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Power Screws Formulas

Calculators! Examples! Conversions!

List of 103 Power Screws Formulas

Power Screws

Acme Thread

1) Coefficient of Friction of Power Screw given Effort in Lowering Load with Acme Threaded Screw

Open Calculator

fx $$\mu = \frac{P_{lo} + W \cdot \tan(\alpha)}{W \cdot \sec(0.253) - P_{lo} \cdot \sec(0.253) \cdot \tan(\alpha)}$$

ex $$0.145345 = \frac{120N + 1700N \cdot \tan(4.5^\circ)}{1700N \cdot \sec(0.253) - 120N \cdot \sec(0.253) \cdot \tan(4.5^\circ)}$$

2) Coefficient of Friction of Power Screw given Effort in Moving Load with Acme Threaded Screw

Open Calculator

fx $$\mu = \frac{P_{li} - W \cdot \tan(\alpha)}{\sec\left(14.5 \cdot \frac{\pi}{180}\right) \cdot (W + P_{li} \cdot \tan(\alpha))}$$

ex $$0.149953 = \frac{402N - 1700N \cdot \tan(4.5^\circ)}{\sec\left(14.5 \cdot \frac{\pi}{180}\right) \cdot (1700N + 402N \cdot \tan(4.5^\circ))}$$

3) Coefficient of Friction of Power Screw given Torque Required in Lifting Load with Acme Thread

Open Calculator

fx $$\mu = \frac{2 \cdot Mt_{li} - W \cdot d_m \cdot \tan(\alpha)}{\sec(0.253) \cdot (W \cdot d_m + 2 \cdot Mt_{li} \cdot \tan(\alpha))}$$

ex $$0.150412 = \frac{2 \cdot 9265N{*}mm - 1700N \cdot 46mm \cdot \tan(4.5^\circ)}{\sec(0.253) \cdot (1700N \cdot 46mm + 2 \cdot 9265N{*}mm \cdot \tan(4.5^\circ))}$$

4) Coefficient of Friction of Power Screw given Torque Required in Lowering Load with Acme Thread

Open Calculator

$$\mu = \frac{2 \cdot Mt_{lo} + W \cdot d_m \cdot \tan(\alpha)}{\sec(0.253) \cdot (W \cdot d_m - 2 \cdot Mt_{lo} \cdot \tan(\alpha))}$$

$$0.150386 = \frac{2 \cdot 2960\text{N*mm} + 1700\text{N} \cdot 46\text{mm} \cdot \tan(4.5^{\circ})}{\sec(0.253) \cdot (1700\text{N} \cdot 46\text{mm} - 2 \cdot 2960\text{N*mm} \cdot \tan(4.5^{\circ}))}$$

5) Efficiency of Acme Threaded Power Screw

Open Calculator

$$\eta = \tan(\alpha) \cdot \frac{1 - \mu \cdot \tan(\alpha) \cdot \sec(0.253)}{\mu \cdot \sec(0.253) + \tan(\alpha)}$$

$$0.332752 = \tan(4.5^{\circ}) \cdot \frac{1 - 0.15 \cdot \tan(4.5^{\circ}) \cdot \sec(0.253)}{0.15 \cdot \sec(0.253) + \tan(4.5^{\circ})}$$

6) Effort Required in Lifting Load with Acme Threaded Screw

Open Calculator

$$P_{li} = W \cdot \left(\frac{\mu \cdot \sec((0.253)) + \tan(\alpha)}{1 - \mu \cdot \sec((0.253)) \cdot \tan(\alpha)} \right)$$

$$402.0803\text{N} = 1700\text{N} \cdot \left(\frac{0.15 \cdot \sec((0.253)) + \tan(4.5^{\circ})}{1 - 0.15 \cdot \sec((0.253)) \cdot \tan(4.5^{\circ})} \right)$$

7) Effort Required in Lowering Load with Acme Threaded Screw

Open Calculator

$$P_{lo} = W \cdot \left(\frac{\mu \cdot \sec((0.253)) - \tan(\alpha)}{1 + \mu \cdot \sec((0.253)) \cdot \tan(\alpha)} \right)$$

$$128.0306\text{N} = 1700\text{N} \cdot \left(\frac{0.15 \cdot \sec((0.253)) - \tan(4.5^{\circ})}{1 + 0.15 \cdot \sec((0.253)) \cdot \tan(4.5^{\circ})} \right)$$

8) Helix Angle of Power Screw given Effort Required in Lifting Load with Acme Threaded Screw

Open Calculator

$$\alpha = a\tan\left(\frac{P_{li} - W \cdot \mu \cdot \sec(0.253)}{W + P_{li} \cdot \mu \cdot \sec(0.253)}\right)$$

$$4.497438° = a\tan\left(\frac{402N - 1700N \cdot 0.15 \cdot \sec(0.253)}{1700N + 402N \cdot 0.15 \cdot \sec(0.253)}\right)$$

9) Helix Angle of Power Screw given Load and Coefficient of Friction

Open Calculator

$$\alpha = a\tan\left(\frac{W \cdot \mu \cdot \sec(0.253) - P_{lo}}{W + (P_{lo} \cdot \mu \cdot \sec(0.253))}\right)$$

$$4.769225° = a\tan\left(\frac{1700N \cdot 0.15 \cdot \sec(0.253) - 120N}{1700N + (120N \cdot 0.15 \cdot \sec(0.253))}\right)$$

10) Helix Angle of Power Screw given Torque Required in Lifting Load with Acme Threaded Screw

Open Calculator

$$\alpha = a\tan\left(\frac{2 \cdot Mt_{li} - W \cdot d_m \cdot \mu \cdot \sec\left(0.253 \cdot \frac{\pi}{180}\right)}{W \cdot d_m + 2 \cdot Mt_{li} \cdot \mu \cdot \sec\left(0.253 \cdot \frac{\pi}{180}\right)}\right)$$

$$4.799891° = a\tan\left(\frac{2 \cdot 9265N{*}mm - 1700N \cdot 46mm \cdot 0.15 \cdot \sec\left(0.253 \cdot \frac{\pi}{180}\right)}{1700N \cdot 46mm + 2 \cdot 9265N{*}mm \cdot 0.15 \cdot \sec\left(0.253 \cdot \frac{\pi}{180}\right)}\right)$$

11) Helix Angle of Power Screw given Torque Required in Lowering Load with Acme Threaded Screw

Open Calculator

fx $$\alpha = a\tan\left(\frac{W \cdot d_m \cdot \mu \cdot \sec(0.253) - 2 \cdot Mt_{lo}}{W \cdot d_m + 2 \cdot Mt_{lo} \cdot \mu \cdot \sec(0.253)}\right)$$

ex $$4.477712^{\circ} = a\tan\left(\frac{1700N \cdot 46mm \cdot 0.15 \cdot \sec(0.253) - 2 \cdot 2960N^{*}mm}{1700N \cdot 46mm + 2 \cdot 2960N^{*}mm \cdot 0.15 \cdot \sec(0.253)}\right)$$

12) Load on Power Screw given Effort Required in Lifting Load with Acme Threaded Screw

Open Calculator

fx $$W = P_{li} \cdot \frac{1 - \mu \cdot \sec((0.253)) \cdot \tan(\alpha)}{\mu \cdot \sec((0.253)) + \tan(\alpha)}$$

ex $$1699.661N = 402N \cdot \frac{1 - 0.15 \cdot \sec((0.253)) \cdot \tan(4.5^{\circ})}{0.15 \cdot \sec((0.253)) + \tan(4.5^{\circ})}$$

13) Load on Power Screw given Effort Required in Lowering Load with Acme Threaded Screw

Open Calculator

fx $$W = P_{lo} \cdot \frac{1 + \mu \cdot \sec((0.253)) \cdot \tan(\alpha)}{\mu \cdot \sec((0.253)) - \tan(\alpha)}$$

ex $$1593.369N = 120N \cdot \frac{1 + 0.15 \cdot \sec((0.253)) \cdot \tan(4.5^{\circ})}{0.15 \cdot \sec((0.253)) - \tan(4.5^{\circ})}$$

14) Load on Power Screw given Torque Required in Lifting Load with Acme Threaded Screw

Open Calculator

fx $$W = 2 \cdot Mt_{li} \cdot \frac{1 - \mu \cdot \sec((0.253)) \cdot \tan(\alpha)}{d_m \cdot (\mu \cdot \sec((0.253)) + \tan(\alpha))}$$

ex $$1703.153N = 2 \cdot 9265N^{*}mm \cdot \frac{1 - 0.15 \cdot \sec((0.253)) \cdot \tan(4.5^{\circ})}{46mm \cdot (0.15 \cdot \sec((0.253)) + \tan(4.5^{\circ}))}$$

15) Load on Power Screw given Torque Required in Lowering Load with Acme Threaded Screw

Open Calculator

fx
$$W = 2 \cdot Mt_{lo} \cdot \frac{1 + \mu \cdot \sec((0.253)) \cdot \tan(\alpha)}{d_m \cdot (\mu \cdot \sec((0.253)) - \tan(\alpha))}$$

ex
$$1708.831N = 2 \cdot 2960N^{*}mm \cdot \frac{1 + 0.15 \cdot \sec((0.253)) \cdot \tan(4.5^\circ)}{46mm \cdot (0.15 \cdot \sec((0.253)) - \tan(4.5^\circ))}$$

16) Mean Diameter of Power Screw given Torque Required in Lowering Load with Acme Threaded Screw

Open Calculator

fx
$$d_m = 2 \cdot Mt_{lo} \cdot \frac{1 + \mu \cdot \sec((0.253)) \cdot \tan(\alpha)}{W \cdot (\mu \cdot \sec((0.253)) - \tan(\alpha))}$$

ex
$$46.23895mm = 2 \cdot 2960N^{*}mm \cdot \frac{1 + 0.15 \cdot \sec((0.253)) \cdot \tan(4.5^\circ)}{1700N \cdot (0.15 \cdot \sec((0.253)) - \tan(4.5^\circ))}$$

17) Torque Required in Lifting Load with Acme Threaded Power Screw

Open Calculator

fx
$$Mt_{li} = 0.5 \cdot d_m \cdot W \cdot \left(\frac{\mu \cdot \sec((0.253)) + \tan(\alpha)}{1 - \mu \cdot \sec((0.253)) \cdot \tan(\alpha)} \right)$$

ex
$$9247.846N^{*}mm = 0.5 \cdot 46mm \cdot 1700N \cdot \left(\frac{0.15 \cdot \sec((0.253)) + \tan(4.5^\circ)}{1 - 0.15 \cdot \sec((0.253)) \cdot \tan(4.5^\circ)} \right)$$

18) Torque Required in Lowering Load with Acme Threaded Power Screw

fx

Open Calculator

$$Mt_{lo} = 0.5 \cdot d_m \cdot W \cdot \left(\frac{(\mu \cdot \sec((0.253))) - \tan(\alpha)}{1 + (\mu \cdot \sec((0.253)) \cdot \tan(\alpha))} \right)$$

ex

$$2944.704 \text{N*mm} = 0.5 \cdot 46\text{mm} \cdot 1700\text{N} \cdot \left(\frac{(0.15 \cdot \sec((0.253))) - \tan(4.5°)}{1 + (0.15 \cdot \sec((0.253)) \cdot \tan(4.5°))} \right)$$

Torque Requirement in Lowering Load using Square threaded Screws

19) Coefficient of Friction of Screw Thread given Load

Open Calculator

fx
$$\mu = \frac{P_{lo} + \tan(\alpha) \cdot W}{W - P_{lo} \cdot \tan(\alpha)}$$

ex
$$0.150124 = \frac{120\text{N} + \tan(4.5°) \cdot 1700\text{N}}{1700\text{N} - 120\text{N} \cdot \tan(4.5°)}$$

20) Coefficient of Friction of Screw Thread given Torque Required in Lowering Load

Open Calculator

fx
$$\mu = \frac{2 \cdot Mt_{lo} + W \cdot d_m \cdot \tan(\alpha)}{W \cdot d_m - 2 \cdot Mt_{lo} \cdot \tan(\alpha)}$$

ex
$$0.15533 = \frac{2 \cdot 2960\text{N*mm} + 1700\text{N} \cdot 46\text{mm} \cdot \tan(4.5°)}{1700\text{N} \cdot 46\text{mm} - 2 \cdot 2960\text{N*mm} \cdot \tan(4.5°)}$$

21) Effort Required in Lowering Load

Open Calculator

fx $$P_{lo} = W \cdot \left(\frac{\mu - \tan(\alpha)}{1 + \mu \cdot \tan(\alpha)} \right)$$

ex $$119.7929\text{N} = 1700\text{N} \cdot \left(\frac{0.15 - \tan(4.5°)}{1 + 0.15 \cdot \tan(4.5°)} \right)$$

22) Helix Angle of Power Screw given Effort Required in Lowering Load

Open Calculator

fx $$\alpha = a\tan\left(\frac{W \cdot \mu - P_{lo}}{\mu \cdot P_{lo} + W} \right)$$

ex $$4.493055° = a\tan\left(\frac{1700\text{N} \cdot 0.15 - 120\text{N}}{0.15 \cdot 120\text{N} + 1700\text{N}} \right)$$

23) Helix Angle of Power Screw given Torque Required in Lowering Load

Open Calculator

fx $$\alpha = a\tan\left(\frac{\mu \cdot W \cdot d_m - (2 \cdot Mt_{lo})}{2 \cdot Mt_{lo} \cdot \mu + (W \cdot d_m)} \right)$$

ex $$4.201542° = a\tan\left(\frac{0.15 \cdot 1700\text{N} \cdot 46\text{mm} - (2 \cdot 2960\text{N*mm})}{2 \cdot 2960\text{N*mm} \cdot 0.15 + (1700\text{N} \cdot 46\text{mm})} \right)$$

24) Load on power Screw given Effort Required in Lowering Load

Open Calculator

fx $$W = \frac{P_{lo}}{\frac{\mu - \tan(\alpha)}{1 + \mu \cdot \tan(\alpha)}}$$

ex $$1702.939\text{N} = \frac{120\text{N}}{\frac{0.15 - \tan(4.5°)}{1 + 0.15 \cdot \tan(4.5°)}}$$

25) Load on power Screw given Torque Required in Lowering Load

Open Calculator

fx $$W = \frac{Mt_{lo}}{0.5 \cdot d_m \cdot \left(\frac{\mu - \tan(\alpha)}{1 + \mu \cdot \tan(\alpha)}\right)}$$

ex $$1826.34\text{N} = \frac{2960\text{N*mm}}{0.5 \cdot 46\text{mm} \cdot \left(\frac{0.15 - \tan(4.5°)}{1 + 0.15 \cdot \tan(4.5°)}\right)}$$

26) Mean Diameter of Power Screw given Torque Required in Lowering Load

Open Calculator

fx $$d_m = \frac{Mt_{lo}}{0.5 \cdot W \cdot \left(\frac{\mu - \tan(\alpha)}{1 + \mu \cdot \tan(\alpha)}\right)}$$

ex $$49.41862\text{mm} = \frac{2960\text{N*mm}}{0.5 \cdot 1700\text{N} \cdot \left(\frac{0.15 - \tan(4.5°)}{1 + 0.15 \cdot \tan(4.5°)}\right)}$$

27) Torque Required in Lowering Load on Power Screw

Open Calculator

fx $$Mt_{lo} = 0.5 \cdot W \cdot d_m \cdot \left(\frac{\mu - \tan(\alpha)}{1 + \mu \cdot \tan(\alpha)}\right)$$

ex $$2755.237\text{N*mm} = 0.5 \cdot 1700\text{N} \cdot 46\text{mm} \cdot \left(\frac{0.15 - \tan(4.5°)}{1 + 0.15 \cdot \tan(4.5°)}\right)$$

Collar Friction

28) Coefficient of Friction at Collar of Screw according to Uniform Pressure Theory

Open Calculator

$$\mu_{collar} = \frac{3 \cdot T_c \cdot \left(\left(D_o^2 \right) - \left(D_i^2 \right) \right)}{W \cdot \left(\left(D_o^3 \right) - \left(D_i^3 \right) \right)}$$

$$0.144058 = \frac{3 \cdot 10000\text{N*mm} \cdot \left(\left((100\text{mm})^2 \right) - \left((60\text{mm})^2 \right) \right)}{1700\text{N} \cdot \left(\left((100\text{mm})^3 \right) - \left((60\text{mm})^3 \right) \right)}$$

29) Coefficient of Friction at Collar of Screw according to Uniform Wear Theory

Open Calculator

$$\mu_{collar} = \frac{4 \cdot T_c}{W \cdot \left((D_o) + (D_i) \right)}$$

$$0.147059 = \frac{4 \cdot 10000\text{N*mm}}{1700\text{N} \cdot \left((100\text{mm}) + (60\text{mm}) \right)}$$

30) Collar Friction Torque for Screw according to Uniform Pressure Theory

Open Calculator

$$T_c = \frac{\mu_{collar} \cdot W \cdot \left(\left(R_1^3 \right) - \left(R_2^3 \right) \right)}{\left(\frac{3}{2} \right) \cdot \left(\left(R_1^2 \right) - \left(R_2^2 \right) \right)}$$

$$11951.13\text{N*mm} = \frac{0.16 \cdot 1700\text{N} \cdot \left(\left((54\text{mm})^3 \right) - \left((32\text{mm})^3 \right) \right)}{\left(\frac{3}{2} \right) \cdot \left(\left((54\text{mm})^2 \right) - \left((32\text{mm})^2 \right) \right)}$$

31) Collar Friction Torque for Screw according to Uniform Wear Theory

Open Calculator

$$T_c = \mu_{collar} \cdot W \cdot \frac{R_1 + R_2}{2}$$

$$11696\text{N*mm} = 0.16 \cdot 1700\text{N} \cdot \frac{54\text{mm} + 32\text{mm}}{2}$$

32) Load on Screw given Collar Friction Torque according to Uniform Pressure Theory

Open Calculator

$$W = \frac{3 \cdot T_c \cdot \left(\left(D_o^2 \right) - \left(D_i^2 \right) \right)}{\mu_{collar} \cdot \left(\left(D_o^3 \right) - \left(D_i^3 \right) \right)}$$

$$1530.612\text{N} = \frac{3 \cdot 10000\text{N*mm} \cdot \left(\left((100\text{mm})^2 \right) - \left((60\text{mm})^2 \right) \right)}{0.16 \cdot \left(\left((100\text{mm})^3 \right) - \left((60\text{mm})^3 \right) \right)}$$

33) Load on Screw given Collar Friction Torque according to Uniform Wear Theory

Open Calculator

$$W = \frac{4 \cdot T_c}{\mu_{collar} \cdot \left(\left(D_o \right) + \left(D_i \right) \right)}$$

$$1562.5\text{N} = \frac{4 \cdot 10000\text{N*mm}}{0.16 \cdot \left((100\text{mm}) + (60\text{mm}) \right)}$$

Design of Screw and Nut

34) Axial Load on Screw given Direct Compressive Stress

Open Calculator

fx $$W_a = \frac{\sigma_c \cdot \pi \cdot d_c^2}{4}$$

ex $$130231.6\text{N} = \frac{94\text{N/mm}^2 \cdot \pi \cdot (42\text{mm})^2}{4}$$

35) Axial Load on Screw given Transverse Shear Stress

Open Calculator

fx $$W_a = (\tau_s \cdot \pi \cdot d_c \cdot t \cdot z)$$

ex $$131102.4\text{N} = (27.6\text{N/mm}^2 \cdot \pi \cdot 42\text{mm} \cdot 4\text{mm} \cdot 9)$$

36) Axial Load on Screw given Transverse Shear Stress at Root of Nut

Open Calculator

fx $$W_a = \pi \cdot t_n \cdot t \cdot d \cdot z$$

ex $$131758.4\text{N} = \pi \cdot 23.3\text{N/mm}^2 \cdot 4\text{mm} \cdot 50\text{mm} \cdot 9$$

37) Axial Load on Screw given Unit Bearing Pressure

Open Calculator

fx $$W_a = \pi \cdot z \cdot S_b \cdot \frac{(d^2) - (d_c^2)}{4}$$

ex $$129541.7\text{N} = \pi \cdot 9 \cdot 24.9\text{N/mm}^2 \cdot \frac{\left((50\text{mm})^2\right) - \left((42\text{mm})^2\right)}{4}$$

38) Bearing Area between Screw and Nut for One Thread

Open Calculator

fx $$A = \pi \cdot \frac{(d^2) - (d_c^2)}{4}$$

ex $$578.053\text{mm}^2 = \pi \cdot \frac{\left((50\text{mm})^2\right) - \left((42\text{mm})^2\right)}{4}$$

39) Core Diameter of Power Screw

Open Calculator

fx $$d_c = d - p$$

ex $$42.2\text{mm} = 50\text{mm} - 7.8\text{mm}$$

40) Core Diameter of Screw given Direct Compressive Stress

Open Calculator

fx $$d_c = \sqrt{\frac{4 \cdot W_a}{\pi \cdot \sigma_c}}$$

ex $$42.12373\text{mm} = \sqrt{\frac{4 \cdot 131000\text{N}}{\pi \cdot 94\text{N/mm}^2}}$$

41) Core Diameter of Screw given Torsional Shear Stress

Open Calculator

fx $$d_c = \left(16 \cdot \frac{Mt_t}{\pi \cdot \tau}\right)^{\frac{1}{3}}$$

ex $$42.00011\text{mm} = \left(16 \cdot \frac{658700\text{N*mm}}{\pi \cdot 45.28\text{N/mm}^2}\right)^{\frac{1}{3}}$$

42) Core Diameter of Screw given Transverse Shear Stress in Screw

Open Calculator

fx $$d_c = \frac{W_a}{\tau_s \cdot \pi \cdot t \cdot z}$$

ex $$41.96719\text{mm} = \frac{131000\text{N}}{27.6\text{N/mm}^2 \cdot \pi \cdot 4\text{mm} \cdot 9}$$

43) Core Diameter of Screw given Unit Bearing Pressure

Open Calculator

fx $$d_c = \sqrt{(d)^2 - \left(4 \cdot \frac{W_a}{S_b \cdot \pi \cdot z}\right)}$$

ex $$41.90125\text{mm} = \sqrt{(50\text{mm})^2 - \left(4 \cdot \frac{131000\text{N}}{24.9\text{N/mm}^2 \cdot \pi \cdot 9}\right)}$$

44) Direct Compressive Stress in Screw

Open Calculator

fx $$\sigma_c = \frac{W_a \cdot 4}{\pi \cdot d_c^2}$$

ex $$94.55464\text{N/mm}^2 = \frac{131000\text{N} \cdot 4}{\pi \cdot (42\text{mm})^2}$$

45) Helix Angle of Thread

Open Calculator

fx $$\alpha = a\tan\left(\frac{L}{\pi \cdot d_m}\right)$$

ex $$4.352823^\circ = a\tan\left(\frac{11\text{mm}}{\pi \cdot 46\text{mm}}\right)$$

46) Lead of Screw given Helix angle

Open Calculator

fx $L = \tan(\alpha) \cdot \pi \cdot d_m$

ex $11.37344\text{mm} = \tan(4.5°) \cdot \pi \cdot 46\text{mm}$

47) Lead of Screw given Overall Efficiency

Open Calculator

fx $L = 2 \cdot \pi \cdot \eta \cdot \frac{Mt_t}{W_a}$

ex $11.05769\text{mm} = 2 \cdot \pi \cdot 0.35 \cdot \frac{658700\text{N*mm}}{131000\text{N}}$

48) Mean Diameter of Power Screw

Open Calculator

fx $d_m = d - 0.5 \cdot p$

ex $46.1\text{mm} = 50\text{mm} - 0.5 \cdot 7.8\text{mm}$

49) Mean diameter of Screw given Helix Angle

Open Calculator

fx $d_m = \frac{L}{\pi \cdot \tan(\alpha)}$

ex $44.48962\text{mm} = \frac{11\text{mm}}{\pi \cdot \tan(4.5°)}$

50) Nominal Diameter of Power Screw

Open Calculator

fx $d = d_c + p$

ex $49.8\text{mm} = 42\text{mm} + 7.8\text{mm}$

51) Nominal Diameter of Power Screw given Mean Diameter

Open Calculator

fx $$d = d_m + (0.5 \cdot p)$$

ex $$49.9\text{mm} = 46\text{mm} + (0.5 \cdot 7.8\text{mm})$$

52) Nominal Diameter of Screw given Transverse Shear Stress at Root of Nut

Open Calculator

fx $$d = \frac{W_a}{\pi \cdot t_n \cdot t \cdot z}$$

ex $$49.7122\text{mm} = \frac{131000\text{N}}{\pi \cdot 23.3\text{N/mm}^2 \cdot 4\text{mm} \cdot 9}$$

53) Nominal Diameter of Screw given Unit Bearing Pressure

Open Calculator

fx $$d = \sqrt{\left(4 \cdot \frac{W_a}{S_b \cdot \pi \cdot z}\right) + (d_c)^2}$$

ex $$50.08279\text{mm} = \sqrt{\left(4 \cdot \frac{131000\text{N}}{24.9\text{N/mm}^2 \cdot \pi \cdot 9}\right) + (42\text{mm})^2}$$

54) Number of Threads in Engagement with Nut given Transverse Shear Stress

Open Calculator

fx $$z = \frac{W_a}{\pi \cdot t \cdot \tau_s \cdot d_c}$$

ex $$8.992968 = \frac{131000\text{N}}{\pi \cdot 4\text{mm} \cdot 27.6\text{N/mm}^2 \cdot 42\text{mm}}$$

55) Number of Threads in Engagement with Nut given Transverse Shear Stress at Root of Nut

Open Calculator

fx $$z = \frac{W_a}{\pi \cdot d \cdot t_n \cdot t}$$

ex $$8.948196 = \frac{131000\text{N}}{\pi \cdot 50\text{mm} \cdot 23.3\text{N/mm}^2 \cdot 4\text{mm}}$$

56) Number of Threads in Engagement with Nut given Unit Bearing Pressure

Open Calculator

fx $$z = 4 \cdot \frac{W_a}{\left(\pi \cdot S_b \cdot \left(\left(d^2\right) - \left(d_c^2\right)\right)\right)}$$

ex $$9.101317 = 4 \cdot \frac{131000\text{N}}{\left(\pi \cdot 24.9\text{N/mm}^2 \cdot \left(\left((50\text{mm})^2\right) - \left((42\text{mm})^2\right)\right)\right)}$$

57) Overall Efficiency of Power Screw

Open Calculator

fx $$\eta = W_a \cdot \frac{L}{2 \cdot \pi \cdot Mt_t}$$

ex $$0.348174 = 131000\text{N} \cdot \frac{11\text{mm}}{2 \cdot \pi \cdot 658700\text{N*mm}}$$

58) Pitch of Power Screw

Open Calculator

fx $$p = d - d_c$$

ex $$8\text{mm} = 50\text{mm} - 42\text{mm}$$

59) Pitch of Screw given Mean Diameter

Open Calculator

$$p = \frac{d - d_m}{0.5}$$

$$8\text{mm} = \frac{50\text{mm} - 46\text{mm}}{0.5}$$

60) Thread Thickness at Core Diameter of Screw given Transverse Shear Stress

Open Calculator

$$t = \frac{W_a}{\pi \cdot \tau_s \cdot d_c \cdot z}$$

$$3.996875\text{mm} = \frac{131000\text{N}}{\pi \cdot 27.6\text{N/mm}^2 \cdot 42\text{mm} \cdot 9}$$

61) Thread Thickness at Root of Nut given Transverse Shear Stress at Root of Nut

Open Calculator

$$t = \frac{W_a}{\pi \cdot d \cdot z \cdot t_n}$$

$$3.976976\text{mm} = \frac{131000\text{N}}{\pi \cdot 50\text{mm} \cdot 9 \cdot 23.3\text{N/mm}^2}$$

62) Torsional Moment in Screw given Torsional Shear Stress

Open Calculator

$$Mt_t = \tau \cdot \pi \cdot \frac{d_c^3}{16}$$

$$658694.7\text{N*mm} = 45.28\text{N/mm}^2 \cdot \pi \cdot \frac{(42\text{mm})^3}{16}$$

63) Torsional Shear Stress of Screw

Open Calculator

fx $$\tau = 16 \cdot \frac{Mt_t}{\pi \cdot \left(d_c^3\right)}$$

ex $$45.28036\text{N/mm}^2 = 16 \cdot \frac{658700\text{N*mm}}{\pi \cdot \left(\left(42\text{mm}\right)^3\right)}$$

64) Transverse Shear Stress at Root of Nut

Open Calculator

fx $$t_n = \frac{W_a}{\pi \cdot d \cdot t \cdot z}$$

ex $$23.16589\text{N/mm}^2 = \frac{131000\text{N}}{\pi \cdot 50\text{mm} \cdot 4\text{mm} \cdot 9}$$

65) Transverse Shear Stress in Screw

Open Calculator

fx $$\tau_s = \frac{W_a}{\pi \cdot d_c \cdot t \cdot z}$$

ex $$27.57844\text{N/mm}^2 = \frac{131000\text{N}}{\pi \cdot 42\text{mm} \cdot 4\text{mm} \cdot 9}$$

66) Unit Bearing Pressure for Thread

Open Calculator

fx $$S_b = 4 \cdot \frac{W_a}{\pi \cdot z \cdot \left(\left(d^2\right) - \left(d_c^2\right)\right)}$$

ex $$25.18031\text{N/mm}^2 = 4 \cdot \frac{131000\text{N}}{\pi \cdot 9 \cdot \left(\left(\left(50\text{mm}\right)^2\right) - \left(\left(42\text{mm}\right)^2\right)\right)}$$

Torque Requirement in Lifting Load using Square Threaded Screw

67) Coefficient of Friction for Screw Thread given Efficiency of Square Threaded Screw

Open Calculator

fx $$\mu = \frac{\tan(\alpha) \cdot (1 - \eta)}{\tan(\alpha) \cdot \tan(\alpha) + \eta}$$

ex $$0.143619 = \frac{\tan(4.5°) \cdot (1 - 0.35)}{\tan(4.5°) \cdot \tan(4.5°) + 0.35}$$

68) Coefficient of Friction of Power Screw given Effort Required to Lift Load

Open Calculator

fx $$\mu = \frac{P_{li} - W \cdot \tan(\alpha)}{W + P_{li} \cdot \tan(\alpha)}$$

ex $$0.154886 = \frac{402\text{N} - 1700\text{N} \cdot \tan(4.5°)}{1700\text{N} + 402\text{N} \cdot \tan(4.5°)}$$

69) Coefficient of Friction of Power Screw given Torque Required to Lift Load

Open Calculator

fx $$\mu = \frac{\left(2 \cdot \frac{Mt_{li}}{d_m}\right) - W \cdot \tan(\alpha)}{W - \left(2 \cdot \frac{Mt_{li}}{d_m}\right) \cdot \tan(\alpha)}$$

ex $$0.161262 = \frac{\left(2 \cdot \frac{9265\text{N*mm}}{46\text{mm}}\right) - 1700\text{N} \cdot \tan(4.5°)}{1700\text{N} - \left(2 \cdot \frac{9265\text{N*mm}}{46\text{mm}}\right) \cdot \tan(4.5°)}$$

70) Efficiency of Square Threaded Power Screw

Open Calculator

fx $$\eta = \frac{\tan(\alpha)}{\frac{\mu+\tan(\alpha)}{1-\mu\cdot\tan(\alpha)}}$$

ex $$0.340061 = \frac{\tan(4.5°)}{\frac{0.15+\tan(4.5°)}{1-0.15\cdot\tan(4.5°)}}$$

71) Effort Required in Lifting load using Power Screw

Open Calculator

fx $$P_{li} = W \cdot \left(\frac{\mu + \tan(\alpha)}{1 - \mu \cdot \tan(\alpha)}\right)$$

ex $$393.4375\text{N} = 1700\text{N} \cdot \left(\frac{0.15 + \tan(4.5°)}{1 - 0.15 \cdot \tan(4.5°)}\right)$$

72) Effort Required to Lift Load given Torque Required to Lift Load

Open Calculator

fx $$P_{li} = 2 \cdot \frac{Mt_{li}}{d_m}$$

ex $$402.8261\text{N} = 2 \cdot \frac{9265\text{N*mm}}{46\text{mm}}$$

73) External Torque required to raise Load given Efficiency

Open Calculator

fx $$Mt_t = W_a \cdot \frac{L}{2 \cdot \pi \cdot \eta}$$

ex $$655263.6\text{N*mm} = 131000\text{N} \cdot \frac{11\text{mm}}{2 \cdot \pi \cdot 0.35}$$

74) Helix Angle of Power Screw given Effort Required to Lift Load

Open Calculator

fx $$\alpha = a\tan\left(\frac{P_{li} - W \cdot \mu}{P_{li} \cdot \mu + W}\right)$$

ex $$4.773608° = a\tan\left(\frac{402N - 1700N \cdot 0.15}{402N \cdot 0.15 + 1700N}\right)$$

75) Helix Angle of Power Screw given Torque Required to Lift Load

Open Calculator

fx $$\alpha = a\tan\left(\frac{2 \cdot Mt_{li} - W \cdot d_m \cdot \mu}{2 \cdot Mt_{li} \cdot \mu + W \cdot d_m}\right)$$

ex $$4.799973° = a\tan\left(\frac{2 \cdot 9265N*mm - 1700N \cdot 46mm \cdot 0.15}{2 \cdot 9265N*mm \cdot 0.15 + 1700N \cdot 46mm}\right)$$

76) Load on Power Screw given Effort Required to Lift Load

Open Calculator

fx $$W = \frac{P_{li}}{\frac{\mu + \tan(\alpha)}{1 - \mu \cdot \tan(\alpha)}}$$

ex $$1736.997N = \frac{402N}{\frac{0.15 + \tan(4.5°)}{1 - 0.15 \cdot \tan(4.5°)}}$$

77) Load on Power Screw given Torque Required to Lift Load

Open Calculator

fx $$W = \left(2 \cdot \frac{Mt_{li}}{d_m}\right) \cdot \left(\frac{1 - \mu \cdot \tan(\alpha)}{\mu + \tan(\alpha)}\right)$$

ex $$1740.567N = \left(2 \cdot \frac{9265N*mm}{46mm}\right) \cdot \left(\frac{1 - 0.15 \cdot \tan(4.5°)}{0.15 + \tan(4.5°)}\right)$$

78) Load on Screw given Overall Efficiency

Open Calculator

$$W_a = 2 \cdot \pi \cdot Mt_t \cdot \frac{\eta}{L}$$

$$131687N = 2 \cdot \pi \cdot 658700N{*}mm \cdot \frac{0.35}{11mm}$$

79) Maximum Efficiency of Square Threaded Screw

Open Calculator

$$\eta_{max} = \frac{1 - \sin(a\tan(\mu))}{1 + \sin(a\tan(\mu))}$$

$$0.741644 = \frac{1 - \sin(a\tan(0.15))}{1 + \sin(a\tan(0.15))}$$

80) Mean Diameter of Power Screw given Torque Required to Lift Load

Open Calculator

$$d_m = 2 \cdot \frac{Mt_{li}}{P_{li}}$$

$$46.09453mm = 2 \cdot \frac{9265N{*}mm}{402N}$$

81) Torque Required to Lift Load given Effort

Open Calculator

$$Mt_{li} = P_{li} \cdot \frac{d_m}{2}$$

$$9246N{*}mm = 402N \cdot \frac{46mm}{2}$$

82) Torque Required to Lift Load given Load

Open Calculator

$$Mt_{li} = \left(W \cdot \frac{d_m}{2}\right) \cdot \left(\frac{\mu + \tan(\alpha)}{1 - \mu \cdot \tan(\alpha)}\right)$$

$$9049.063N^*mm = \left(1700N \cdot \frac{46mm}{2}\right) \cdot \left(\frac{0.15 + \tan(4.5^\circ)}{1 - 0.15 \cdot \tan(4.5^\circ)}\right)$$

Trapezoidal Thread

83) Coefficient of Friction of Power Screw given Efficiency of Trapezoidal Threaded Screw

Open Calculator

$$\mu = (\tan(\alpha)) \cdot \frac{1 - \eta}{\sec(0.253) \cdot \left(\eta + (\tan(\alpha))^2\right)}$$

$$0.139047 = (\tan(4.5^\circ)) \cdot \frac{1 - 0.35}{\sec(0.253) \cdot \left(0.35 + (\tan(4.5^\circ))^2\right)}$$

84) Coefficient of Friction of Screw given Efficiency of Trapezoidal Threaded Screw

Open Calculator

$$\mu = \tan(\alpha) \cdot \frac{1 - \eta}{\sec(0.2618) \cdot (\eta + \tan(\alpha) \cdot \tan(\alpha))}$$

$$0.138725 = \tan(4.5^\circ) \cdot \frac{1 - 0.35}{\sec(0.2618) \cdot (0.35 + \tan(4.5^\circ) \cdot \tan(4.5^\circ))}$$

85) Coefficient of Friction of Screw given Effort for Trapezoidal Threaded Screw

Open Calculator

fx $$\mu = \frac{P_{li} - (W \cdot \tan(\alpha))}{\sec(0.2618) \cdot (W + P_{li} \cdot \tan(\alpha))}$$

ex $$0.149609 = \frac{402N - (1700N \cdot \tan(4.5°))}{\sec(0.2618) \cdot (1700N + 402N \cdot \tan(4.5°))}$$

86) Coefficient of Friction of Screw given Effort in Lowering Load

Open Calculator

fx $$\mu = \frac{P_{lo} + W \cdot \tan(\alpha)}{W \cdot \sec(0.2618) - P_{lo} \cdot \sec(0.2618) \cdot \tan(\alpha)}$$

ex $$0.145009 = \frac{120N + 1700N \cdot \tan(4.5°)}{1700N \cdot \sec(0.2618) - 120N \cdot \sec(0.2618) \cdot \tan(4.5°)}$$

87) Coefficient of Friction of Screw given Torque Required in Lifting Load with Trapezoidal Thread

Open Calculator

fx $$\mu = \frac{2 \cdot Mt_{li} - W \cdot d_m \cdot \tan(\alpha)}{\sec(0.2618) \cdot (W \cdot d_m + 2 \cdot Mt_{li} \cdot \tan(\alpha))}$$

ex $$0.150064 = \frac{2 \cdot 9265N*mm - 1700N \cdot 46mm \cdot \tan(4.5°)}{\sec(0.2618) \cdot (1700N \cdot 46mm + 2 \cdot 9265N*mm \cdot \tan(4.5°))}$$

88) Coefficient of Friction of Screw given Torque Required in Lowering Load with Trapezoidal Thread

Open Calculator

fx $$\mu = \frac{2 \cdot Mt_{lo} + W \cdot d_m \cdot \tan(\alpha)}{\sec(0.2618) \cdot (W \cdot d_m - 2 \cdot Mt_{lo} \cdot \tan(\alpha))}$$

ex $$0.150038 = \frac{2 \cdot 2960N*mm + 1700N \cdot 46mm \cdot \tan(4.5°)}{\sec(0.2618) \cdot (1700N \cdot 46mm - 2 \cdot 2960N*mm \cdot \tan(4.5°))}$$

89) Efficiency of Trapezoidal Threaded Screw

Open Calculator

fx $$\eta = \tan(\alpha) \cdot \frac{1 - \mu \cdot \tan(\alpha) \cdot \sec(0.2618)}{\mu \cdot \sec(0.2618) + \tan(\alpha)}$$

ex $$0.332231 = \tan(4.5°) \cdot \frac{1 - 0.15 \cdot \tan(4.5°) \cdot \sec(0.2618)}{0.15 \cdot \sec(0.2618) + \tan(4.5°)}$$

90) Effort Required in Lifting Load with Trapezoidal Threaded Screw

Open Calculator

fx $$P_{li} = W \cdot \left(\frac{\mu \cdot \sec((0.2618)) + \tan(\alpha)}{1 - \mu \cdot \sec((0.2618)) \cdot \tan(\alpha)} \right)$$

ex $$402.7102\text{N} = 1700\text{N} \cdot \left(\frac{0.15 \cdot \sec((0.2618)) + \tan(4.5°)}{1 - 0.15 \cdot \sec((0.2618)) \cdot \tan(4.5°)} \right)$$

91) Effort Required in Lowering Load with Trapezoidal Threaded Screw

Open Calculator

fx $$P_{lo} = W \cdot \left(\frac{\mu \cdot \sec((0.2618)) - \tan(\alpha)}{1 + \mu \cdot \sec((0.2618)) \cdot \tan(\alpha)} \right)$$

ex $$128.6305\text{N} = 1700\text{N} \cdot \left(\frac{0.15 \cdot \sec((0.2618)) - \tan(4.5°)}{1 + 0.15 \cdot \sec((0.2618)) \cdot \tan(4.5°)} \right)$$

92) Helix Angle of Screw given Effort Required in Lifting Load with Trapezoidal Threaded Screw

Open Calculator

fx $$\alpha = a\tan\left(\frac{P_{li} - W \cdot \mu \cdot \sec(0.2618)}{W + (P_{li} \cdot \mu \cdot \sec(0.2618))} \right)$$

ex $$4.477334° = a\tan\left(\frac{402\text{N} - 1700\text{N} \cdot 0.15 \cdot \sec(0.2618)}{1700\text{N} + (402\text{N} \cdot 0.15 \cdot \sec(0.2618))} \right)$$

93) Helix Angle of Screw given Effort Required in Lowering Load with Trapezoidal Threaded Screw

Open Calculator

fx $$\alpha = a\tan\left(\frac{W \cdot \mu \cdot \sec\left(15 \cdot \frac{\pi}{180}\right) - P_{lo}}{W + \left(P_{lo} \cdot \mu \cdot \sec\left(15 \cdot \frac{\pi}{180}\right)\right)}\right)$$

ex $$4.789327° = a\tan\left(\frac{1700\text{N} \cdot 0.15 \cdot \sec\left(15 \cdot \frac{\pi}{180}\right) - 120\text{N}}{1700\text{N} + \left(120\text{N} \cdot 0.15 \cdot \sec\left(15 \cdot \frac{\pi}{180}\right)\right)}\right)$$

94) Helix Angle of Screw given Torque Required in Lifting Load with Trapezoidal Threaded Screw

Open Calculator

fx $$\alpha = a\tan\left(\frac{2 \cdot Mt_{li} - (W \cdot d_m \cdot \mu \cdot \sec(0.2618))}{(W \cdot d_m) + (2 \cdot Mt_{li} \cdot \mu \cdot \sec(0.2618))}\right)$$

ex $$4.503699° = a\tan\left(\frac{2 \cdot 9265\text{N*mm} - (1700\text{N} \cdot 46\text{mm} \cdot 0.15 \cdot \sec(0.2618))}{(1700\text{N} \cdot 46\text{mm}) + (2 \cdot 9265\text{N*mm} \cdot 0.15 \cdot \sec(0.2618))}\right)$$

95) Helix Angle of Screw given Torque Required in Lowering Load with Trapezoidal Threaded Screw

Open Calculator

fx $$\alpha = a\tan\left(\frac{(W \cdot d_m \cdot \mu \cdot \sec(0.2618)) - (2 \cdot Mt_{lo})}{(W \cdot d_m) + (2 \cdot Mt_{lo} \cdot \mu \cdot \sec(0.2618))}\right)$$

ex $$4.497816° = a\tan\left(\frac{(1700\text{N} \cdot 46\text{mm} \cdot 0.15 \cdot \sec(0.2618)) - (2 \cdot 2960\text{N*mm})}{(1700\text{N} \cdot 46\text{mm}) + (2 \cdot 2960\text{N*mm} \cdot 0.15 \cdot \sec(0.2618))}\right)$$

96) Load on Screw given Effort Required in Lifting Load with Trapezoidal Threaded Screw

Open Calculator

fx $$W = \frac{P_{li}}{\frac{\mu \cdot \sec((0.2618)) + \tan(\alpha)}{1 - \mu \cdot \sec((0.2618)) \cdot \tan(\alpha)}}$$

ex $$1697.002N = \frac{402N}{\frac{0.15 \cdot \sec((0.2618)) + \tan(4.5°)}{1 - 0.15 \cdot \sec((0.2618)) \cdot \tan(4.5°)}}$$

97) Load on Screw given helix Angle

Open Calculator

fx $$W = P_{lo} \cdot \frac{1 + \mu \cdot \sec((0.2618)) \cdot \tan(\alpha)}{(\mu \cdot \sec((0.2618)) - \tan(\alpha))}$$

ex $$1585.938N = 120N \cdot \frac{1 + 0.15 \cdot \sec((0.2618)) \cdot \tan(4.5°)}{(0.15 \cdot \sec((0.2618)) - \tan(4.5°))}$$

98) Load on Screw given Torque Required in Lifting Load with Trapezoidal Threaded Screw

Open Calculator

fx $$W = Mt_{li} \cdot \frac{1 - \mu \cdot \sec((0.2618)) \cdot \tan(\alpha)}{0.5 \cdot d_m \cdot ((\mu \cdot \sec((0.2618)) + \tan(\alpha)))}$$

ex $$1700.489N = 9265N*mm \cdot \frac{1 - 0.15 \cdot \sec((0.2618)) \cdot \tan(4.5°)}{0.5 \cdot 46mm \cdot ((0.15 \cdot \sec((0.2618)) + \tan(4.5°)))}$$

99) Load on Screw given Torque Required in Lowering Load with Trapezoidal Threaded Screw

Open Calculator

fx $$W = \frac{Mt_{lo}}{0.5 \cdot d_m \cdot \left(\frac{(\mu \cdot \sec((0.2618))) - \tan(\alpha)}{1 + (\mu \cdot \sec((0.2618)) \cdot \tan(\alpha))} \right)}$$

ex $$1700.861N = \frac{2960N^*mm}{0.5 \cdot 46mm \cdot \left(\frac{(0.15 \cdot \sec((0.2618))) - \tan(4.5°)}{1 + (0.15 \cdot \sec((0.2618)) \cdot \tan(4.5°))} \right)}$$

100) Mean Diameter of Screw given Torque in Lifting Load with Trapezoidal Threaded Screw

Open Calculator

fx $$d_m = \frac{Mt_{li}}{0.5 \cdot W \cdot \left(\frac{\mu \cdot \sec((0.2618)) + \tan(\alpha)}{1 - \mu \cdot \sec((0.2618)) \cdot \tan(\alpha)} \right)}$$

ex $$46.01324mm = \frac{9265N^*mm}{0.5 \cdot 1700N \cdot \left(\frac{0.15 \cdot \sec((0.2618)) + \tan(4.5°)}{1 - 0.15 \cdot \sec((0.2618)) \cdot \tan(4.5°)} \right)}$$

101) Mean Diameter of Screw given Torque in Lowering Load with Trapezoidal Threaded Screw

Open Calculator

fx $$d_m = \frac{Mt_{lo}}{0.5 \cdot W \cdot \left(\frac{\mu \cdot \sec((0.2618)) - \tan(\alpha)}{1 + \mu \cdot \sec((0.2618)) \cdot \tan(\alpha)} \right)}$$

ex $$46.0233mm = \frac{2960N^*mm}{0.5 \cdot 1700N \cdot \left(\frac{0.15 \cdot \sec((0.2618)) - \tan(4.5°)}{1 + 0.15 \cdot \sec((0.2618)) \cdot \tan(4.5°)} \right)}$$

102) Torque Required in Lifting Load with Trapezoidal Threaded Screw

fx Open Calculator

$$Mt_{li} = 0.5 \cdot d_m \cdot W \cdot \left(\frac{(\mu \cdot \sec((0.2618))) + \tan(\alpha)}{1 - (\mu \cdot \sec((0.2618)) \cdot \tan(\alpha))} \right)$$

ex

$$9262.334\text{N*mm} = 0.5 \cdot 46\text{mm} \cdot 1700\text{N} \cdot \left(\frac{(0.15 \cdot \sec((0.2618))) + \tan(4.5°)}{1 - (0.15 \cdot \sec((0.2618)) \cdot \tan(4.5°))} \right)$$

103) Torque Required in Lowering Load with Trapezoidal Threaded Screw

fx Open Calculator

$$Mt_{lo} = 0.5 \cdot d_m \cdot W \cdot \left(\frac{(\mu \cdot \sec((0.2618))) - \tan(\alpha)}{1 + (\mu \cdot \sec((0.2618)) \cdot \tan(\alpha))} \right)$$

ex

$$2958.501\text{N*mm} = 0.5 \cdot 46\text{mm} \cdot 1700\text{N} \cdot \left(\frac{(0.15 \cdot \sec((0.2618))) - \tan(4.5°)}{1 + (0.15 \cdot \sec((0.2618)) \cdot \tan(4.5°))} \right)$$

Variables Used

- **A** Bearing area between screw and nut *(Square Millimeter)*
- **d** Nominal diameter of screw *(Millimeter)*
- d_c Core diameter of screw *(Millimeter)*
- D_i Inner Diameter of Collar *(Millimeter)*
- d_m Mean Diameter of Power Screw *(Millimeter)*
- D_o Outer Diameter of Collar *(Millimeter)*
- **L** Lead of Power Screw *(Millimeter)*
- Mt_{li} Torque for lifting load *(Newton Millimeter)*
- Mt_{lo} Torque for lowering load *(Newton Millimeter)*
- Mt_t Torsional Moment on Screw *(Newton Millimeter)*
- **p** Pitch of power screw thread *(Millimeter)*
- P_{li} Effort in lifting load *(Newton)*
- P_{lo} Effort in lowering load *(Newton)*
- R_1 Outer Radius of Power Screw Collar *(Millimeter)*
- R_2 Inner Radius of Power Screw Collar *(Millimeter)*
- S_b Unit bearing pressure for nut *(Newton per Square Millimeter)*
- **t** Thread Thickness *(Millimeter)*
- T_c Collar Friction Torque for Power Screw *(Newton Millimeter)*
- t_n Transverse shear stress in nut *(Newton per Square Millimeter)*
- **W** Load on screw *(Newton)*
- W_a Axial load on screw *(Newton)*
- **z** Number of Engaged Threads
- α Helix angle of screw *(Degree)*
- η Efficiency of power screw
- η_{max} Maximum Efficiency of Power Screw

- **μ** Coefficient of friction at screw thread
- **μ_{collar}** Coefficient of Friction for Collar
- **σ_c** Compressive stress in screw *(Newton per Square Millimeter)*
- **τ** Torsional shear stress in screw *(Newton per Square Millimeter)*
- **τ_s** Transverse Shear Stress in Screw *(Newton per Square Millimeter)*

Constants, Functions, Measurements used

- Constant: **pi**, 3.14159265358979323846264338327950288
  Archimedes' constant
- Function: **atan**, atan(Number)
  Inverse tan is used to calculate the angle by applying the tangent ratio of the angle, which is the opposite side divided by the adjacent side of the right triangle.
- Function: **sec**, sec(Angle)
  Secant is a trigonometric function that is defined ratio of the hypotenuse to the shorter side adjacent to an acute angle (in a right-angled triangle); the reciprocal of a cosine.
- Function: **sin**, sin(Angle)
  Sine is a trigonometric function that describes the ratio of the length of the opposite side of a right triangle to the length of the hypotenuse.
- 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.
- Function: **tan**, tan(Angle)
  The tangent of an angle is a trigonometric ratio of the length of the side opposite an angle to the length of the side adjacent to an angle in a right triangle.
- 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: **Force** in Newton (N)
  Force Unit Conversion
- Measurement: **Angle** in Degree (°)
  Angle Unit Conversion
- Measurement: **Torque** in Newton Millimeter (N*mm)
  Torque Unit Conversion

- Measurement: **Stress** in Newton per Square Millimeter (N/mm²)
  Stress Unit Conversion

Check other formula lists

- **Refrigeration and Air Conditioning Formulas**

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