

Definition of pressure

Pressure is calculated by dividing the size of the force acting upon an object by the area over which it acts. In other words:

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

The units of pressure are Newtons per square metre (N/m^2). 1.0 Newton per square metre (1.0 N/m^2) is also known as 1.0 Pascal (1.0 Pa).

$$1 \text{ N/m}^2 = 1 \text{ Pa}$$

Suppose you need to calculate the pressure exerted by a 1.0 kg book resting on the surface of a table. The area of the book in contact with the table is 0.06 m^2 .

$$\text{mass of book} = 1 \text{ kg}$$

$$\begin{aligned} \text{weight of book} &= mg \\ &= 1 \times 9.8 \\ &= 9.8 \end{aligned}$$

$$\begin{aligned} \text{pressure} &= \frac{\text{force}}{\text{area}} \\ &= \frac{9.8}{0.06} \\ &= 163 \text{ N/m}^2 \\ &= 163 \text{ Pa} \end{aligned}$$