Volumetric heat capacity

@wikipedia

Amount of heat required to change the temperature of one unit of volume by one unit of temperature:

$$c_v = \frac{\delta Q}{\delta V \cdot \delta T}$$

Symbol	Dimension	SI units	Oil metric units	Oil field units
c_v	M L^{-1} T^{2} 1	J/(m^{3}K)	J/(m^{3}K)	BTU/(ft^3°F)

Volumetric Heat Capacity depends on the way the heat is transferred and as such is not a material property.

The two major heat transfer processes are isobaric and isohoric which define:

Isobaric volumetric heat capacity	Isochoric volumetric heat capacity
c_{vp}	c_{vV}

Both c_{vp} and c_{vV} are material properties and properly tabulated for the vast majority of materials.

Volumetric Heat Capacity c_v relates to Specific Heat Capacity c_m and density of the matter ρ as:

(1) $$c_v = \frac{c_m}{\rho}$$

In many technical papers the "m" or "v" index is omitted which leads to confusion between Specific Heat Capacity c_m and Volumetric Heat Capacity c_v .

The other confusion is made between Volumetric Heat Capacity c_v and Isochoric Heat Capacity c_V .

For multiphase fluid in thermodynamic equilibrium the Volumetric Heat Capacity c_v is:

(2) $$c_v = \sum_\alpha s_\alpha c_{v\alpha}$$

where

s_α	α-phase volume share, subjected to $\sum_\alpha s_\alpha = 1$
$c_{v\alpha}$	α-phase Volumetric Heat Capacity

See also

Physics / Thermodynamics / Thermodynamic process / Heat Transfer / Heat Capacity

[Heat] [Specific heat capacity]