Important Torsion of Coil Spring Formulas PDF



Formulas Examples with Units

List of 11

Important Torsion of Coil Spring Formulas

1) Compressed Length of Coil Spring Formula C



Example with Units

Evaluate Formula (

$$L_c = L + G_A$$

 $44.5\,\mathrm{mm} = 42\,\mathrm{mm} + 2.5\,\mathrm{mm}$

2) Mean Radius of Spring Coil Formula C



Example with Units

Evaluate Formula

Evaluate Formula (

Evaluate Formula (

3) Mean Radius of Spring Coil given Maximum Shear Stress Induced in Wire Formula 🕝



 $R = \frac{\tau_{\text{W}} \cdot \pi \cdot d^{3}}{16 \cdot P}$ $5.5217 \, \text{mm} = \frac{16 \, \text{MPa} \cdot 3.1416 \cdot 26 \, \text{mm}^{3}}{16 \cdot 10 \, \text{kN}}$

4) Mean Radius of Spring Coil of Helical Spring given Stiffness of Spring Formula 🕝

Example with Units

5) Pitch of Coil Spring Formula C

Example with Units

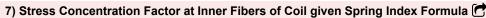
Evaluate Formula

Evaluate Formula

 $p = \frac{L_f}{N_t - 1} \left| \quad | \quad 18.1818 \, \text{mm} = \frac{200 \, \text{mm}}{12 - 1} \right|$

6) Spring Index given Wire Diameter of Inner and Outer Springs Formula C

 $C = \frac{2 \cdot d_1}{d_1 - d_2} \qquad 13 = \frac{2 \cdot 6.5 \, \text{mm}}{6.5 \, \text{mm} - 5.5 \, \text{mm}}$



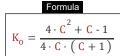
$$K_{i} = \frac{4 \cdot C^{2} - C - 1}{4 \cdot C \cdot (C - 1)}$$

$$K_{i} = \frac{4 \cdot C^{2} - C - 1}{4 \cdot C \cdot (C - 1)}$$

$$1.175 = \frac{4 \cdot 5^{2} - 5 - 1}{4 \cdot 5 \cdot (5 - 1)}$$

Evaluate Formula (

8) Stress Concentration Factor at Outer Fibers of Coils Formula 🕝



$$K_{0} = \frac{4 \cdot C^{2} + C \cdot 1}{4 \cdot C \cdot (C + 1)}$$

$$0.8667 = \frac{4 \cdot 5^{2} + 5 \cdot 1}{4 \cdot 5 \cdot (5 + 1)}$$

Evaluate Formula [

9) Total Axial Gap between Coils of Spring Formula C

Formula
$$G_{A} = (N_{t} - 1) \cdot G_{m}$$

Formula Example with Units
$$G_{A} = \left(\begin{array}{c} N_{t} - 1 \\ \end{array}\right) \cdot G_{m} \qquad \boxed{ 198 \, \text{mm} \, = \, \left(\begin{array}{c} 12 - 1 \\ \end{array}\right) \cdot 18 \, \text{mm} }$$

Evaluate Formula (

10) Wire Diameter of Inner Spring given Wire Diameter of Outer Spring and Spring Index Formula 🕝

Evaluate Formula (

11) Wire Diameter of Outer Spring given Wire Diameter of Inner Spring and Spring Index Formula 🕝

$$d_1 = \left(\frac{C}{C}\right) \cdot d_2$$

Formula Example with Units
$$d_1 = \left(\frac{C}{C-2}\right) \cdot d_2$$

$$9.1667 \, \text{mm} = \left(\frac{5}{5-2}\right) \cdot 5.5 \, \text{mm}$$

Evaluate Formula (

Variables used in list of Torsion of Coil Spring Formulas above

- C Spring Index of Coil Spring
- d Diameter of Spring Wire (Millimeter)
- D Twisting Moments on Shells (Kilonewton Meter)
- d₁ Wire Diameter of Outer Spring (Millimeter)
- d₂ Wire Diameter of Inner Spring (Millimeter)
- **G** Modulus of Rigidity of Spring (Megapascal)
- G_A Total Axial Gap between Coils of Springs (Millimeter)
- G_m Axial Gap between Adjacent Coils Bearing Max Load (Millimeter)
- k Stiffness of Helical Spring (Kilonewton per Meter)
- K_i Stress Concentration Factor at Inner Fibers
- K_o Stress Concentration Factor at Outer Fibres
- L Solid Length of Spring (Millimeter)
- L_c Compressed Length of Spring (Millimeter)
- L_f Free Length of Spring (Millimeter)
- . N Number of Coils
- N_t Total Number of Coils
- p Pitch of Coil Spring (Millimeter)
- P Axial Load (Kilonewton)
- R Mean Radius Spring Coil (Millimeter)
- τ_w Maximum Shear Stress in Wire (Megapascal)

Constants, Functions, Measurements used in list of Torsion of Coil Spring Formulas above

- constant(s): pi,
 3.14159265358979323846264338327950288
 Archimedes' constant
- Measurement: Length in Millimeter (mm)
 Length Unit Conversion
- Measurement: Pressure in Megapascal (MPa)
 Pressure Unit Conversion
- Measurement: Force in Kilonewton (kN)
 Force Unit Conversion
- Measurement: Surface Tension in Kilonewton per Meter (kN/m)
 Surface Tension Unit Conversion
- Measurement: Moment of Force in Kilonewton Meter (kN*m)
 Moment of Force Unit Conversion
- Measurement: Stress in Megapascal (MPa)
 Stress Unit Conversion

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 Formulas 😭

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