GEN3SYS® and GEN3SYS® XT

Technical Information - Inch

TAP DRILL INFORMATION

AMERICAN - Unified Inch Screw Thread

Tap Size	Tap Drill Size	Decimal Equivalent	* Theo % Thread	Prob Mean Oversize	Prob Hole Size	** Prob % Thread
1/2 - 20	29/64"	.4531"	72%	.003"	.4561"	68%
9/16 - 12	12.0 mm	.4724"	72%	.003"	.4754"	69%
	31/64"	.4844"	83%	.003"	.4874"	80%
9/16 - 18	1/2"	.5000"	87%	.003"	.5030"	82%
	13.0 mm	.5118"	70%	.003"	.5148"	66%
	31/64"	.5156"	65%	.003"	.5186"	61%
5/8 - 11	17/32"	.5313"	79%	.003"	.5343"	77%
5/8 - 12	35/64"	.5469"	72%	.003"	.5499"	69%
5/8 - 18	9/16"	.5625"	87%	.003"	.5655"	82%
	14.5 mm	.5709"	75%	.003"	.5739"	71%
	37/64"	.5781"	65%	.003"	.5811"	61%
11/16 - 12	39/64"	.6094"	72%	.003"	.6124"	69%
3/4 - 10	41/64"	.6406"	84%	.003"	.6436"	82%
	16.5 mm	.6496"	77%	.003"	.6526"	75%
	21/32"	.6563"	72%	.003"	.6593"	70%
3/4 - 12	43/64"	.6719"	72%	.003"	.6749"	69%
3/4 - 16	11/16"	.6875"	77%	.003"	.6905"	73%
	17.5 mm	.6890"	75%	.003"	.6920"	71%
7/8 - 9	49/64"	.7656"	76%	.003"	.7686"	74%
	25/32"	.7813"	65%	.003"	.7843"	63%
7/8 - 14	51/64"	.7969"	84%	.003"	.7999"	81%
	13/16"	.8125"	67%	.003"	.8155"	64%
15/16 - 12	55/64"	.8594"	72%	.003"	.8624"	69%
15/16 - 20	57/64"	.8906"	72%	.003"	.8936"	68%
1 - 8	22.0 mm	.8661"	82%	.003"	.8691"	81%
	7/8"	.8750"	77%	.003"	.8780"	75%
	57/64"	.8906"	67%	.003"	.8936"	65%
1 - 12	29/32"	.9063"	87%	.003"	.9093"	84%
	59/64"	.9219"	72%	.003"	.9249"	69%
1 - 14	15/16"	.9375"	67%	.003"	.9405"	64%
1-1/8 - 12	1-1/32"	1.0313"	87%	.003"	1.0343"	84%
	1-3/64"	1.0469"	72%	.003"	1.0499"	69%
1-1/4 - 7	1-7/64"	1.1094"	76%	.003"	1.1124"	74%

Taper Pipe Thread (NPT)						
Tap Size	Tap Drill Size	Decimal Equivalent	* Theo % Thread	Prob Mean Oversize	Prob Hole Size	** Prob % Thread
1/4 - 18	7/16"	.4375"	N/A	.003"	.4405"	N/A
3/8 - 18	9/16"	.5625"	N/A	.003"	.5655"	N/A
1/2 - 14	45/64"	.7031"	N/A	.003"	.7061"	N/A
3/4 - 14	29/32"	.9063"	N/A	.003"	.9093"	N/A

Based on nominal tap drill diameter. ** Based on .003" probable mean oversize.
To calculate percent of full thread for a given hole diameter:

$$\% \text{ Thread} = \#\text{ of Threads per inch} * \frac{\left(\text{Basic Major Dia. of thread (inch)} - \text{Drill Hole Size (inch)}\right)}{.0130}$$

The above tap drill information represents probable thread percentages for the standard tap drills stocked at Allied. Special insert diameters may be required in order to meet a user specific percentage of thread requirements.

The .003" probable mean oversize hole condition is based on optimum cutting conditions. Probable % of full thread may vary based on less ideal cutting conditions.

Formulas

1. $\text{RPM} = \frac{3.82 \cdot \text{SFM}}{\text{DIA}}$

where:
RPM = revolutions per minute (rev/min)
SFM = speed (ft/min)
DIA = diameter of drill (in)

2. $\text{IPM} = \text{RPM} \cdot \text{IPR}$

where:
IPM = inches per minute (in/min)
RPM = revolutions per minute (rev/min)
IPR = feed rate (in/rev)

3. $\text{SFM} = \text{RPM} \cdot 0.262 \cdot \text{DIA}$

where:
SFM = speed (ft/min)
RPM = revolutions per minute (rev/min)
DIA = diameter of drill (in)

4. $\text{Thrust} = 153{,}700 \cdot \text{IPR} \cdot \text{DIA} \cdot \text{Km}$

where:
Thrust = axial thrust (lbs)
IPR = feed rate (in/rev)
DIA = diameter of drill (in)
Km = specific cutting energy (lbs/in^2)

5. $\text{Tool Power} = .6283 \cdot \text{IPR} \cdot \text{RPM} \cdot \text{Km} \cdot \text{DIA}^2$

where:
Tool Power = tool power (HP)
IPR = feed rate (in/rev)
RPM = revolutions per minute (rev/min)
Km = specific cutting energy (lbs/in^2)
DIA = diameter of drill (in)

MATERIAL CONSTANTS

Type of Material	Km (lbs/in^2)
Plain Carbon and Alloy Steel	
85 - 200 BHN	0.79
200 - 275 BHN	0.94
275 - 375 BHN	1.00
375 - 425 BHN	1.15
High Temperature Alloys	1.44
Stainless Steel:	
135-275 BHN	0.94
30 - 45 RC	1.08
Copper Alloy	
20 - 80 RB	0.43
80 - 100 RB	0.72
Titanium Alloy	0.72
Aluminum Alloy	0.22
Magnesium Alloy	0.16
Cast Iron	
100 - 200 BHN	0.50
200 - 300 BHN	1.08

Note: The above table and equations are found in the Machinery's Handbook. Permission to simplify and print the equations is granted by the Editor of the Machinery's Handbook.

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