

The densities of the coexisting vapor and liquid of a pure compound at various temperatures are as follows:

$t^{\circ}\text{C}$	30	50	70	100	120
D_l (grams/cc)	0.6455	0.6116	0.5735	0.4950	0.4040
D_v (grams/cc)	0.0142	0.0241	0.0385	0.0810	0.1465

If the critical temperature is 126.9°C , what is the molal critical volume if the molecular weight is 50? If 300 grams are placed in a 1-liter vessel at 30°C , calculate the weights of liquid and vapor present. Calculate the same quantities if only 10 grams are placed in the vessel.

T	ρ_L	ρ_v	ρ_{avg}
30	0.6455	0.0142	0.32985
50	0.6116	0.0241	0.31785
70	0.5735	0.0385	0.306
100	0.495	0.081	0.288
120	0.404	0.1465	0.27525
126.9	0.271408	0.271408	0.271408

Average density

$$\rho_{avg} = \frac{\rho_L + \rho_v}{2} = aT + b$$

$$V_c = \frac{MW}{\rho_c}$$

ρ_c	0.271408
V_c	184.2244

