Multiphase Fluid vs Fluid Mixture

Multiphase Fluid is a Fluid consisting of phases, each occupying its own space volume.

Each phase of the Multiphase Fluid is represented either by a pure substance or by a Fluid Mixture.

It may also happen that a Multiphase Fluid consists of one pure substance and as such is not a Fluid Mixture (example is liquid water and its vapour staying in equlibrium).

Fluid Mixture is a sum of Fluid Components, which are pure chemical substances.

Fluid Mixture can stay as a single phase with Fluid Components sharing the same volume.

Under specific temperature and pressure conditions Fluid Mixture can develop few phases, each occupying its own space volume.

The Fluid Components of each phase are sharing the same space volume.

The primary measure of Fluid Mixture Composition is mole fractions of its Fluid Components:

(1) $$x_i = \frac{\nu_i}{\nu} = \frac{N_i}{N}$$

where

$\nu_i = N_i / N_A$	amount of substance of the i-th mixture component
$\nu = \sum_i \nu_i$	total amount of substance in the mixture
N_A	Avogadro constant
N_i	amount of molecules/atoms in the i-th mixture component
$N = \sum_i N_i$	total amount of molecules/atoms in the mixture
$\sum_i x_i = 1$	

In case of Multiphase Fluid one often need to assess the volume fraction of each phase:

(2) $$s_\alpha = \frac{V_\alpha}{V}$$

where

V_α	volume occupied by α-phase
$V = \sum_\alpha V_\alpha$	total volume of Multiphase Fluid sample which is a sum of all phase volumes

The model is based on Equation of State (EOS) and inter-phase Thermodynamic equilibrium.

See Also

Natural Science / Chemistry / Chemical Substance / Mixture / Fluid Mixture

Natural Science / Physics / Thermodynamics / Thermodynamic system / Phase / Multiphase Fluid