Important Pin Formulas PDF



Formulas Examples with Units

List of 13 **Important Pin Formulas**

1) Diameter of Knuckle Pin given Bending Moment in Pin Formula 🕝



Evaluate Formula

$$d = \left(\frac{32 \cdot M_b}{\pi \cdot \sigma_b}\right)^{\frac{1}{3}}$$

$$37.0672 \, \text{mm} = \left(\frac{32 \cdot 450000 \, \text{N*mm}}{3.1416 \cdot 90 \, \text{N/mm}^2}\right)^{\frac{1}{3}}$$

2) Diameter of Knuckle Pin given Bending Stress in Pin Formula 🕝

Evaluate Formula

Formula

Formula Example with Units
$$d = \left(\frac{32 \cdot \frac{L}{2} \cdot \left(\frac{b}{4} + \frac{a}{3}\right)}{\pi \cdot \sigma_b}\right)^{\frac{1}{3}}$$

$$37.0311 \, \text{mm} = \left(\frac{32 \cdot \frac{45000 \, \text{N}}{2} \cdot \left(\frac{44.3 \, \text{mm}}{4} + \frac{26.6 \, \text{mm}}{3}\right)}{3.1416 \cdot 90 \, \text{N/mm}^2}\right)^{\frac{1}{3}}$$

3) Diameter of Pin of Knuckle Joint given Compressive Stress in Eye End Portion of Pin Formula 🕝



Evaluate Formula (

4) Diameter of Pin of Knuckle Joint given Compressive Stress in Fork End Portion of Pin Formula 🕝



Evaluate Formula C

5) Diameter of Pin of Knuckle Joint given Diameter of Pinhead Formula 🗂





Evaluate Formula (

6) Diameter of Pin of Knuckle Joint given Load and Shear Stress in Pin Formula 🕝



Example with Units

$$d = \sqrt{\frac{2 \cdot L}{\pi \cdot \tau_p}}$$

$$35.14 \, \text{mm} = \sqrt{\frac{2 \cdot 45000 \, \text{N}}{3.1416 \cdot 23.2 \, \text{N/mm}^2}}$$

7) Diameter of Pin of Knuckle Joint given Outer Diameter of Eye Formula C



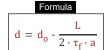
Formula Example with Units
$$d = \frac{d_o}{2} \qquad 40_{mm} = \frac{80_{mm}}{2}$$

8) Diameter of Pin of Knuckle Joint given Shear Stress in Eye Formula 🕝



$$d = d_0 - \frac{L}{b \cdot \tau_e} \qquad \boxed{ \begin{aligned} & \text{Example with Units} \\ & \end{aligned} } \\ & 37.6749 \, \text{mm} = 80 \, \text{mm} - \frac{45000 \, \text{N}}{44.3 \, \text{mm} \cdot 24 \, \text{N/mm}^2} \end{aligned} }$$

9) Diameter of Pin of Knuckle Joint given Shear Stress in Fork Formula 🕝





10) Diameter of Pin of Knuckle Joint given Tensile Stress in Eye Formula 🕝





11) Diameter of Pin of Knuckle Joint given Tensile Stress in Fork Formula 🕝 Evaluate Formula 🕝

Formula
$$d = d_0 - \frac{L}{2 \cdot \sigma_{tf} \cdot a}$$

Formula Example with Units
$$d = d_0 - \frac{L}{2 \cdot \sigma_{tf} \cdot a} \qquad 48.0806 \, \text{mm} = 80 \, \text{mm} - \frac{45000 \, \text{N}}{2 \cdot 26.5 \, \text{N/mm}^2 \cdot 26.6 \, \text{mm}}$$

12) Diameter of Pinhead of Knuckle Joint given Diameter of Pin Formula C

13) Length of Pin of Knuckle Joint in Contact with Eye End Formula C









Evaluate Formula

Evaluate Formula

Evaluate Formula

Evaluate Formula

Evaluate Formula

Variables used in list of Pin Formulas above

- a Thickess of Fork Eye of Knuckle Joint (Millimeter)
- b Thickess of Eye of Knuckle Joint (Millimeter)
- d Diameter of Knuckle Pin (Millimeter)
- d₁ Diameter of Knuckle Pin Head (Millimeter)
- d_o Outer Diameter of Eye of Knuckle Joint (Millimeter)
- I Length of Knuckle Pin in Eye End (Millimeter)
- L Load on Knuckle Joint (Newton)
- M_b Bending Moment in Knuckle Pin (Newton Millimeter)
- σ_b Bending Stress in Knuckle Pin (Newton per Square Millimeter)
- σ_c Compressive Stress in Knuckle Pin (Newton per Square Millimeter)
- σ_{te} Tensile Stress in Eye of Knuckle Joint (Newton per Square Millimeter)
- σ_{tf} Tensile Stress in Fork of Knuckle Joint (Newton per Square Millimeter)
- T_e Shear Stress in Eye of Knuckle Joint (Newton per Square Millimeter)
- T_f Shear Stress in Fork of Knuckle Joint (Newton per Square Millimeter)
- T_p Shear Stress in Knuckle Pin (Newton per Square Millimeter)

Constants, Functions, Measurements used in list of Pin Formulas above

- constant(s): pi,
 3.14159265358979323846264338327950288
 Archimedes' constant
- Functions: sqrt, sqrt(Number)
 A square root function is a function that takes a non-negative number as an input and returns the square root of the given input number.
- Measurement: Length in Millimeter (mm)
 Length Unit Conversion
- Measurement: Force in Newton (N)
 Force Unit Conversion
- Measurement: Torque in Newton Millimeter (N*mm)
 Torque Unit Conversion
- Measurement: Stress in Newton per Square Millimeter (N/mm²)
 Stress Unit Conversion

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Percentage error

• ECM of three numbers

• 🛂 Subtract fraction 🕝

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