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Design of Splines Formulas

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List of 9 Design of Splines Formulas

Design of Splines

1) Major Diameter of Spline given Mean Radius

Open Calculator

fx $$D = 4 \cdot R_m - d$$

ex $$60\text{mm} = 4 \cdot 28\text{mm} - 52\text{mm}$$

2) Mean Radius of Splines

Open Calculator

fx $$R_m = \frac{D + d}{4}$$

ex $$28\text{mm} = \frac{60\text{mm} + 52\text{mm}}{4}$$

3) Mean Radius of Splines given Torque Transmitting Capacity

Open Calculator

fx $$R_m = \frac{M_t}{p_m \cdot A}$$

ex $$26.56805\text{mm} = \frac{224500\text{N*mm}}{6.5\text{N/mm}^2 \cdot 1300\text{mm}^2}$$

4) Minor Diameter of Spline given Mean Radius

Open Calculator

fx $$d = 4 \cdot R_m - D$$

ex $$52\text{mm} = 4 \cdot 28\text{mm} - 60\text{mm}$$

5) Permissible Pressure on Splines given Torque Transmitting Capacity

Open Calculator

fx $$p_m = \frac{M_t}{A \cdot R_m}$$

ex $$6.167582\text{N/mm}^2 = \frac{224500\text{N*mm}}{1300\text{mm}^2 \cdot 28\text{mm}}$$

6) Torque Transmitting Capacity of Splines

Open Calculator

fx $$M_t = p_m \cdot A \cdot R_m$$

ex $$236600\text{N*mm} = 6.5\text{N/mm}^2 \cdot 1300\text{mm}^2 \cdot 28\text{mm}$$

7) Torque Transmitting Capacity of Splines given Diameter of Splines

Open Calculator

fx $$M_t = \frac{p_m \cdot l_h \cdot n \cdot \left(D^2 - d^2\right)}{8}$$

ex $$283920\text{N*mm} = \frac{6.5\text{N/mm}^2 \cdot 65\text{mm} \cdot 6 \cdot \left((60\text{mm})^2 - (52\text{mm})^2\right)}{8}$$

8) Total Area of Splines

Open Calculator

fx $$A = 0.5 \cdot (l_h \cdot n) \cdot (D - d)$$

ex $$1560\text{mm}^2 = 0.5 \cdot (65\text{mm} \cdot 6) \cdot (60\text{mm} - 52\text{mm})$$

9) Total Area of Splines given Torque Transmitting Capacity

Open Calculator

fx $$A = \frac{M_t}{p_m \cdot R_m}$$

ex $$1233.516\text{mm}^2 = \frac{224500\text{N*mm}}{6.5\text{N/mm}^2 \cdot 28\text{mm}}$$

Variables Used

- **A** Total Area of Splines *(Square Millimeter)*
- **d** Minor Diameter of Spline Key Shaft *(Millimeter)*
- **D** Major Diameter of Spline Key Shaft *(Millimeter)*
- l_h Length of Hub on Keyed Shaft *(Millimeter)*
- M_t Transmitted Torque By Keyed Shaft *(Newton Millimeter)*
- **n** Number of Splines
- p_m Permissible Pressure on Splines *(Newton per Square Millimeter)*
- R_m Mean Radius of Spline of Shaft *(Millimeter)*

Constants, Functions, Measurements used

- Measurement: **Length** in Millimeter (mm)
  Length Unit Conversion
- Measurement: **Area** in Square Millimeter (mm²)
  Area Unit Conversion
- Measurement: **Pressure** in Newton per Square Millimeter (N/mm²)
  Pressure Unit Conversion
- Measurement: **Torque** in Newton Millimeter (N*mm)
  Torque Unit Conversion

Check other formula lists

- **Design of Flywheel Formulas**
- **Design of Splines Formulas**

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