

Bulk modulus

[@wikipedia](#)

A measure of resistance of a [Continuum body](#) to compression.

It is defined as the ratio of the [infinitesimal pressure](#) increase to the resulting relative decrease of the [density](#) ρ or [molar volume](#) V_m :

(1)
$$K = \rho \cdot \frac{\partial p}{\partial \rho} = -V_m \cdot \frac{\partial p}{\partial V_m}$$

It is inverse to [compressibility](#) c :

(2)
$$K = \frac{1}{c}$$

[Bulk modulus](#) depends on the thermodynamic conditions at which it is measured and as such is not a [material property](#).

The most popular [material Bulk modulus](#) are:

Isothermal Bulk modulus	Isentropic Bulk modulus
$T = \text{const}$	$S = \text{const}$
(3) $K_T = \rho \cdot \left(\frac{\partial p}{\partial \rho}\right)_T$	(4) $K_S = \rho \cdot \left(\frac{\partial p}{\partial \rho}\right)_S$

See also

[Physics](#) / [Mechanics](#) / [Continuum mechanics](#) / [Continuum body](#)