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Thread Measurement Formulas

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List of 45 Thread Measurement Formulas

Thread Measurement

Three Wires System Method

ACME Thread

1) Diameter of measuring wires ACME threads

Open Calculator

fx $$G = \frac{M - D + 1.933357 \cdot P}{4.9939}$$

ex $$1.401724\text{mm} = \frac{8.2\text{mm} - 7\text{mm} + 1.933357 \cdot 3\text{mm}}{4.9939}$$

2) Micrometer measurement per reading acme threads

Open Calculator

fx $$M = D + 4.9939 \cdot G - P \cdot 1.933357$$

ex $$7.192609\text{mm} = 7\text{mm} + 4.9939 \cdot 1.2\text{mm} - 3\text{mm} \cdot 1.933357$$

3) Pitch diameter acme threads

Open Calculator

fx $$D = M - (4.9939 \cdot G - 1.933357 \cdot P)$$

ex $$8.007391\text{mm} = 8.2\text{mm} - (4.9939 \cdot 1.2\text{mm} - 1.933357 \cdot 3\text{mm})$$

4) Pitch of screw acme threads

Open Calculator

fx $$P = \frac{D - M + 4.9939 \cdot G}{1.933357}$$

ex $$2.478942\text{mm} = \frac{7\text{mm} - 8.2\text{mm} + 4.9939 \cdot 1.2\text{mm}}{1.933357}$$

British Association Thread

5) Diameter of Measuring Wires British Threads

Open Calculator

fx $$G = \frac{M - D + 1.13634 \cdot P}{3.4829}$$

ex $$1.323328\text{mm} = \frac{8.2\text{mm} - 7\text{mm} + 1.13634 \cdot 3\text{mm}}{3.4829}$$

6) Micrometer Measurement per Reading British Threads

Open Calculator

$$M = D + 3.4829 \cdot G - 1.13634 \cdot P$$

$$7.77046\text{mm} = 7\text{mm} + 3.4829 \cdot 1.2\text{mm} - 1.13634 \cdot 3\text{mm}$$

7) Pitch diameter British thread

Open Calculator

$$D = M - 3.4829 \cdot G + 1.13634 \cdot P$$

$$7.42954\text{mm} = 8.2\text{mm} - 3.4829 \cdot 1.2\text{mm} + 1.13634 \cdot 3\text{mm}$$

8) Pitch of Screw British

Open Calculator

$$P = \frac{D + 3.4829 \cdot G - M}{1.13634}$$

$$2.621997\text{mm} = \frac{7\text{mm} + 3.4829 \cdot 1.2\text{mm} - 8.2\text{mm}}{1.13634}$$

Lowenherz Thread

9) Diameter of Measuring Wires

Open Calculator

$$G = \frac{M + P - D}{3.23594}$$

$$1.297923\text{mm} = \frac{8.2\text{mm} + 3\text{mm} - 7\text{mm}}{3.23594}$$

10) Micrometer Measurement per Reading Lowenherz

Open Calculator

$$M = D + 3.23594 \cdot G - P$$

$$7.883128\text{mm} = 7\text{mm} + 3.23594 \cdot 1.2\text{mm} - 3\text{mm}$$

11) Pitch Diameter Lowenherz

Open Calculator

$$D = M - 3.23594 \cdot G + P$$

$$7.316872\text{mm} = 8.2\text{mm} - 3.23594 \cdot 1.2\text{mm} + 3\text{mm}$$

12) Pitch of Screw Lowenherz

Open Calculator

$$P = D - M + 3.23594 \cdot G$$

$$2.683128\text{mm} = 7\text{mm} - 8.2\text{mm} + 3.23594 \cdot 1.2\text{mm}$$

Metric Thread

13) Diameter of Wire used in Three Wire System Method

Open Calculator

fx $$G_m = \frac{M - D + \frac{P \cdot \cot(\theta)}{2}}{1 + \cos ec(\theta)}$$

ex $$0.958846\text{mm} = \frac{8.2\text{mm} - 7\text{mm} + \frac{3\text{mm} \cdot \cot(60^\circ)}{2}}{1 + \cos ec(60^\circ)}$$

14) Ideal wire diameter in three wire system method

Open Calculator

fx $$G_m = \left(\frac{P}{2}\right) \cdot \sec\left(\frac{\theta}{2}\right)$$

ex $$1.732051\text{mm} = \left(\frac{3\text{mm}}{2}\right) \cdot \sec\left(\frac{60^\circ}{2}\right)$$

15) Micrometer reading from three wire system method

Open Calculator

fx $$M = D + G_m \cdot (1 + \cos ec(\theta)) - \frac{P \cdot \cot(\theta)}{2}$$

ex $$9.883154\text{mm} = 7\text{mm} + 1.74\text{mm} \cdot (1 + \cos ec(60^\circ)) - \frac{3\text{mm} \cdot \cot(60^\circ)}{2}$$

16) Pitch diameter from three wire system method

Open Calculator

fx $$D = M - \left(G_m \cdot (1 + \cos ec(\theta)) - \frac{P \cdot \cot(\theta)}{2}\right)$$

ex $$5.316846\text{mm} = 8.2\text{mm} - \left(1.74\text{mm} \cdot (1 + \cos ec(60^\circ)) - \frac{3\text{mm} \cdot \cot(60^\circ)}{2}\right)$$

17) Pitch of thread from three wire system method

Open Calculator

fx $$P = \frac{D + G_m \cdot (1 + \cos ec(\theta)) - M}{\frac{\cot(\theta)}{2}}$$

ex $$8.830615\text{mm} = \frac{7\text{mm} + 1.74\text{mm} \cdot (1 + \cos ec(60^\circ)) - 8.2\text{mm}}{\frac{\cot(60^\circ)}{2}}$$

18) Pitch of thread given ideal wire diameter

Open Calculator

$$P = \frac{2 \cdot G_m}{\sec\left(\frac{\theta}{2}\right)}$$

$$3.013768\text{mm} = \frac{2 \cdot 1.74\text{mm}}{\sec\left(\frac{60^\circ}{2}\right)}$$

19) Thread Angle given Ideal Wire Diameter

Open Calculator

$$\theta = 2 \cdot arc\sec\left(\frac{2 \cdot G_m}{P}\right)$$

$$60.90063^\circ = 2 \cdot arc\sec\left(\frac{2 \cdot 1.74\text{mm}}{3\text{mm}}\right)$$

Sharp-V Thread

20) Diameter of Wire used Sharp V

Open Calculator

$$G = \frac{M - D + 0.86603 \cdot P}{3}$$

$$1.26603\text{mm} = \frac{8.2\text{mm} - 7\text{mm} + 0.86603 \cdot 3\text{mm}}{3}$$

21) Micrometer Measurement per Reading Sharp V

Open Calculator

$$M = D + 3 \cdot G - 0.86603 \cdot P$$

$$8.00191\text{mm} = 7\text{mm} + 3 \cdot 1.2\text{mm} - 0.86603 \cdot 3\text{mm}$$

22) Pitch Diameter Sharp V

Open Calculator

$$D = M - 3 \cdot G + 0.86603 \cdot P$$

$$7.19809\text{mm} = 8.2\text{mm} - 3 \cdot 1.2\text{mm} + 0.86603 \cdot 3\text{mm}$$

23) Pitch of Screw Threads Sharp V

Open Calculator

$$P = \frac{D + 3 \cdot G - M}{0.86603}$$

$$2.771267\text{mm} = \frac{7\text{mm} + 3 \cdot 1.2\text{mm} - 8.2\text{mm}}{0.86603}$$

Unified and National Threads

24) Diameter of Wire used Unified and National Threads

Open Calculator

$$G = \frac{M - D + 0.86603 \cdot P}{3}$$

$$1.26603\text{mm} = \frac{8.2\text{mm} - 7\text{mm} + 0.86603 \cdot 3\text{mm}}{3}$$

25) Micrometer Measurement per Reading

Open Calculator

$$M = D + 3 \cdot G - 0.86603 \cdot P$$

$$8.00191\text{mm} = 7\text{mm} + 3 \cdot 1.2\text{mm} - 0.86603 \cdot 3\text{mm}$$

26) Pitch diameter Unified national threads

Open Calculator

$$D = M - 3 \cdot G + 0.86603 \cdot P$$

$$7.19809\text{mm} = 8.2\text{mm} - 3 \cdot 1.2\text{mm} + 0.86603 \cdot 3\text{mm}$$

27) Pitch of Screw Threads

Open Calculator

$$P = \frac{D - M + 3 \cdot G}{0.86603}$$

$$2.771267\text{mm} = \frac{7\text{mm} - 8.2\text{mm} + 3 \cdot 1.2\text{mm}}{0.86603}$$

Unsymmetrical Threads

28) Best size wire

Open Calculator

$$G = P \cdot \left(\frac{\tan\left(\frac{a_1 + a_2}{2}\right) \cdot \sec(a_1)}{\tan(a_1) + \tan(a_2)} \right)$$

$$1.500047\text{mm} = 3\text{mm} \cdot \left(\frac{\tan\left(\frac{0.5^\circ + 0.2^\circ}{2}\right) \cdot \sec(0.5^\circ)}{\tan(0.5^\circ) + \tan(0.2^\circ)} \right)$$

29) Best wire size for modified buttress 45deg and 7deg

Open Calculator

$$G = 0.54147 \cdot P$$

$$1.62441\text{mm} = 0.54147 \cdot 3\text{mm}$$

30) Micrometer reading per measurement

Open Calculator

$$M = D_u - \left(\frac{P}{\tan(a_1)+\tan(a_2)}\right) + G \cdot \left(1 + \cos ec\left(\frac{a_1+a_2}{2}\right) \cdot \cos\left(\frac{a_1-a_2}{2}\right)\right)$$

ex

$$8.294618\text{mm} = 56.2\text{mm} - \left(\frac{3\text{mm}}{\tan(0.5^\circ)+\tan(0.2^\circ)}\right) + 1.2\text{mm} \cdot \left(1 + \cos ec\left(\frac{0.5^\circ+0.2^\circ}{2}\right) \cdot \cos\left(\frac{0.5^\circ-0.}{2}\right)\right.$$

31) Pitch diameter unsymmetrical threads

Open Calculator

$$D_u = M + \left(\frac{P}{\tan(a_1)+\tan(a_2)}\right) - G \cdot \left(1 + \cos ec\left(\frac{a_1+a_2}{2}\right) \cdot \cos\left(\frac{a_1-a_2}{2}\right)\right)$$

ex

$$56.10538\text{mm} = 8.2\text{mm} + \left(\frac{3\text{mm}}{\tan(0.5^\circ)+\tan(0.2^\circ)}\right) - 1.2\text{mm} \cdot \left(1 + \cos ec\left(\frac{0.5^\circ+0.2^\circ}{2}\right) \cdot \cos\left(\frac{0.5^\circ-0.2}{2}\right)\right.$$

32) Pitch for modified buttress 45deg and 7deg

Open Calculator

$$P = \frac{G}{0.54147}$$

ex

$$2.216189\text{mm} = \frac{1.2\text{mm}}{0.54147}$$

33) Pitch of Screw Unsymmetrical Threads

Open Calculator

$$P = \left(D_u + G \cdot \left(1 + \cos ec\left(\frac{a_1+a_2}{2}\right) \cdot \cos\left(\frac{a_1-a_2}{2}\right)\right) - M\right) \cdot (\tan(a_1)+\tan(a_2))$$

ex

$$3.001156\text{mm} = \left(56.2\text{mm} + 1.2\text{mm} \cdot \left(1 + \cos ec\left(\frac{0.5^\circ+0.2^\circ}{2}\right) \cdot \cos\left(\frac{0.5^\circ-0.2^\circ}{2}\right)\right) - 8.2\text{mm}\right) \cdot (\tan(0.5$$

USA Standard Taper Pipe Thread

34) Diameter of Wire used USA Standard Taper Pipe

Open Calculator

$$G = \frac{1.00049 \cdot M - D + 0.86603 \cdot P}{3.00049}$$

ex

$$1.267162\text{mm} = \frac{1.00049 \cdot 8.2\text{mm} - 7\text{mm} + 0.86603 \cdot 3\text{mm}}{3.00049}$$

35) Micrometer Reading per Measurement USA Standard Taper Pipe

Open Calculator

$$M = \frac{D + 3.00049 \cdot G - 0.86603 \cdot P}{1.00049}$$

$$7.998579\text{mm} = \frac{7\text{mm} + 3.00049 \cdot 1.2\text{mm} - 0.86603 \cdot 3\text{mm}}{1.00049}$$

36) Pitch Diameter USA Standard Taper Pipe

Open Calculator

$$D = 1.00049 \cdot M - (3.00049 \cdot G - 0.86603 \cdot P)$$

$$7.20152\text{mm} = 1.00049 \cdot 8.2\text{mm} - (3.00049 \cdot 1.2\text{mm} - 0.86603 \cdot 3\text{mm})$$

37) Pitch of Screw USA Standard Taper

Open Calculator

$$P = \frac{D - 1.00049 \cdot M + 3.00049 \cdot G}{0.86603}$$

$$2.767306\text{mm} = \frac{7\text{mm} - 1.00049 \cdot 8.2\text{mm} + 3.00049 \cdot 1.2\text{mm}}{0.86603}$$

Whitworth Thread

38) Diameter of Wire

Open Calculator

$$G = \frac{M - D + 0.96049 \cdot P}{3.16568}$$

$$1.289287\text{mm} = \frac{8.2\text{mm} - 7\text{mm} + 0.96049 \cdot 3\text{mm}}{3.16568}$$

39) Micrometer Reading per Measurement Whitworth

Open Calculator

$$M = D + 3.16568 \cdot G - 0.96049 \cdot P$$

$$7.917346\text{mm} = 7\text{mm} + 3.16568 \cdot 1.2\text{mm} - 0.96049 \cdot 3\text{mm}$$

40) Pitch diameter whitworth

Open Calculator

$$D = M - 3.16568 \cdot G + 0.96049 \cdot P$$

$$7.282654\text{mm} = 8.2\text{mm} - 3.16568 \cdot 1.2\text{mm} + 0.96049 \cdot 3\text{mm}$$

41) pitch of screw threads whitworth

Open Calculator

$$P = \frac{D - M + 3.16568 \cdot G}{0.96049}$$

$$2.705719\text{mm} = \frac{7\text{mm} - 8.2\text{mm} + 3.16568 \cdot 1.2\text{mm}}{0.96049}$$

Two Wires System Method

42) Diameter of wire used in measurement over wires method

Open Calculator

$$G_o = M + 0.866 \cdot P - D$$

$$3.798\text{mm} = 8.2\text{mm} + 0.866 \cdot 3\text{mm} - 7\text{mm}$$

43) Micrometer reading from measurement over wires method

Open Calculator

$$M = D - (0.866 \cdot P - G_o)$$

$$8.212\text{mm} = 7\text{mm} - (0.866 \cdot 3\text{mm} - 3.81\text{mm})$$

44) Pitch diameter from measurement over wires method

Open Calculator

$$D = M + 0.866 \cdot P - G_o$$

$$6.988\text{mm} = 8.2\text{mm} + 0.866 \cdot 3\text{mm} - 3.81\text{mm}$$

45) Pitch of thread from measurement over wires method

Open Calculator

$$P = \frac{D + G_o - M}{0.866}$$

$$3.013857\text{mm} = \frac{7\text{mm} + 3.81\text{mm} - 8.2\text{mm}}{0.866}$$

Variables Used

- a_1 Large Angle *(Degree)*
- a_2 Small Angle *(Degree)*
- **D** Pitch Diameter *(Millimeter)*
- D_u Thickness of Screw *(Millimeter)*
- **G** Wire Diameter *(Millimeter)*
- G_m Wire Diameter Metric Thread *(Millimeter)*
- G_o Diameter of Wire Two Wire Method *(Millimeter)*
- **M** Micrometer Reading *(Millimeter)*
- **P** Screw Pitch *(Millimeter)*
- **θ** Thread Angle *(Degree)*

Constants, Functions, Measurements used

- Function: **arcsec**, arcsec(x)
  Inverse trigonometric secant – Unary function.
- Function: **cos**, cos(Angle)
  Cosine of an angle is the ratio of the side adjacent to the angle to the hypotenuse of the triangle.
- Function: **cosec**, cosec(Angle)
  The cosecant function is a trigonometric function that is the reciprocal of the sine function.
- Function: **cot**, cot(Angle)
  Cotangent is a trigonometric function that is defined as the ratio of the adjacent side to the opposite side in a 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: **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: **Angle** in Degree (°)
  Angle Unit Conversion

Check other formula lists

- **Thread Measurement Formulas**

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