



Specific Gravity vs. Temperature

Temperature fluctuations affect the specific gravity and volume of silicone fluids to a greater degree than water or mercury, but close to that of benzene. We compare the Polydimethylsiloxane fluids (PSF-Fluids) and Diphenyl-Dimethylsiloxane fluid (DPDM-400) with mineral oil.

Presented here are the measured values of specific gravity in the range from -40°C to 200°C. The results show that the degree of change in the specific gravity and volume due to temperature fluctuation are in opposite correlation to the change due to the viscosity of the oil. In other words, temperature-dependent viscosity change is in the following order: PSF-Fluids < DPDM-400 < mineral oil.

Temperature dependent change in specific gravity is in this order: mineral oil < DPDM-400 < PSF-Fluids. For a given type of silicone fluid, the higher the viscosity, the smaller the change. The correlation between specific gravity and measurement temperature is shown in Table 1. All measurements were performed using a floating hydrometer so there is a slight inaccuracy at higher temperatures. As such, please use the information here as an industry guideline.

Table 1: Specific gravity at various temperatures

	-40°C *1	-20°C *1	0°C *2	25°C	50°C	100°C	150°C	200°C
PSF-2cSt	0.936	0.917	0.898	0.873	0.859	0.823	-	-
PSF-5cSt	0.979	0.961	0.939	0.915	0.900	0.862		
PSF-10cSt	1.000	0.982	-	0.935	0.914	0.870		
PSF-20cSt	1.008	-	0.974	0.950	0.930	0.885		
PSF-50cSt	1.020	1.002	0.982	0.960	0.938	0.897	0.857	0.816
PSF-100cSt	1.024	1.006	0.987	0.965	0.944	0.902	0.862	0.823
PSF-1,000cSt	1.029	1.011	0.992	0.970	0.949	0.907	0.868	0.830
DPDM-400	----	-----	----	1.074	1.055	1.019	0.984	0.948
Damper oil 15mm ² /s	----	-----	----	0.887	0.873	0.844	-----	----
Spindle oil 18mms/s	----	-----	----	0.915	0.899	0.868	-----	----

Measurement temperature *1: $\pm 0.2^{\circ}\text{C}$ *2: $\pm 0.3-0.5^{\circ}\text{C}$