

Natural Convection Heat Transfer Multiplier @model

Dimensionless multiplier correcting the [Conductive Annulus Heat Transfer Coefficient](#) U^* to account for the [Natural Thermal Convection](#) effects in the [Annulus](#):

$$(1) \quad U = \epsilon_a \cdot U^* = \epsilon \cdot \frac{\lambda_a}{d_t \cdot \ln(d_{ci}/d_t)}$$

The most popular empirical correlations are:

$$(2) \quad \epsilon = \begin{cases} 1, & \text{if } Ra < 10^3 \\ 0.18 \cdot Ra^{0.25}, & \text{if } Ra > 10^3 \end{cases}$$

$$(3) \quad \epsilon = \begin{cases} 1, & \text{if } Ra < 10^3 \\ 0.105 \cdot Ra^{0.3}, & \text{if } 10^3 < Ra < 10^6 \\ 0.4 \cdot Ra^{0.2}, & \text{if } Ra > 10^6 \end{cases}$$

See also

[Physics](#) / [Thermodynamics](#) / [Heat Transfer](#) / [Heat Transfer Coefficient \(HTC\)](#) / [Heat Transfer Coefficient \(HTC\) @model](#)

[[Rayleigh number](#)]