Mayer's relation

@wikipedia

Universal relation between Isobaric molar heat capacity (c_P) and Isochoric molar heat capacity (c_V):

(1) $$c_P - c_V = V_m T \frac{\alpha_V^2}{c_T}$$

where

T	temperature	V_m	molar volume
c_T	Isothermal Compressibility	α_V	thermal expansion coefficient

For incompressible matter the Isobaric molar heat capacity (c_P) and Isochoric molar heat capacity (c_V) are identical:

(2) $$c_P = c_V$$

For the ideal gas it will take a form:

(3) $$c_P - c_V = R$$

where

R	Gas constant

Both incompressible matter and ideal gas are idealistic models but some real mattes come very close to conditions of (2) or (3) at engineering level of accuracy.

See also

Physics / Thermodynamics / Thermodynamic process / Heat Transfer / Heat Capacity / Molar heat capacity

[Heat]