Answer ID
7471

Propylene Glycols - Density Values

Question

What are the density values for glycols and glycol-water solutions?

Answer

Density is the weight per unit volume of a mass. Density varies with temperature and the graphs below show the densities of Dow's glycols and glycol-water solutions over a range of temperatures. The first two graphs show that the densities of PG-water solutions and DPG-water solutions may be the same for two concentrations. Therefore, density alone is not a reliable method of testing for solutions concentration.

Although the graphs below show the densities of glycols and glycol-water solutions, it may sometimes be desirable to know the specific gravities at certain temperatures. The specific gravity can be obtained by dividing the density of the glycol or glycol-water solution by the density of water. Densities, and therefore specific gravities, vary with temperature; hence it is necessary to indicate the temperatures of both the glycol and water. The specific gravity of PG, the density of which is 1.037 at 77°F (25°C), when compared to water, which has density of 0.997 at 77°F (25°C), could be calculated as follows:

Specific Gravity of PG at 77°F (25°C) = 1.037/0.997 = 1.040

Specific gravities may be expressed at various temperatures, as follows:

Specific gravity of PG at ("x"°F)/("y"°F)[1] = (density of PG at "x"°F) /(density of water At "y"° F)

[1] *"x" and "y" may be the same or different numbers*

The weight per gallon of a glycol or aqueous glycol solution is determined as follows:

Density in g/ml at t°C x 8.345 = lb/gal at t°C

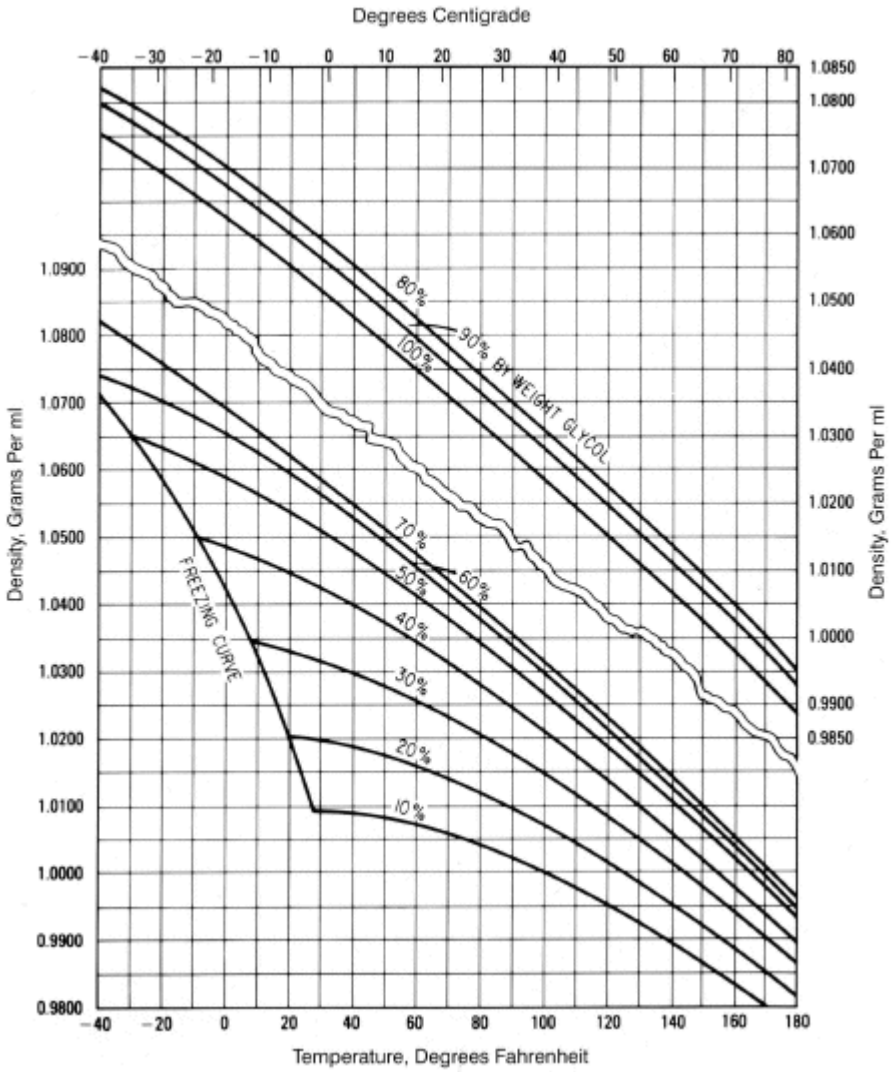
Pounds per gallon 77°F (25°C)

- Propylene Glycol 8.62
- Dipropylene Glycol 8.53
- Tripropylene Glycol 8.51

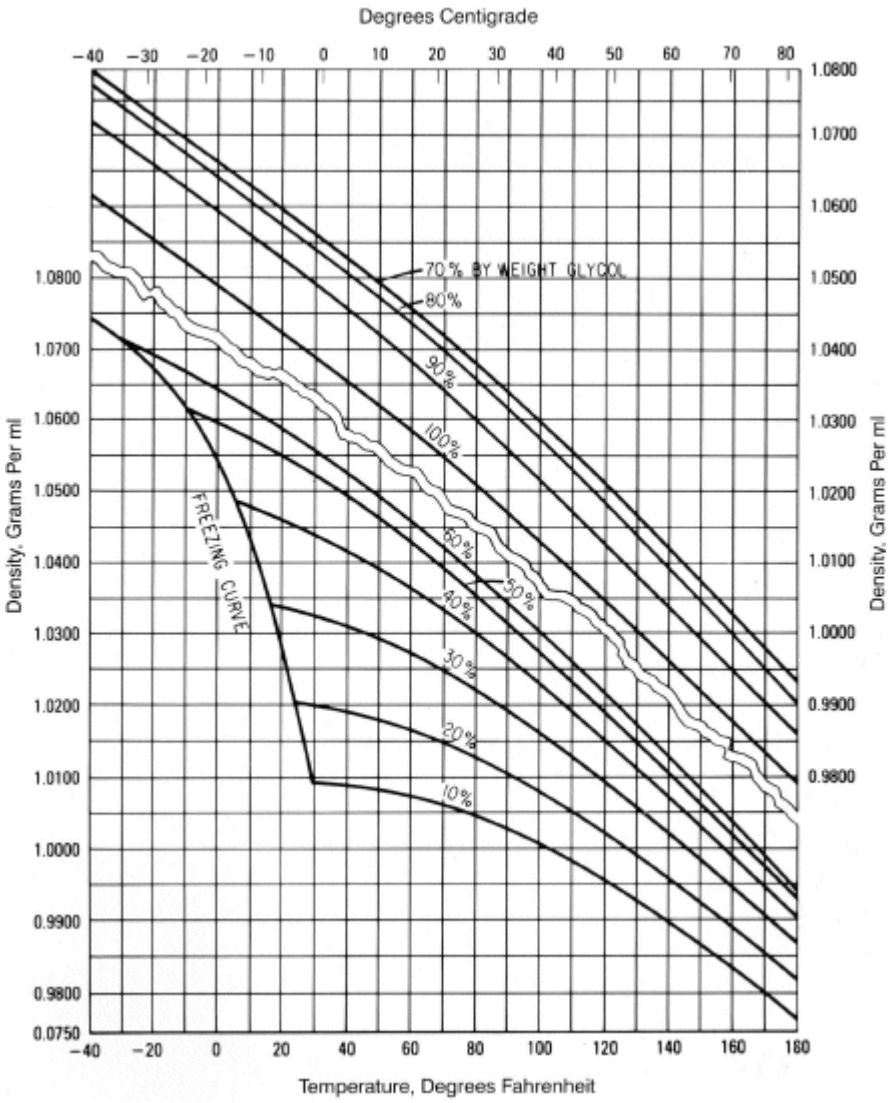
Volume changes resulting from heating or cooling glycol-water solutions may be readily calculated from the data presented in the below graphs. For example, in heating 10,000 lb of PG from 77°F to 140°F (25°C to 60°C), the increase in volume will be:

[(1 0000lb) / ((1 .006g/ml)(8.345lb/gal/g/ml))] – [(1 0000lb) / ((1 .032g/ml)(8.345lb/ gal/g/ml)] = 1191gal – 1161gal = 30 gal

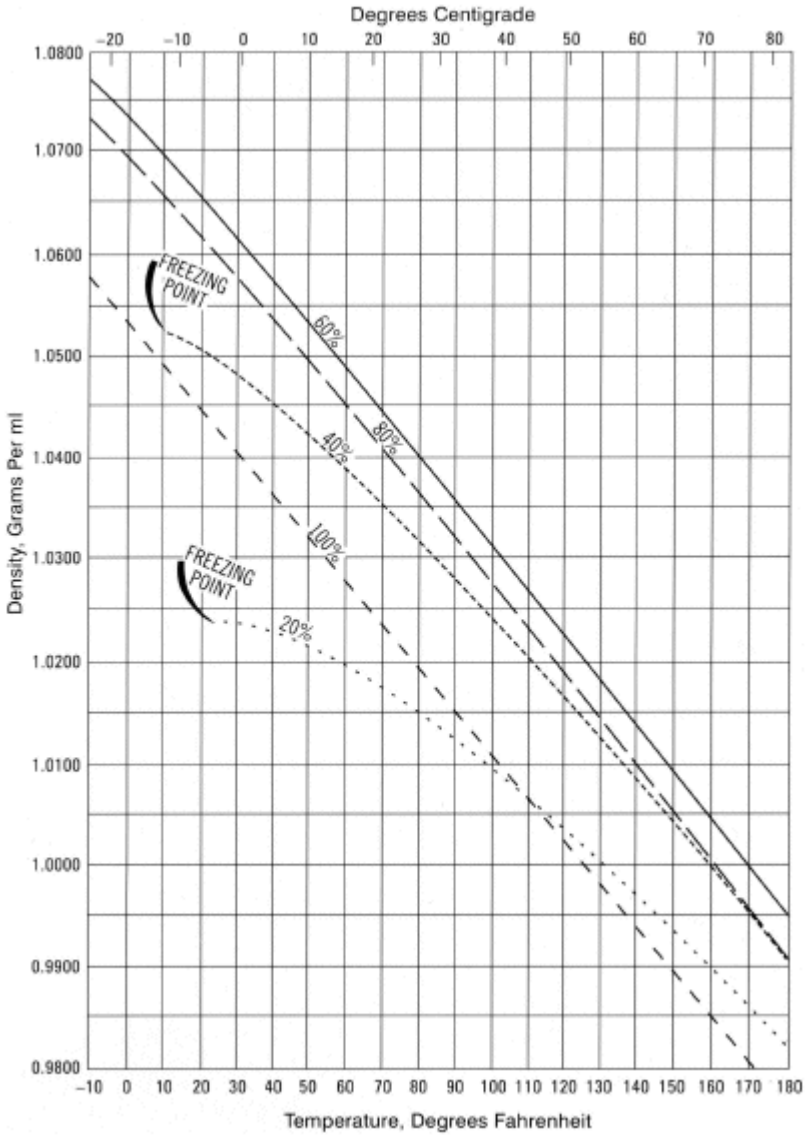
Densities of Aqueous Propylene Glycol Solutions



Densities of Aqueous Dipropylene Glycol Solutions



Densities of Tripropylene Glycol Solutions



Density of Water at Various Temperatures

Temperature, °C	Density, g/ml	Temperature, °C	Density, g/ml
-20	0.993490	15	0.999129
-10	0.998137	20	0.998234
0	0.999868	25	0.997075
1	0.999927	30	0.995678
2	0.999968	35	0.994063
3	0.999992	40	0.992247
4	1.000000	50	0.988066
5	0.999992	60	0.983226
6	0.999968	70	0.977793
7	0.999930	80	0.971819

8	0.999877	90	0.965340
9	0.999809	95	0.961920
10	0.999728	100	0.958384