



## **Tapping Systems**

# The Palmgren Tapping Solution

The use of a Palmgren parallel arm tapping machine in combination with primary operations will generate savings through improved operator utilization, reduced set-up time, reduced material handling, and improved material flow. They are the right choice to create a profitable manufacturing cell when coupled with any CNC or manually operated machine tool. When used in conjunction with a CNC machining center, profitability is increased through additional hourly production. Coupled with the savings through the elimination of costly tool holders and additional programming time a tapping arm easily pays for itself in no time. The elimination of tapping on your machining centers can actually save between 30% to 40% or more.

## Features

- Taps both blind and through holes
- Faster tapping cycles
- Greater thread quality and accuracy
- Easy to operate
- Extends tap life
- Eliminates broken taps
- Faster tap positioning with difficult locations – easier to reach holes
- No indexing or laborious handling of work pieces
- Increases productivity – lowers tapping cost per part
- Can be applied to many other shop uses and applications
- Highly flexible, mobile and easy to use

## Applications

Palmgren offers a variety of universal (articulated) arm systems that can perform a wide range of applications. This allows you to customize a unit to fit a particular need saving you time and money while improving overall quality.

### Standard Applications

(with tapping motor)

- Tapping new holes
- Re-tap previous tapped holes from damaged to warped heat treated holes (The tap will automatically self-center so the tap matches to the same lead already in the hole.)
- Reaming

- Countersinking
- Drilling – soft materials only
- Chamfering
- Hone
- Burnish & size through holes
- Finishing with wire brush or abrasives

### Custom Applications

- Screw driving
- Nut running
- Routing
- Grinding/deburring with die grinders, straight or vertical grinders
- Insert Helicoils

## Cost Comparison: Parallel Arm vs. Machining Center Tapping

Estimated Operating Burden	CNC Machining Center	Parallel Arm
Average Machine Burden Rate	\$50.00/hr	\$3.00/hr
Average Operator Burden Rate	\$20.00/hr	\$0.00
Average Programming Burden Rate	\$28.00/hr	\$0.00
<b>Average Total Burden</b>	<b>\$98.00/hr</b>	<b>\$3.00/hr</b>
Estimated Time for Tapping Each Hole		
Programming/Fixturing	.4 minutes	0 minutes
Set Up	.1 minute	0 minutes
Locating/Tool Changing	.4 minutes	.2 minutes
Tapping	.5 minutes	.3 minutes
Spindle Reversing	.4 minutes	.3 minutes
<b>Total Time per Hole</b>	<b>1.8 minutes</b>	<b>.8 minutes</b>
Estimated Cost per Hole	\$2.94 per hole	.05 per hole





## Palmgren's Parallel Arm Tapping Machines Make Tapping Fast & Easy

### Increased Efficiency

With Parallel Arm Tapping, the operator brings the tap to the work utilizing the efficiency of bearings at all swivel points versus positioning a part under a spindle. Bringing the tap to the work is 3 to 4 times more efficient than taking the work to the tap.

### Ergonomically Correct

With the articulated arm design, the operator benefits from improved ergonomics and proper tool handling. The ergonomically-correct design absorbs the tapping torque thus minimizing the exposure to torque reaction — reducing strain on the operator's hand, wrist and arm. They are also effective in making the tapping tool weightless with adjustable gas springs that virtually eliminate the weight of the tool from the operator resulting in reduced fatigue and increased productivity.

### Increased Productivity

The tapping cycle always starts at the correct speed and can go direct to reverse at the desired depth. With rigid tapping, that tapping cycle starts from 0 rpm and the rate of acceleration and deceleration is limited when the tap is reversed. All

the high torque tapping motors come standard with a quick change system that utilizes quick change torque control tap holder adaptors. With this style of adaptor it is a 5 second quick change method that reduces tool change time and increases the productivity in all threading operations.

### Maximum Quality

The balanced Parallel Arm allows the tap holder to float in the machine, allowing the tap to precisely follow the hole without the influence of the spindle. With this "float", typically the Palmgren tapping parallel arm system produces tapped holes with higher quality threads that permit less than a quarter turn on a No-Go Gauge.

### Never Break a Tap Again

The Palmgren Parallel Arm tapping system uses an adjustable clutch style tap holder. The clutch built into the tap holder "clicks" when the tap bottoms, hits interference, or becomes dull. At bottoming or in case of an obstruction, the operator simply reverses the motor and backs the tap out of the hole. In the case of a dull tap, the operator simply changes to a new tap. If this practice is used, broken taps are a thing of the past.

## How to Order Your Tapping System

**Palmgren's Parallel Arm Tapping systems make tapping easy and offer the best solution for all of your tapping needs**

**Follow these easy steps to choose the right Tapping System from Palmgren:**



# 1

### Select the Tapping Arm System that best fits your requirements.

#### **Universal-Tap/Electric**

Variable mounting capabilities with a unique articulating arm design which optimizes work area coverage. Suitable for small, medium and large size taps and all secondary bench operations, with a high torque reversible electric motor and a working reach area of 55".

#### **Quick-Tap**

Variable mounting capabilities, suitable for small and medium size taps with 2 different motor choices and a working area reach of 37".

#### **Shop-Tap**

Variable mounting capabilities, suitable for general purpose tapping with 2 different motor

choices and a working area reach of 62".

#### **Production-Tap**

Variable mounting capabilities, suitable for a wide range of general purpose to heavy duty tapping with 3 different motor choices and a working reach of 55".

# 2

### Select the motor that best fits your overall requirements.

The single speed 400 or 700 rpm motors are an economical choice when tapping small to medium size holes. The 300 rpm motor and electric motor are the proper choice when tapping medium to large size holes or when your applications cover a broad range of tap sizes.

Motor RPM	Number of Speeds	Tap Capacity Mild Steel	Tap Capacity Aluminum
400	1	1/2"	9/16"
700	1	3/8"	7/16"
300	1	5/8"	11/16"
130 & 400	2	5/8"	3/4"

# 3

### Select the tap holders required to meet your needs.

Whether you're tapping small, medium or large size holes it is recommended that you use a clutch style torque drive tap holder. They provide the added sensitivity and help prevent broken taps. **A separate tap holder is required for each size tap you use.** Tap holders come in two sizes (1 & 2). The specification box for each model of tapping machine lists the quick change tooling size. You would then choose the correct size tap holder located on page 11 that properly matches up to the quick change adaptor on the tapping arm system chosen.

# Universal-Tap

Palmgren's Universal-Tap electric tapping machine is suitable for small, medium and large size taps. It utilizes a unique single articulating arm design that permits tapping as close as eight inches to the vertical mounting bracket. This feature provides a large work envelope even in confined work areas. The arm is equipped with lubricated for life bearings at all swivel points, provides weightless operation through the use of gas counter balance springs and permits the operator to bring the tap to the hole with ease.

## Standard Features

- Articulating arm with 8" to 55" reach
- Stationary bench bracket
- Quick change tooling adaptor
- Two-speed gear reducer with vari speed control to adjust torque speed to optimize the treading process
- 115 volt, 1 phase high torque reversible electric motor
- See page 11 for optional tap holders

## Specifications

Model #	Item #	Motor (RPM)	Motor	Max. Tap Capacity/ Mild Steel	Max. Tap Capacity/ Aluminum	Quick Change Tooling Size
UTE400	<b>9680426</b>	130/400	.54 HP/ 115V/1PH	5/8"	3/4"	2

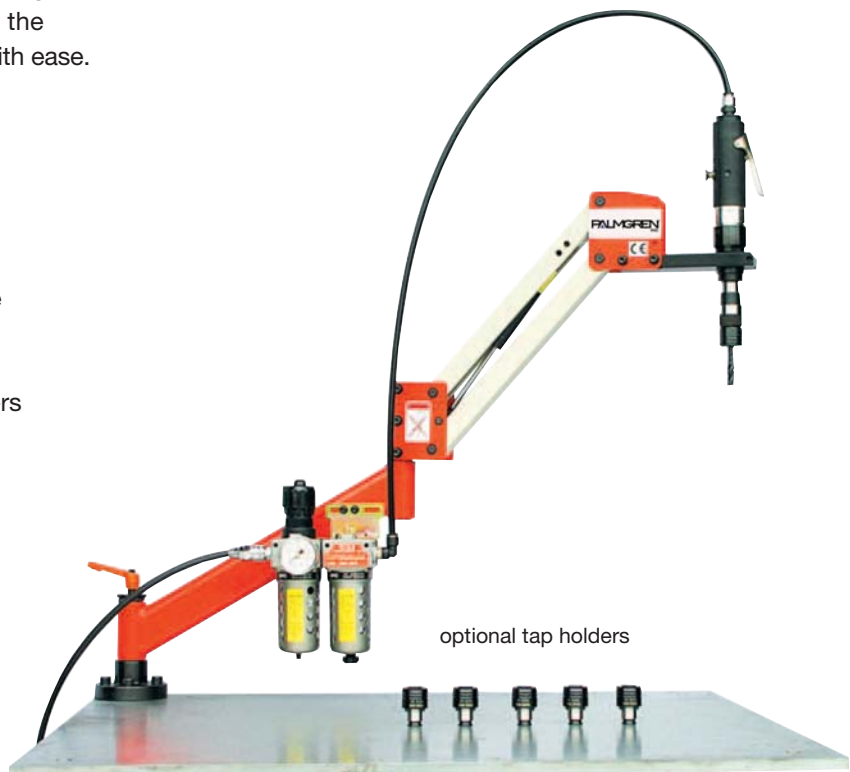


## Quick-Tap

Palmgren's Quick-Tap pneumatic tapping machine is suitable for small and medium size taps. The arm is equipped with lubricated for life bearings at all swivel points, provides weightless operation through the use of gas counter balance springs and permits the operator to bring the tap to the hole with ease.

### Standard Equipment

- Parallel arm with 4" to 37" reach
- Stationary bench bracket
- Quick change tooling adaptor
- Air preparation unit with lubricator, filter, regulator and pressure gauge
- Vertical motor bracket
- High torque reversible air motor
- See page 11 for optional tap holders



### Specifications

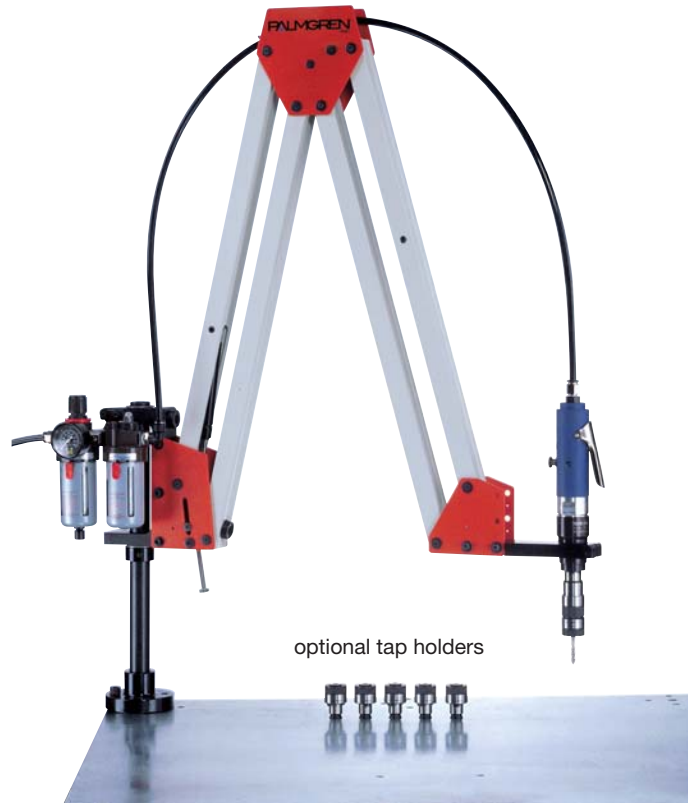
Model #	Item #	Motor (RPM)	Torque @ 90PSI (ft/lbs)	Air Consumption (CFM)	Max. Tap Capacity/ Mild Steel	Max. Tap Capacity/ Aluminum	Quick Change Tooling Size
QT400	9680420	400	27	24	1/2"	9/16"	1
QT700	9680421	700	16	24	3/8"	1/2"	1

# Shop-Tap

Palmgren's Shop-Tap pneumatic tapping machine is a medium duty general purpose machine suitable for tapping small to medium size taps. The arm is equipped with lubricated for life bearings at all swivel points, provides weightless operation through the use of gas counter balance springs and permits the operator to bring the tap to the hole with ease.

## Standard Features

- Parallel arm with 20" to 62" reach
- Stationary bench bracket
- Quick change tooling adaptor
- Air preparation unit with lubricator, filter, regulator and pressure gauge
- Vertical motor bracket
- High torque reversible air motor
- See page 11 for optional tap holders



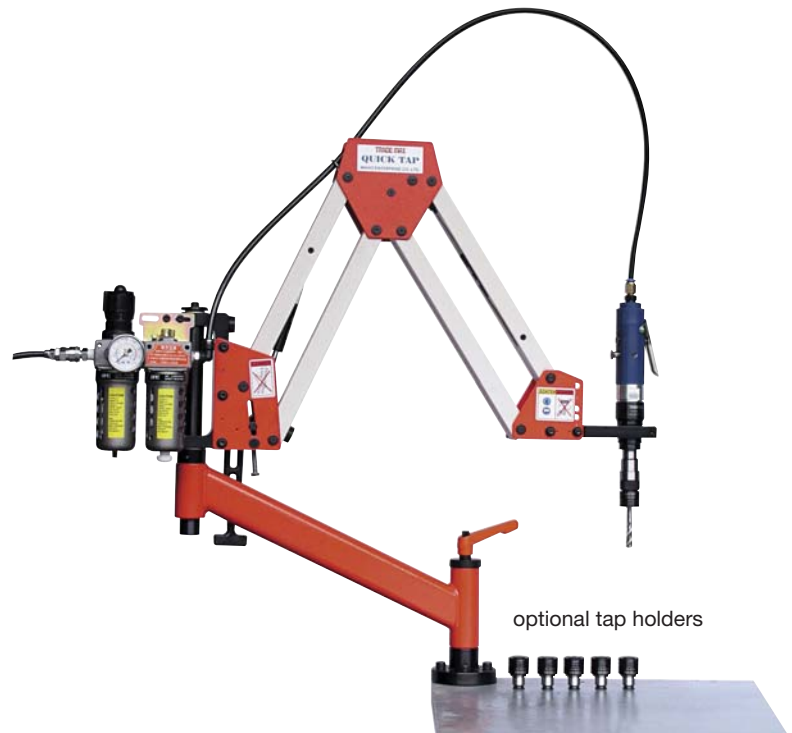
## Specifications

Model #	Item #	Motor (RPM)	Torque @ 90PSI (ft/lbs)	Air Consumption (CFM)	Max. Tap Capacity/ Mild Steel	Max. Tap Capacity/ Aluminum	Quick Change Tooling Size
ST400	<b>9680400</b>	400	27	24	1/2"	9/16"	1
ST700	<b>9680401</b>	700	16	24	3/8"	1/2"	1



## Production-Tap

Palmgren's Production-Tap pneumatic tapping machine is suitable for a wide range of general purpose to heavy duty tapping applications. The arm is equipped with lubricated for life bearings at all swivel points, provides weightless operation over a wide area and permits the operator to bring the tap to the hole on very large and multi-level parts with ease.



### Standard Equipment

- Parallel arm with 8" to 55" reach
- Stationary bench bracket
- Quick change tooling adaptor
- Air preparation unit with lubricator, filter, regulator and pressure gauge
- High torque reversible air motor
- See page 11 for optional tap holders

### Specifications

Model #	Item #	Motor (RPM)	Torque @ 90PSI (ft/lbs)	Air Consumption (CFM)	Max. Tap Capacity/ Mild Steel	Max. Tap Capacity/ Aluminum	Quick Change Tooling Size
PT400	<b>9680410</b>	400	27	24	1/2"	9/16"	1
PT700	<b>9680411</b>	700	16	26	3/8"	1/2"	1
PT300	<b>9680412</b>	300	30	29	5/8"	3/4"	2



# Pneumatic Hand Tapper

Palmgren's pneumatic hand tapper is engineered to make your tapping job easier, safer and more efficient. It is ideal for all general purpose tapping making time consuming hand tapping obsolete. It uses a pneumatic high-reversal-type motor with added torque to easily handle a broad range of tap sizes. The tapping cycle starts at the correct speed and reverses instantly. A quick change tool holder adaptor is standard. The quick change tool holder design provides the ultimate in tap changing flexibility. It allows the tool to accept a broad range of both inch and metric tap holders fast and easily. The clutch built into the tap holder ratchets when the tap bottoms, hits any interference or begins to dull. This makes tapping both blind and through holes simple and aids in the elimination of broken taps. Whether you have only a few holes or many to tap the Palmgren hand tapper can save you up to 90% of time as compared to tapping by hand.



## Standard Features

- 1/8" to 7/16" capacity in mild steel
- Ergonomic comfort grip
- Adjustable side handle
- Trigger reverse
- Quick change tooling adaptor
- Precision machined and hardened gear reduction
- High torque reversible air motor
- See page 11 for Optional Tap Holder Listing

## Specifications

Model #	RPM	CFM	HP	Tapping Cap Mild Steel	Quick Change Tooling Size	Noise dB	Air Inlet (Inch-npt)	Min. Hose Size (inch-i.d.)	Max. Pressure PSI	Weight (Lbs.)
<b>9680451</b>	150	27	.50	1/8-7/16	1	80	1/4	3/8	90	2.6

## Horizontal Vertical Motor Bracket

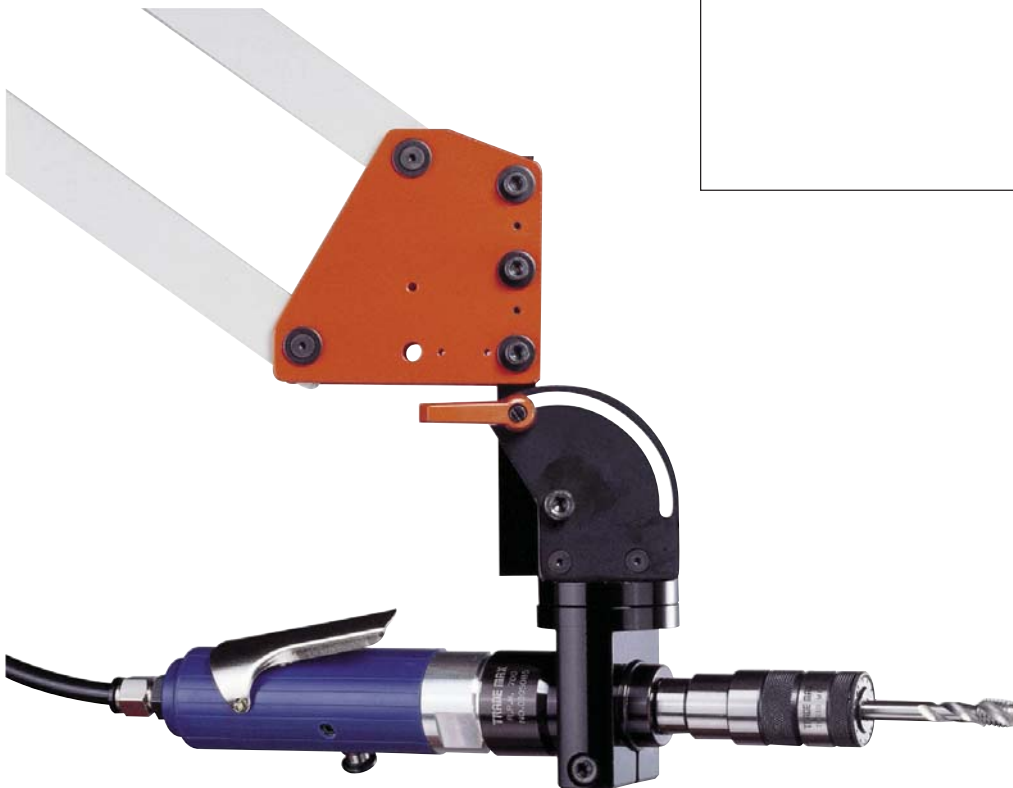
The optional horizontal/vertical motor bracket offers the operator the ability to tap vertically or horizontally or at any position in-between.

### **9680428**

Horizontal/Vertical motor bracket for the 300 rpm pneumatic tapping motor and the Universal-Tap electric motor.

### **9680429**

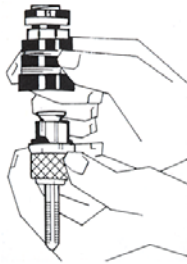
Horizontal/Vertical motor bracket for all 400 and 700 rpm pneumatic tapping motors



# Torque Drive Tap Holders

No matter the size of taps — small, medium or large — the right choice of tap holder is a clutch style torque drive tap holder. These holders make tapping blind holes easy and even tap on parts that can't be easily tapped by other methods. The torque clutch allows the tap to stop turning when it becomes dull or encounters any obstruction that might cause tap breakage, and is adjustable for all types of materials. The quick change tap holder allows you to change from one size tap to another in 3 to 5 seconds. No gears, head height, or stops to change.

Tap adapters change easily by sliding chuck sleeve until adapter is free.



Torque drive tap holder shown with tap.

Adaptor for size 2 to 1- fits size 2 quick change adaptor and accepts all size 1 tap holders – 9680550



Drill chuck with size 1 quick change adaptor – 9680516

## Torque Drive Tap Holders w/Clutch Fits Size 1 Quick Change Adaptor

Model	Description
<b>9680500</b>	0-6 Tap holder w/clutch fits size 1 quick change adaptor
<b>9680501</b>	8 Tap holder w/clutch fits size 1 quick change adaptor
<b>9680502</b>	10 Tap holder w/clutch fits size 1 quick change adaptor
<b>9680503</b>	12 Tap holder w/clutch fits size 1 quick change adaptor
<b>9680504</b>	1/4" Tap holder w/clutch fits size 1 quick change adaptor
<b>9680505</b>	5/16" Tap holder w/clutch fits size 1 quick change adaptor
<b>9680506</b>	3/8" Tap holder w/clutch fits size 1 quick change adaptor
<b>9680507</b>	7/16" Tap holder w/clutch fits size 1 quick change adaptor
<b>9680508</b>	1/2" Tap holder w/clutch fits size 1 quick change adaptor
<b>9680509</b>	9/16" Tap holder w/clutch fits size 1 quick change adaptor
<b>9680510</b>	1/8" NPT Pipe tap holder w/clutch fits size 1 quick change adaptor
<b>9680511</b>	9/16" NPT Pipe tap holder w/clutch fits size 1 quick change adaptor
<b>9680520</b>	Size M3 Tap holder w/clutch fits size 1 quick change adaptor
<b>9680521</b>	Size M4 Tap holder w/clutch fits size 1 quick change adaptor
<b>9680522</b>	Size M5 Tap holder w/clutch fits size 1 quick change adaptor
<b>9680523</b>	Size M6 Tap holder w/clutch fits size 1 quick change adaptor
<b>9680524</b>	Size M8 Tap holder w/clutch fits size 1 quick change adaptor
<b>9680525</b>	Size M10 Tap holder w/clutch fits size 1 quick change adaptor
<b>9680526</b>	Size M12 Tap holder w/clutch fits size 1 quick change adaptor
<b>9680527</b>	Size M14 Tap holder w/clutch fits size 1 quick change adaptor

## Drill Chuck w/Size 1 Quick Change Adaptor

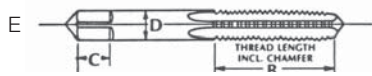
Model	Description
<b>9680515</b>	3/8" Drill chuck on size 1 quick change adaptor

## Torque Drive Tap Holders w/clutch Fits Size 2 Quick Change Adaptor

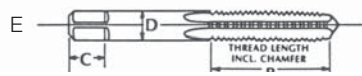
Model	Description
<b>9680530</b>	5/16" Tap holder w/clutch fits size 2 quick change adaptor
<b>9680531</b>	3/8" Tap holder w/clutch fits size 2 quick change adaptor
<b>9680532</b>	7/16" Tap holder w/clutch fits size 2 quick change adaptor
<b>9680533</b>	1/2" Tap holder w/clutch fits size 2 quick change adaptor
<b>9680534</b>	9/16" Tap holder w/clutch fits size 2 quick change adaptor
<b>9680535</b>	5/8" Tap holder w/clutch fits size 2 quick change adaptor
<b>9680536</b>	11/16" Tap holder w/clutch fits size 2 quick change adaptor
<b>9680537</b>	3/4" Tap holder w/clutch fits size 2 quick change adaptor
<b>9680538</b>	13/16" Tap holder w/clutch fits size 2 quick change adaptor
<b>9680539</b>	7/8" Tap holder w/clutch fits size 2 quick change adaptor
<b>9680540</b>	1" Tap holder w/clutch fits size 2 quick change adaptor
<b>9680541</b>	1/4" NPT Pipe tap holder w/clutch fits size 2 quick change adaptor
<b>9680542</b>	3/8" NPT Pipe tap holder w/clutch fits size 2 quick change adaptor
<b>9680550</b>	Adaptor for size 2 to 1- fits size 2 quick change adaptor and accepts all size 1 tap holders

## Standard Tap Dimensions, Ground Thread

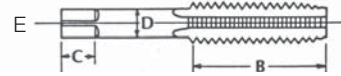
General Dimensions



Style 1



Style 2



Style 3

Nominal Diameter Range - Inches		Machine Screw Size No.	Nominal Fractional Diameter Inches	Nominal Metric Diameter Millimeters	STYLE*	Overall Length A	Tap Dimensions - Inches			
							Thread Length B	Square Length C	Shank Diameter D	Size of Square E
.052	.065	0	1/16	M1.6	1	1-5/8	5/1	3/16	.141	.110
.065	.078	1		M1.8	1	1-11/16	3/8	3/16	.141	.110
.078	.091	2		M2, M2.2	1	1-3/4	7/16	3/16	.141	.110
.091	.104	3	3/32	M2.5	1	1-13/16	1/2	3/16	.141	.110
.104	.117	4			1	1-7/8	9/16	3/16	.141	.110
.117	.130	5	1/8	M3, M3.15	1	1-15/16	5/8	3/16	.141	.110
.130	.145	6		M3.5	1	2	11/16	3/16	.141	.110
.145	.171	8	5/32	M4	1	2-1/8	3/4	1/4	.168	.131
.171	.197	10	3/16	M4.5, M5	1	2-3/8	7/8	1/4	.194	.152
.197	.223	12	7/32		1	2-3/8	15/16	9/32	.220	.165
.223	.260	14	1/4	M6, M6.3	2	2-1/2	1	5/16	.255	.191
.260	.323		5/16	M7, M8	2	2-23/32	1-1/8	3/8	.318	.238
.323	.395		3/8	M110	2	2-15/16	1-1/4	7/16	.381	.286
.395	.448		7/16		3	3-5/32	1-7/16	13/32	.323	.242
.448	.510		1/2	M12, M12.5	3	3-3/8	1-21/32	7/16	.367	.275
.510	.573		9/16	M14	3	3-19/32	1-21/32	1/2	.429	.322
.573	.635		5/8	M16	3	3-13/16	1-13/16	9/16	.480	.360
.635	.709		11/16	M18	3	4-1/32	1-13/16	5/8	.542	.406
.709	.760		3/4		3	4-1/4	2	11/16	.590	.442
.760	.823		13/16	M20	3	4-15/32	2	11/16	.652	.489
.823	.885		7/8	M22	3	4-11/16	2-7/32	33/4	.697	.523
.885	.948		15/16	M24	3	4-29/32	2-7/32	3/4	.760	.570
.948	1.010		1	M25	3	5-1/8	2-1/2	13/16	.800	.600
1.010	1.073		1-1/16	M27	3	5-1/8	2-1/2	7/8	.896	.672
1.073	1.135		1-1/8		3	5-7/16	2-9/16	7/8	.896	.672
1.135	1.198		1-3/16	M30	3	5-7/16	2-9/16	1	1.021	.766
1.198	1.260		1-1/4		3	5-3/4	2-9/16	1	1.021	.766
1.260	1.323		1-5/16	M33	3	5-3/4	2-9/16	1-1/16	1.108	.831
1.323	1.385		1-3/8		3	6-1/16	3	1-1/16	1.108	.831
1.385	1.448		1-7/16	M36	3	6-1/16	3	1-1/8	1.233	.925
1.448	1.510		1-1/2		3	6-3/8	3	1-1/8	1.233	.925
1.510	1.635		1-5/8	M39	3	6-11/16	3-3/16	1-1/8	1.305	.979
1.635	1.760		1-3/4	M42	3	7	3-3/16	1-1/4	1.430	1.072
1.760	1.885		1-7/8		3	7-5/16	3-9/16	1-1/4	1.519	1.139
1.885	2.010		2	M48	3	7-5/8	3-9/16	1-3/8	1.644	1.233
2.010	2.135		2-1/8		3	8	3-9/16	1-3/8	1.769	1.327
2.135	2.260		2-1/4	M56	3	8-1/4	3-9/16	1-7/16	1.894	1.420
2.260	2.385		2-3/8		3	8-1/2	4	1-7/16	2.019	1.514
2.385	2.510		2-1/2		3	8-3/4	4	1-1/2	2.100	1.575
2.510	2.635		2-5/8	M64	3	8-3/4	4	1-1/2	2.225	1.669
2.635	2.760		2-3/4		3	9-1/4	4	1-9/16	2.350	1.762
2.760	2.885		2-7/8	M72	3	9-1/4	4	1-9/16	2.475	1.856
2.885	3.010		3		3	9-3/4	4-9/16	1-5/8	2.543	1.907
3.010	3.135		3-1/8		3	9-3/4	4-9/16	1-5/8	2.668	2.001
3.135	3.260		3-1/4	M80	3	10	4-9/16	1-3/4	2.793	2.095

\*Styles shown are for ground thread taps.

Metal Cutting Tool Institute Standards



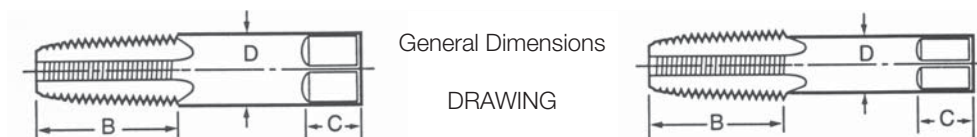
# Tap Drill Sizes

TAP		Tap Drill	Decimal Equiv.	Theor. % of Thread
Nom. Size	T.P.I			
0	80	#56 3/64	0.0465 .0469	83 81
1	64	#54 #53	.0550 .0595	89 67
1	72	#53 1/16	.0595 .0625	75 58
2	56	#51 #50 #49	.0670 .0700 .0730	82 69 56
2	64	#50 #49	.0700 .0730	79 64
3	48	#48 5/64 #47 #46 #45	.0760 .0781 .0785 .0810 .0820	85 77 76 67 63
3	56	#46 #45 #44	.0810 .0820 .0860	78 73 56
4	40	#44 #43 #42 3/32	.0860 .0890 .0935 .0938	80 71 57 56
4	48	#43 #42 3/32 #41	.0890 .0935 .0938 .0960	85 68 67 59
5	40	#40 #39 #38 #37	.0980 .0995 .1015 .1040	83 79 72 65
5	44	#38 #37 #36	.1015 .1040 .1065	80 71 63
6	32	#37 #36 7/64 #35 #34 #33	.1040 .1065 .1094 .1100 .1110 .1130	84 78 70 69 67 62
6	40	#34 #33 #32	.1110 .1130 .1160	83 77 68
8	32	#29	.1360	69
8	36	#29 #28 9/64	.1360 .1405 .1406	78 65 65
10	24	#27 #26 #25 #24 #23	.1440 .1470 .1495 .1520 .1540	85 79 75 70 66
10	32	5/32 #22 #21 #20	.1562 .1570 .1590 .1610	83 81 76 71
12	24	11/64 #17 #16 #15	.1719 .1730 .1770 .1800	82 79 72 67
12	28	#16 #15 #14 #13	.1770 .1800 .1820 .1850	84 78 73 67
12	32	#14 #13 3/16 #12	.1820 .1850 .1875 .1890	84 76 70 67

TAP		Tap Drill	Decimal Equiv.	Theor. % of Thread
Nom. Size	T.P.I			
1/4	20	#9 #8 #7	.1960 .1990 .2010	83 79 75
1/4	20	13/64 #6 #5	.2031 .2040 .2055	72 71 69
1/4	28	#3 7/32	.2130 .2188	80 67
1/4	32	7/32 #22	.2188 .2210	77 71
1/4	36	#2	.2210	80
5/16	18	F G	.2570 .2610	77 71
5/16	20	F G H	.2570 .2610 .2660	85 79 72
5/16	24	H I J	.2660 .2720 .2770	86 75 66
5/16	28	J K 9/32	.2770 .2810 .2812	77 68 67
5/16	32	K 9/32	.2810 .2812	78 77
5/16	36	7.2mm	.2854	75
3/8	16	5/16 O	.3125 .3160	77 73
3/8	20	P Q	.3230 .3320	80 66
3/8	24	Q R	.3320 .3390	79 67
3/8	28	R 11/32	.3390 .3438	78 67
3/8	32	11/32 S	.3438 .3480	77 67
3/8	36	S	.3480	75
7/16	14	T 23/64	.3580 .3594	86 84
7/16	16	3/8 V	.3750 .3770	77 75
7/16	20	W 25/64	.3860 .3906	79 72
7/16	28	Y	.4040	72
7/16	32	Y 13/32	.4040 .4062	83 77
1/2	12	Z 27/64	.4130 .4219	80 72
1/2	13	27/64	.4219	78
1/2	16	7/16	.4375	77
1/2	20	29/64	.4531	72
1/2	28	15/32	.4688	67
1/2	32	15/32	.4688	77
9/16	12	15/32 31/64	.4688 .4844	87 72
9/16	16	1/2 0.5062	.5000 .5062	77 69
9/16	18	1/2 0.5062	.5000 .5062	87 78
9/16	20	33/64	.5156	72
9/16	24	33/64 0.5203	.5156 .5203	87 78
9/16	28	17/32 0.5263	.5312 .5263	67 78
9/16	32	17/32	.5312	77
5/8	11	17/32	.5312	79
5/8	12	35/64	.5469	72
5/8	16	9/16 0.5687	.5625 .5687	77 69

TAP		Tap Drill	Decimal Equiv.	Theor. % of Thread
Nom. Size	T.P.I			
5/8	18	9/16 0.5687	.5625 .5687	87 78
5/8	20	37/64	.5781	72
5/8	24	37/64 0.5828	.5781 .5828	87 78
5/8	28	19/32	.5938	67
5/8	32	19/32	.5938	77
11/16	12	19/32 39/64	.5938 .6094	87 72
11/16	16	5/8	.6250	77
11/16	20	41/64	.6406	72
11/16	24	41/64	.6406	87
11/16	28	21/32	.6562	67
11/16	32	21/32	.6562	77
3/4	10	41/64 21/32	.6406 .6562	84 72
3/4	12	21/32 43/64	.6562 .6719	87 72
3/4	16	11/16	.6875	77
3/4	20	45/64	.7031	72
3/4	28	23/32	.7188	67
3/4	32	23/32	.7188	77
13/16	12	47/64	.7344	72
13/16	16	3/4	.7500	77
13/16	20	49/644	.7656	72
13/16	28	25/32	.7812	67
13/16	32	25/32	.7812	77
7/8	9	49/64	.7656	76
7/8	12	25/32 54/64	.7812 .7969	87 72
7/8	14	54/64 0.8024 13/16	.7969 .8024 .8125	84 78 67
7/8	16	13/16	.8125	77
7/8	20	53/64	.8281	72
7/8	28	27/32	.8438	67
7/8	32	27/32	.8438	77
15/16	12	27/32 55/64	.8438 .8594	87 72
15/16	16	7/8	.8750	77
15/16	20	57/64	.8906	72
15/16	28	29/32	.9062	67
15/16	32	29/32	.9062	77
1	8	55/64 7/8	.8594 .8750	87 77
1	12	29/32 59/64	.9062 .9219	87 72
1	14	59/64 0.9274	.9219 .9274	84 78
1	16	15/16	.9375	77
1	20	61/64	.9531	72
1	28	31/32	.9688	67
1	32	31/32	.9688	77
1-1/16	8	59/64 0.9274 15/16	.9219 .9274 .9375	87 83 77
1-1/16	12	31/32 63/64	.9688 .9844	87 72
1-1/16	16	1	1.0000	77
1-1/16	18	1	1.0000	87
1-1/16	20	1-1/64	1.0156	72

## Standard Pipe Tap Dimensions, Straight and Taper, Ground Thread



Nominal Size Inches	Dimensions - Inches				
	Length Overall A	Length of Thread B	Length of Square C	Diameter of Shank D	Size of Square E
1/16	2-1/8	11/16	3/8	.3125	.234
1/8 Small Shank	2-1/8	3/4	3/8	.3125	.234
1/8 Large Shank	2-1/8	3/4	3/8	.4375	.328
1/4	2-7/16	1-1/16	7/16	.5625	.421
3/8	2-9/16	1-1/16	1/2	.7000	.531
1/2	3-1/8	1-3/8	5/8	.6875	.515
3/4	3-1/4	1-3/8	11/16	.9063	.679
1	3-3/4	1-3/4	13/16	1.1250	.843
1-1/4	4	1-3/4	15/16	1.3125	.984
1-1/2	4-1/4	1-3/4	1	1.5000	1.125
2	4-1/2	1-3/4	1-1/8	1.8750	1.406
2-1/2	5-1/2	2-9/16	1-1/4	2.2500	1.687
3	6	2-5/8	1-3/8	2.6250	1.968
3-1/2	6-1/2	2-11/16	1-1/2	2.8125	2.108
4	6-3/4	2-3/4	1-5/8	3.0000	2.250

## Taper Pipe Taps Thread Limits

Nominal Size Inches	Threads Per Inch NPT	Standard Projection NPT & NPTF			P.T.F. S.A.E. Short Projection		
		Projection Through L <sub>1</sub> Ring Gage	Thickness of L <sub>1</sub> Ring Gage	Run of Thread	Projection Through L <sub>1</sub> Ring Gage	Thickness of L <sub>1</sub> Ring Gage	Run of Thread
1/16	27	.312	.160	.472	.2405+/- .019	.160	.4005
1/8	27	.312	.1615	.4735	.2405+/- .019	.1615	.4020
1/4	18	.459	.2278	.6868	.3610+/- .028	.2278	.5888
3/8	18	.454	.240	.694	.3610+/- .028	.240	.6010
1/2	14	.579	.320	.899	.4645+/- .036	.320	.7845
3/4	14	.565	.339	.904	.4645+/- .036	.339	.8035
1	11-1/2	.678	.400	1.078	.5652+/- .044	.400	.9652
1-1/4	11-1/2	.686	.420	1.106	.5652+/- .044	.420	.9852
1-1/2	11-1/2	.699	.420	1.119	.5652+/- .044	.420	.9852
2	11-1/2	.667	.436	1.103	.5652+/- .044	.436	1.0012
2-1/2	8	.925	.682	1.607	.8125+/- .062	.682	1.4945
3	8	.925	.766	1.691	.8125+/- .062	.766	1.5785
3-1/2	8	.938	.821	1.759			
4	8	.950	.844	1.794			

Projection and Thickness L<sub>1</sub> Ring Gauge = Run  
Gage Measurement in Inches

# Metric Tap Drill Sizes and Percentages of Threads

Tap	Tap Drill	Decim. Equiv.	Theor. % of Thread	Tap	Tap Drill	Decim. Equiv.	Theor. % of Thread	Tap	Tap Drill	Decim. Equiv.	Theor. % of Thread
M1.6x.35	1.25mm	.0492	77		I	.2720	67	M22x1.5	20.5mm	.8071	77
	1.3mm	.0512	66	M8x1	7mm	.2756	77		13/16	.8125	70
	#55	.0520	61		J	.2770	74	M24x3	21mm	.8268	77
M1.8x.35	1.45mm	.0571	77	M10x1.5	8.5mm	.3346	77		27/32	.8438	66
	1.5mm	.0591	66		R	.3390	71	M24x2	22mm	.8661	77
	#53	.0595	64	M10x1.25	8.75mm	.3445	77		7/8	.8750	68
M2x.4	1.6mm	.0630	77		S	.3480	71	M27x3	24mm	.9449	77
	#52	.0635	74	M12x1.75	13/32	.4062	74		61/64	.9531	72
M2.2x.45	1.75mm	.0689	77		Z	.4130	66	M27x2	25mm	.9843	77
	#50	.0700	72	M12x1.25	27/64	.4219	79		63/64	.9844	77
M2.5x.45	2.05mm	.0807	77		11mm	.4331	62	M30x3.5	26.5mm	1.0433	77
	#45	.0820	71	M14x2	12mm	.4724	77		1-1/16	1.0625	66
M3x.5	2.5mm	.0984	77		31/64	.4844	65	M30x2	28mm	1.1024	77
	#39	.0995	73	M14x1.5	12.5mm	.4921	77		1-7/64	1.1094	70
M3.5x.6	2.9mm	.1142	77		1/2	.5000	67	M33x3.5	29.5mm	1.1614	77
	#32	.1160	71	M16x2	14mm	.5512	77		1-11/64	1.1719	71
M4x.7	3.3mm	.1299	77		9/16	.5625	66	M33x2	31mm	1.2205	77
	3.4mm	.1339	66	M16x1.5	14.4mm	.5709	77		1-15/64	1.2344	63
	#29	.1360	60		37/64	.5781	68	M36x4	32mm	1.2598	77
M4.5x.75	3.75mm	.1476	77	M18x2.5	15.5mm	.6102	77		1-17/64	1.2656	74
	#25	.1495	72		5/8	.6250	65	M36x3	1-19/64	1.2969	78
M5x.8	4.2mm	.1654	77	M18x1.5	16.5mm	.6496	77		33mm	1.2992	77
	#18	.1695	67		21/32	.6562	68		1-5/16	1.3125	68
M6x1	5mm	.1969	77	M20x2.5	17.5mm	.6890	77	M39x4	1-3/8	1.3750	78
	#8	.1990	73		45/64	.7031	66		35mm	1.3780	77
M7x1	6mm	.2362	77	M20x1.5	18.5mm	.7283	77		1-25/64	1.3906	71
	B	.2380	74		47/64	.7344	69	M39x3	36mm	1.4173	77
M8x1.25	6.75mm	.2657	77	M22x2.5	19.5mm	.7677	77		1-27/64	1.4219	74
	6.8mm	.2677	74		25/32	.7812	66				

## Pipe Tap Drill Sizes

Tap Size	*NPT		*NPTF		STRAIGHT	
	Tap Drill	Decim. Equiv.	Tap Drill	Decim. Equiv.	Tap Drill	Decim. Equiv.
1/16	D	.2460	D	.2460	1/4	.2500
1/8	Q	.3320	R	.3390	11/32	.3438
1/4	7/16	.4375	7/16	.4375	7/16	.4375
3/8	9/16	.5625	37/64	.5781	37/64	.5781
1/2	45/64	.7031	45/64	.7031	23/32	.7188
3/4	29/32	.9062	59/64	.9219	59/64	.9219
1	1-9/64	1.1406	1-5/32	1.1562	1-5/32	1.1562
1-1/4	1-31/64	1.4844	1-1/2	1.5000	1-1/2	1.5000
1-1/2	1-47/64	1.7344	1-47/64	1.7344	1-3/4	1.7500
2	2-13/64	2.2031	2-7/32	2.2188	2-7/32	2.2188
2-1/2	2-5/8	2.6250	2-41/64	2.6406	2-21/32	2.6562
33			3-17/64	3.2656		

\*For tapping without reaming.



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