



Flanged Coupling Formulas

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Examples!

Conversions!

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List of 16 Flanged Coupling Formulas

Flanged Coupling

1) Diameter of bolt given maximum load that can be resisted by one bolt

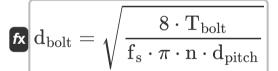


 $extbf{d}_{ ext{bolt}} = \sqrt{rac{4 \cdot ext{W}}{\pi \cdot ext{f}_{ ext{s}}}}$

Open Calculator

ex
$$18.09432 \mathrm{mm} = \sqrt{rac{4 \cdot 3.6 \mathrm{kN}}{\pi \cdot 14 \mathrm{N/mm^2}}}$$

2) Diameter of bolt given torque resisted by n bolts



Open Calculator

ex
$$18.0827 \mathrm{mm} = \sqrt{\frac{8 \cdot 49 \mathrm{N^*m}}{14 \mathrm{N/mm^2} \cdot \pi \cdot 1.001 \cdot 27.23 \mathrm{mm}}}$$



3) Diameter of bolt given torque resisted by one bolt

 $oldsymbol{\mathrm{d}_{\mathrm{bolt}}} = \sqrt{rac{8 \cdot \mathrm{T_{bolt}}}{\mathrm{f_s} \cdot \pi \cdot \mathrm{d_{pitch}}}}$

Open Calculator

ex
$$18.09174 \mathrm{mm} = \sqrt{\frac{8 \cdot 49 \mathrm{N^*m}}{14 \mathrm{N/mm^2} \cdot \pi \cdot 27.23 \mathrm{mm}}}$$

4) Diameter of bolt pitch circle given torque resisted by n bolts

$$\mathbf{f}_{\mathbf{k}} d_{\mathrm{pitch}} = rac{8 \cdot T_{\mathrm{bolt}}}{f_{\mathrm{s}} \cdot \pi \cdot (d_{\mathrm{bolt}}^2) \cdot n}$$

Open Calculator 🗗

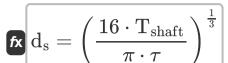
5) Diameter of bolt pitch circle given torque resisted by one bolt

$$extbf{d}_{ ext{pitch}} = rac{8 \cdot ext{T}_{ ext{bolt}}}{ ext{f}_{ ext{s}} \cdot \pi \cdot \left(ext{d}_{ ext{bolt}}^2
ight)}$$

Open Calculator 🗗



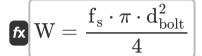
6) Diameter of shaft given torque transmitted by shaft



Open Calculator

$$ag{50.30796} ext{mm} = \left(rac{16\cdot 50 ext{N*m}}{\pi\cdot 2 ext{MPa}}
ight)^{rac{1}{3}}$$

7) Maximum amount of load that can be resisted by one bolt



Open Calculator

$$=$$
 $3.598281 \mathrm{kN} = rac{14 \mathrm{N/mm^2} \cdot \pi \cdot (18.09 \mathrm{mm})^2}{4}$

8) Number of bolts given torque resisted by n bolts

$$\mathbf{f}_{\mathbf{s}} = rac{8 \cdot T_{\mathrm{bolt}}}{\mathrm{f}_{\mathrm{s}} \cdot \pi \cdot \left(\mathrm{d}_{\mathrm{bolt}}^2\right) \cdot \mathrm{d}_{\mathrm{pitch}}}$$

Open Calculator

$$1.000192 = \frac{8 \cdot 49 \text{N*m}}{14 \text{N/mm}^2 \cdot \pi \cdot \left((18.09 \text{mm})^2 \right) \cdot 27.23 \text{mm}}$$

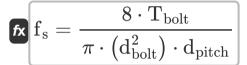


9) Shear stress in bolt given torque resisted by n bolts

 $\mathbf{f_s} = rac{8 \cdot T_{bolt}}{\mathbf{n} \cdot \pi \cdot \left(d_{bolt}^2
ight) \cdot d_{pitch}}$

Open Calculator

10) Shear stress in bolt given torque resisted by one bolt



Open Calculator

ex $14.00269 \mathrm{N/mm^2} = \frac{8 \cdot 49 \mathrm{N*m}}{\pi \cdot \left((18.09 \mathrm{mm})^2 \right) \cdot 27.23 \mathrm{mm}}$

11) Shear Stress in Bolt using Maximum Load that can be Resisted by One Bolt

$$\mathbf{f_s} = rac{4 \cdot \mathrm{W}}{\pi \cdot \left(\mathrm{d_{bolt}^2}
ight)}$$

Open Calculator 🚰

$$ag{14.00669 ext{N/mm}^2 = rac{4 \cdot 3.6 ext{kN}}{\pi \cdot \left(\left(18.09 ext{mm}
ight)^2
ight)}}$$



12) Shear stress in shaft given torque transmitted by shaft 🗗

 $au = rac{16 \cdot ext{T}_{ ext{shaft}}}{\pi \cdot \left(ext{d}_{ ext{s}}^3
ight)}$

Open Calculator

ex $2.00095 \text{MPa} = \frac{16 \cdot 50 \text{N*m}}{\pi \cdot \left((50.3 \text{mm})^3 \right)}$

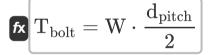
13) Torque resisted by one bolt given shear stress in bolt

 $oldsymbol{ au_{
m bolt}} = rac{{
m f_s} \cdot \pi \cdot \left({
m d_{
m bolt}^2}
ight) \cdot {
m d_{
m pitch}}}{8}$

Open Calculator

 $= \frac{14 \text{N/mm}^2 \cdot \pi \cdot \left((18.09 \text{mm})^2 \right) \cdot 27.23 \text{mm}}{8}$

14) Torque Resisted by One Bolt using Load Resisted by One Bolt



Open Calculator

= 49.014N*m = 3.6kN $\cdot \frac{27.23 \text{mm}}{2}$



15) Torque transmitted by shaft 🛂

 $ag{T_{
m shaft}} = rac{\pi \cdot au \cdot {
m d}_{
m s}^3}{16}$

Open Calculator

$$= \frac{49.97627 \text{N*m} = \frac{\pi \cdot 2 \text{MPa} \cdot (50.3 \text{mm})^3}{16} }{16}$$

16) Total torque resisted by n number of bolts

 $oldsymbol{ au_{bolt}} egin{aligned} \mathbf{T_{bolt}} &= rac{\mathbf{n} \cdot \mathbf{f_s} \cdot \pi \cdot \left(\mathbf{d_{bolt}^2}
ight) \cdot \mathbf{d_{pitch}}}{8} \end{aligned}$

Open Calculator

$$= \frac{1.001 \cdot 14 \text{N/mm}^2 \cdot \pi \cdot \left((18.09 \text{mm})^2 \right) \cdot 27.23 \text{mm}}{8}$$



Variables Used

- **d**bolt Diameter of Bolt (Millimeter)
- dpitch Diameter of Bolt Pitch Circle (Millimeter)
- d_s Diameter of Shaft (Millimeter)
- **f**_s Shear Stress in Bolt (Newton per Square Millimeter)
- n Number of Bolts
- T_{bolt} Torque Resisted by Bolt (Newton Meter)
- T_{shaft} Torque Transmitted by Shaft (Newton Meter)
- W Load Resisted by One Bolt (Kilonewton)
- τ Shear Stress in Shaft (Megapascal)





Constants, Functions, Measurements used

- Constant: pi, 3.14159265358979323846264338327950288
 Archimedes' constant
- Function: sqrt, sqrt(Number)

 A square root function is a function that takes a non-negative number as an input and returns the square root of the given input number.
- Measurement: Length in Millimeter (mm)
 Length Unit Conversion
- Measurement: Pressure in Newton per Square Millimeter (N/mm²)
 Pressure Unit Conversion
- Measurement: Force in Kilonewton (kN)
 Force Unit Conversion
- Measurement: Torque in Newton Meter (N*m)
 Torque Unit Conversion
- Measurement: Stress in Megapascal (MPa)
 Stress Unit Conversion





Check other formula lists

- Deviation of Shear Stress produced in a Circular Shaft subjected to Torsion Formulas
- Expression for Strain Energy stored in a Body Due to Torsion Formulas
- Expression for Torque in terms of Polar Moment of Inertia
 Formulas
- Flanged Coupling Formulas
- Polar Modulus Formulas
 Torque Transmitted by a Hollow
 Circular Shaft Formulas

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