



FORCE, LOAD & PRESSURE CALCULATIONS FOR CYLINDER AND GAUGE OUTPUT

To calculate: **FORCE** (Kilonewtons; **kN**) & **LOAD** (Metric Tonnes; **T**)
FROM GAUGE PRESSURE (Pounds/Square Inch; **psi**)
AND A GIVEN CYLINDER EFFECTIVE AREA (Square Centimeters **cm²**)

$$\frac{\text{APPLIED PRESSURE (psi)} \times \text{CYLINDER EFFECTIVE AREA (cm}^2\text{)} \times 9.81(\text{g})}{14223} = \text{KILO NEWTONS (kN)}$$

$$\frac{\text{APPLIED PRESSURE (psi)} \times \text{CYLINDER EFFECTIVE AREA (cm}^2\text{)}}{14223} = \text{METRIC TONNES (T) (1000's kg)}$$

e.g. 1000psi using a nominal 50T cylinder effective area 62.1cm²

$$1000\text{psi} \times 62.1\text{cm}^2 \times 9.81\text{g}/14223 = 42.83\text{kN}$$

$$1000\text{psi} \times 62.1\text{cm}^2/14223 = 4.366\text{T}$$

To calculate: Gauge **PRESSURE** (Pounds/Square Inch; **psi**)

FROM A GIVEN **FORCE** (Kilonewtons; **kN**) & **LOAD** (Metric Tonnes; **T**)
AND A GIVEN CYLINDER EFFECTIVE AREA (Square Centimeters **cm²**)

CALCULATING THE GAUGE PRESSURE (psi) REQUIRED TO ACHIEVE REACTION FORCE

$$\frac{(\text{T}) \text{ METRIC TONNES OF FORCE} \times 14223}{\text{CYLINDER EFFECTIVE AREA (cm}^2\text{)}} = \text{APPLIED PRESSURE (psi)}$$

e.g. Force 10T using a nominal 50T cylinder effective area 62.1cm²

$$10\text{T (10,000kg)} \times 14223 / 62.1\text{cm}^2 = 2290.0\text{psi}$$

TIPS

When using multiple cylinders in a system the total effective areas of all the cylinders must be used.

$$\text{METRIC TONNES (T) (1000's kg) (T)} \times 1.1 = \text{IMPERIAL SHORT TONS (t)}$$