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# Elastic Packing Formulas

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# List of 9 Elastic Packing Formulas

## Elastic Packing

### 1) Diameter of Bolt given Frictional Force exerted by Soft packing on Reciprocating rod

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

[Open Calculator !\[\]\(a870788d6ed9b8fd294b7654a8c8526b\_img.jpg\)](#)

$$\text{ex } 13.86792\text{mm} = \frac{294\text{N}}{.005 \cdot 4.24\text{MPa}}$$

### 2) Fluid pressure by soft packing exerted by frictional force on reciprocating rod

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

[Open Calculator !\[\]\(c50c8b7b2cc2cf9ff925edec0ee94c0d\_img.jpg\)](#)

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

### 3) Fluid Pressure given Friction Resistance

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

[Open Calculator !\[\]\(f60b7a900783ac3fd531bfd9c111be6d\_img.jpg\)](#)

$$\text{ex } 4.20202\text{MPa} = \frac{294\text{N} - 190\text{N}}{0.3 \cdot 82.5\text{mm}^2}$$



#### 4) Fluid Pressure given Torsional Resistance

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

[Open Calculator !\[\]\(cbe80b694ebd74fcfe136a095b608235\_img.jpg\)](#)

$$\text{ex } 4.204082\text{MPa} = \frac{2.06\text{N} \cdot 2}{.005 \cdot (14\text{mm})^2}$$

#### 5) Friction resistance

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

[Open Calculator !\[\]\(3e2231b1ad3ca8da8658228c00dd08e0\_img.jpg\)](#)

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

#### 6) Frictional force exerted by soft packing on reciprocating rod

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

[Open Calculator !\[\]\(0d5ec72f61334709c3fc9450209b754f\_img.jpg\)](#)

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

#### 7) Seal resistance

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

[Open Calculator !\[\]\(b64b40baaee5acddc1eab8538ba84754\_img.jpg\)](#)

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



## 8) Torsional Resistance given Fluid Pressure

[Open Calculator !\[\]\(dfbd6b3763a6d1d9afaa974f64e2e4b5\_img.jpg\)](#)

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

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

## 9) Torsional resistance in rotary motion friction

[Open Calculator !\[\]\(ec9132f1d27c8919987d92907322654d\_img.jpg\)](#)

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

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







## Variables Used

- **A** Area of Seal Contacting Sliding Member (*Square Millimeter*)
- **d** Diameter of Elastic Packing Bolt (*Millimeter*)
- **F<sub>0</sub>** Seal Resistance (*Newton*)
- **F<sub>friction</sub>** Friction Force in Elastic Packing (*Newton*)
- **M<sub>t</sub>** Torsional Resistance in Elastic Packing (*Newton*)
- **p** Fluid Pressure in Elastic Packing (*Megapascal*)
- **μ** Coefficient of Friction in Elastic Packing



## Constants, Functions, Measurements used

- **Measurement: Length** in Millimeter (mm)  
*Length Unit Conversion* 
- **Measurement: Area** in Square Millimeter (mm<sup>2</sup>)  
*Area Unit Conversion* 
- **Measurement: Pressure** in Megapascal (MPa)  
*Pressure Unit Conversion* 
- **Measurement: Force** in Newton (N)  
*Force Unit Conversion* 



## Check other formula lists

- [Bolt Loads in Gasket Joints Formulas](#) 

- [Elastic Packing Formulas](#) 
- [V Ring Packing Formulas](#) 

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