Important Design of Splines Formulas PDF

Formulas
Examples
with Units

List of 9
Important Design of Splines Formulas

1) Major Diameter of Spline given Mean Radius Formula

Evaluate Formula

Formula

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

Example with Units

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

2) Mean Radius of Splines Formula

Evaluate Formula

Formula

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

Example with Units

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

3) Mean Radius of Splines given Torque Transmitting Capacity Formula

Evaluate Formula

Formula

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

Example with Units

$$26.568\,\text{mm} = \frac{224500\,\text{N*mm}}{6.5\,\text{N/mm}^2 \cdot 1300\,\text{mm}^2}$$

4) Minor Diameter of Spline given Mean Radius Formula

Evaluate Formula

Formula

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

Example with Units

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

5) Permissible Pressure on Splines given Torque Transmitting Capacity Formula

Evaluate Formula

Formula

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

Example with Units

$$6.1676\,\text{N/mm}^2 = \frac{224500\,\text{N*mm}}{1300\,\text{mm}^2 \cdot 28\,\text{mm}}$$

6) Torque Transmitting Capacity of Splines Formula

Evaluate Formula

Formula

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

Example with Units

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

7) Torque Transmitting Capacity of Splines given Diameter of Splines Formula

Evaluate Formula

Formula

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

Example with Units

$$283920\,\text{N*mm} = \frac{6.5\,\text{N/mm²} \cdot 65\,\text{mm} \cdot 6 \cdot \left(60\,\text{mm}^2 - 52\,\text{mm}^2 \right)}{8}$$

8) Total Area of Splines Formula

Evaluate Formula

Formula

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

Example with Units

$$1560\,\text{mm²} = 0.5 \cdot \left(65\,\text{mm} \cdot 6 \right) \cdot \left(60\,\text{mm} - 52\,\text{mm} \right)$$

9) Total Area of Splines given Torque Transmitting Capacity Formula

Evaluate Formula

Formula

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

Example with Units

$$1233.5165\,\text{mm²} = \frac{224500\,\text{N*mm}}{6.5\,\text{N/mm²} \cdot 28\,\text{mm}}$$

Variables used in list of Design of Splines Formulas above

- **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 in list of Design of Splines Formulas above

- 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

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