



Proof Load on Spring Formulas

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List of 18 Proof Load on Spring Formulas

Proof Load on Spring &

Leaf Springs 🗷

1) Deflection given Proof Load on Leaf Spring

$$\delta = rac{3 \cdot \mathrm{W_{O\,(Leaf\,Spring)} \cdot L^3}}{8 \cdot \mathrm{E} \cdot \mathrm{n} \cdot \mathrm{t}^3 \cdot \mathrm{b}}$$

Open Calculator 🗗

2) Length given Proof Load on Leaf Spring

$$\mathbf{E} = \left(rac{8 \cdot \mathrm{E} \cdot \mathrm{n} \cdot \mathrm{b} \cdot \mathrm{t}^3 \cdot \delta}{3 \cdot \mathrm{W}_{\mathrm{O}\, (\mathrm{Leaf\, Spring})}}
ight)^{rac{1}{3}}$$

Open Calculator 🗗

$$4168.075 \text{mm} = \left(\frac{8 \cdot 20000 \text{MPa} \cdot 8 \cdot 300 \text{mm} \cdot (460 \text{mm})^3 \cdot 3.4 \text{mm}}{3 \cdot 585 \text{kN}}\right)^{\frac{1}{3}}$$



3) Modulus of Elasticity given Proof Load on Leaf Spring

 $ext{E} = rac{3 \cdot W_{O ext{ (Leaf Spring)}} \cdot L^3}{8 \cdot n \cdot b \cdot t^3 \cdot \delta}$

Open Calculator

 $20027.73\text{MPa} = \frac{3 \cdot 585 \text{kN} \cdot (4170 \text{mm})^3}{8 \cdot 8 \cdot 300 \text{mm} \cdot (460 \text{mm})^3 \cdot 3.4 \text{mm} }$

4) Number of Plates given Proof Load on Leaf Spring

 $\mathbf{n} = rac{3 \cdot \mathrm{W_{O \, (Leaf \, Spring)} \cdot L^3}}{8 \cdot \mathrm{E} \cdot \mathrm{b} \cdot \mathrm{t}^3 \cdot \delta}$

Open Calculator

5) Proof Load on Leaf Spring

 $\mathbf{W}_{ ext{O (Leaf Spring)}} = rac{8 \cdot \mathrm{E} \cdot \mathrm{n} \cdot \mathrm{b} \cdot \mathrm{t}^3 \cdot \delta}{3 \cdot \mathrm{L}^3}$

Open Calculator

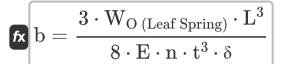


6) Thickness given Proof Load on Leaf Spring

 $\mathbf{t} = \left(rac{3 \cdot W_{O \, (\mathrm{Leaf \, Spring})} \cdot L^3}{8 \cdot E \cdot n \cdot \delta \cdot b}
ight)^{rac{1}{3}}$

Open Calculator 🗗

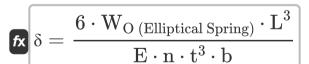
7) Width given Proof Load on Leaf Spring



Open Calculator

Quarter Elliptical Springs

8) Deflection given Proof Load in Quarter Elliptical Spring



Open Calculator 🗗

 $= \frac{6 \cdot 37 \text{kN} \cdot (4170 \text{mm})^3}{20000 \text{MPa} \cdot 8 \cdot 460 \text{mm}^3 \cdot 300 \text{mm}}$



9) Length given Proof Load in Quarter Elliptical Spring

 $\mathbf{E} = \left(rac{\mathbf{E} \cdot \mathbf{n} \cdot \mathbf{b} \cdot \mathbf{t}^3 \cdot \delta}{6 \cdot \mathbf{W}_{O \, (Elliptical \, Spring)}}
ight)^{rac{1}{3}}$

Open Calculator

10) Modulus of Elasticity given Proof Load in Quarter Elliptical Spring

 $\boxed{\mathbf{E} = \frac{6 \cdot W_{O \; (Elliptical \; Spring)} \cdot L^3}{n \cdot b \cdot t^3 \cdot \delta}}$

Open Calculator

11) Number of Plates given Proof Load in Quarter Elliptical Spring

 $n = rac{6 \cdot W_{O \, (Elliptical \, Spring)} \cdot L^3}{E \cdot b \cdot t^3 \cdot \delta}$

Open Calculator



12) Proof Load in Quarter Elliptical Spring

 $W_{O \; (Elliptical \; Spring)} = rac{E \cdot n \cdot b \cdot t^3 \cdot \delta}{6 \cdot L^3}$

Open Calculator

 $= \frac{36.51188 \text{kN} = \frac{20000 \text{MPa} \cdot 8 \cdot 300 \text{mm} \cdot (460 \text{mm})^3 \cdot 3.4 \text{mm}}{6 \cdot (4170 \text{mm})^3}$

13) Thickness given Proof Load in Quarter Elliptical Spring

 $t = \left(rac{6 \cdot W_{O \, (Elliptical \, Spring)} \cdot L^3}{E \cdot n \cdot \delta \cdot b}
ight)^{rac{1}{3}}$

Open Calculator

14) Width given Proof Load in Quarter Elliptical Spring

 $\mathbf{b} = rac{6 \cdot \mathrm{W_{O \, (Elliptical \, Spring)} \cdot L^3}}{\mathrm{E} \cdot \mathrm{n} \cdot \mathrm{t}^3 \cdot \delta}$

Open Calculator 🗗



Springs in Parallel and Series Load 🗗

15) Springs in Parallel - Load 🔽 fx $W_{load} = W_1 + W_2$

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85N = 35N + 50N

16) Springs in Parallel - Spring Constant 🗗

fx $\mathrm{K}=\mathrm{K}_1+\mathrm{K}_2$

= 100 N/mm = 49 N/mm + 51 N/mm

17) Springs in Series- Deflection

fx $\delta = \delta_1 + \delta_2$

= 179 mm = 36 mm + 143 mm

18) Springs in Series- Spring Constant 🗗

 $\mathbf{K} = rac{\mathrm{K}_1 \cdot \mathrm{K}_2}{\mathrm{K}_1 + \mathrm{K}_2}$

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 $oxed{ex} 24.99 \mathrm{N/mm} = rac{49 \mathrm{N/mm} \cdot 51 \mathrm{N/mm}}{49 \mathrm{N/mm} + 51 \mathrm{N/mm}}$



Variables Used

- b Width of Cross Section (Millimeter)
- E Young's Modulus (Megapascal)
- **K** Stiffness of Spring (Newton per Millimeter)
- K₁ Stiffness of Spring 1 (Newton per Millimeter)
- **K₂** Stiffness of Spring 2 (Newton per Millimeter)
- L Length in Spring (Millimeter)
- n Number of Plates
- t Thickness of Section (Millimeter)
- W₁ Load 1 (Newton)
- W₂ Load 2 (Newton)
- Wload Spring Load (Newton)
- Wo (Elliptical Spring) Proof Load on Elliptical Spring (Kilonewton)
- Wo (Leaf Spring) Proof Load on Leaf Spring (Kilonewton)
- δ Deflection of Spring (Millimeter)
- δ₁ Deflection 1 (Millimeter)
- δ₂ Deflection 2 (Millimeter)





Constants, Functions, Measurements used

- Measurement: Length in Millimeter (mm)
 Length Unit Conversion
- Measurement: Force in Kilonewton (kN), Newton (N) Force Unit Conversion
- Measurement: Stiffness Constant in Newton per Millimeter (N/mm)
 Stiffness Constant Unit Conversion
- Measurement: Stress in Megapascal (MPa)
 Stress Unit Conversion





Check other formula lists

- Deflection in Spring Formulas Proof Load on Spring
- Maximum Bending Stress in Spring Formulas

Formulas C

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