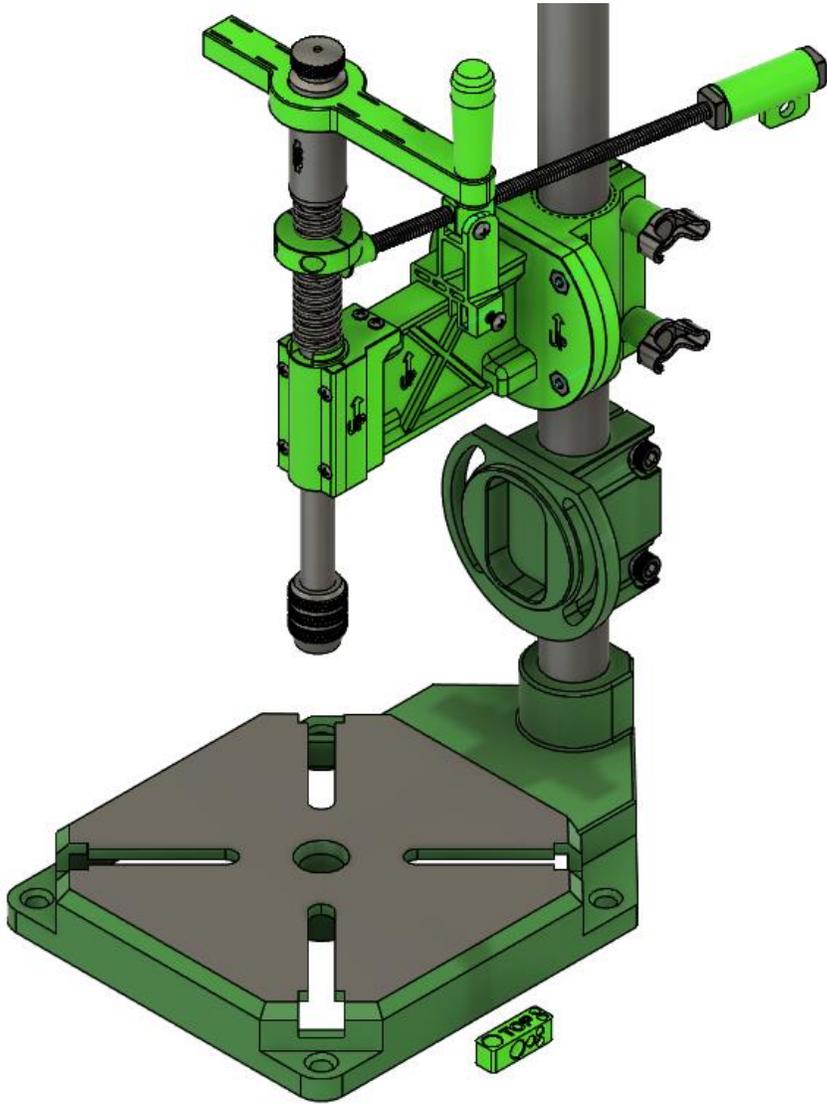
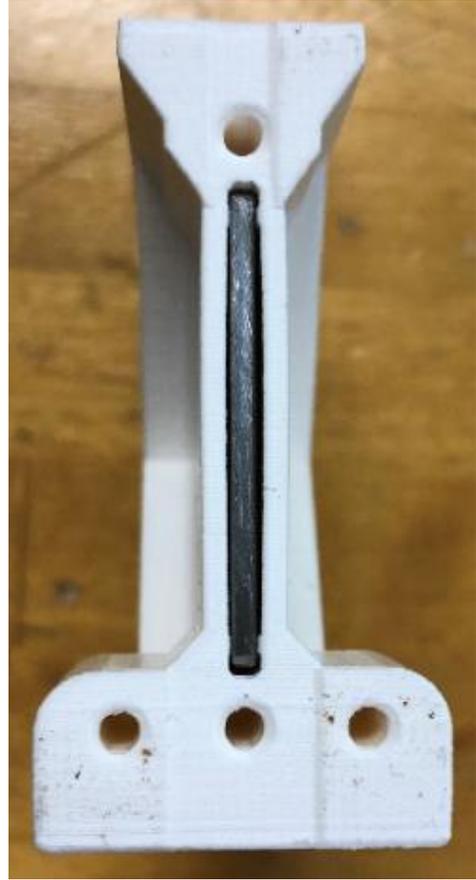


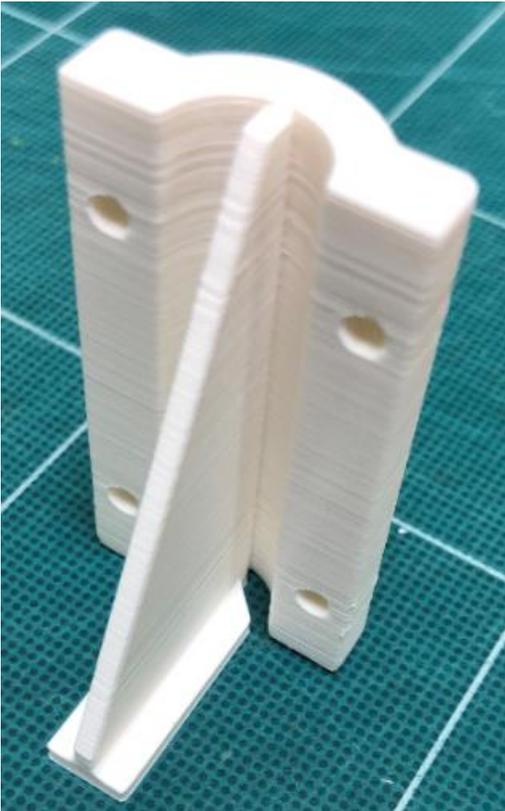
Tapping Stand



Optional insertion of 1/16" steel plate to enhance rigidity



Front uses breakaway rib for printing.



BOM (Bill of Materials)

Line	Qty	Type	Description	Part Num	Price
1	6	screw	6-32 5/8" Pan-Head Phillips Steel Zinc-Plated	90272A150	\$3.39(100)
2	3	screw	#4 1/2"L RoundedHead SheetMetalBluntScrew 18-8SS	92525A207	\$6.25(100)
3	16	screw	#4 1/2"L RoundedHead SheetMetalBluntScrew 18-8SS	92525A207	\$6.25(100)
4	2	screw	1/4-20 1-1/8"L SocketHead AlloySteel BlackOxide	91251A560	14.90(25)
5	2	screw	Wing-Head Thumb 1/4-20 1-1/2"L Zinc-Plated Steel	91510A161	\$7.22(5)
6	2	nut	1/4-20 Square 7/16W 3/16H Low-Strength Steel	94855A247	\$4.71(100)
7	5	nut	1/4-20 Square 7/16W 3/16H Low-Strength Steel	94855A247	\$4.71(100)
8	4	nut	1/4-20 Square 7/16W 3/16H Low-Strength Steel	94855A247	\$4.71(100)
9	4	washer	#6 Oversized 0.562"OD 0.156"ID Steel Zinc-Plated	91090A102	\$3.12(50)
10	1	rod	threaded 1/4-20 8"L Grade B7 Steel ZincYellowChromate	99086A349	\$5.64(1)
11	1	spring	Compression 0.594"OD 0.594"ID 2.188"L 302 StainlessSteel	1986K125	\$7.45(6)
12	1	spring	Compression 0.688"OD 0.594"ID 3"L	9657K124	\$8.87(12)
13	1	undef	T-Handle Ratchet Tap Wrench, M3-8 240mmL	Amazon B08DQW6D2T	\$14.49
14	1	undef	Drill Press Work Station	Amazon B01NCRDLI5	\$42.99
15	1	printPLA	SpringCapBottom		
16	1	printPLA	TapStand-Extension		
17	1	printPLA	TapStand-BarrelRear		
18	1	printPLA	TapStand-BarrelFront		
19	1	printPLA	TapStand-BarrelFrontSupport		
20	1	printPLA	TapStand-Plate		
21	1	printPLA	TapStand-CounterweightPivot		
22	1	printPLA	TapStand-CounterWeightHub		
23	1	printPLA	CounterWeight		
24	1	printPLA	TapStand_HandleArm		
25	1	printPLA	TapStand_Handle		
26	1	printPLA	TapStand_HandleWasher		
27	1	printPLA	ColumnMount		
28	2	printPLA	TapStand_ColumnMountSpacer		
29	1	printPLA	TapStand_Test-Holes		



Size Pitch

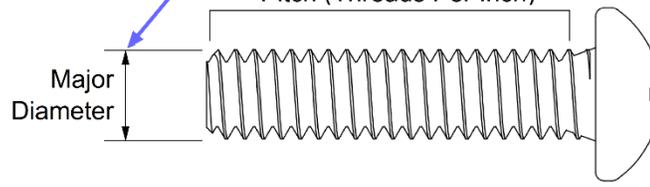
8 - 32

First number corresponds to the screw's "Major Diameter"

Second number corresponds to the screw's "Pitch"

Pitch (Threads Per Inch)

Major Diameter



Machine Screw Tap & Drill Chart

(Not for self-tapping or wood screws)

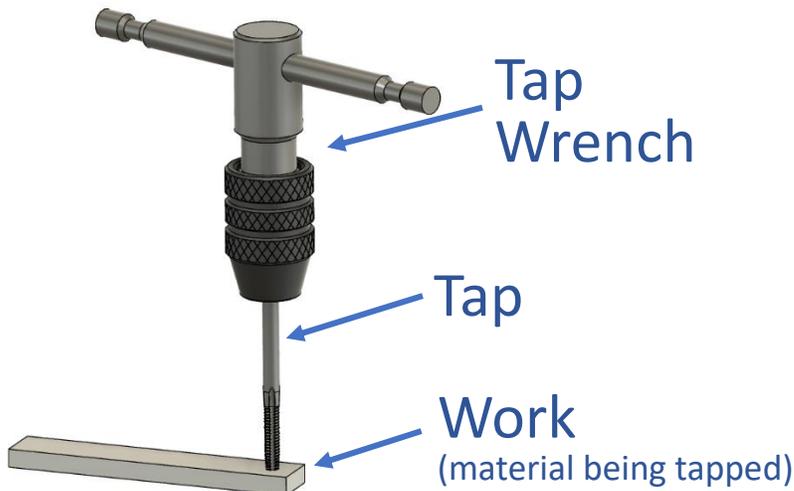
The "Tap Drill" and "Clearance Drill" are just normal drill bits.

A Screw Size has nothing to do with the screw's length.



Screw Size Num or Dia.	Major Dia.	Threads Per Inch	Tap Drill		Clearance Drill
			Aluminum, Brass & Plastic 75% Thread	Steel, Stainless Steel, Iron & Unobtainium 50% Thread	Close Fit (Any Material)
			Drill Size (Decimal equivalent)	Drill Size (Decimal equivalent)	Drill Size (Decimal equivalent)
2	.086	56	50 (0.070)	49 (0.073)	43 (0.089)
		64	50 (0.070)	48 (0.076)	
4	.112	40	43 (0.089)	41 (0.096)	32 (0.116)
		48	42 (0.094)	40 (0.098)	
6	.138	32	36 (0.107)	32 (0.116)	27 (0.144)
		40	33 (0.113)	31 (0.120)	
8	.164	32	29 (0.136)	27 (0.144)	18 (0.170)
		36	29 (0.136)	26 (0.147)	
10	.190	24	25 (0.150)	20 (0.161)	9 (0.196)
		32	21 (0.159)	18 (0.170)	
1/4	.250	20	7 (0.201)	7/32 (0.219)	F (0.257)
		28	3 (0.213)	1 (0.228)	
5/16	.313	18	F (0.257)	J (0.277)	P (0.323)
		24	I (0.272)	9/32 (0.281)	
3/8	.375	16	5/16 (0.313)	Q (0.332)	W (0.386)
		24	Q (0.332)	S (0.348)	
1/2	.500	13	27/64 (0.422)	29/64 (0.453)	33/64 (0.516)
		20	29/64 (0.453)	15/32 (0.469)	

There are other screw sizes and pitches. This chart only lists some more common sizes. Uncommon pitches are grayed out.



Taps are hardened steel and **can easily crack**. Then you have a broken tap stuck in your work, which may now be ruined and cause you to **yell bad words**. If this happens see section on "Broken tap removal".

Wear safety glasses.

Ensure that tap is kept perpendicular to work surface.

When tapping reverse rotation ¼ turn for every full turn to break chips.

Tapping fixtures will help tap straight holes. Cutting fluid, such as Tap Magic, can help.

Best Seller



Tap Magic

30004P ProTap Cutting Fluid, 4 oz. Size

★★★★☆ ~ 4,319

4K+ bought in past month

\$4⁸⁹ (\$1.22/Fl Oz)

Save more with Subscribe & Save

✓prime One-Day

FREE delivery Tomorrow

A few drops on the tap can make tapping easier to help prevent breakage.

A tapping fixture will help tap a straight hole and prevent a bending force on the tap.



Tap Options

There are many types of taps. The focus here will be for “hand taps” for manual tapping.

Taps and Chamfer Options



Taper

Most common and used for a hole that extends through material.



Plug

More likely used with powered tapping equipment.



Bottoming

Used for final tapping of a “blind hole” that does not extend through material.

Flute Count Options



2 Flute

Most common and used for a hole that extends through material.



3 Flute

Most common and used for a hole that extends through material.



4 Flute

Easiest for starting a straight hole without using a fixture. Larger size taps may only be available as 4 Flute.

One consideration is to buy flute counts that match that of your tap extractor(s).

GH Options

“G” designates Ground Thread and “H” designates a High Oversize. The number after “H” specifies the amount of oversize according to the below table. There are also “L” options for undersized taps, but they are rare. **H3** is the most common.

H1 = oversized by 0.0000” to 0.0005”

H2 = oversized by 0.0005” to 0.0010”

H3 = oversized by 0.0010” to 0.0015” Most common option

H4 = oversized by 0.0015” to 0.0020”

H5 = oversized by 0.0020” to 0.0025”

H6 = oversized by 0.0025” to 0.0030”

H7 = oversized by 0.0030” to 0.0035”

Specifying a particular HG option allows one to fine tune the thread fit. One may also use a higher oversize if the tapped part will later be anodized or plated, because these finishing processes can add up to a few thousandths of an inch to all surfaces of the part and thus holes will become slightly smaller.

Thread Type

The Thread Type (UNC, UNF, UNEF, UNS) designates the following pitch options: “Unified Coarse”, “Unified Fine”, “Unified Extra Fine”, and “Unified Special”. Note that these designations are somewhat redundant with the pitch. For example, ¼-20, specifies a Coarse thread, whereas ¼-28 specifies a Fine thread.

The “UN” stands for “Unified”. In 1949, the United States, United Kingdom, and Canada adopted the “Unified Thread Standard” to unify the thread standards of these countries. This was done to alleviate interchangeability problems that plagued equipment production and maintenance during World War 2.

Material

Most taps are High Speed Steel, which is hardened steel. To tap harder materials, “carbide” taps can be used. However, carbide is very brittle and should not be used for hand tapping, just as carbide drill bits should not be used with a hand drill.

Markings on the tap

Reading the markings on a tap can be difficult. If you are unsure of the size try screwing a nut of a known size onto the tap.

The markings on this tap indicate that it is a ¼-20 “NC” likely indicates UNC. “HS” likely indicates High Speed Steel. “GH3” indicates H3 (oversized by 0.0010” to 0.0015”). Marking will also vary among different manufacturers.



Broken tap removal

When a tap breaks, the portion stuck in the work can seem impossible to remove and imagine it happens after hours have been invested in performing previous machining operations.

In industry, it's common to send work with a broken tap out to a company with equipment, such as EDM (Electrical Discharge Machining), that can burn out a broken tap without damaging the work. There are also portable EDM units specifically made for tap removal.

Before resorting to having a tap burnt out, a tap extractor, such as those made by Walton, can be tried. However, the tap extractor used must match the tap size and number of flutes.



Using a tap extractor is not easy and does not always work. Read the instructions that come with the extractor. Walton Tools is considered the "go to" brand and start at \$20.

Some tips.

Grind down any protruding tap "shards".

Add a few drops of penetration oil (PB Blaster, Liquid Wrench, WD-40, etc.) into the hole.

Ensure that the cylinder is pushed down close to the work surface, otherwise the prongs will twist.

Start twisting a little in both directions to help loosen the tap.

Note that it is easy to damage the prongs of the tap extractor.

At some point you may be deciding if the work is important enough to risk breaking a \$20 tap extractor.

Using chemistry

If the material being tapped is aluminum or brass, one could try dissolving the iron of the tap. Alum (aluminum sulfate), is a white powder sold in grocery stores. It is actually used in baking and who would think it could be used to dissolve iron.

The section of work with the broken tap must be submerged in a hot solution of alum for several hours. The difficulty here is that water must be brought close to a boil to allow as much alum as possible to be dissolved and the temperature must be maintained to ensure alum doesn't come out of solution. The key is the high concentration of alum and the high temperature to achieve a reaction rate so that the process doesn't take forever.

One may just need a small amount of the tap to dissolve to allow it to loosen.