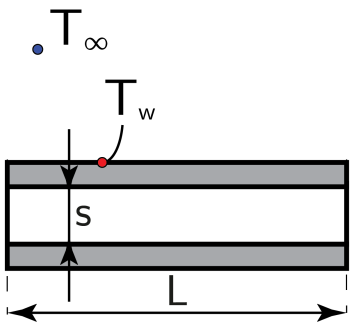
Grashof Number 04

Give an expression for the Grashof number in terms of given variables.



The standard expression for the Grashof number is:

$$\mathrm{Gr} = \frac{g\beta\left(T_\mathrm{H} - T_\mathrm{L}\right) L_\mathrm{c}^3}{\nu^2}$$

In this case the Grashof number used for determining the rate of heat transfer from the top plate to environment should be determined.

In that case, the characteristic length is:

$$L_\mathrm{c} = L$$

And it is given that $T_\infty < T_\mathrm{w}$.

So we can define the Grashof number as:

$$\mathrm{Gr} = \frac{g\beta\left(T_\mathrm{w} - T_\infty\right) L^3}{\nu^2}$$