Modulus of Elasticity of Concrete:

The modulus of elasticity of concrete is a function of the modulus of elasticity of the aggregates and the cement matrix and their relative proportions. The moulus of elasticity of concrete is relatively constant at low stress levels but starts decreasing at higher stress levels as matrix cracking develops.

$psi := \frac{lb}{in^2}$ $psf := \frac{lb}{ft^2}$ $pcf := \frac{lb}{ft^3}$ $kip := 1000lb$ $ksi := \frac{kip}{in^2}$

convert: $\frac{N}{mm^2}$ to psi multiply by $0.00689475728 \frac{psi}{\left(\frac{N}{mm^2}\right)}$

Concrete Compressive Strength (28day) $f_c := 3000psi$

Concrete Weigth $w_c := 150pcf$

The modulus of elasticity of concrete E_c adopted in modified form by the ACI Code can be calculated by the following fornula.

$E_c := 33\, w_c^{1.5} \sqrt{f_c}$ $E_c := 33 \left[\frac{w_c^{1.5}}{(1pcf)^{1.5}}\right] \left(\sqrt{1psi \cdot f_c}\right)$ $E_c = 3320561\ psi$

REFERENCE: