

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

T	$\rho_L$	$\rho_v$	$\rho_{avg}$
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

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

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

$\rho_c$	0.271408
$V_c$	184.2244

