calculatoratoz.com

unitsconverters.com

Soderberg and Goodman Lines Formulas

Calculators! Examples! Conversions!

Bookmark **calculatoratoz.com**, **unitsconverters.com**

Widest Coverage of Calculators and Growing - **30,000+ Calculators!**
Calculate With a Different Unit for Each Variable - **In built Unit Conversion!**
Widest Collection of Measurements and Units - **250+ Measurements!**

Feel free to SHARE this document with your friends!

Please leave your feedback here...

List of 15 Soderberg and Goodman Lines Formulas

Soderberg and Goodman Lines

1) Goodman Line Amplitude Stress

Open Calculator

fx $$\sigma_a = S_e \cdot \left(1 - \frac{\sigma_m}{\sigma_{ut}}\right)$$

ex $$30\text{N/mm}^2 = 33.84615\text{N/mm}^2 \cdot \left(1 - \frac{50\text{N/mm}^2}{440\text{N/mm}^2}\right)$$

2) Goodman Line Endurance Limit

Open Calculator

fx $$S_e = \frac{\sigma_a}{1 - \frac{\sigma_m}{\sigma_{ut}}}$$

ex $$33.84615\text{N/mm}^2 = \frac{30\text{N/mm}^2}{1 - \frac{50\text{N/mm}^2}{440\text{N/mm}^2}}$$

3) Goodman Line Mean Stress

Open Calculator

fx $$\sigma_m = \sigma_{ut} \cdot \left(1 - \frac{\sigma_a}{S_e}\right)$$

ex $$49.99996\text{N/mm}^2 = 440\text{N/mm}^2 \cdot \left(1 - \frac{30\text{N/mm}^2}{33.84615\text{N/mm}^2}\right)$$

4) Goodman Line Ultimate Tensile Strength

Open Calculator

$$\sigma_{ut} = \frac{\sigma_m}{1 - \frac{\sigma_a}{S_e}}$$

$$440.0004\text{N/mm}^2 = \frac{50\text{N/mm}^2}{1 - \frac{30\text{N/mm}^2}{33.84615\text{N/mm}^2}}$$

5) Limiting Value of Mean Stress

Open Calculator

$$S_m = f_s \cdot \sigma_m$$

$$100\text{N/mm}^2 = 2 \cdot 50\text{N/mm}^2$$

6) Limiting Value of Stress Amplitude

Open Calculator

$$S_a = f_s \cdot \sigma_a$$

$$60\text{N/mm}^2 = 2 \cdot 30\text{N/mm}^2$$

7) Permissible Mean Stress for Fluctuating Load

Open Calculator

$$\sigma_m = \frac{S_m}{f_s}$$

$$50\text{N/mm}^2 = \frac{100\text{N/mm}^2}{2}$$

8) Permissible Stress Amplitude for Fluctuating Load

Open Calculator

fx $$\sigma_a = \frac{S_a}{f_s}$$

ex $$30\text{N/mm}^2 = \frac{60\text{N/mm}^2}{2}$$

9) Slope of Line OE in Modified Goodman Diagram given Bending Amplitude and Mean Bending Moment

Open Calculator

fx $$m = \frac{M_{ba}}{M_{bm}}$$

ex $$0.6 = \frac{720\text{N*mm}}{1200\text{N*mm}}$$

10) Slope of Line OE in Modified Goodman Diagram given Force Amplitude and Mean Force

Open Calculator

fx $$m = \frac{P_a}{P_m}$$

ex $$0.6 = \frac{45.6\text{N}}{76\text{N}}$$

11) Slope of Line OE in Modified Goodman Diagram given Stress Amplitude and Mean Stress

Open Calculator

fx $$m = \frac{\sigma_a}{\sigma_m}$$

ex $$0.6 = \frac{30\text{N/mm}^2}{50\text{N/mm}^2}$$

12) Soderberg Line Amplitude Stress

Open Calculator

fx $$\sigma_a = S_e \cdot \left(1 - \frac{\sigma_m}{\sigma_{yt}}\right)$$

ex $$30\text{N/mm}^2 = 33.84615\text{N/mm}^2 \cdot \left(1 - \frac{50\text{N/mm}^2}{440.0004\text{N/mm}^2}\right)$$

13) Soderberg Line Endurance Limit

Open Calculator

fx $$S_e = \frac{\sigma_a}{1 - \frac{\sigma_m}{\sigma_{yt}}}$$

ex $$33.84615\text{N/mm}^2 = \frac{30\text{N/mm}^2}{1 - \frac{50\text{N/mm}^2}{440.0004\text{N/mm}^2}}$$

14) Soderberg Line Mean stress

Open Calculator

$$\sigma_m = \sigma_{yt} \cdot \left(1 - \frac{\sigma_a}{S_e}\right)$$

$$50\text{N/mm}^2 = 440.0004\text{N/mm}^2 \cdot \left(1 - \frac{30\text{N/mm}^2}{33.84615\text{N/mm}^2}\right)$$

15) Soderberg Line Tensile Yield Strength

Open Calculator

$$\sigma_{yt} = \frac{\sigma_m}{1 - \frac{\sigma_a}{S_e}}$$

$$440.0004\text{N/mm}^2 = \frac{50\text{N/mm}^2}{1 - \frac{30\text{N/mm}^2}{33.84615\text{N/mm}^2}}$$

Variables Used

- f_s Design Factor of Safety
- m Slope of modified Goodman Line
- M_{ba} Bending Moment Amplitude *(Newton Millimeter)*
- M_{bm} Mean Bending Moment *(Newton Millimeter)*
- P_a Force Amplitude for Fluctuating Stress *(Newton)*
- P_m Mean Force for Fluctuating Stress *(Newton)*
- S_a Limiting Value of Stress Amplitude *(Newton per Square Millimeter)*
- S_e Endurance Limit *(Newton per Square Millimeter)*
- S_m Limiting Value of Mean Stress *(Newton per Square Millimeter)*
- σ_a Stress Amplitude for Fluctuating Load *(Newton per Square Millimeter)*
- σ_m Mean Stress for Fluctuating Load *(Newton per Square Millimeter)*
- σ_{ut} Ultimate Tensile strength *(Newton per Square Millimeter)*
- σ_{yt} Tensile Yield Strength for Fluctuating load *(Newton per Square Millimeter)*

Constants, Functions, Measurements used

- 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

Check other formula lists

- **Power Screws Formulas**
- **Design of Belt Drives Formulas**
- **Design of Pressure Vessels Formulas**
- **Design of Rolling Contact Bearing Formulas**

Feel free to SHARE this document with your friends!

PDF Available in

English Spanish French German Russian Italian Portuguese Polish Dutch

11/21/2024 | 12:07:18 PM UTC *Please leave your feedback here...*