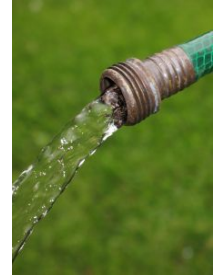




Chapter 6

Pressure in Fluids

Force is anything that causes a change in the motion of an object.
Example) A push or pull



Pressure is the force acting on a certain area of a surface.

When you lean against a wall you exert pressure on the wall.

Calculating Pressure

- The unit for pressure is the Pascal (Pa)
- You can determine pressure if you know the force and the area.

$$\text{Pressure} = \frac{\text{Force}}{\text{Area}}$$

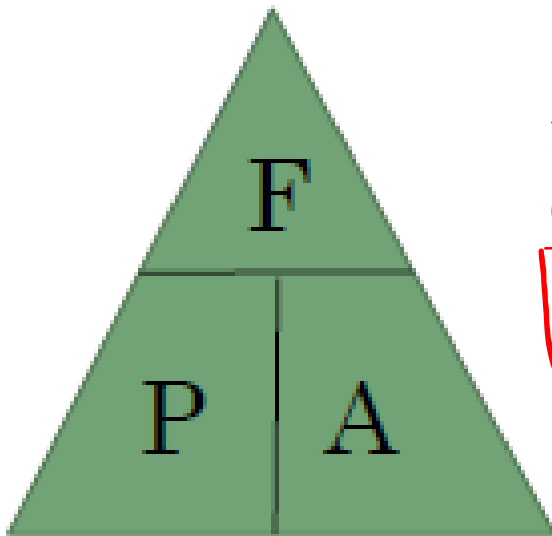
Force is measured in Newtons (N)

Area is measured in m^2 measure the base shape

so Pascal (Pa) is N/m^2

Formula:

$$\text{Pressure (P)} = \frac{\text{Force (F)}}{\text{Area (A)}}$$



$$F = P \times A$$

units on force (N)
area (m²)

$$A = \frac{F}{P}$$

units on Area
m²

SAMPLE PROBLEMS

1. An aquarium is filled with water that weighs 10 000 N. If the base of the aquarium has an area of 1.6 m², what pressure does the water exert on its base?

$$F = 10\,000\text{ N}$$

$$A = 1.6\text{ m}^2$$

$$P = ? \text{ Pa}$$

$$P = \frac{F}{A}$$

$$P = \frac{10\,000\text{ N}}{1.6\text{ m}^2} = 6\,250\text{ Pa}$$

2. If the atmospheric pressure is 101 200 Pa and you are holding your hand, the atmosphere is exerting a force on your hand. If the area of your palm is 0.006m², calculate the force on your hand.

$$P = 101\,200\text{ Pa}$$

$$A = 0.006\text{ m}^2$$

$$F = ? \text{ N}$$

$$F = P \times A$$

$$= 101\,200\text{ Pa} \times 0.006\text{ m}^2$$

$$F = 607.2\text{ N}$$

Force

$$P = \frac{F}{A}$$

$$A = \frac{F}{P}$$

3. The weight of water in a glass is 4.9 N. If the water is exerting a pressure of 1700 Pa on the bottom of the glass, what is the area of the bottom of the glass?

$$F = 4.9 \text{ N}$$

$$P = 1700 \text{ Pa}$$

$$A = ? \text{ m}^2$$

$$A = \frac{4.9 \text{ N}}{1700 \text{ Pa}}$$

$$= 0.0029 \text{ m}^2$$