MASS REPRESENTATIONS

Property	**Mass Relationship (M_i = total mass of component i)**	**Symbols**
Count	$M_i = m_i N_i$	N_{item} = number of units of i m_{item} = mass of 1 unit of i
Density	$M_i = \rho_i V_i$	ρ_i = density of material i V_i = volume of material i
Moles	$M_i = MW_i n_i$	n_i = moles of species i MW_i = molar weight of i
Gas pressure	$M_i = (\frac{PV}{RT})MW_i$	P = pressure of gas V = volume of gas R = Gas Constant T = temperature MW = molar weight of gas i
Mass percent	$M\% = 100\% * M_i / m_{total}$	M% = mass percent m_{total} = total mass of mixture
Volume percent	$V\% = 100\% * V_i / V_{total}$	V% = volume percent V_i = volume of material i V_{total} = total volume of mixture
Mass by volume percent	$(m/v)\% = 100\% * M_i / V_{total}$	(m/v)% = mass by volume percent V_{total} = total volume of mixture
Molarity (solution)	$\boldsymbol{M} = n_i / V_{total}$ *[L]*	$\boldsymbol{M}$ = molarity n_i = moles of i V_{total} = total volume of mixture in liters
Molality (solution)	$\boldsymbol{m} = n_i / m_{solvent}$ *[kg]*	$\boldsymbol{m}$ = molality n_i = moles of i $m_{solvent}$ = total mass of solvent in kilograms
Normality (solution)	$\boldsymbol{N} = ge_i / V_{total}$ *[L]*	$\boldsymbol{N}$ = normality ge_i = gram equivalents of i V_{total} = total volume of mixture in liters
Formality (solution)	$\boldsymbol{F} = gfm_i / V_{total}$ *[L]*	$\boldsymbol{F}$ = formality gfm_i = gram formula masses of i V_{total} = total volume of mixture in liters
Mole fraction	$x_i = n_i / n_{total}$	x_i = mole fraction of i n_i = moles of i n_{total} = total number of moles in the mixture
Parts per million	$ppm = 10^6 * u_i / u_{total}$	Ppm = parts per million u_i = units of i u_{total} = total units of mixture **u can be mass/volume/mole and is consistent for u_i and u_{total}*