Important Packing Formulas PDF

Formulas
Examples
with Units

List of 56
Important Packing Formulas

1) Bolt Loads in Gasket Joints Formulas

1.1) Actual Cross-sectional Area of Bolts given Root Diameter of Thread Formula

Evaluate Formula

Formula

$$A_b = \frac{2 \cdot \pi \cdot y_{sl} \cdot G \cdot N}{\sigma_{gs}}$$

Example with Units

$$126.6466\,\text{mm}^2 = \frac{2 \cdot 3.1416 \cdot 3.85\,\text{N/mm}^2 \cdot 32\,\text{mm} \cdot 4.1\,\text{mm}}{25.06\,\text{N/mm}^2}$$

1.2) Bolt Load in Design of Flange for Gasket Seating Formula

Evaluate Formula

Formula

$$W_{m1} = \left(\frac{A_m + A_b}{2}\right) \cdot \sigma_{gs}$$

Example with Units

$$15612.38\,\text{N} = \left(\frac{1120\,\text{mm}^2 + 126\,\text{mm}^2}{2}\right) \cdot 25.06\,\text{N/mm}^2$$

1.3) Bolt load under operating condition Formula

Evaluate Formula

Formula

$$W_{m1} = H + H_p$$

Example with Units

$$15486\,\text{N} = 3136\,\text{N} + 12350\,\text{N}$$

1.4) Bolt Load under operating condition given Hydrostatic End Force Formula

Evaluate Formula

Formula

$$W_{m1} = \left(\left(\frac{\pi}{4}\right) \cdot (G)^2 \cdot P\right) + \left(2 \cdot b_g \cdot \pi \cdot G \cdot P \cdot m\right)$$

Example with Units

$$15516.2005\,\text{N} = \left(\left(\frac{3.1416}{4}\right) \cdot (32\,\text{mm})^2 \cdot 3.9\,\text{MPa}\right) + \left(2 \cdot 4.21\,\text{mm} \cdot 3.1416 \cdot 32\,\text{mm} \cdot 3.9\,\text{MPa} \cdot 3.75\right)$$

1.5) Deflection of Spring Initial Bolt Load to Seal Gasket Joint Formula

Evaluate Formula

Formula

$$y_{sl} = \frac{W_{m2}}{\pi \cdot b_g \cdot G}$$

Example with Units

$$3.7922\,\text{N/mm}^2 = \frac{1605\,\text{N}}{3.1416 \cdot 4.21\,\text{mm} \cdot 32\,\text{mm}}$$

1.6) Gasket Width given actual Cross-sectional Area of Bolts Formula

Evaluate Formula

Formula

$$N = \frac{\sigma_{gs} \cdot A_b}{2 \cdot \pi \cdot y_{sl} \cdot G}$$

Example with Units

$$4.0791\,\text{mm} = \frac{25.06\,\text{N/mm}^2 \cdot 126\,\text{mm}^2}{2 \cdot 3.1416 \cdot 3.85\,\text{N/mm}^2 \cdot 32\,\text{mm}}$$

1.7) Hydrostatic Contact Force given Bolt Load under Operating condition Formula

Evaluate Formula

Formula

$$H_p = W_{m1} - \left(\left(\frac{\pi}{4}\right) \cdot (G)^2 \cdot P\right)$$

Example with Units

$$12349.4339\,\text{N} = 15486\,\text{N} - \left(\left(\frac{3.1416}{4}\right) \cdot (32\,\text{mm})^2 \cdot 3.9\,\text{MPa}\right)$$

1.8) Hydrostatic end force Formula

Evaluate Formula

Formula

$$H = W_{m1} - H_p$$

Example with Units

$$3136\,\text{N} = 15486\,\text{N} - 12350\,\text{N}$$

1.9) Hydrostatic End Force given Bolt Load under Operating condition Formula

Evaluate Formula

Formula

$$H = W_{m1} - \left(2 \cdot b_g \cdot \pi \cdot G \cdot m \cdot P\right)$$

Example with Units

$$3106.3657\,\text{N} = 15486\,\text{N} - \left(2 \cdot 4.21\,\text{mm} \cdot 3.1416 \cdot 32\,\text{mm} \cdot 3.75 \cdot 3.9\,\text{MPa}\right)$$

1.10) Initial Bolt Load to seat Gasket Joint Formula

Evaluate Formula

Formula

$$W_{m2} = \pi \cdot b_g \cdot G \cdot y_{sl}$$

Example with Units

$$1629.4561\,\text{N} = 3.1416 \cdot 4.21\,\text{mm} \cdot 32\,\text{mm} \cdot 3.85\,\text{N/mm}^2$$

1.11) Load on bolts based on hydrostatic end force Formula

Evaluate Formula

Formula

$$F_b = f_s \cdot P_t \cdot A_m$$

Example with Units

$$18816\,\text{N} = 3 \cdot 5.6\,\text{MPa} \cdot 1120\,\text{mm}^2$$

1.12) Stress Required for Gasket Seating Formula

Evaluate Formula

Formula

$$\sigma_{gs} = \frac{2 \cdot \pi \cdot y_{sl} \cdot G \cdot N}{A_b}$$

Example with Units

$$25.1886\,\text{N/mm}^2 = \frac{2 \cdot 3.1416 \cdot 3.85\,\text{N/mm}^2 \cdot 32\,\text{mm} \cdot 4.1\,\text{mm}}{126\,\text{mm}^2}$$

1.13) Stress Required for Gasket Seating given Bolt Load Formula

Evaluate Formula

Formula

$$\sigma_{gs} = \frac{W_{m1}}{\frac{A_m + A_b}{2}}$$

Example with Units

$$24.8571\,\text{N/mm}^2 = \frac{15486\,\text{N}}{\frac{1120\,\text{mm}^2 + 126\,\text{mm}^2}{2}}$$

1.14) Test pressure given Bolt Load Formula

Evaluate Formula

Formula

$$P_t = \frac{F_b}{f_s \cdot A_m}$$

Example with Units

$$5.4018\,\text{MPa} = \frac{18150\,\text{N}}{3 \cdot 1120\,\text{mm}^2}$$

1.15) Total cross-sectional area of bolt at root of thread Formula

Evaluate Formula

Formula

$$A_{m1} = \frac{W_{m1}}{\sigma_{oc}}$$

Example with Units

$$297.8077\,\text{mm}^2 = \frac{15486\,\text{N}}{52\,\text{N/mm}^2}$$

1.16) Width of U Collar given Initial Bolt Load to Seat Gasket Joint Formula

Evaluate Formula

Formula

$$b_g = \frac{W_{m2}}{\pi \cdot G \cdot y_{sl}}$$

Example with Units

$$4.1468\,\text{mm} = \frac{1605\,\text{N}}{3.1416 \cdot 32\,\text{mm} \cdot 3.85\,\text{N/mm}^2}$$

2) Elastic Packing Formulas

2.1) Diameter of Bolt given Frictional Force exerted by Soft packing on Reciprocating rod Formula

Evaluate Formula

Formula

$$d = \frac{F_{friction}}{.005 \cdot p}$$

Example with Units

$$13.8679\,\text{mm} = \frac{294\,\text{N}}{.005 \cdot 4.24\,\text{MPa}}$$

2.2) Fluid pressure by soft packing exerted by frictional force on reciprocating rod Formula

Evaluate Formula

Formula

$$p = \frac{F_{friction}}{.005 \cdot d}$$

Example with Units

$$4.2\,\text{MPa} = \frac{294\,\text{N}}{.005 \cdot 14\,\text{mm}}$$

2.3) Fluid Pressure given Friction Resistance Formula

Evaluate Formula

Formula

$$p = \frac{F_{friction} - F_0}{\mu \cdot A}$$

Example with Units

$$4.202\,\text{MPa} = \frac{294\,\text{N} - 190\,\text{N}}{0.3 \cdot 82.5\,\text{mm}^2}$$

2.4) Fluid Pressure given Torsional Resistance Formula

Evaluate Formula

Formula

$$p = \frac{M_t \cdot 2}{.005 \cdot (d)^2}$$

Example with Units

$$4.2041\,\text{MPa} = \frac{2.06\,\text{N} \cdot 2}{.005 \cdot (14\,\text{mm})^2}$$

2.5) Friction resistance Formula

Evaluate Formula

Formula

$$F_{friction} = F_0 + (\mu \cdot A \cdot p)$$

Example with Units

$$294.94\,\text{N} = 190\,\text{N} + (0.3 \cdot 82.5\,\text{mm}^2 \cdot 4.24\,\text{MPa})$$

2.6) Frictional force exerted by soft packing on reciprocating rod Formula

Evaluate Formula

Formula

$$F_{friction} = .005 \cdot p \cdot d$$

Example with Units

$$296.8\,\text{N} = .005 \cdot 4.24\,\text{MPa} \cdot 14\,\text{mm}$$

2.7) Seal resistance Formula

Evaluate Formula

Formula

$$F_0 = F_{friction} - (\mu \cdot A \cdot p)$$

Example with Units

$$189.06\,\text{N} = 294\,\text{N} - (0.3 \cdot 82.5\,\text{mm}^2 \cdot 4.24\,\text{MPa})$$

2.8) Torsional Resistance given Fluid Pressure Formula

Evaluate Formula

Formula

$$M_t = \frac{.005 \cdot (d)^2 \cdot p}{2}$$

Example with Units

$$2.0776\,\text{N} = \frac{.005 \cdot (14\,\text{mm})^2 \cdot 4.24\,\text{MPa}}{2}$$

2.9) Torsional resistance in rotary motion friction Formula

Evaluate Formula

Formula

$$M_t = \frac{F_{friction} \cdot d}{2}$$

Example with Units

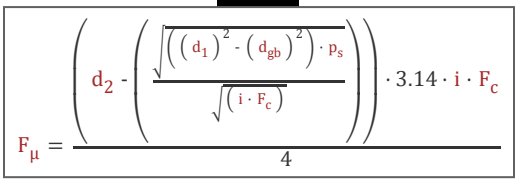
$$2.058\,\text{N} = \frac{294\,\text{N} \cdot 14\,\text{mm}}{2}$$

3) Metallic Gaskets Formulas

3.1) Frictional Force given Minor diameter of bolt Formula

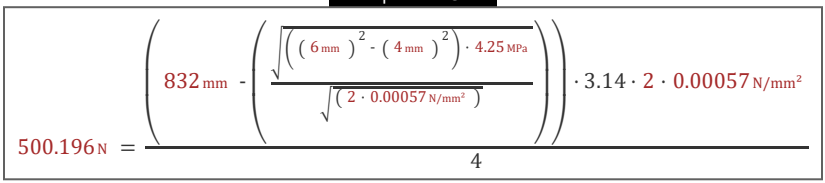
Evaluate Formula

Formula



$$F_\mu = \frac{\left(d_2 - \left(\frac{\sqrt{\left(\left(d_1\right)^2 - \left(d_{gb}\right)^2\right) \cdot p_s}}{\sqrt{\left(i \cdot F_c\right)}}\right)\right) \cdot 3.14 \cdot i \cdot F_c}{4}$$

Example with Units

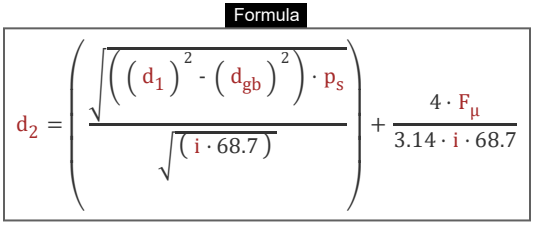


$$500.196\,\text{N} = \frac{\left(832\,\text{mm} - \left(\frac{\sqrt{\left(\left(6\,\text{mm}\right)^2 - \left(4\,\text{mm}\right)^2\right) \cdot 4.25\,\text{MPa}}}{\sqrt{\left(2 \cdot 0.00057\,\text{N/mm²}\right)}}\right)\right) \cdot 3.14 \cdot 2 \cdot 0.00057\,\text{N/mm²}}{4}$$

3.2) Minor Diameter of Bolt given Working Strength Formula

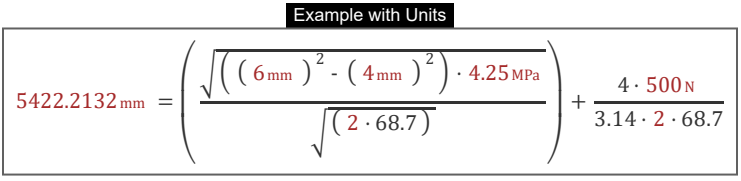
Evaluate Formula

Formula



$$d_2 = \left(\frac{\sqrt{\left(\left(d_1\right)^2 - \left(d_{gb}\right)^2\right) \cdot p_s}}{\sqrt{\left(i \cdot 68.7\right)}}\right) + \frac{4 \cdot F_\mu}{3.14 \cdot i \cdot 68.7}$$

Example with Units



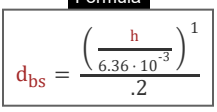
$$5422.2132\,\text{mm} = \left(\frac{\sqrt{\left(\left(6\,\text{mm}\right)^2 - \left(4\,\text{mm}\right)^2\right) \cdot 4.25\,\text{MPa}}}{\sqrt{\left(2 \cdot 68.7\right)}}\right) + \frac{4 \cdot 500\,\text{N}}{3.14 \cdot 2 \cdot 68.7}$$

4) Self Sealing Packing Formulas

4.1) Diameter of bolt given Radial ring wall thickness Formula

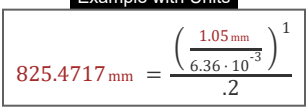
Evaluate Formula

Formula



$$d_{bs} = \frac{\left(\frac{h}{6.36 \cdot 10^{-3}}\right)^1}{.2}$$

Example with Units

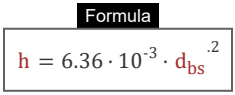


$$825.4717\,\text{mm} = \frac{\left(\frac{1.05\,\text{mm}}{6.36 \cdot 10^{-3}}\right)^1}{.2}$$

4.2) Radial ring wall thickness considering SI units Formula

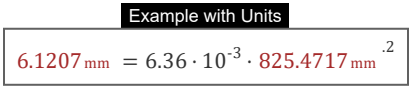
Evaluate Formula

Formula



$$h = 6.36 \cdot 10^{-3} \cdot d_{bs}^{.2}$$

Example with Units



$$6.1207\,\text{mm} = 6.36 \cdot 10^{-3} \cdot 825.4717\,\text{mm}^{.2}$$

4.3) Radial Ring Wall Thickness given Width of U shaped collar Formula

Evaluate Formula

Formula

$$h = \frac{b_s}{4}$$

Example with Units

$$1.05\,\text{mm} = \frac{4.20\,\text{mm}}{4}$$

4.4) Width of U collar Formula

Evaluate Formula

Formula

$$b_s = 4 \cdot h$$

Example with Units

$$4.2\,\text{mm} = 4 \cdot 1.05\,\text{mm}$$

5) V Ring Packing Formulas

5.1) Multiple spring installations Formulas

5.1.1) Bolt Load given Flange pressure Formula

Evaluate Formula

Formula

$$F_v = p_f \cdot a \cdot \frac{C_u}{n}$$

Example with Units

$$15.4\,\text{N} = 5.5\,\text{MPa} \cdot 100\,\text{mm}^2 \cdot \frac{0.14}{5}$$

5.1.2) Bolt Load given Modulus of Elasticity and Increment Length Formula

Evaluate Formula

Formula

$$F_v = E \cdot \frac{dl}{\left(\frac{l_1}{A_i}\right) + \left(\frac{l_2}{A_t}\right)}$$

Example with Units

$$15.4123\,\text{N} = 1.55\,\text{MPa} \cdot \frac{1.5\,\text{mm}}{\left(\frac{3.2\,\text{mm}}{53\,\text{mm}^2}\right) + \left(\frac{3.8\,\text{mm}}{42\,\text{mm}^2}\right)}$$

5.1.3) Bolt load in gasket joint Formula

Evaluate Formula

Formula

$$F_v = 11 \cdot \frac{m_{ti}}{d_n}$$

Example with Units

$$15.4786\,\text{N} = 11 \cdot \frac{0.00394\,\text{N}}{2.8\,\text{mm}}$$

5.1.4) Flange pressure developed due to tightening of bolt Formula

Evaluate Formula

Formula

$$p_f = n \cdot \frac{F_v}{a \cdot C_u}$$

Example with Units

$$5.5\,\text{MPa} = 5 \cdot \frac{15.4\,\text{N}}{100\,\text{mm}^2 \cdot 0.14}$$

5.1.5) Flange pressure given Twisting moment Formula

Evaluate Formula

Formula

$$p_f = 2 \cdot n \cdot \frac{T}{a \cdot C_u \cdot d_b}$$

Example with Units

$$5.5556\,\text{MPa} = 2 \cdot 5 \cdot \frac{0.07\,\text{N*m}}{100\,\text{mm}^2 \cdot 0.14 \cdot 9\,\text{mm}}$$

5.1.6) Gasket Area given Flange pressure Formula

Evaluate Formula

Formula

$$a = n \cdot \frac{F_v}{p_f \cdot C_u}$$

Example with Units

$$100\,\text{mm}^2 = 5 \cdot \frac{15.4\,\text{N}}{5.5\,\text{MPa} \cdot 0.14}$$

5.1.7) Initial Bolt Torque given Bolt Load Formula

Evaluate Formula

Formula

$$m_{ti} = d_n \cdot \frac{F_v}{11}$$

Example with Units

$$0.0039\,\text{N} = 2.8\,\text{mm} \cdot \frac{15.4\,\text{N}}{11}$$

5.1.8) Minimum percentage compression Formula

Evaluate Formula

Formula

$$P_s = 100 \cdot \left(1 - \left(\frac{b}{h_i}\right)\right)$$

Example with Units

$$30 = 100 \cdot \left(1 - \left(\frac{4.2\,\text{mm}}{6.0\,\text{mm}}\right)\right)$$

5.1.9) Nominal Bolt Diameter given Bolt Load Formula

Evaluate Formula

Formula

$$d_n = 11 \cdot \frac{m_{ti}}{F_v}$$

Example with Units

$$2.8143\,\text{mm} = 11 \cdot \frac{0.00394\,\text{N}}{15.4\,\text{N}}$$

5.1.10) Number of Bolts given Flange pressure Formula

Evaluate Formula

Formula

$$n = p_f \cdot a \cdot \frac{C_u}{F_v}$$

Example with Units

$$5 = 5.5\,\text{MPa} \cdot 100\,\text{mm}^2 \cdot \frac{0.14}{15.4\,\text{N}}$$

5.1.11) Twisting Moment given Flange Pressure Formula

Evaluate Formula

Formula

$$T = \frac{p_f \cdot a \cdot C_u \cdot d_b}{2 \cdot n}$$

Example with Units

$$0.0693\,\text{N*m} = \frac{5.5\,\text{MPa} \cdot 100\,\text{mm}^2 \cdot 0.14 \cdot 9\,\text{mm}}{2 \cdot 5}$$

5.1.12) Uncompressed gasket thickness Formula

Evaluate Formula

Formula

$$h_i = \frac{100 \cdot b}{100 - P_s}$$

Example with Units

$$6\,\text{mm} = \frac{100 \cdot 4.2\,\text{mm}}{100 - 30}$$

5.1.13) Width of u collar given uncompressed Gasket Thickness Formula

Evaluate Formula

Formula

$$b = \frac{\left(h_i\right) \cdot \left(100 - P_s\right)}{100}$$

Example with Units

$$4.2\,\text{mm} = \frac{\left(6.0\,\text{mm}\right) \cdot \left(100 - 30\right)}{100}$$

5.2) Single spring installations Formulas

5.2.1) Actual Diameter of Spring Wire given Actual mean diameter of Conical spring Formula

Evaluate Formula

Formula

$$d_{sw} = 2 \cdot \left(D_a + D_o - \left(\frac{w}{2}\right)\right)$$

Example with Units

$$39.2\,\text{mm} = 2 \cdot \left(0.1\,\text{mm} + 23.75\,\text{mm} - \left(\frac{8.5\,\text{mm}}{2}\right)\right)$$

5.2.2) Actual Diameter of Spring Wire given Deflection of Spring Formula

Evaluate Formula

Formula

$$d_{sw} = .0123 \cdot \frac{\left(D_a\right)^2}{y}$$

Example with Units

$$0.0008\,\text{mm} = .0123 \cdot \frac{\left(0.1\,\text{mm}\right)^2}{0.154\,\text{mm}}$$

5.2.3) Actual mean diameter of conical spring Formula

Evaluate Formula

Formula

$$D_a = D_o - \left(\frac{1}{2}\right) \cdot \left(w + d_{sw}\right)$$

Example with Units

$$-38\,\text{mm} = 23.75\,\text{mm} - \left(\frac{1}{2}\right) \cdot \left(8.5\,\text{mm} + 115\,\text{mm}\right)$$

5.2.4) Actual Mean Diameter of Conical Spring given Deflection of Spring Formula

Evaluate Formula

Formula

$$D_a = \frac{\left(\frac{y \cdot d_{sw}}{0.0123}\right)^1}{2}$$

Example with Units

$$0.7199\,\text{mm} = \frac{\left(\frac{0.154\,\text{mm} \cdot 115\,\text{mm}}{0.0123}\right)^1}{2}$$

5.2.5) Deflection of conical spring Formula

Evaluate Formula

Formula

$$y = .0123 \cdot \frac{\left(D_a\right)^2}{d_{sw}}$$

Example with Units

$$1.1E\text{-}6\,\text{mm} = .0123 \cdot \frac{\left(0.1\,\text{mm}\right)^2}{115\,\text{mm}}$$

5.2.6) Diameter of wire for spring given Mean diameter of Conical spring Formula

Evaluate Formula

Formula

$$d_{sw} = \frac{\left(\frac{\pi \cdot \left(D_m\right)^2}{139300}\right)^1}{3}$$

Example with Units

$$3.3E\text{-}6\,\text{mm} = \frac{\left(\frac{3.1416 \cdot \left(21\,\text{mm}\right)^2}{139300}\right)^1}{3}$$

5.2.7) Inside diameter of member given Mean diameter of Conical spring Formula

Evaluate Formula

Formula

$$D_i = D_m - \left(\left(\frac{3}{2}\right) \cdot w\right)$$

Example with Units

$$8.25\,\text{mm} = 21\,\text{mm} - \left(\left(\frac{3}{2}\right) \cdot 8.5\,\text{mm}\right)$$

5.2.8) Mean diameter of conical spring Formula

Evaluate Formula

Formula

$$D_m = D_i + \left(\left(\frac{3}{2}\right) \cdot w\right)$$

Example with Units

$$21\,\text{mm} = 8.25\,\text{mm} + \left(\left(\frac{3}{2}\right) \cdot 8.5\,\text{mm}\right)$$

5.2.9) Mean diameter of conical spring given Diameter of spring wire Formula

Evaluate Formula

Formula

$$D_m = \frac{\left(\frac{\left(d_{sw}\right)^3 \cdot 139300}{\pi}\right)^1}{2}$$

Example with Units

$$33718.23\,\text{mm} = \frac{\left(\frac{\left(115\,\text{mm}\right)^3 \cdot 139300}{3.1416}\right)^1}{2}$$

5.2.10) Nominal packing cross section given Actual mean diameter of Conical spring Formula

Evaluate Formula

Formula

$$w = 2 \cdot \left(D_a + D_o - \left(\frac{d_{sw}}{2}\right)\right)$$

Example with Units

$$-67.3\,\text{mm} = 2 \cdot \left(0.1\,\text{mm} + 23.75\,\text{mm} - \left(\frac{115\,\text{mm}}{2}\right)\right)$$

5.2.11) Nominal packing cross section given Mean diameter of Conical spring Formula

Evaluate Formula

Formula

$$w = \left(D_m - D_i\right) \cdot \frac{2}{3}$$

Example with Units

$$8.5\,\text{mm} = \left(21\,\text{mm} - 8.25\,\text{mm}\right) \cdot \frac{2}{3}$$

5.2.12) Outer Diameter of spring wire given Actual mean diameter of Conical spring Formula

Evaluate Formula

Formula

$$D_o = D_a - \left(\frac{1}{2}\right) \cdot \left(w + d_{sw}\right)$$

Example with Units

$$-61.65\,\text{mm} = 0.1\,\text{mm} - \left(\frac{1}{2}\right) \cdot \left(8.5\,\text{mm} + 115\,\text{mm}\right)$$

Variables used in list of Packing Formulas above

- **a** Gasket Area *(Square Millimeter)*
- **A** Area of Seal Contacting Sliding Member *(Square Millimeter)*
- A_b Actual Bolt Area *(Square Millimeter)*
- A_i Area of Cross Section at the Inlet *(Square Millimeter)*
- A_m Greater Cross-section Area of Bolts *(Square Millimeter)*
- A_{m1} Bolt Cross-Sectional Area at Root of Thread *(Square Millimeter)*
- A_t Area of Cross Section at the Throat *(Square Millimeter)*
- **b** Width of u-collar *(Millimeter)*
- b_g Width of u-collar in Gasket *(Millimeter)*
- b_s Width of U-Collar in Self Sealing *(Millimeter)*
- C_u Torque Friction Coefficient
- **d** Diameter of Elastic Packing Bolt *(Millimeter)*
- d_1 Outside Diameter of Seal Ring *(Millimeter)*
- d_2 Minor Diameter of Metallic Gasket Bolt *(Millimeter)*
- D_a Actual Mean Diameter of Spring *(Millimeter)*
- d_b Diameter of Bolt *(Millimeter)*
- d_{bs} Diameter of Bolt in Self Sealing *(Millimeter)*
- d_{gb} Nominal Diameter of Metallic Gasket Bolt *(Millimeter)*
- D_i Inside Diameter *(Millimeter)*
- D_m Mean Diameter of Conical Spring *(Millimeter)*
- d_n Nominal Bolt Diameter *(Millimeter)*
- D_o Outer Diameter of Spring Wire *(Millimeter)*
- d_{sw} Diameter of Spring Wire *(Millimeter)*
- **dl** Incremental Length in Direction of Velocity *(Millimeter)*
- **E** Modulus of Elasticity *(Megapascal)*
- F_0 Seal Resistance *(Newton)*

Constants, Functions, Measurements used in list of Packing Formulas above

- constant(s): **pi**, 3.14159265358979323846264338327950288 *Archimedes' constant*
- Functions: **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: **Area** in Square Millimeter (mm²) *Area Unit Conversion*
- Measurement: **Pressure** in Megapascal (MPa) *Pressure Unit Conversion*
- Measurement: **Force** in Newton (N) *Force Unit Conversion*
- Measurement: **Moment of Force** in Newton Meter (N*m) *Moment of Force Unit Conversion*
- Measurement: **Stress** in Newton per Square Millimeter (N/mm²) *Stress Unit Conversion*

- F_b Bolt Load in Gasket Joint *(Newton)*
- F_c Design Stress for Metallic Gasket *(Newton per Square Millimeter)*
- $F_{friction}$ Friction Force in Elastic Packing *(Newton)*
- f_s Factor of Safety for Bolt Packing
- F_v Bolt Load in Gasket Joint of V Ring *(Newton)*
- F_μ Friction Force in Metallic Gasket *(Newton)*
- **G** Gasket Diameter *(Millimeter)*
- **h** Radial Ring Wall Thickness *(Millimeter)*
- **H** Hydrostatic End Force in Gasket Seal *(Newton)*
- h_i Uncompressed gasket thickness *(Millimeter)*
- H_p Total Joint Surface Compression Load *(Newton)*
- **i** Number of Bolts in Metallic Gasket Seal
- l_1 Length of joint 1 *(Millimeter)*
- l_2 Length of joint 2 *(Millimeter)*
- **m** Gasket Factor
- M_t Torsional Resistance in Elastic Packing *(Newton)*
- m_{ti} Initial Bolt Torque *(Newton)*
- **n** Number of Bolts
- **N** Gasket Width *(Millimeter)*
- **p** Fluid Pressure in Elastic Packing *(Megapascal)*
- **P** Pressure at Outer Diameter of Gasket *(Megapascal)*
- p_f Flange Pressure *(Megapascal)*
- p_s Fluid Pressure on Metallic Gasket Seal *(Megapascal)*
- P_s Minimum Percentage Compression
- P_t Test Pressure in Bolted Gasket Joint *(Megapascal)*
- **T** Twisting Moment *(Newton Meter)*
- **w** Nominal Packing Cross-section of Bush Seal *(Millimeter)*
- W_{m1} Bolt Load Under Operating Condition for Gasket *(Newton)*

- W_{m2} Initial Bolt Load to Seat the Gasket Joint *(Newton)*
- y Deflection of Conical Spring *(Millimeter)*
- y_{sl} Gasket Unit Seating Load *(Newton per Square Millimeter)*
- μ Coefficient of Friction in Elastic Packing
- σ_{gs} Stress Required for Gasket Seating *(Newton per Square Millimeter)*
- σ_{oc} Stress Required for Operating Condition for Gasket *(Newton per Square Millimeter)*

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