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Constant Wear Theory Formulas

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List of 13 Constant Wear Theory Formulas

Constant Wear Theory

1) Axial Force on Clutch from Constant Wear Theory given Friction Torque

Open Calculator

fx $$P_a = 4 \cdot \frac{M_T}{\mu \cdot (d_o + d_i)}$$

ex $$15900\text{N} = 4 \cdot \frac{238500\text{N*mm}}{0.2 \cdot (200\text{mm} + 100\text{mm})}$$

2) Axial Force on Clutch from Constant Wear Theory given Permissible Intensity of Pressure

Open Calculator

fx $$P_a = \pi \cdot p_a \cdot d_i \cdot \frac{d_o - d_i}{2}$$

ex $$15899.99\text{N} = \pi \cdot 1.012225\text{N/mm}^2 \cdot 100\text{mm} \cdot \frac{200\text{mm} - 100\text{mm}}{2}$$

3) Axial Force on Cone Clutch from Constant Wear Theory given Permissible Pressure Intensity

Open Calculator

fx $$P_a = \pi \cdot p_a \cdot d_i \cdot \frac{d_o - d_i}{2}$$

ex $$15899.99\text{N} = \pi \cdot 1.012225\text{N/mm}^2 \cdot 100\text{mm} \cdot \frac{200\text{mm} - 100\text{mm}}{2}$$

4) Axial Force on Cone Clutch from Constant Wear Theory given Pressure

Open Calculator

$$P_a = \pi \cdot P_p \cdot \frac{\left(d_o^2\right) - \left(d_i^2\right)}{4}$$

$$15900.78\text{N} = \pi \cdot 0.67485\text{N/mm}^2 \cdot \frac{\left((200\text{mm})^2\right) - \left((100\text{mm})^2\right)}{4}$$

5) Coefficient of Friction of Clutch from Constant Wear Theory

Open Calculator

$$\mu = 8 \cdot \frac{M_T}{\pi \cdot p_a \cdot d_i \cdot \left(\left(d_o^2\right) - \left(d_i^2\right)\right)}$$

$$0.2 = 8 \cdot \frac{238500\text{N*mm}}{\pi \cdot 1.012225\text{N/mm}^2 \cdot 100\text{mm} \cdot \left(\left((200\text{mm})^2\right) - \left((100\text{mm})^2\right)\right)}$$

6) Coefficient of Friction of Clutch from Constant Wear Theory given Axial Force

Open Calculator

$$\mu = 4 \cdot \frac{M_T}{P_a \cdot (d_o + d_i)}$$

$$0.2 = 4 \cdot \frac{238500\text{N*mm}}{15900\text{N} \cdot (200\text{mm} + 100\text{mm})}$$

7) Friction Torque on Clutch from Constant Wear Theory given Diameters

Open Calculator

$$M_T = \mu \cdot P_a \cdot \frac{d_o + d_i}{4}$$

$$238500\text{N*mm} = 0.2 \cdot 15900\text{N} \cdot \frac{200\text{mm} + 100\text{mm}}{4}$$

8) Friction Torque on Cone Clutch from Constant Wear Theory given Axial Force

Open Calculator

$$M_T = \mu \cdot P_m \cdot \frac{d_o + d_i}{4 \cdot \sin(\alpha)}$$

$$238500.8\text{N*mm} = 0.2 \cdot 15900.03\text{N} \cdot \frac{200\text{mm} + 100\text{mm}}{4 \cdot \sin(89.9^\circ)}$$

9) Friction Torque on Cone Clutch from Constant Wear Theory given Semi-Cone Angle

Open Calculator

$$M_T = \pi \cdot \mu \cdot p_a \cdot d_i \cdot \frac{\left(d_o^2\right) - \left(d_i^2\right)}{8 \cdot \sin(\alpha)}$$

$$238500.3\text{N*mm} = \pi \cdot 0.2 \cdot 1.012225\text{N/mm}^2 \cdot 100\text{mm} \cdot \frac{\left((200\text{mm})^2\right) - \left((100\text{mm})^2\right)}{8 \cdot \sin(89.9^\circ)}$$

10) Friction Torque on Multiple Disk Clutch from Constant Wear Theory

Open Calculator

$$M_T = \mu \cdot P_m \cdot z \cdot \frac{d_o + d_i}{4}$$

$$238524.3\text{N*mm} = 0.2 \cdot 15900.03\text{N} \cdot 1.0001 \cdot \frac{200\text{mm} + 100\text{mm}}{4}$$

11) Frictional Torque on Clutch from Constant Wear Theory given Diameters

Open Calculator

$$M_T = \pi \cdot \mu \cdot p_a \cdot d_i \cdot \frac{\left(d_o^2\right) - \left(d_i^2\right)}{8}$$

$$238499.9\text{N*mm} = \pi \cdot 0.2 \cdot 1.012225\text{N/mm}^2 \cdot 100\text{mm} \cdot \frac{\left((200\text{mm})^2\right) - \left((100\text{mm})^2\right)}{8}$$

12) Permissible Pressure Intensity on Clutch from Constant Wear Theory given Axial Force

Open Calculator

fx $$p_a = 2 \cdot \frac{P_a}{\pi \cdot d_i \cdot (d_o - d_i)}$$

ex $$1.012225\text{N/mm}^2 = 2 \cdot \frac{15900\text{N}}{\pi \cdot 100\text{mm} \cdot (200\text{mm} - 100\text{mm})}$$

13) Permissible Pressure Intensity on Clutch from Constant Wear Theory given Friction Torque

Open Calculator

fx $$p_a = 8 \cdot \frac{M_T}{\pi \cdot \mu \cdot d_i \cdot \left(\left(d_o^2\right) - \left(d_i^2\right)\right)}$$

ex $$1.012225\text{N/mm}^2 = 8 \cdot \frac{238500\text{N*mm}}{\pi \cdot 0.2 \cdot 100\text{mm} \cdot \left(\left((200\text{mm})^2\right) - \left((100\text{mm})^2\right)\right)}$$

Variables Used

- d_i Inner Diameter of Clutch *(Millimeter)*
- d_o Outer Diameter of Clutch *(Millimeter)*
- M_T Friction Torque on Clutch *(Newton Millimeter)*
- p_a Permissible Intensity of Pressure in Clutch *(Newton per Square Millimeter)*
- P_a Axial Force for Clutch *(Newton)*
- P_m Operating Force for Clutch *(Newton)*
- P_p Pressure between Clutch Plates *(Newton per Square Millimeter)*
- z Pairs of Contacting Surface of Clutch
- α Semi-Cone Angle of Clutch *(Degree)*
- μ Coefficient of Friction Clutch

Constants, Functions, Measurements used

- Constant: **pi**, 3.14159265358979323846264338327950288
  Archimedes' constant
- Function: **sin**, sin(Angle)
  Sine is a trigonometric function that describes the ratio of the length of the opposite side of a right triangle to the length of the hypotenuse.
- Measurement: **Length** in Millimeter (mm)
  Length Unit Conversion
- Measurement: **Pressure** in Newton per Square Millimeter (N/mm²)
  Pressure Unit Conversion
- Measurement: **Force** in Newton (N)
  Force Unit Conversion
- Measurement: **Angle** in Degree (°)
  Angle Unit Conversion
- Measurement: **Torque** in Newton Millimeter (N*mm)
  Torque Unit Conversion

Check other formula lists

- **Constant Pressure Theory Formulas**
- **Constant Wear Theory Formulas**

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