.034
255	0.97	458.2	297.4	755.6	3.831	0.0100	0.0238	0.954	1.829	1.036
305	2.60	572.2	271.5	843.6	9.896	0.0110	0.0279	0.908	1.976	1.042
355	5.80	693.1	240.6	933.8	22.03	0.0122	0.0322	0.838	2.133	1.057
405	11.32	822.0	201.7	1023.7	45.17	0.0138	0.0368	0.740	2.333	1.094

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Form 176-01472-0417