



Fastner Geometry Formulas

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List of 38 Fastner Geometry Formulas

Fastner Geometry 2

1) Core Diameter of Bolt

 $\left(\mathrm{d_{c}}^{\prime}
ight) =rac{\mathrm{P}}{\pi\cdot au\cdot\mathrm{h_{n}}}$

Open Calculator

= 8.500321mm = $\frac{28200 ext{N}}{\pi \cdot 120 ext{N/mm}^2 \cdot 8.8 ext{mm}}$

- 2) Core Diameter of Bolt given Nominal Diameter
- fx $(\mathrm{d_c}') = 0.8 \cdot \mathrm{d_b}$

Open Calculator

 $\mathbf{ex} \ 8 \mathrm{mm} = 0.8 \cdot 10 \mathrm{mm}$

- 3) Core Diameter of Bolt given Pitch
- $(\mathrm{d_c'}) = \mathrm{d_b} (1.22687 \cdot \mathrm{p_b})$

Open Calculator 🗗

 $= 2.466412 \text{mm} = 10 \text{mm} - (1.22687 \cdot 1.25 \text{mm})$



4) Core diameter of Bolt given Tensile Stress

fx $\left(\mathrm{d_c'}
ight) = \sqrt{4 \cdot rac{\mathrm{P}}{\pi \cdot \sigma_\mathrm{t}}}$

Open Calculator 🗗

ex $15.73605 \mathrm{mm} = \sqrt{4 \cdot \frac{28200 \mathrm{N}}{\pi \cdot 145 \mathrm{N/mm^2}}}$

5) Height of Basic Profile of Screw Threads

 $h = 0.640327 \cdot p$

Open Calculator

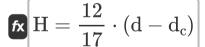
 $= 2.554905 \text{mm} = 0.640327 \cdot 3.99 \text{mm}$

- 6) Height of Fundamental Triangle of Screw Threads
- fx $|\mathrm{H}=0.960491\cdot\mathrm{p}|$

Open Calculator

 $= 3.832359 \text{mm} = 0.960491 \cdot 3.99 \text{mm}$

7) Height of Fundamental Triangle of Screw Threads given Minor Diameter of External Thread



Open Calculator

 $\boxed{\textbf{ex}} \ 3.465882 \text{mm} = \frac{12}{17} \cdot (29.8 \text{mm} - 24.89 \text{mm})$



- 8) Height of Fundamental Triangle of Screw Threads given Minor Diameter of Internal Thread
- $ext{H} = rac{ ext{D} ext{D}_{ ext{c}}}{1.25}$

Open Calculator 🗗

- $oxed{ex} 3.464 \mathrm{mm} = rac{30 \mathrm{mm} 25.67 \mathrm{mm}}{1.25}$
- 9) Height of Fundamental Triangle of Screw Threads given Pitch Diameter of External Thread
- $H = rac{d-d_p}{0.75}$

Open Calculator 🖸

- $= \frac{29.8 \text{mm} 27.2 \text{mm}}{0.75}$
- 10) Height of Fundamental Triangle of Screw Threads given Pitch Diameter of Internal Thread
- $ext{H} = rac{ ext{D} ext{D}_{ ext{p}}}{0.75}$

Open Calculator

 $= \frac{30 \text{mm} - 27.4 \text{mm}}{0.75}$



11) Height of nut

fx $\mathbf{h}_{\mathrm{n}} = rac{\mathrm{P}}{\pi \cdot au \cdot (\mathrm{d_c}')}$

Open Calculator

= 8.800332mm = $\frac{28200 \mathrm{N}}{\pi \cdot 120 \mathrm{N/mm^2 \cdot 8.5mm}}$

12) Major Diameter of External Thread given Height of Fundamental Triangle

fx $d = d_p + (0.75 \cdot H)$

Open Calculator

 $= 29.795 \text{mm} = 27.2 \text{mm} + (0.75 \cdot 3.46 \text{mm})$

13) Major Diameter of External Thread given Minor Diameter of External Thread

 $\mathbf{fx} = \mathrm{d_c} + \left(rac{17}{12} \cdot \mathrm{H}
ight)$

Open Calculator

 $\mathbf{ex} = 29.79167 \mathrm{mm} = 24.89 \mathrm{mm} + \left(\frac{17}{12} \cdot 3.46 \mathrm{mm}\right)$

14) Major Diameter of External Thread given Pitch and Pitch Diameter of External Thread

fx
$$d = d_{
m p} + (0.650 \cdot {
m p})$$

Open Calculator 🗗





15) Major Diameter of Internal Thread given Height of Fundamental triangle

 $D = D_c + (1.25 \cdot H)$

Open Calculator

16) Major Diameter of Internal Thread given Pitch and Minor Diameter of External Thread

fx $D = d_c + (1.227 \cdot p)$

Open Calculator

17) Major Diameter of Internal Thread given Pitch and Minor Diameter of Internal Thread

 $D = (1.083 \cdot p) + D_c$

Open Calculator

18) Major Diameter of Internal Thread given Pitch Diameter of Internal Thread

fx $D=D_{
m p}+(0.75\cdot {
m H})$

Open Calculator



19) Minor Diameter of External Thread given Height of Fundamental Triangle

 $\left| \mathbf{d_c} = \mathbf{d} - \left(rac{17}{12} \cdot \mathbf{H}
ight)
ight|$

Open Calculator

 $oxed{ex} 24.89833 \mathrm{mm} = 29.8 \mathrm{mm} - \left(rac{17}{12} \cdot 3.46 \mathrm{mm}
ight)$

20) Minor Diameter of External Thread given Pitch and Major Diameter of Internal Thread

 $\mathbf{fx} igl[\mathrm{d_c} = \mathrm{D} - (1.227 \cdot \mathrm{p}) igr]$

Open Calculator

21) Minor Diameter of Internal Thread given Height of Fundamental Triangle

fx $m D_c = D - (1.25 \cdot H)^{7}$

Open Calculator 🗗

 $25.675 \mathrm{mm} = 30 \mathrm{mm} - (1.25 \cdot 3.46 \mathrm{mm})$

22) Minor Diameter of Internal Thread given Pitch and Major Diameter of Internal Thread

fx $D_{
m c}=D-(1.083\cdot {
m p})$

Open Calculator 🗗

 $\mathbf{ex} \left[25.67883 \mathrm{mm} = 30 \mathrm{mm} - (1.083 \cdot 3.99 \mathrm{mm}) \right]$



23) Minor Diameter of Internal Thread given Pitch and Pitch Diameter of Internal Thread

fx $D = D_p + (0.650 \cdot p)$

Open Calculator

29.9935mm = 27.4mm + $(0.650 \cdot 3.99$ mm)

24) Nominal Diameter of Bolt

Open Calculator

fx $d_{
m b} = (d_{
m c}) + (1.22687 \cdot {
m p_b})$

$(2.2687 \cdot 1.25)$

25) Nominal Diameter of Bolt given Core Diameter 🛂

fx $d_b = \frac{d_c}{0.8}$

Open Calculator

= 10.625mm = $\frac{8.5$ mm}{0.8}

26) Pitch Diameter of External Thread given Height of Fundamental

Triangle fx $d_{ m p}=d-(0.75\cdot { m H})$

Open Calculator

Open Calculator

27.205mm = 29.8mm - $(0.75 \cdot 3.46$ mm)

27) Pitch Diameter of External Thread given Pitch 🗹

fx $\mathrm{d_p} = \mathrm{d} - (0.650 \cdot \mathrm{p})$

 $27.2065 \text{mm} = 29.8 \text{mm} - (0.650 \cdot 3.99 \text{mm})$



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28) Pitch Diameter of Internal Thread given Height of Fundamental Triangle

fx $m D_p = D - (0.75 \cdot H)$

Open Calculator 2

 $27.405 \text{mm} = 30 \text{mm} - (0.75 \cdot 3.46 \text{mm})$

29) Pitch Diameter of Internal Thread given Pitch

 $\left. \mathbf{D}_{\mathrm{p}} = \mathrm{D} - (0.650 \cdot \mathrm{p})
ight|$

Open Calculator

27.4065mm = 30mm - $(0.650 \cdot 3.99$ mm)

30) Pitch of bolt thread

 $p_{\rm b} = rac{{
m d}_{
m b} - ({
m d}_{
m c}{}')}{1.22687}$ = 1.222623mm = $\frac{10mm - 8.5mm}{}$ Open Calculator

31) Pitch of Screw Threads given Radius of Root

fx
$$p=rac{r}{0.137329}$$

 $= 2.912713 \text{mm} = \frac{0.4 \text{mm}}{0.137329}$

Open Calculator G





32) Pitch of Threads given Height of Basic Profile

fx $p=rac{h}{0.640327}$

Open Calculator

 $= \frac{3.98234 \text{mm}}{0.640327}$

33) Pitch of Threads given Height of Fundamental Triangle

 $p=rac{\mathrm{H}}{0.960491}$

Open Calculator 🖸

 $= 3.602324 \text{mm} = \frac{3.46 \text{mm}}{0.960491}$

34) Pitch of Threads given Major Diameter of Internal Thread

 $p=rac{\mathrm{D}-\mathrm{d_c}}{1.227}$

Open Calculator 🗗

= $4.164629 ext{mm} = rac{30 ext{mm} - 24.89 ext{mm}}{1.227}$

35) Pitch of Threads given Minor Diameter of Internal Thread

fx $m p = rac{D-D_c}{1.083}$

Open Calculator





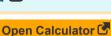
36) Pitch of Threads given Pitch Diameter of External Thread



$$p = rac{\mathrm{d} - \mathrm{d_p}}{0.650}$$

$$4 \text{mm} = \frac{29.8 \text{mm} - 27.2 \text{mm}}{0.650}$$

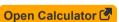
37) Pitch of Threads given Pitch Diameter of Internal Thread



$$p = rac{D-D_{
m p}}{0.650}$$

$$=$$
 $\frac{30 \text{mm} - 27.4 \text{mm}}{0.650}$

38) Radius of Root of Threads



fx
$$m r = 0.137329 \cdot p$$

$$\text{ex} \ 0.547943 \text{mm} = 0.137329 \cdot 3.99 \text{mm}$$



Variables Used

- d Major Diameter of External Thread (Millimeter)
- **D** Major Diameter of Internal Thread (Millimeter)
- d_h Nominal Diameter of Threaded Bolt (Millimeter)
- d_c Minor Diameter of External Thread (Millimeter)
- d_c' Core Diameter of Threaded Bolt (Millimeter)
- D_c Minor Diameter of Internal Thread (Millimeter)
- d_p Pitch Diameter of External Thread (Millimeter)
- D_p Pitch Diameter of Internal Thread (Millimeter)
- **h** Height of Basic Profile (Millimeter)
- **H** Height of Fundamental Triangle (Millimeter)
- h_n Height of Nut (Millimeter)
- p Pitch of Threads (Millimeter)
- P Tensile Force on Bolt (Newton)
- ph Pitch of Bolt Threads (Millimeter)
- r Radius of Root of Thread (Millimeter)
- σ_t Tensile Stress in Bolt (Newton per Square Millimeter)
- τ Shear Stress in Bolt (Newton per Square Millimeter)





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





Check other formula lists

• Fastner Geometry Formulas

 Structural Response and Force Analysis Formulas

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