

Calculating Pressure

To calculate Pressure you need to:

Use the Equation: Pressure = Force divide by Area

This equation is easy to understand, the area is usually given to you but you have to be able to convert MN Million Newtons or KN Kilo Newtons.

So 30MN is simply 30 000 000Newtons
Or 30KN is simply 30 000Newtons

MATHEMATICAL UNDERSTANDING

E10 Calculating pressure

Question

A press is being used to stamp components from a metal sheet. The area over which the tool contacts the sheet is 75 mm^2 . The force applied by the press is 30 MN.

Calculate the pressure that the tool applies to the metal sheet.

Solution

The pressure $P = \frac{F}{A} = \frac{3 \times 10^7}{75} = 400 \text{ kN mm}^{-2}$



Calculating Pressure

1, A press is being used to stamp components from a metal sheet. The area over which the tool contacts the sheet is 75mm^2 . The force applied by the press is 30MN .

Calculate the pressure that the tool applies to the metal sheet.

2, A press is being used to stamp components from a metal sheet. The area over which the tool contacts the sheet is 50mm^2 . The force applied by the press is 15MN .

Calculate the pressure that the tool applies to the metal sheet

3, A press is being used to stamp components from a metal sheet. The area over which the tool contacts the sheet is 20mm^2 . The force applied by the press is 10MN .

Calculate the pressure that the tool applies to the metal sheet

4, A press is being used to stamp components from a metal sheet. The area over which the tool contacts the sheet is 15mm^2 . The force applied by the press is 300KN .

Calculate the pressure that the tool applies to the metal sheet

5, A press is being used to stamp components from a metal sheet. The area over which the tool contacts the sheet is 95mm^2 . The force applied by the press is 5KN .

Calculate the pressure that the tool applies to the metal sheet

6, A press is being used to stamp components from a metal sheet. The area over which the tool contacts the sheet is 105mm^2 . The force applied by the press is 950N .

Calculate the pressure that the tool applies to the metal sheet

Calculating Force

To calculate the Force output you need to:

Firstly work out the area of the material by using the equation:
 $3.142 \times (R \times R) =$

Then you can put the Area calculation into the Force equation:

Force = Pressure \times Area =

Read the question to get the Pressure and multiply the numbers together to get the answer.

MATHEMATICAL UNDERSTANDING

E10: Calculating force

This example shows how to calculate the force output of a cylinder.

The radius of the piston is 10 mm and the pressure in the cylinder is 0.5 N mm^{-2} .

First calculate the surface area:

$$\text{Area} = \pi \times 10^2$$

$$\text{Area} = 3.14 \times 10 \times 10$$

$$\text{Area} = 314 \text{ mm}^2$$

Now calculate the force:

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

$$\text{Force} = 0.5 \times 314$$

$$\text{Force} = 157 \text{ N}$$

Calculating Force

1, The radius of the piston is 20mm and the pressure in the cylinder is 0.6Nmm^2
Calculate the force on the cylinder.

2, The radius of the piston is 25mm and the pressure in the cylinder is 0.7Nmm^2
Calculate the force on the cylinder.

3, The radius of the piston is 15mm and the pressure in the cylinder is 0.3Nmm^2
Calculate the force on the cylinder.

4, The radius of the piston is 25.5mm and the pressure in the cylinder is 0.45Nmm^2
Calculate the force on the cylinder.

15 The radius of the piston is 9.75mm and the pressure in the cylinder is 0.875Nmm^2
Calculate the force on the cylinder.