

SOWA

HIGH PERFORMANCE TAPS

**YOUR TAP SELECTION HAS JUST BECOME
EASIER WITH THE SOWA COLOR BAND SYSTEM**

Made In Japan

*high performance
superior quality
easy tap selection*



SOWA

HIGH PERFORMANCE TAPS



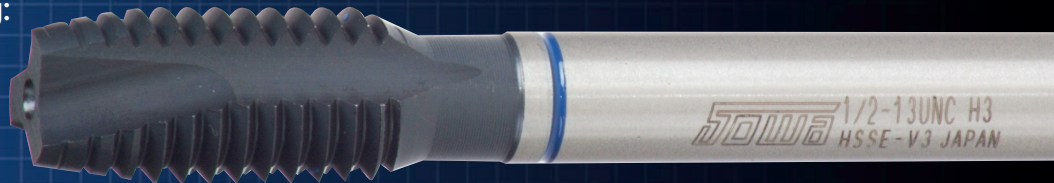
SOWA HIGH PERFORMANCE TAP SELECTION	2-3
BLUE RING TAPS, HSSE-V3 up to 25 HRc	
Spiral Point Taps	4
Spiral Flute Taps	5
Blue-Gold HSSE-V3 Spiral Point & Spiral Flute Taps	6
+ .005" Spiral Point Taps	7
YELLOW RING TAPS, HSSE-V3 up to 35 HRc	
Spiral Point Taps	8
Spiral Flute Taps	9
UN8 DIN Length ANSI Shank Taps	10
DIN Length ANSI Shank Spiral Point & Spiral Flute Taps	10
4" & 6" O.A.L. Spiral Point & Spiral Flute Taps	10-11
NPT Spiral Flute Pipe Taps	11
ORANGE RING Taps, HSSE-V3 up to 35 HRc for Stainless Steel	
Spiral Point Taps	12
Spiral Flute Taps	13
RED RING TAPS, Powdered Metal up to 48 HRc	
Spiral Point Taps	14
Spiral Flute Taps	15
Spiral Flute Taps For Aluminum	16
S.T.I. 45° Spiral Flute Taps	16
Roll Form Taps	16
Hand Taps	17
NPT Taps, Regular Pipe, 6" O.A.L. & Interrupted Thread	18
Tap & Drill Sets	18
Tapping Speed Guide, Conversion Table, ANSI Tap Dimensions, Tap/Drill Charts	19-24

We have taken the guess work out of your tap selection!

HSSE-V3 ANSI SHANK Blue Ring Pg. 4

For general ductile materials including:

- :: LOW AND MEDIUM CARBON STEEL
- :: BRASS
- :: COPPER AND CAST IRON
- :: ALUMINUM



HSSE-V3 ANSI SHANK Yellow Ring Pg. 8

For tough materials including:

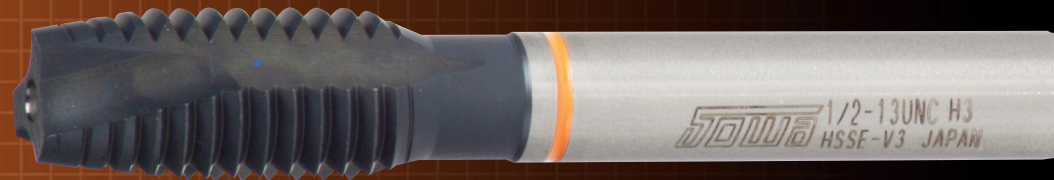
- :: HIGH CARBON STEEL
- :: HIGH ALLOY
- :: TITANIUM
- :: ALUMINUM



HSSE-V3 ANSI SHANK Orange Ring Pg. 12

For STAINLESS STEEL
as well as:

- :: LOW CARBON STEELS
- :: MEDIUM CARBON STEELS
- :: ALLOYED HIGH CARBON



P-HSS ANSI SHANK Red Ring Pg. 14

For high tensile materials including:

- :: TOOL STEELS
- :: TITANIUM
- :: NICKEL ALLOYS
- :: STAINLESS STEEL





High Performance Taps

Made In Japan

Recommended Cutting Conditions

Blue Ring HSSE-V3 Soft Steels up to 25HRC

Materials Main Group	Materials Sub-Group	Condition	Hardness (HRC)	Cutting Speed (FPM)
Low Carbon	1018, 1010, 1035	Normalized	<25	20-50
Medium Carbon	1045, 1050, 1065	Normalized	<25	20-40
Aluminum	Unalloyed, Cast	—	—	30-80
Brass/Bronze	—	—	—	30-80
Copper	—	—	—	25-60
Cast Iron	—	As Cast	<15	20-40

Yellow Ring HSSE-V3 Steels and other materials up to 35HRC

Materials Main Group	Materials Sub-Group	Condition	Hardness(HRC)	Cutting Speed (FPM)
Tool Steels	01, A-2, D-2, H-13, P-20	Annealed	<35	15-25
Medium Carbon	1030, 1035, 1038, 1040, 1045, 1050	Normalized	<28	20-40
Alloyed High Carbon	1065, 1070, 1080, 1090, 1095, 1561, 1572	Normalized	<32	20-30
High Strength	4140, 4340	Normalized	<32	20-30
Titanium	Commercially Pure	Annealed	<32	15-30
Stainless Steel		Annealed	<29	20-30
Aluminum	Cast, Wrought	—	—	30-90

Orange Ring HSSE-V3 for Stainless Steel and other materials

Materials Main Group	Materials Sub-Group	Condition	Hardness (HRC)	Cutting Speed (FPM)
Stainless Steel	200 Series,	Annealed	<28	20-35
	300 Series, 17-4 PH, 15-5, A286	Annealed	<28	20-35
	400 Series	Annealed	<29	20-35
	400 Series	Hardened	35-42	15-20
	17-4PH, 15-5, A286	Hardened	35-42	15-20
Low Carbon Steels	1010, 1018	Normalized	<20	25-50
Alloyed High Carbon	1050, 1065, 1070, 1080, 1090, 1095, 1561, 1572	Normalized	<25	20-30
Beryllium Copper			<25	20-30

Red Ring P-HSS for materials up to 48HRC

Materials Main Group	Materials Sub-Group	Condition	Hardness (HRC)	Cutting Speed (FPM)
Stainless Steel	17-4PH, 15-5, 17-7PH, AM350	Hardened	<48	12-20
Tool Steels	01, A-2, D-2, H-13, P-20,	Hardened	<48	10-20
High Strength	4140, 4340, 50100	Hardened	<48	15-20
Nickel Alloys	Inconel, Hastaloy, Waspaloy,	Annealed	<42	5-20
	Astraloy, Rene, Monel	and Hardened		
Titanium	6 AL 4	Annealed/hardened	<42	8-15

Blue Ring HSSE-V3 Spiral Point Taps - Inch

Designed for high-speed tapping applications. Developed to withstand the high stress and high heat associated with high-speed CNC production or conventional tapping. Features a unique free-cutting design with a special tempering and geometry which contributes to extra tool life.



- Used in general machine tapping applications for mild carbon steels such as 1018, 1010, 1035, 1045, 1050 and 1065
- Up to 25 HRC

• 4.5 Pitch lead (Intermediate)

Tap	Threads Per Inch	No. of Flutes	Thread Limits	Overall Length (in.)	Thread Length	Code No.
4	40	2	H2	1-7/8	.433	119-700
6	32	3	H3	2	.512	119-701
6	40	3	H2	2	.512	119-722
8	32	3	H3	2-1/8	.512	119-702
10	24	2	H3	2-3/8	.512	119-703
10	24	3	H3	2-3/8	.512	119-704
10	32	2	H3	2-3/8	.512	119-723
10	32	3	H3	2-3/8	.512	119-724
12	24	3	H3	2-3/8	.512	119-705
1/4	20	2	H3	2-1/2	.630	119-706
1/4	20	3	H3	2-1/2	.630	119-707
1/4	28	2	H3	2-1/2	.630	119-725
1/4	28	3	H3	2-1/2	.630	119-726
5/16	18	2	H3	2-23/32	.748	119-708
5/16	18	3	H3	2-23/32	.748	119-709
5/16	24	2	H3	2-23/32	.748	119-727
5/16	24	3	H3	2-23/32	.748	119-728
3/8	16	2	H3	2-15/16	.748	119-710
3/8	16	3	H3	2-15/16	.748	119-711
3/8	24	2	H3	2-15/16	.748	119-729
3/8	24	3	H3	2-15/16	.748	119-730
7/16	14	3	H3	3-5/32	.866	119-712
7/16	20	3	H3	3-5/32	.866	119-731
1/2	13	3	H3	3-3/8	.945	119-713
1/2	20	3	H3	3-3/8	.945	119-732
5/8	11	3	H3	3-13/16	1.102	119-714
5/8	18	3	H3	3-13/16	1.102	119-733
3/4	10	3	H3	4-1/4	1.220	119-715
3/4	16	3	H3	4-1/4	1.220	119-734
7/8	9	3	H4	4-11/16	1.339	119-716
7/8	14	3	H4	4-11/16	1.339	119-735
1	8	3	H4	5-1/8	1.496	119-717
1	12	3	H4	5-1/8	1.496	119-736
1-1/8	7	4	H4	5-7/16	1.732	119-718
1-1/8	12	4	H4	5-7/16	1.732	119-737
1-1/4	7	4	H4	5-3/4	1.732	119-719
1-1/4	12	4	H4	5-3/4	1.732	119-738
1-3/8	6	4	H4	6-1/16	2.000	119-720
1-3/8	12	4	H4	6-1/16	2.000	119-739
1-1/2	6	4	H4	6-3/8	2.000	119-721
1-1/2	12	4	H4	6-3/8	2.000	119-740

Cutting Conditions

Materials				Cutting Speed (FPM)
Main Group	Sub-Group	Condition	Hardness (HRC)	
Low Carbon	1018, 1010, 1035	Normalized	<25	20-50
Medium Carbon	1045, 1050, 1065	Normalized	<25	20-40
Aluminum	Unalloyed, Cast	—	—	30-80
Brass/Bronze	—	—	—	30-80
Copper	—	—	—	25-60
Cast Iron	—	As Cast	<15	20-40

Blue Ring HSSE-V3 Spiral Point Taps - Metric

Designed for high-speed tapping applications. Developed to withstand the high stress and high heat associated with high-speed CNC production or conventional tapping. Features a unique free-cutting design with a special tempering and geometry which contributes to extra tool life.



- Used in general machine tapping applications for mild carbon steels such as 1018, 1010, 1035, 1045, 1050 and 1065
- Up to 25 HRC

• 4.5 Pitch lead (Intermediate)

Tap	No. of Flutes	Thread Limits	Overall Length (in.)	Thread Length	Code No.
M2 x .4	2	D3	1-3/4	.433	119-750
M2.5 x .45	2	D3	1-13/16	.512	119-751
M3 x .5	3	D3	1-15/16	.433	119-752
M3.5 x .6	3	D4	2	.512	119-753
M4 x .7	3	D4	2-1/8	.512	119-754
M4.5 x .75	3	D4	2-3/8	.512	119-755
M5 x .8	3	D4	2-3/8	.512	119-756
M6 x 1	3	D5	2-1/2	.630	119-757
M7 x 1	3	D5	2-23/32	.630	119-758
M8 x 1	3	D5	2-23/32	.748	119-759
M8 x 1.25	3	D5	2-23/32	.748	119-760
M10 x 1.25	3	D5	2-15/16	.748	119-761
M10 x 1.5	3	D6	2-15/16	.748	119-762
M12 x 1.25	3	D5	3-3/8	.945	119-763
M12 x 1.75	3	D6	3-3/8	.945	119-764
M14 x 1.5	3	D6	3-19/32	.984	119-765
M14 x 2	3	D7	3-19/32	.984	119-766
M16 x 1.5	3	D6	3-13/16	1.102	119-767
M16 x 2	3	D7	3-13/16	1.102	119-768
M18 x 1.5	3	D6	4-1/32	1.102	119-769
M18 x 2.5	3	D7	4-1/32	1.102	119-770
M20 x 1.5	3	D5	4-15/32	1.220	119-771
M20 x 2.5	3	D6	4-15/32	1.220	119-772
M22 x 1.5	3	D6	4-11/16	1.339	119-773
M22 x 2.5	3	D6	4-11/16	1.339	119-774
M24 x 1.5	3	D5	4-29/32	1.339	119-775
M24 x 3	3	D7	4-29/32	1.339	119-776
M27 x 1.5	4	D7	5-1/8	1.181	119-777
M27 x 3	4	D7	5-1/8	1.181	119-778
M30 x 1.5	4	D7	5-7/16	1.378	119-779
M30 x 3.5	4	D7	5-7/16	1.378	119-780

Cutting Speed (fpm)

	10	20	30	40	50	60	70	80	90	100
Low Carbon										
Medium Carbon										
Aluminum										
Brass/Bronze										
Copper										
Cast Iron										

Hardness (hrc)

	0	5	10	15	20	25	30	35	40
Low Carbon						up to 25			
Medium Carbon						up to 25			
Aluminum									
Brass/Bronze									
Copper									
Cast Iron					up to 15				

Low / Medium Carbon Steels

Alloy / High Carbon Steels

Stainless Steel

High Tensile

Blue Ring HSSE-V3 Spiral Flute Taps - Inch

Designed for high-speed tapping applications. Developed to withstand the high stress and high heat associated with high-speed CNC production or conventional tapping. Features a unique free-cutting design with a special tempering and geometry which contributes to extra tool life.



- Used in general machine tapping applications for mild carbon steels such as 1018, 1010, 1035, 1045, 1050 and 1065
- Up to 25 HRC

• 2.5 Pitch lead (Bottoming)

Tap	Threads Per Inch	No. of Flutes	Thread Limits	Overall Length (in.)	Thread Length	Code No.
4	40	2	H2	1-7/8	.433	119-800
6	32	3	H3	2	.512	119-801
8	32	3	H3	2-1/8	.512	119-802
10	24	3	H3	2-3/8	.512	119-803
10	32	3	H3	2-3/8	.512	119-817
1/4	20	3	H3	2-3/8	.630	119-804
1/4	28	3	H3	2-1/2	.630	119-818
5/16	18	3	H3	2-1/2	.748	119-805
5/16	24	3	H3	2-23/32	.748	119-819
3/8	16	3	H3	2-23/32	.748	119-806
3/8	24	3	H3	2-15/16	.748	119-820
7/16	14	3	H3	2-15/16	.866	119-807
7/16	20	3	H3	2-15/16	.866	119-830
1/2	13	3	H3	3-3/8	.945	119-808
1/2	20	3	H3	3-3/8	.945	119-821
5/8	11	4	H3	3-13/16	1.102	119-809
5/8	18	4	H3	3-13/16	1.102	119-822
3/4	10	4	H3	4-1/4	1.220	119-810
3/4	16	4	H3	4-1/4	1.220	119-823
7/8	9	4	H4	4-11/16	1.339	119-811
7/8	14	4	H4	4-11/16	1.339	119-824
1	8	4	H4	5-1/8	1.496	119-812
1	12	4	H4	5-1/8	1.496	119-825
1-1/8	7	4	H4	5-7/16	1.732	119-813
1-1/8	12	4	H4	5-7/16	1.732	119-826
1-1/4	7	4	H4	5-3/4	1.732	119-814
1-1/4	12	4	H4	5-3/4	1.732	119-827
1-3/8	6	4	H4	6-1/16	2.000	119-815
1-3/8	12	4	H4	6-1/16	2.000	119-828
1-1/2	6	4	H4	6-3/8	2.000	119-816
1-1/2	12	4	H4	6-3/8	2.000	119-829

Blue Ring HSSE-V3 Spiral Flute Taps - Metric

Designed for high-speed tapping applications. Developed to withstand the high stress and high heat associated with high-speed CNC production or conventional tapping. Features a unique free-cutting design with a special tempering and geometry which contributes to extra tool life.



- Used in general machine tapping applications for mild carbon steels such as 1018, 1010, 1035, 1045, 1050 and 1065
- Up to 25 HRC

• 2.5 Pitch lead (Bottoming)

Tap	No. of Flutes	Thread Limits	Overall Length (in.)	Thread Length	Code No.
M3 x .5	3	D3	1-15/16	.433	119-840
M3.5 x .6	3	D4	2	.512	119-841
M4 x .7	3	D4	2-1/8	.512	119-842
M5 x .8	3	D4	2-3/8	.512	119-843
M6 x 1	3	D5	2-1/2	.630	119-844
M7 x 1	3	D5	2-23/32	.630	119-845
M8 x 1	3	D5	2-23/32	.748	119-846
M8 x 1.25	3	D5	2-23/32	.748	119-847
M10 x 1.25	3	D5	2-15/16	.748	119-848
M10 x 1.5	3	D6	2-15/16	.748	119-849
M12 x 1.25	3	D5	3-3/8	.945	119-850
M12 x 1.75	3	D6	3-3/8	.945	119-851
M14 x 1.5	3	D6	3-19/32	.984	119-852
M14 x 2	3	D7	3-19/32	.984	119-853
M16 x 1.5	3	D6	3-13/16	1.102	119-854
M16 x 2	3	D7	3-13/16	1.102	119-855
M18 x 1.5	4	D6	4-1/32	1.102	119-856
M18 x 2.5	4	D7	4-1/32	1.102	119-857
M20 x 1.5	4	D5	4-15/32	1.220	119-858
M20 x 2.5	4	D6	4-15/32	1.220	119-859
M22 x 1.5	4	D6	4-11/16	1.339	119-860
M22 x 2.5	4	D6	4-11/16	1.339	119-861
M24 x 1.5	4	D5	4-29/32	1.339	119-862
M24 x 3	4	D7	4-29/32	1.339	119-863
M27 x 1.5	4	D7	5-1/8	1.181	119-864
M27 x 3	4	D7	5-1/8	1.181	119-865
M30 x 1.5	4	D7	5-7/16	1.378	119-866
M30 x 3.5	4	D7	5-7/16	1.378	119-867

Cutting Conditions

Materials			Hardness (HRC)	Cutting Speed (FPM)
Main Group	Sub-Group	Condition		
Low Carbon	1018, 1010, 1035	Normalized	<25	20-50
Medium Carbon	1045, 1050, 1065	Normalized	<25	20-40
Aluminum	Unalloyed, Cast	—	—	30-80
Brass/Bronze	—	—	—	30-80
Copper	—	—	—	25-60
Cast Iron	—	As Cast	<15	20-40

Cutting Speed (fpm)

	10	20	30	40	50	60	70	80	90	100
Low Carbon										
Medium Carbon										
Aluminum										
Brass/Bronze										
Copper										
Cast Iron										

Hardness (hrc)

	0	5	10	15	20	25	30	35	35	40
Low Carbon						up to 25				
Medium Carbon						up to 25				
Aluminum										
Brass/Bronze										
Copper										
Cast Iron						up to 15				

Low / Medium Carbon Steels

Alloy / High Carbon Steels

Stainless Steel

High Tensile

Blue-Gold HSSE-V3 Spiral Point Taps - Inch

Blue Gold Titanium Nitride

Taps can provide an increase in tool life of 2 to 6 times depending on the application.

- The extremely hard and durable surface and high lubricity delivers long tool life, reduces friction and galling allowing higher speeds for higher productivity and less down time.



• 4.5 Pitch lead (Intermediate)

Tap	No. of Flutes	Thread Limits	Overall Length (in.)	Thread Length	Code No.
4-40	2	H2	1-7/8	.433	119-870
6-32	3	H3	2	.512	119-871
8-32	3	H3	2-1/8	.512	119-872
10-24	3	H3	2-3/8	.512	119-873
10-32	3	H3	2-3/8	.512	119-883
1/4-20	3	H3	2-1/2	.630	119-874
1/4-28	3	H3	2-1/2	.630	119-884
5/16-18	3	H3	2-23/32	.748	119-875
5/16-24	3	H3	2-23/32	.748	119-885
3/8-16	3	H3	2-15/16	.748	119-876
3/8-24	3	H3	2-15/16	.748	119-886
7/16-14	3	H3	3-5/32	.866	119-877
7/16-20	3	H3	3-5/32	.866	119-887
1/2-13	3	H3	3-3/8	.945	119-878
1/2-20	3	H3	3-3/8	.945	119-888
9/16-18	3	H3	3-19/32	1.006	119-889
5/8-11	3	H3	3-13/16	1.102	119-879
5/8-18	3	H3	3-13/16	1.102	119-890
3/4-10	3	H3	4-1/4	1.220	119-880
7/8-9	3	H4	4-11/16	1.339	119-881
1-8	3	H4	5-1/8	1.496	119-882

Blue-Gold HSSE-V3 Spiral Flute Taps - Inch

Blue Gold Titanium Nitride

Taps can provide an increase in tool life of 2 to 6 times depending on the application.

- The extremely hard and durable surface and high lubricity delivers long tool life, reduces friction and galling allowing higher speeds for higher productivity and less down time.



• 2.5 Pitch lead (Bottoming)

Tap	No. of Flutes	Thread Limits	Overall Length (in.)	Thread Length	Code No.
4-40	2	H2	1-7/8	.256	119-900
6-32	3	H3	2	.315	119-901
8-32	3	H3	2-1/8	.315	119-902
10-24	3	H3	2-3/8	.413	119-903
10-32	3	H3	2-3/8	.413	119-913
1/4-20	3	H3	2-1/2	.492	119-904
1/4-28	3	H3	2-1/2	.492	119-914
5/16-18	3	H3	2-23/32	.551	119-905
5/16-24	3	H3	2-23/32	.551	119-915
3/8-16	3	H3	2-15/16	.630	119-906
3/8-24	3	H3	2-15/16	.630	119-916
7/16-14	3	H3	3-5/32	.709	119-907
7/16-20	3	H3	3-5/32	.709	119-917
1/2-13	3	H3	3-3/8	.768	119-908
1/2-20	3	H3	3-3/8	.768	119-918
9/16-18	3	H3	3-19/32	.827	119-919
5/8-11	4	H3	3-13/16	.906	119-909
5/8-18	4	H3	3-13/16	.906	119-920
3/4-10	4	H3	4-1/4	.827	119-910
7/8-9	4	H4	4-11/16	1.102	119-911
1-8	4	H4	5-1/8	1.260	119-912

Cutting Conditions

Materials

Main Group	Sub-Group	Condition	Hardness (HRC)	Cutting Speed (FPM)
Stainless Steel	200 Series,	Annealed	<28	25-40
	300 Series,	Annealed	<28	25-40
	17-4, 15-5	Annealed	<25	20-30
	AM286	Annealed	<25	20-30
	400 Series	Annealed	<29	25-40
Tool Steels	01, A-2, D-2 H-13, P-20	Annealed	<35	20-30
Medium Carbon	1030, 1035 1038, 1040 1045, 1050	Normalized	<28	25-45
Alloyed High Carbon	1065, 1070, 1080, 1090 1095, 1561, 1572	Normalized	<32	25-35
High Strength	4140, 4340	Normalized	<32	25-35
Titanium	Commercially Pure	Annealed	<32	20-35
Aluminum	Cast, Wrought	-	-	40-100

Cutting Speed (fpm)

	10	20	30	40	50	60	70	80	90	100
Stainless Steel										
Tool Steels										
Medium Carbon										
Alloyed High Carbon										
High Strength										
Titanium										
Aluminum										

Hardness (hrc)

	0	5	10	15	20	25	30	35	35	40
Stainless Steel										
Tool Steels										
Medium Carbon										
Alloyed High Carbon										
High Strength										
Titanium										
Aluminum										

Low / Medium
Carbon Steels

Alloy / High
Carbon Steels

Stainless Steel

High Tensile

HSSE-V3 + .005" Spiral Point Taps - Inch

- Steam oxide
- ANSI



Features a unique free-cutting design with a special tempering and geometry which contributes to extra tool life.



• 4.5 Pitch lead (Intermediate)

Tap	Threads per Inch	No. of Flutes	Overall Length (in.)	Thread Length	Code No.
6	32	3	2	.512	119-925
8	32	3	2-1/8	.512	119-926
10	32	3	2-3/8	.512	119-939
1/4	20	3	2-1/2	.630	119-927
1/4	28	3	2-1/2	.630	119-934
5/16	18	3	2-23/32	.748	119-928
5/16	24	3	2-23/32	.748	119-935
3/8	16	3	2-15/16	.748	119-929
3/8	24	3	2-15/16	.748	119-936
7/16	14	3	3-5/32	.866	119-930
7/16	20	3	3-5/32	.866	119-937
1/2	13	3	3-3/8	.945	119-931
1/2	20	3	3-3/8	.945	119-938
5/8	11	3	3-13/16	1.102	119-932
3/4	10	3	4-1/4	1.220	119-933

Cutting Conditions

Materials			Hardness (HRC)	Cutting Speed (FPM)
Main Group	Sub-Group	Condition		
Low Carbon	1018, 1010, 1035	Normalized	<25	20-50
Medium Carbon	1045, 1050, 1065	Normalized	<25	20-40
Aluminum	Unalloyed, Cast	—	—	30-80
Brass/Bronze	—	—	—	30-80
Copper	—	—	—	25-60
Cast Iron	—	As Cast	<15	20-40

Cutting Speed (fpm)

	10	20	30	40	50	60	70	80	90	100
Low Carbon										
Medium Carbon										
Aluminum										
Brass/Bronze										
Copper										
Cast Iron										

Hardness (hrc)

	0	5	10	15	20	25	30	35	35	40
Low Carbon						up to 25				
Medium Carbon						up to 25				
Aluminum										
Brass/Bronze										
Copper										
Cast Iron						up to 15				

Yellow Ring HSSE-V3 Spiral Point Taps

HSSE-V3% Vanadium

- Superior performance in hardened tool steels such as 4140, 4340, H13, D2.
- Up to 35 HRC

Designed for high-speed tapping applications. Developed to withstand the high stress and high heat associated with high-speed CNC production tapping. Features a unique free-cutting design with a special tempering and geometry which contributes to extra tool life.

- Standard limits of H2, H3, H4 apply to Bright Finish taps as appropriate



Inch

Standard Limits H2, H3, H4

• 4.5 Pitch lead (Intermediate)

Tap	No. Flutes	Overall Length (in.)	Thread Length (in.)	Steam Oxide Code No.	H2 Limit	Steam Oxide Code No.	H3 Limit	Steam Oxide Code No.	H4 Limit	Steam Oxide Code No.	H5 Limit	Steam Oxide Code No.	H6 Limit	Steam Oxide Code No.	H7 Limit	Bright Finish Code No.	Standard Limits
2-56	2	1-3/4	.433	122-550												122-550B	
3-48	2	1-13/16	.512	122-552												122-552B	
4-40	2	1-7/8	.433	123-296												123-296B	
4-40	2	1-7/8	.433					122-554								122-554B	
6-32	3	2	.512					123-300			122-556				122-650	123-300B	
6-40	3	2	.512					123-334								123-334B	
8-32	3	2-1/8	.512					123-302			122-558				122-652	123-302B	
10-24	3	2-3/8	.512					123-304			122-560				122-654	123-304B	
10-32	3	2-3/8	.512					123-338			122-562				122-656	123-338B	
12-24	3	2-3/8	.512					123-306								123-306B	
1/4-20	3	2-1/2	.630					123-308			122-564				122-658	123-308B	
1/4-28	3	2-1/2	.630					123-342			122-566				122-660	123-342B	
5/16-18	3	2-23/32	.748					123-310			122-568				122-662	123-310B	
5/16-24	3	2-23/32	.748					123-344			122-570				122-664	123-344B	
3/8-16	3	2-15/16	.748					123-312			122-572				122-666	123-312B	
3/8-24	3	2-15/16	.748					123-346			122-574				122-668	123-346B	
7/16-14	3	3-5/32	.866					123-314			122-576					123-314B	
7/16-20	3	3-5/32	.866					123-348			122-578					123-348B	
1/2-13	3	3-3/8	.945					123-316			122-580				122-670	123-316B	
1/2-20	3	3-3/8	.945					123-350			122-582					123-350B	
5/8-11	3	3-13/16	1.102					123-318			122-584					123-318B	
5/8-18	3	3-13/16	1.102					123-352								123-352B	
3/4-10	3	4-1/4	1.220					123-320			122-586					123-320B	
3/4-16	3	4-1/4	1.220					123-353								123-353B	
7/8-9	3	4-11/16	1.339						123-321							123-321B	
7/8-14	3	4-11/16	1.339						123-359							123-359B	
1-8	4	5-1/8	1.496						123-323				122-588			123-323B	
1-12	4	5-1/8	1.496						123-361							123-361B	
1-14	4	5-1/8	1.496						123-360							123-360B	
1-1/8-7	4	5-7/16	1.732						123-364							123-364B	
1-1/8-12	4	5-7/16	1.732						123-365							123-365B	
1-1/4-7	4	5-3/4	1.732						123-367				122-590			123-367B	
1-1/4-12	4	5-3/4	1.732						123-369							123-369B	
1-3/8-6	4	6-1/16	2.000						123-371				122-592			123-371B	
1-3/8-12	4	6-1/16	2.000						123-373							123-373B	
1-1/2-6	4	6-3/8	2.000						123-363				122-594			123-363B	
1-1/2-12	4	6-3/8	2.000						123-375							123-375B	

Metric

Tap	No. Flutes	Thread Limits	Overall Length (in.)	Thread Length (in.)	Steam Oxide Code No.	Bright Finish Code No.
M2 x .4	2	D3	1-3/4	.433	123-502	123-502B
M2.5 x .45	2	D3	1-13/16	.512	123-504	123-504B
M3 x .5	3	D3	1-15/16	.433	123-505	123-505B
M3.5 x .6	3	D4	2	.512	123-506	123-506B
M4 x .7	3	D4	2-1/8	.512	123-507	123-507B
M4.5 x .75	3	D4	2-3/8	.512	123-508	123-508B
M5 x .8	3	D4	2-3/8	.512	123-509	123-509B
M6 x 1	3	D5	2-1/2	.630	123-510	123-510B
M7 x 1	3	D5	2-23/32	.630	123-511	123-511B
M8 x 1	3	D5	2-23/32	.748	123-512	123-512B
M8 x 1.25	3	D5	2-23/32	.748	123-513	123-513B
M10 x 1.25	3	D5	2-15/16	.748	123-516	123-516B
M10 x 1.5	3	D6	2-15/16	.748	123-515	123-515B
M12 x 1.25	3	D5	3-3/8	.945	123-518	123-518B
M12 x 1.75	3	D6	3-3/8	.945	123-517	123-517B
M14 x 1.5	3	D7	3-19/32	.984	123-519	123-519B
M14 x 2	3	D6	3-19/32	.984	123-520	123-520B
M16 x 1.5	3	D6	3-13/16	1.102	123-522	123-522B
M16 x 2	3	D7	3-13/16	1.102	123-521	123-521B
M18 x 1.5	4	D6	4-1/32	1.102	123-523	123-523B
M18 x 2.5	4	D7	4-1/32	1.102	123-524	123-524B
M20 x 1.5	4	D5	4-15/32	1.220	123-525	123-525B
M20 x 2.5	4	D6	4-15/32	1.220	123-526	123-526B
M22 x 1.5	4	D6	4-11/16	1.339	123-527	123-527B
M22 x 2.5	4	D6	4-11/16	1.339	123-528	123-528B
M24 x 1.5	4	D5	4-29/32	1.339	123-529	123-529B

Tap	No. Flutes	Thread Limits	Overall Length (in.)	Thread Length (in.)	Steam Oxide Code No.	Bright Finish Code No.
M24 x 3	4	D7	4-29/32	1.339	123-530	123-530B
M27 x 1.5	4	D7	5-1/8	1.181	123-531	123-531B
M27 x 3	4	D7	5-1/8	1.181	123-532	123-532B
M30 x 1.5	4	D7	5-7/16	1.378	123-533	123-533B
M30 x 3.5	4	D7	5-7/16	1.378	123-534	123-534B

Cutting Conditions

Materials

Main Group	Sub-Group	Condition	Hardness (HRC)	Cutting Speed (FPM)
Tool Steels	01, A-2, D-2 H-13, P-20	Annealed	<35	15-25
Medium Carbon	1030, 1035 1038, 1040 1045, 1050	Normalized	<28	20-40
Alloyed High Carbon	1065, 1070, 1080, 1090 1095, 1561, 1572	Normalized	<32	20-30
High Strength Titanium	4140, 4340 Commercially Pure	Normalized Annealed	<32	20-30 15-30
Aluminum	Cast, Wrought	-	-	30-90

Yellow Ring HSSE-V3 Spiral Flute Taps

HSSE-V3% Vanadium

- Superior performance in hardened tool steels such as 4140, 4340, H13, D2.
- Up to 35 HRC

Designed for high-speed tapping applications. Developed to withstand the high stress and high heat associated with high-speed CNC production tapping. Features a unique free-cutting design with a special tempering and geometry which contributes to extra tool life.

- Standard limits of H2, H3, H4 apply to Bright Finish taps as appropriate



• 2.5 Pitch lead (Bottoming)

Standard Limits H2, H3, H4

Inch

Tap	No. Flutes	Overall Length (in.)	Thread Length (in.)	Steam Oxide Code No.	H2 Limit	Steam Oxide Code No.	H3 Limit	Steam Oxide Code No.	H4 Limit	Steam Oxide Code No.	H5 Limit	Steam Oxide Code No.	H6 Limit	Steam Oxide Code No.	H7 Limit	Bright Finish Code No.	Standard Limit
2-56	2	1-3/4	.433	122-500												122-500B	
3-48	2	1-13/16	.512	122-502												122-502B	
4-40	2	1-7/8	.250	123-362												123-362B	
4-40	2	1-7/8	.250			122-506										122-506B	
6-32	3	2	.313	123-366						122-508				122-600		123-366B	
8-32	3	2-1/8	.313	123-368						122-510				122-602		123-368B	
10-24	3	2-3/8	.417				123-370			122-512				122-604		123-370B	
10-32	3	2-3/8	.417				123-382			122-514				122-606		123-382B	
1/4-20	3	2-1/2	.500				123-372			122-516				122-608		123-372B	
1/4-28	3	2-1/2	.500				123-384			122-518				122-610		123-384B	
5/16-18	3	2-23/32	.556				123-374			122-520				122-612		123-374B	
5/16-24	3	2-23/32	.556				123-386			122-522				122-614		123-386B	
3/8-16	3	2-15/16	.625				123-376			122-524				122-616		123-376B	
3/8-24	3	2-15/16	.625				123-388			122-526				122-618		123-388B	
7/16-14	3	3-5/32	.714				123-378			122-528						123-378B	
7/16-20	3	3-5/32	.714				123-389			122-530						123-389B	
1/2-13	3	3-3/8	.769				123-380			122-532				122-620		123-380B	
1/2-20	3	3-3/8	.769				123-392			122-534						123-392B	
5/8-11	4	3-13/16	.909				123-452			122-536						123-452B	
5/8-18	4	3-13/16	.909				123-462									123-462B	
3/4-10	4	4-1/4	1.000				123-454			122-538						123-454B	
3/4-16	4	4-1/4	1.000				123-464									123-464B	
7/8-9	4	4-11/16	1.111						123-466							123-466B	
7/8-14	4	4-11/16	1.111						123-468							123-468B	
1-8	4	5-1/8	1.250						123-469				122-540			123-469B	
1-12	4	5-1/8	1.250						123-470							123-470B	
1-14	4	5-1/8	1.250						123-465							123-465B	
1-1/8-7	4	5-7/16	1.429						123-471							123-471B	
1-1/8-12	4	5-7/16	1.429						123-472							123-472B	
1-1/4-7	4	5-3/4	1.429						123-473				122-542			123-473B	
1-1/4-12	4	5-3/4	1.429						123-474							123-474B	
1-3/8-6	4	6-1/16	1.667						123-475				122-544			123-475B	
1-3/8-12	4	6-1/16	1.667						123-476							123-476B	
1-1/2-6	4	6-3/8	1.667						123-477				122-546			123-477B	
1-1/2-12	4	6-3/8	1.667						123-478							123-478B	

Metric

Tap	No. Flutes	Thread Limits	Overall Length (in.)	Thread Length (in.)	Steam Oxide Code No.	Bright Finish Code No.
M3 x .5	3	D3	2-3/8	.197	123-650	123-650B
M3.5 x .6	3	D4	2-3/8	.236	123-651	123-651B
M4 x .7	3	D4	2-3/8	.276	123-652	123-652B
M5 x .8	3	D4	2-3/8	.315	123-654	123-654B
M6 x 1	3	D5	2-1/2	.394	123-656	123-656B

Tap	No. Flutes	Thread Limits	Overall Length (in.)	Thread Length (in.)	Steam Oxide Code No.	Bright Finish Code No.
M7 x 1	3	D5	2-23/32	.394	123-657	123-657B
M8 x 1	3	D5	2-23/32	.492	123-659	123-659B
M8 x 1.25	3	D5	2-23/32	.492	123-658	123-658B
M10 x 1.25	3	D5	2-15/16	.591	123-661	123-661B
M10 x 1.5	3	D6	2-15/16	.591	123-660	123-660B
M12 x 1.25	3	D5	3-3/8	.689	123-663	123-663B
M12 x 1.75	3	D6	3-3/8	.689	123-662	123-662B
M14 x 1.5	3	D6	3-19/32	.787	123-665	123-665B
M14 x 2	3	D7	3-19/32	.787	123-667	123-667B
M16 x 1.5	3	D6	3-13/16	.787	123-668	123-668B
M16 x 2	3	D7	3-13/16	.787	123-669	123-669B
M18 x 1.5	4	D6	4-1/32	.984	123-670	123-670B
M18 x 2.5	4	D7	4-1/32	.984	123-671	123-671B
M20 x 1.5	4	D5	4-15/32	.984	123-672	123-672B
M20 x 2.5	4	D6	4-15/32	.984	123-673	123-673B
M22 x 1.5	4	D6	4-11/16	.984	123-674	123-674B
M22 x 2.5	4	D6	4-11/16	.984	123-675	123-675B
M24 x 1.5	4	D5	4-29/32	1.181	123-676	123-676B
M24 x 3	4	D7	4-29/32	1.181	123-677	123-677B
M27 x 1.5	4	D7	5-1/8	1.181	123-678	123-678B
M27 x 3	4	D7	5-1/8	1.181	123-679	123-679B
M30 x 1.5	4	D7	5-7/16	1.378	123-680	123-680B
M30 x 3.5	4	D7	5-7/16	1.378	123-681	123-681B

Cutting Speed (fpm)									
	10	20	30	40	50	60	70	80	90 100
Tool Steels									
Medium Carbon									
Alloyed High Carbon									
High Strength									
Titanium									
Aluminum									

Hardness (hrc)									
	0	5	10	15	20	25	30	35	35 40
Tool Steels									
Medium Carbon									
Alloyed High Carbon									
High Strength									
Titanium									
Aluminum									

Low / Medium Carbon Steels	Alloy / High Carbon Steels	Stainless Steel	High Tensile
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Yellow Ring HSSE-V3 UN8 DIN Length ANSI Shank Taps

HSSE-V3% Vanadium

- Superior performance in hardened tool steels such as 4140, 4340, H13, D2.
- Up to 35 HRC



• 2.5 Pitch lead (Bottoming)

Tap	No. Flutes	Thread Limits	Overall Length (in.)	Thread Length (in.)	Code No.
1-8	4	H7	6.299	1.417	123-055
1-1/8-8	4	H9	7.087	1.575	123-056
1-1/4-8	4	H9	7.087	1.575	123-079
1-3/8-8	5	H9	7.874	1.654	123-080
1-1/2-8	5	H9	7.874	1.654	123-057
1-3/4-8	6	H9	7.874	1.772	123-058
2-8	6	H10	8.858	1.969	123-059

HSSE-V3 DIN Length ANSI Shank Spiral Point Taps

HSSE-V3% Vanadium

- Superior performance in hardened tool steels such as 4140, 4340, H13, D2.
- Up to 35 HRC



• 4.5 Pitch lead (Intermediate)

Tap	No. Flutes	Thread Limits	Overall Length (in.)	Thread Length (in.)	Code No.
10-24	3	H3	2.756	.591	124-820
1/4-20	3	H3	3.150	.669	124-822
5/16-18	3	H3	3.543	.669	124-824
3/8-16	3	H3	3.937	.787	124-826
7/16-14	3	H3	3.937	.866	124-828
1/2-13	3	H3	4.331	.984	124-830
5/8-11	3	H3	4.331	1.063	124-832
3/4-10	3	H3	4.921	1.181	124-834

HSSE-V3 DIN Length ANSI Shank Spiral Flute Taps

HSSE-V3% Vanadium

- Superior performance in hardened tool steels such as 4140, 4340, H13, D2.
- Up to 35 HRC



• 2.5 Pitch lead (Bottoming)

Tap	No. Flutes	Thread Limits	Overall Length (in.)	Thread Length (in.)	Code No.
10-24	3	H3	2.756	.417	124-800
1/4-20	3	H3	3.150	.500	124-802
5/16-18	3	H3	3.543	.556	124-804
3/8-16	3	H3	3.937	.625	124-806
7/16-14	3	H3	3.937	.714	124-808
1/2-13	3	H3	4.331	.769	124-810
5/8-11	4	H3	4.331	.909	124-812
3/4-10	4	H3	4.921	1.000	124-814

4" & 6" O.A.L. Spiral Point HSSE-V3 Taps - Inch

HSSE-V3% Vanadium

- Superior performance in hardened tool steels such as 4140, 4340, H13, D2.
- Up to 35 HRC



• 4.5 Pitch lead (Intermediate)

Designed for high-speed tapping applications.

Developed to withstand the high stress and high heat associated with high-speed CNC production tapping. Features a unique free-cutting design with a special tempering and geometry which contributes to extra tool life.

Designed for long reach applications.

Tap	No. Flutes	Thread Limits	Overall Length (in.)	Thread Length (in.)	Code No.
4-40	2	H2	4"	.433	122-700
6-32	3	H3	4"	.512	122-702
8-32	3	H3	4"	.512	122-704
10-24	3	H3	6"	.512	122-706
10-32	3	H3	6"	.512	122-708
1/4-20	3	H3	6"	.630	122-710
1/4-28	3	H3	6"	.630	122-712
5/16-18	3	H3	6"	.748	122-714
5/16-24	3	H3	6"	.748	122-716
3/8-16	3	H3	6"	.748	122-718
3/8-24	3	H3	6"	.748	122-720
7/16-14	3	H3	6"	.866	122-722
7/16-20	3	H3	6"	.866	122-724
1/2-13	3	H3	6"	.945	122-726
1/2-20	3	H3	6"	.945	122-728
5/8-11	3	H3	6"	1.102	122-730
3/4-10	3	H3	6"	1.220	122-731
7/8-9	3	H4	6"	1.339	122-732
1-8	4	H4	6"	1.496	122-733

Cutting Conditions

Materials

Main Group	Sub-Group	Condition	Hardness (HRC)	Cutting Speed (FPM)
Stainless Steel	200 Series,	Annealed	<28	20-35
	300 Series,	Annealed	<28	20-35
	17-4, 15-5	Annealed	<25	15-25
	AM286	Annealed	<25	15-25
	400 Series	Annealed	<29	20-35
Tool Steels	01, A-2, D-2 H-13, P-20	Annealed	<35	15-25
Medium Carbon	1030, 1035 1038, 1040 1045, 1050	Normalized	<28	20-40
Alloyed High Carbon	1065, 1070, 1080, 1090 1095, 1561, 1572	Normalized	<32	20-30
High Strength	4140, 4340	Normalized	<32	20-30
Titanium	Commercially Pure	Annealed	<32	15-30
Aluminum	Cast, Wrought	-	-	30-90

Cutting Speed (fpm)

	10	20	30	40	50	60	70	80	90	100
Tool Steels										
Medium Carbon										
Alloyed High Carbon										
High Strength										
Titanium										
Aluminum										

Hardness (hrc)

	0	5	10	15	20	25	30	35	35	40
Tool Steels										
Medium Carbon										
Alloyed High Carbon										
High Strength										
Titanium										
Aluminum										

4" & 6" O.A.L. Spiral Flute HSSE-V3 Taps - Inch

HSSE-V3% Vanadium

- Superior performance in hardened tool steels such as 4140, 4340, H13, D2.
- Up to 35 HRC

Designed for high-speed tapping applications. Developed to withstand the high stress and high heat associated with high-speed CNC production tapping. Features a unique free-cutting design with a special tempering and geometry which contributes to extra tool life. Designed for long reach applications.



• 2.5 Pitch lead (Bottoming)

Tap	No. Flutes	Thread Limits	Overall Length (in.)	Thread Length (in.)	Code No.
4-40	2	H2	4"	.433	123-060
6-32	3	H3	4"	.512	123-061
8-32	3	H3	4"	.512	123-062
10-24	3	H3	4"	.512	123-063
10-32	3	H3	6"	.512	123-073
1/4-20	3	H3	6"	.630	123-064
1/4-28	3	H3	6"	.630	123-074
5/16-18	3	H3	6"	.748	123-065
5/16-24	3	H3	6"	.748	123-075
3/8-16	3	H3	6"	.748	123-066
3/8-24	3	H3	6"	.748	123-076
7/16-14	3	H3	6"	.866	123-067
7/16-20	3	H3	6"	.866	123-077
1/2-13	3	H3	6"	.945	123-068
1/2-20	3	H3	6"	.945	123-078
5/8-11	4	H3	6"	1.102	123-069
3/4-10	4	H3	6"	1.220	123-070
7/8-9	4	H4	6"	1.339	123-071
1-8	4	H4	6"	1.496	123-072

Yellow Ring HSSE-V3 NPT Spiral Flute Pipe Taps

HSSE-V3% Vanadium

- Superior performance in hardened tool steels such as 4140, 4340, H13, D2.
- Up to 35 HRC



• 2.5 Pitch lead (Bottoming)

Tap	No. Flutes	Overall Length (in.)	Thread Length (in.)	Code No.
1/16-27	4	2-1/8	.688	123-400
1/8-27	4	2-1/8	.750	123-402
1/4-18	4	2-7/16	1.063	123-404
3/8-18	4	2-9/16	1.063	123-406
1/2-14	4	3-1/8	1.375	123-410
3/4-14	5	3-1/4	1.375	123-412
1-11-1/2	5	3-3/4	1.750	123-414
1-1/4-11-1/2	5	4	1.750	123-416
1-1/2-11-1/2	5	4-1/4	1.750	123-418
2-11-1/2	5	4-1/2	1.750	123-420

Cutting Conditions

Materials				Cutting Speed (FPM)
Main Group	Sub-Group	Condition	Hardness (HRC)	Cutting Speed (FPM)
Stainless Steel	200 Series, 300 Series, 17-4, 15-5 AM286 400 Series	Annealed	<28	20-35
		Annealed	<28	20-35
		Annealed	<25	15-25
		Annealed	<25	15-25
Tool Steels	01, A-2, D-2 H-13, P-20	Annealed	<29	20-35
		Annealed	<35	15-25
Medium Carbon	1030, 1035 1038, 1040 1045, 1050	Normalized	<28	20-40
Alloyed High Carbon	1065, 1070, 1080, 1090 1095, 1561, 1572	Normalized	<32	20-30
High Strength Titanium	4140, 4340 Commercially Pure	Normalized Annealed	<32	20-30 15-30
Aluminum	Cast, Wrought	-	-	30-90

Cutting Speed (fpm)

	10	20	30	40	50	60	70	80	90	100
Tool Steels										
Medium Carbon										
Alloyed High Carbon										
High Strength										
Titanium										
Aluminum										

Hardness (hrc)

	0	5	10	15	20	25	30	35	40
Tool Steels									
Medium Carbon									
Alloyed High Carbon									
High Strength									
Titanium									
Aluminum									

Orange Ring HSSE-V3 Spiral Point Taps - Inch

HSSE-V3% Vanadium

- Superior performance in stainless steels
- Up to 35 HRC



• 4.5 Pitch lead (Intermediate)

Tap	No. Flutes	Thread Limits	Overall Length (in.)	Thread Length (in.)	Code No.
2-56	2	H2	1-3/4	.433	124-926
3-48	2	H2	1-13/16	.512	124-927
4-40	2	H2	1-7/8	.433	124-930
6-32	3	H3	2	.512	124-931
8-32	3	H3	2-1/8	.512	124-932
10-24	3	H3	2-3/8	.512	124-933
10-32	3	H3	2-3/8	.512	124-945
1/4-20	3	H3	2-1/2	.630	124-934
1/4-28	3	H3	2-1/2	.630	124-946
5/16-18	3	H3	2-23/32	.748	124-935
5/16-24	3	H3	2-23/32	.748	124-947
3/8-16	3	H3	2-15/16	.748	124-936
3/8-24	3	H3	2-15/16	.748	124-948
7/16-14	3	H3	3-5/32	.866	124-937
7/16-20	3	H3	3-5/32	.866	124-949
1/2-13	3	H3	3-3/8	.945	124-938
1/2-20	3	H3	3-3/8	.945	124-950
5/8-11	3	H3	3-13/16	1.102	124-939
5/8-18	3	H3	3-13/16	1.102	124-951
3/4-10	3	H3	4-1/4	1.220	124-940
3/4-16	3	H3	4-1/4	1.220	124-952
7/8-9	3	H4	4-11/16	1.339	124-941
7/8-14	3	H4	4-11/16	1.339	124-953
1-8	3	H4	5-1/8	1.496	124-942
1-12	3	H4	5-1/8	1.496	124-954

Orange Ring HSSE-V3 Spiral Point Taps - Metric

HSSE-V3% Vanadium

- Superior performance in stainless steels
- Up to 35 HRC



• 4.5 Pitch lead (Intermediate)

Tap	No. Flutes	Thread Limits	Overall Length (in.)	Thread Length (in.)	Code No.
M3 x .5	3	D3	1-15/16	.433	124-955
M4 x .7	3	D4	2-1/8	.512	124-956
M5 x .8	3	D4	2-3/8	.512	124-957
M6 x 1	3	D5	2-1/2	.630	124-958
M8 x 1.25	3	D5	2-23/32	.748	124-959
M10 x 1.25	3	D5	2-15/16	.748	124-960
M10 x 1.5	3	D6	2-15/16	.748	124-961
M12 x 1.75	3	D6	3-3/8	.945	124-962
M14 x 2	3	D6	3-19/32	.984	124-897•
M16 x 2	3	D7	3-13/16	1.102	124-899
M18 x 2.5	3	D7	4-1/32	1.102	124-901
M20 x 2.5	3	D6	4-1/4	1.220	124-903•
M22 x 2.5	3	D6	4-11/16	1.339	124-905•
M24 x 3	3	D7	4-29/32	1.339	124-907

• Available only while supplies last

Cutting Conditions

Materials				Cutting Speed (FPM)
Main Group	Sub-Group	Condition	Hardness (HRC)	
Stainless Steel	200 Series,	Annealed	<28	20-35
	300 Series,	Annealed	<28	20-35
	17-4, 15-5	Annealed	<25	15-25
	AM286	Annealed	<25	15-25
	400 Series	Annealed	<29	20-35
	400 Series	Hardened	<35	15-20
Low Carbon Steels	17-4PH, 15-5	Hardened	<35	15-20
	A286	Hardened	<35	15-20
Alloyed High Carbon	1010, 1018	Normalized	<20	25-50
Beryllium Copper	1050, 1065, 1070, 1080, 1090, 1095, 1561, 1572	Normalized	<25	20-30
	4140, 4340		<32	20-30

Cutting Speed (fpm)

	10	20	30	40	50	60	70	80	90	100
Stainless Steel										
Low Carbon Steels										
Alloyed High Carbon										
Beryllium Copper										

Hardness (hrc)	
	0 5 10 15 20 25 30 35 35 40
Stainless Steel	up to 35
Low Carbon Steels	up to 20
Alloyed High Carbon	up to 25
Beryllium Copper	up to 32

Orange Ring HSSE-V3 Spiral Flute Taps - Inch

HSSE-V3% Vanadium

- Superior performance in stainless steels
- Up to 35 HRc



• 2.5 Pitch lead (Bottoming)

Tap	No. Flutes	Thread Limits	Overall Length (in.)	Thread Length (in.)	Code No.
2-56	2	H2	1-3/4	.433	124-928
3-48	2	H2	1-13/16	.512	124-929
4-40	2	H2	1-7/8	.250	124-965
6-32	3	H2	2	.313	124-966
8-32	3	H2	2-1/8	.313	124-967
10-24	3	H3	2-3/8	.417	124-968
10-32	3	H3	2-3/8	.417	124-979
1/4-20	3	H3	2-1/2	.500	124-969
1/4-28	3	H3	2-1/2	.500	124-980
5/16-18	3	H3	2-23/32	.556	124-970
5/16-24	3	H3	2-23/32	.556	124-981
3/8-16	3	H3	2-15/16	.625	124-971
3/8-24	3	H3	2-15/16	.625	124-982
7/16-14	3	H3	3-5/32	.714	124-972
7/16-20	3	H3	3-5/32	.714	124-964
1/2-13	3	H3	3-3/8	.769	124-973
1/2-20	3	H3	3-3/8	.769	124-983
9/16-12	4	H3	3-19/32	.880	124-974
5/8-11	4	H3	3-13/16	.909	124-975
5/8-18	4	H3	3-13/16	.909	124-984
3/4-10	4	H3	4-1/4	1.000	124-976
3/4-16	4	H3	4-1/4	1.000	124-985
7/8-9	4	H4	4-11/16	1.111	124-977
7/8-14	4	H4	4-11/16	1.111	124-986
1-8	4	H4	5-1/8	1.250	124-978
1-12	4	H4	5-1/8	1.250	124-987

Orange Ring HSSE-V3 Spiral Flute Taps - Metric

HSSE-V3% Vanadium

- Superior performance in stainless steels
- Up to 35 HRc



• 2.5 Pitch lead (Bottoming)

Tap	No. Flutes	Thread Limits	Overall Length (in.)	Thread Length (in.)	Code No.
M3 x .5	3	D3	1-15/16	.197	124-988
M4 x .7	3	D4	2-1/8	.276	124-989
M5 x .8	3	D4	2-3/8	.315	124-990
M6 x 1	3	D5	2-1/2	.394	124-991
M8 x 1.25	3	D5	2-23/32	.492	124-992
M10 x 1.25	3	D5	2-15/16	.591	124-993
M10 x 1.5	3	D6	2-15/16	.591	124-994
M12 x 1.75	3	D6	3-3/8	.689	124-995
M14 x 2	3	D7	3-19/32	.787	124-996
M16 x 2	3	D7	3-13/16	.787	124-997
M18 x 2.5	4	D7	4-1/32	.984	124-998
M20 x 2.5	4	D6	4-15/32	.984	124-999
M22 x 2.5	4	D6	4-11/16	.984	124-943
M24 x 3	4	D7	4-29/32	1.181	124-944

Cutting Conditions

Materials			Hardness	Cutting Speed
Main Group	Sub-Group	Condition	(HRC)	(FPM)
Stainless Steel	200 Series,	Annealed	<28	20-35
	300 Series,	Annealed	<28	20-35
	17-4, 15-5	Annealed	<25	15-25
	AM286	Annealed	<25	15-25
	400 Series	Annealed	<29	20-35
	400 Series	Hardened	<35	15-20
Low Carbon Steels	17-4PH, 15-5	Hardened	<35	15-20
	A286	Hardened	<35	15-20
Alloyed High Carbon	1010, 1018	Normalized	<20	25-50
Beryllium Copper	1050, 1065,	Normalized	<25	20-30
	1070, 1080			
	1090, 1095,			
	1561, 1572			

Cutting Speed (fpm)

	10	20	30	40	50	60	70	80	90	100
Stainless Steel										
Low Carbon Steels										
Alloyed High Carbon										
Beryllium Copper										

Hardness (hrc)	
	0 5 10 15 20 25 30 35 35 40
Stainless Steel	up to 35
Low Carbon Steels	up to 20
Alloyed High Carbon	up to 25
Beryllium Copper	up to 32

Red Ring P-HSS Spiral Point Taps - Inch

P-HSS - Powdered Metal

Powdered Metal taps offer superior toughness and lubricity and are made of premium-grade, super hard powder high speed steel. These taps have a special geometry for tougher applications.

- Used for heat resistant materials, high strength stainless steel and titanium alloys as well as other high tensile steels and alloys including tool steel and nickel alloys
- Up to 48 HRC



• 4.5 Pitch lead (Intermediate)

Tap	No. Flutes	Thread Limits	Overall Length (in.)	Thread Length (in.)	Code No.
4-40	2	H2	1-7/8	.433	124-100
5-40	3	H2	1-15/16	.433	124-105
6-32	3	H3	2	.512	124-110
8-32	3	H3	2-1/8	.512	124-115
10-24	3	H3	2-3/8	.512	124-120
10-32	3	H3	2-3/8	.512	124-125
1/4-20	3	H3	2-1/2	.630	124-130
1/4-28	3	H3	2-1/2	.630	124-135
5/16-18	3	H3	2-23/32	.748	124-140
5/16-24	3	H3	2-23/32	.748	124-145
3/8-16	3	H3	2-15/16	.748	124-150
3/8-24	3	H3	2-15/16	.748	124-155
7/16-14	3	H3	3-5/32	.866	124-160
7/16-20	3	H3	3-5/32	.866	124-165
1/2-13	3	H3	3-3/8	.945	124-170
1/2-20	3	H3	3-3/8	.945	124-175
5/8-11	3	H3	3-13/16	1.102	124-180
5/8-18	3	H3	3-13/16	1.102	124-185
3/4-10	4	H3	4-1/4	1.220	124-190
3/4-16	4	H3	4-1/4	1.220	124-195

Red Ring P-HSS Spiral Point Taps - Metric

P-HSS - Powdered Metal

Powdered Metal taps offer superior toughness and lubricity and are made of premium-grade, super hard powder high speed steel. These taps have a special geometry for tougher applications.

- Used for heat resistant materials, high strength stainless steel and titanium alloys as well as other high tensile steels and alloys including tool steel and nickel alloys
- Up to 48 HRC



• 4.5 Pitch lead (Intermediate)

Tap	No. Flutes	Thread Limits	Overall Length (in.)	Thread Length (in.)	Code No.
M3 x .5	3	D3	1-15/16	.433	124-500
M4 x .7	3	D4	2-1/8	.512	124-505
M5 x .8	3	D4	2-3/8	.512	124-510
M6 x 1.0	3	D5	2-1/2	.630	124-515
M8 x 1.25	3	D5	2-23/32	.748	124-520
M10 x 1.25	3	D5	2-15/16	.748	124-525
M10 x 1.5	3	D6	2-15/16	.748	124-530
M12 x 1.75	3	D6	3-3/8	.945	124-535

Cutting Conditions

Materials

Main Group	Sub-Group	Condition	Hardness (HRC)	Cutting Speed (FPM)
Stainless Steel	17-4PH, 15-5, 17-7PH, AM350	Hardened	<48	12-20
Tool Steels	01, A-2, D-2, H-13, P-20	Hardened	<48	10-20
High Strength	4140, 4340, 50100	Hardened	<48	15-20
Nickel Alloys	Inconel, Hastaloy, Waspaloy, Rene, Monel	Annealed/Hardened	<42	5-20
Titanium	6 AL 4	Annealed/Hardened	<42	8-15

Cutting Speed (fpm)

	10	20	30	40	50	60	70	80	90	100
Stainless Steel										
Tool Steels										
High Strength										
Titanium										
Aluminum										

Hardness (hrc)

	0	5	10	15	20	25	30	35	35	40	45	50
Stainless Steel												
Tool Steels												
High Strength												
Titanium												
Aluminum												

Red Ring P-HSS Spiral Flute Taps

P-HSS - Powdered Metal

Powdered Metal taps offer superior toughness and lubricity and are made of premium-grade, super hard powder high speed steel. These taps have a special geometry for tougher applications.

- Used for heat resistant materials, high strength stainless steel and titanium alloys as well as other high tensile steels and alloys including tool steel and nickel alloys
- Up to 48 HRC



• 2.5 Pitch lead (Bottoming)

Inch

Tap	No. Flutes	Thread Limits	Overall Length (in.)	Thread Length (in.)	Code No.
4-40	2	H2	1-7/8	.250	124-250
6-32	3	H3	2	.313	124-255
8-32	3	H3	2-1/8	.313	124-260
10-24	3	H3	2-3/8	.417	124-265
10-32	3	H3	2-3/8	.417	124-270
1/4-20	3	H3	2-1/2	.500	124-275
1/4-28	3	H3	2-1/2	.500	124-280
5/16-18	3	H3	2-23/32	.556	124-285
5/16-24	3	H3	2-23/32	.556	124-290
3/8-16	3	H3	2-15/16	.625	124-295
3/8-24	3	H3	2-15/16	.625	124-300
7/16-14	3	H3	3-5/32	.714	124-305
7/16-20	3	H3	3-5/32	.714	124-310
1/2-13	3	H3	3-3/8	.769	124-315
1/2-20	3	H3	3-3/8	.769	124-320
5/8-11	4	H3	3-13/16	.909	124-325
5/8-18	4	H3	3-13/16	.909	124-330
3/4-10	4	H3	4-1/4	1.000	124-335
3/4-16	4	H3	4-1/4	1.000	124-340

Red Ring P-HSS Spiral Flute Taps

P-HSS - Powdered Metal

Powdered Metal taps offer superior toughness and lubricity and are made of premium-grade, super hard powder high speed steel. These taps have a special geometry for tougher applications.

- Used for heat resistant materials, high strength stainless steel and titanium alloys as well as other high tensile steels and alloys including tool steel and nickel alloys
- Up to 48 HRC



• 2.5 Pitch lead (Bottoming)

Metric

Tap	No. Flutes	Thread Limits	Overall Length (in.)	Thread Length (in.)	Code No.
M3 x .5	3	D3	1-15/16	.197	124-550
M4 x .7	3	D4	2-1/8	.276	124-555
M5 x .8	3	D4	2-3/8	.315	124-560
M6 x 1.0	3	D5	2-1/2	.394	124-565
M8 x 1.25	3	D5	2-23/32	.492	124-570
M10 x 1.25	3	D5	2-15/16	.591	124-575
M10 x 1.5	3	D6	2-15/16	.591	124-580
M12 x 1.75	3	D6	3-3/8	.689	124-585

Cutting Conditions

Materials				Cutting Speed (FPM)
Main Group	Sub-Group	Condition	Hardness (HRC)	
Stainless Steel	17-4PH, 15-5, 17-7PH, AM350	Hardened	<48	12-20
Tool Steels	01, A-2, D-2, H-13, P-20	Hardened	<48	10-20
High Strength	4140, 4340, 50100	Hardened	<48	15-20
Nickel Alloys	Inconel, Hastalloy, Waspalloy, Rene, Monel	Annealed/Hardened	<42	5-20
Titanium	6 AL 4	Annealed/Hardened	<42	8-15

Cutting Speed (fpm)

	10	20	30	40	50	60	70	80	90	100
Stainless Steel										
Tool Steels										
High Strength										
Titanium										
Aluminum										

Hardness (hrc)

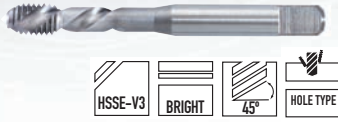
	0	5	10	15	20	25	30	35	40	45	50
Stainless Steel											
Tool Steels											
High Strength											
Titanium											
Aluminum											

HSSE-V3 Spiral Flute Taps For Aluminum

Aluminum

High performance taps with special geometries & bright finish for Aluminum.

- Bright finish
- 45° Spiral flute



• 2.5 Pitch lead (Bottoming)

Inch

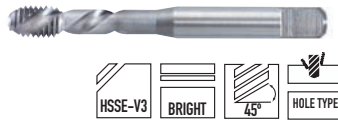
Tap	No. Flutes	Thread Limits	Overall Length (in.)	Thread Length (in.)	Code No.
4-40	2	H2	1-7/8	.250	124-400
6-32	2	H3	2	.313	124-405
8-32	2	H3	2-1/8	.313	124-415
10-24	2	H3	2-3/8	.417	124-420
10-32	2	H3	2-3/8	.417	124-425
1/4-20	2	H3	2-1/2	.500	124-430
1/4-28	2	H3	2-1/2	.500	124-440
5/16-18	2	H3	2-23/32	.556	124-445
5/16-24	2	H3	2-23/32	.556	124-455
3/8-16	2	H3	2-15/16	.625	124-465
3/8-24	2	H3	2-15/16	.625	124-475

Metric

Tap	No. Flutes	Thread Limits	Overall Length (in.)	Thread Length (in.)	Code No.
M3 x .5	2	D3	1-15/16	.197	124-600
M4 x .7	2	D4	2-1/8	.276	124-605
M5 x .8	2	D5	2-3/8	.315	124-610
M6 x 1.0	2	D5	2-1/2	.394	124-615
M8 x 1.25	2	D5	2-23/32	.492	124-620
M10 x 1.25	2	D5	2-15/16	.591	124-625
M10 x 1.5	2	D6	2-15/16	.591	124-630

HSSE-V3 S.T.I. 45° Spiral Flute Taps - Inch

STI taps combine special geometry & surface finish for tapping in Aluminum and other non-ferrous materials for screw thread insert applications.



• 2.5 Pitch lead (Bottoming)

Tap	No. Flutes	Overall Length (in.)	Thread Length (in.)	Code No.
4-40	2	1-7/8	.250	124-050
6-32	2	2	.313	124-052
8-32	2	2-1/8	.313	124-054
10-24	2	2-3/8	.417	124-056
10-32	2	2-3/8	.417	124-058
1/4-20	2	2-1/2	.500	124-060
1/4-28	2	2-1/2	.500	124-062
5/16-18	2	2-23/32	.556	124-064
5/16-24	2	2-23/32	.556	124-066
3/8-16	2	2-15/16	.625	124-068
3/8-24	2	2-15/16	.625	124-070

Cutting Conditions

Materials	Cutting Speed (FPM)
Main Group	
Aluminum	25-60
Die Cast Aluminum	30-80

Cutting Speed (fpm)

	10	20	30	40	50	60	70	80	90	100
Aluminum										
Die Cast Aluminum										

HSS Roll Form Taps

Extended life results from tap geometry that allows optimum cutting performance and close control over tapped hole size. Superior wear resistance, heat treated for toughness.

- Used for thread forming in copper, brass, aluminum, die castings, leaded steels, low carbon steels and stainless steels
- Bright finish
- Premium High Speed Steel



Inch

Tap	Thread Limits	Overall Length (in.)	Thread Length (in.)	Code No.
4-40	H5	1-7/8	.560	124-650
6-32	H5	2	.480	124-655
8-32	H5	2-1/8	.500	124-660
10-24	H6	2-3/8	.640	124-665
10-32	H6	2-3/8	.640	124-670
1/4-20	H6	2-1/2	.830	124-675
1/4-28	H6	2-1/2	.830	124-680
5/16-18	H7	2-23/32	.930	124-685
5/16-24	H7	2-23/32	.930	124-690
3/8-16	H7	2-15/16	.980	124-695
3/8-24	H7	2-15/16	.980	124-700
1/2-13	H8	2-23/32	.930	124-705
1/2-20	H8	2-15/16	.980	124-710

Metric

Tap	Thread Limits	Overall Length (in.)	Thread Length (in.)	Code No.
M3 x .5	D5	1-15/16	.620	124-750
M4 x .7	D6	2-1/8	.500	124-755
M5 x .8	D7	2-3/8	.640	124-760
M6 x 1.0	D8	2-1/2	.830	124-765
M8 x 1.25	D9	2-23/32	.930	124-770
M10 x 1.5	D10	2-15/16	.980	124-775

Cutting Conditions

Materials

Main Group	Sub-Group	Condition	Hardness (HRC)	Cutting Speed (FPM)
Steels	Sheet, Low/Medium Carbon and Stainless Steels	Hardened	<20	20-50
Aluminum	Pure/Low Alloy			30-60
Copper	Alloyed			30-60
Aluminum Cast	Die Cast, Zinc Die Cast			30-80
Copper Alloys	Brass, Bronze			

Cutting Speed (fpm)

	10	20	30	40	50	60	70	80	90	100
Steels										
Aluminum										
Copper										
Aluminum Cast										

Hardness (hrc)

	0	5	10	15	20	25	30	35	35	40
Steels										
Aluminum										
Copper										
Aluminum Cast										

Hand Taps - Inch

High Speed Steel for hand tapping of through or blind holes in ferrous and non-ferrous alloys.



Tap	No. Flutes	Thread Limits	Overall Length (in.)	Thread Length (in.)	Taper Code No.	Plug Code No.	Bottom Code No.
6-32	3	H3	2	.688	123-032	123-034	123-036
8-32	4	H3	2-1/8	.750	123-038	123-040	123-042
10-24	4	H3	2-3/8	.875	123-044	123-046	123-048
10-32	4	H3	2-3/8	.875	123-104	123-106	123-108
12-24	4	H3	2-3/8	.938	123-050	123-052	123-054
1/4-20	4	H3	2-1/2	1.000	123-116	123-118	123-120
1/4-28	4	H3	2-1/2	1.000	123-200	123-202	123-204
5/16-18	4	H3	2-23/32	1.125	123-122	123-124	123-126
5/16-24	4	H3	2-23/32	1.125	123-206	123-208	123-210
3/8-16	4	H3	2-15/16	1.250	123-128	123-130	123-132
3/8-24	4	H3	2-15/16	1.250	123-212	123-214	123-216
7/16-14	4	H3	3-5/32	1.438	123-134	123-136	123-138
7/16-20	4	H3	3-5/32	1.438	123-218	123-220	123-222
1/2-13	4	H3	3-3/8	1.656	123-140	123-142	123-144
1/2-20	4	H3	3-3/8	1.656	123-224	123-226	123-228
9/16-12	4	H3	3-19/32	1.656	123-146	123-148	123-150
9/16-18	4	H3	3-19/32	1.656	123-230	123-232	123-234
5/8-11	4	H3	3-13/16	1.813	123-152	123-154	123-156
5/8-18	4	H3	3-13/16	1.813	123-236	123-238	123-240
3/4-10	4	H3	4-1/4	2.000	123-158	123-160	123-162
3/4-16	4	H3	4-1/4	2.000	123-242	123-244	123-246
7/8-9	4	H4	4-11/16	2.219	123-164	123-166	123-168
7/8-14	4	H4	4-11/16	2.219	123-248	123-250	123-252
1-8	4	H4	5-1/8	2.500	123-170	123-172	123-174
1-12	4	H4	5-1/8	2.500	123-254	123-256	123-258
1-14	4	H4	5-1/8	2.500	123-260	123-262	123-264
1-1/8-7	4	H4	5-7/16	2.562	123-176	123-178	123-180
1-1/8-12	4	H4	5-7/16	2.562	123-266	123-268	123-270
1-1/4-7	4	H4	5-3/4	2.562	123-272	123-274	123-276
1-1/4-12	6	H4	5-3/4	2.562	123-536	123-538	123-540
1-3/8-6	4	H4	6-1/16	3.000	123-278	123-280	123-282
1-3/8-12	6	H4	6-1/16	3.000	123-542	123-544	123-546
1-1/2-6	4	H4	6-3/8	3.000	123-284	123-286	123-288
1-1/2-12	6	H4	6-3/8	3.000	123-548	123-550	123-552

Hand Taps - Metric

High Speed Steel for hand tapping of through or blind holes in ferrous and non-ferrous alloys.



Tap	No. Flutes	Thread Limits	Overall Length (in.)	Thread Length (in.)	Taper Code No.	Plug Code No.	Bottom Code No.
M3 x .5	3	D3	1-15/16	5/8	123-479	123-480	123-481
M4 x 7	3	D4	2-1/8	3/4	123-496	123-482	123-483
M5 x .8	3	D4	2-3/8	7/8	123-497	123-484	123-485
M6 x 1.0	4	D5	2-1/2	1	123-498	123-486	123-487
M8 x 1.25	4	D5	2-23/32	1-1/8	123-499	123-488	123-489
M10 x 1.25	4	D5	2-15/16	1-1/4	123-500	123-490	123-491
M10 x 1.5	4	D6	2-15/16	1-1/4	123-501	123-492	123-493
M12 x 1.75	4	D6	3-3/8	1-21/32	123-503	123-494	123-495
M14 x 2.0	4	D7	3-19/32	1-21/32	123-081	123-082	123-083
M16 x 2.0	4	D7	3-13/16	1-13/16	123-084	123-085	123-086
M18 x 2.5	4	D7	4-1/32	1-13/16	123-087	123-088	123-089
M20 x 2.5	4	D6	4-15/32	2	123-090	123-091	123-092
M22 x 2.5	4	D6	4-11/16	2-7/32	123-093	123-094	123-095
M24 x 3.0	4	D7	4-29/32	2-7/32	123-096	123-098	123-097

HSS NPT Taps

Ground thread High Speed Steel pipe taps.



Tap	No. Flutes	Overall Length (in.)	Thread Length (in.)	Code No.
1/16-27	4	2-1/8	.688	123-430
1/8-27	4	2-1/8	.750	123-432
1/4-18	4	2-7/16	1.063	123-434
3/8-18	4	2-9/16	1.063	123-436
1/2-14	4	3-1/8	1.375	123-438
3/4-14	5	3-1/4	1.375	123-440
1-11-1/2	5	3-3/4	1.750	123-442
1-1/4-11-1/2	5	4	1.750	123-444
1-1/2-11-1/2	7	4-1/4	1.750	123-446
2-11-1/2	7	4-1/2	1.750	123-448

HSS 6" OAL NPT Taps

Long series high speed steel pipe taps for longer reach applications.



Tap	No. Flutes	Overall Length (in.)	Thread Length (in.)	Code No.
1/16-27	4	6"	.688	122-430
1/8-27	4	6"	.750	122-432
1/4-18	4	6"	1.063	122-434
3/8-18	4	6"	1.063	122-436
1/2-14	4	6"	1.375	122-438

HSS NPT Interrupted Thread Taps

These taps are designed to produce less cutting pressure in a variety of applications.



Tap	No. Flutes	Overall Length (in.)	Thread Length (in.)	Code No.
1/8-27	4	2-1/8	.750	123-700
1/4-18	4	2-7/16	1.063	123-702
3/8-18	4	2-9/16	1.063	123-704
1/2-14	4	3-1/8	1.375	123-706
3/4-14	5	3-1/4	1.375	123-708
1-11-1/2	5	3-3/4	1.750	123-710

Blue Ring Tap & Drill Set

Featuring Blue Ring Taps
For general ductile materials including:

- Low and Medium Carbon Steel
- Brass
- Copper and Cast Iron
- Aluminum

Comes in a metal case.



Description	Code No.
Blue Ring tap and drill set Set consists of the following Taps - 6-32, 8-32, 10-24, 10-32, 1/4-20, 5/16-18, 3/8-16, 7/16-14, 1/2-13 Drills - #36, #29, #25, #21, #7, F, 5/16, U, 27/64	113-721
Metric Blue Ring Spiral Point tap and drill set Set consists of the following Taps - M2.5 to M12 Drills - #46, 40, 33, 30, 19, 9, H, Q	113-658

Yellow Ring Tap & Drill Set

Featuring Yellow Ring Taps
For tough materials including:

- High Carbon Steel
- High Alloy
- Titanium
- Aluminum

Comes in metal case.



Description	Code No.
N.C. Yellow Ring Spiral Point tap and drill set Set consists of the following Taps - 6-32 to 1/2-13 Drills - #36, #29, #25, #21, #7, F, 5/16, U, 27/64	113-651
N.F. Yellow Ring Spiral Point tap and drill set Set consists of the following Taps - 6-40 to 1/2-20 Drills - #36, #29, #25, #21, #7, F, 5/16, U, 27/64	113-656
Metric Yellow Ring Spiral Point tap and drill set Set consists of the following Taps - M2.5 to M12 Drills - #46, 40, 33, 30, 19, 9, H, Q	113-657

Tapping Speed Guide

TAPPING SPEED GUIDE

Proper tapping speeds are very important in obtaining efficient tapping results. There are many factors which affect proper tapping speeds, some of which are listed below.

MATERIAL FACTORS:

- Thermo-conductivity of the material and wall thickness as it affects heat dispersion
- Variations in carbon content of steel
- Hard spots in material
- Depth of hole to be tapped
- Percentage of full thread to be tapped

TAP FACTORS:

- Major diameters, pitch and lead
- Style of tap
- Width of lands
- Amount of hook or rake
- Length of chamfer
- Bottoming taps normally require slower speeds than plug chamfered taps

Materials			Speed Feet/ Minute
HSSE-V3 BLUE RING			
Low Carbon	1018, 1010, 1035	Normalized	20-50
Medium Carbon	1045, 1050, 1065	Normalized	20-40
Aluminum	Unalloyed, Cast	—	30-80
Brass/Bronze	—	—	30-80
Copper	—	—	25-60
Cast Iron	—	As Cast	20-40
HSSE-V3			
Stainless Steel	200 Series,	Annealed	20-35
	300 Series, 17-4, 15-5	Annealed	20-35
	AM286	Annealed	15-25
	400 Series	Annealed	20-35
Tool Steels	01, A-2, D-2, H-13, P-20	Annealed	15-25
Medium Carbon	1030, 1035, 1038, 1040, 1045, 1050	Normalized	20-40
Alloyed High Carbon	1065, 1070, 1080, 1090,1095, 1561, 1572	Normalized	20-30
High Strength	4140, 4340	Normalized	20-30
Titanium	Commercially Pure	Annealed	15-30
Aluminum	Cast, Wrought	—	30-90
P-HSS			
Stainless Steel	17-4PH, 15-5, 17-7PH,AM350	Hardened	12-20
Tool Steels	01, A-2, D-2, H-13, P-20,	Hardened	10-20
High Strength	4140, 4340, 50100	Hardened	15-20
Nickel Alloys	Inconel, Hastaloy, Waspaloy, Astraloy, Rene, Monel	Annealed and Hardened	5-20
Titanium	6 AL 4	Annealed/ Hardened	8-15
ALUMINUM			
Aluminum		25-60	
Die Cast Aluminum		30-80	
ROLL FORM			
Steels	Sheet, Low/Medium Carbon/Stainless Steels	Hardened	20-50
Aluminum/Copper	Pure/Low Alloyed	30-60	
Aluminum Cast, Copper Alloys	Die Cast, Zinc Die Cast, Brass, Bronze	30-80	

Conversion Table, Surface Feet Per Minute to Revolutions Per Minute

Proper tapping speeds are determined best by experiment. In the table below, speeds shown should be used as a guide only, and the suggested surface feet per minute adjusted upward or downward until the best results are obtained.

Surface Feet Per Minute	20	25	30	40	50	60	70	80	90	100	110	120	130	140	150
Tap Size rpm															
0	1273	1592	1910	2546	3183	3820	4456	5093	5730	6366	7003	7639	8276	8913	9549
1	1047	1308	1570	2093	2617	3140	3663	4186	4710	5233	5756	6279	6808	7326	7849
2	888	1110	1333	1777	2221	2665	3109	3554	3999	4442	4886	5330	5774	6218	6662
3	772	964	1157	1543	1929	2315	2701	3086	3472	3858	4244	4629	5015	5401	5787
4	682	853	1023	1364	1705	2046	2387	2728	3069	3411	3751	4092	4434	4775	5116
5	611	764	917	1222	1528	1833	2139	2445	2750	3056	3361	3667	3973	4278	4584
6	553	691	829	1106	1382	1658	1934	2211	2487	2764	3040	3316	3592	3869	4145
8	466	583	699	932	1165	1387	1631	1864	2097	2330	2563	2796	3029	3262	3495
10	402	502	603	804	1005	1208	1406	1607	1808	2009	2210	2411	2612	2813	3014
12	354	442	531	707	884	1061	1238	1415	1592	1769	1945	2122	2300	2476	2653
1/4	306	382	458	611	764	917	1070	1222	1375	1528	1681	1833	1986	2139	2292
5/16	245	306	367	489	611	733	856	978	1100	1222	1345	1467	1589	1711	1833
3/8	204	255	306	407	509	611	713	815	917	1019	1120	1222	1324	1426	1528
7/16	175	219	262	349	437	524	611	698	786	872	960	1048	1135	1222	1310
1/2	153	191	229	306	382	458	535	611	688	764	840	917	993	1070	1146
9/16	137	172	206	275	344	412	481	550	619	687	756	825	893	963	1031
5/8	122	153	183	244	306	367	428	489	550	611	672	733	794	856	917
3/4	102	128	153	203	255	306	357	407	458	509	560	611	662	713	764
7/8	87	109	131	175	218	262	306	350	392	437	480	524	568	611	655
1	76	96	115	153	191	230	268	306	344	382	420	458	497	535	573

MECHANICAL FACTORS:

- Type of tapping machine and holder; speeds for small diameter taps are often governed by the limitations of the machine
- Condition of tapping machine and spindle
- Type of fixture; vertical or horizontal tapping (faster speeds for vertical tapping)
- Method of feeding the tap
- Cutting fluid used and method of application
- The optimum speed for tapping is the highest speed that conditions permit, consistent with economic tool life

ANSI Tap Dimensions

Mach. Screw Size No.	Nominal Fractional Diameter (in.)	Nominal Metric Diameter (mm)	Tap Dimensions – inches				
			Overall Length	Thread Length	Square Length	Shank Diameter	Size of Square
0	1/16	M1.6	1-5/8	5/16	3/16	.141	.110
1		M1.8	1-11/16	3/8	3/16	.141	.110
2		M2, M2.2	1-3/4	7/16	3/16	.141	.110
3	3/32	M2.5	1-13/16	1/2	3/16	.141	.110
4			1-7/8	9/16	3/16	.141	.110
5	1/8	M3, M3.15	1-15/16	5/8	3/16	.141	.110
6		M3.5	2	11/16	3/16	.141	.110
8	5/32	M4	2-1/8	3/4	1/4	.168	.131
10	3/16	M4.5, M5	2-3/8	7/8	1/4	.194	.152
12	7/32		2-3/8	15/16	9/32	.220	.165
14	1/4	M6, M6.3	2-1/2	1	5/16	.255	.191
	5/16	M7, M8	2-23/32	1-1/8	3/8	.318	.238
	3/8	M10	2-15/16	1-1/4	7/16	.381	.286
	7/16		3-5/32	1-7/16	13/32	.323	.242
	1/2	M12, 12.5	3-3/8	1-21/32	7/16	.367	.275
	9/16	M14	3-19/32	1-21/32	1/2	.429	.322
	5/8	M16	3-13/16	1-13/16	9/16	.480	.360
	11/16	M18	4-1/32	1-13/16	5/8	.542	.406
	3/4		4-1/4	2	11/16	.590	.442
	13/16	M20	4-15/32	2	11/16	.652	.489
	7/8	M22	4-11/16	2-7/32	3/4	.697	.523
	15/16	M24	4-29/32	2-7/32	3/4	.760	.570
	1	M25	5-1/8	2-1/2	13/16	.800	.600
	1-1/16	M27	5-1/8	2-1/2	7/8	.895	.672
	1-1/8		5-7/16	2-9/16	7/8	.896	.672
	1-3/16	M30	5-7/16	2-9/16	1	1.021	.766
	1-1/4		5-3/4	2-9/16	1	1.021	.766
	1-5/16	M33	5-3/4	2-9/16	1-1/16	1.108	.831
	1-3/8		6-1/16	3	1-1/16	1.108	.831
	1-7/16	M36	6-1/16	3	1-1/8	1.233	.925
	1-1/2		6-3/8	3	1-1/8	1.233	.925
	1-5/8	M39	6-11/16	3-3/16	1-1/8	1.305	.979
	1-3/4	M42	7	3-3/16	1-1/4	1.430	1.072
	1-7/8		7-5/16	3-9/16	1-1/4	1.519	1.139
	2	M48	7-5/8	3-9/16	1-3/8	1.644	1.233

Nominal Size Inches	NPT Dimensions – inches				
	Overall Length	Thread Length	Square Length	Shank Diameter	Size of Square
1/16	2-1/8	11/16	3/8	.3125	.234
1/8	2-1/8	3/4	3/8	.3125	.234
1/8	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

Tap/Drill Chart - Inch

To minimize tapping problems and lengthen tool life, use the largest drill possible to produce a minor diameter that will result in the lowest percentage of full thread consistent with adequate strength. A minor diameter that provides a 55% to 65% thread is sufficient for most requirements, but in some cases a higher percentage of thread may be necessary to conform with the minor diameter limits of the thread class specified.

TAP DRILL SIZES

Drills generally cut holes larger than their diameters. In the table to the right, the probable percentages of full thread were determined by the average amount oversize the various drills are expected to cut.

■ SUGGESTED PIPE TAP DRILL SIZES

Tap Size	Pipe Taper	Tap Drill Size Straight†
1/16	D	-
1/8	R	S
1/4	7/16	29/64
3/8	37/64	19/32
1/2	23/32	47/64
3/4	59/64	15/16
1	1-5/32	1-3/16
1-1/4	1-1/2	1-33/64
1-1/2	1-47/64	1-3/4
2	2-7/32	2-7/32
2-1/2	2-5/8	-
3	3-1/4	-

* Sizes given permit direct tapping without reaming the hole, but only give a full thread for the first two or three threads

† For Dryseal Straight Pipe Threads suggested drill sizes are as shown, except; 1/4" pipe, use .444 drill size

TAP/DRILL SELECTION

Tap	Tap Drill	Decimal Equiv. of Tap Drill	Theo. Oversize Mean	Probable Oversize Mean	Probable Hole Size	% of Threads
0-80	56 3/64	.0465 .0469	83 81	.0015 .0015	.0480 .0484	74 71
1-64	54 53	.0550 .0595	89 67	.0015 .0015	.0565 .0610	81 59
1-72	53 1/16	.0595 .0625	75 58	.0015 .0015	.0610 .0640	67 50
5-56	51 50 49	.0670 .0700 .0730	82 69 56	.0017 .0017 .0017	.0687 .0717 .0747	74 62 49
2-64	50 49	.0700 .0730	79 64	.0017 .0017	.0717 .0747	70 56
3-48	48 5/64 47 46 45	.0760 .0781 .0785 .0810 .0820	85 77 76 67 61	.0019 .0019 .0019 .0019 .0019	.0779 .0800 .0801 .0829 .0839	78 70 69 60 56
3-56	46 45 44	.0810 .0820 .0860	78 73 56	.0019 .0019 .0020	.0829 .0839 .0880	69 65 47
4-40	44 43 42 3/32	.0860 .0890 .0935 .0938	80 71 57 56	.0020 .0020 .0020 .0020	.0880 .0910 .0955 .0958	74 65 51 50
4-48	42 3/32 41	.0935 .0938 .0960	68 68 59	.0020 .0020 .0020	.0955 .0958 .0980	61 60 52
5-40	40 39 38 37	.0980 .0995 .1015 .1040	83 79 72 65	.0023 .0023 .0023 .0023	.1003 .1018 .1038 .1063	76 71 65 58
5-44	38 37 36	.1015 .1040 .1065	79 71 63	.0023 .0023 .0023	.1038 .1063 .1088	72 63 55
6-32	37 36 7/64 35 34 33	.1040 .1065 .1094 .1100 .1110 .1130	84 78 70 69 67 62	.0023 .0023 .0026 .0026 .0026 .0026	.1063 .1088 .1120 .1126 .1136 .1156	78 72 64 63 60 55
6-40	34 33 32	.1110 .1130 .1160	83 77 68	.0026 .0026 .0026	.1136 .1156 .1186	75 69 60
8-32	29 28	.1360 .1405	69 58	.0029 .0029	.1389 .1434	62 51
8-36	29 28 9/64	.1360 .1405 .1406	78 68 68	.0029 .0029 .0029	.1389 .1434 .1435	70 57 57
10-24	27 26 25 24 23 5/32 22	.1440 .1470 .1495 .1520 .1540 .1563 .1570	85 79 75 70 67 62 61	.0032 .0032 .0032 .0032 .0032 .0032 .0032	.1472 .1502 .1527 .1552 .1572 .1595 .1602	79 74 69 64 61 56 55
10-32	5/32 22 21	.1563 .1570 .1590	83 81 76	.0032 .0032 .0032	.1595 .1602 .1672	75 73 64
	20 19	.1610 .1660	71 59	.0032 .0032	.1642 .1692	64 51
12-24	11/64 17 16 15 14	.1719 .1730 .1770 .1800 .1820	82 79 72 67 63	.0035 .0035 .0035 .0035 .0035	.1754 .1765 .1805 .1835 .1855	75 73 66 60 56
12-28	16 15 14 13 3/16	.1770 .1800 .1820 .1850 .1875	84 78 73 67 61	.0035 .0035 .0038 .0035 .0035	.1805 .1835 .1835 .1885 .1970	77 70 66 59 54

Tap/Drill Chart - Inch - cont'd

Formula: Percentage of Full Thread

Threads Per Inch x Major Dia. of Tap = Drill Dia.
.01299

= Percentage of Full Thread

Example: Determine percentage of full thread for
2" - 12N Tap, using 1.9219" Drill.

$2.0000 - 1.9219 = .0781 \div .01299 = 6.012$

Threads Per Inch = $\times 12$

Theoretical Percentage of Full Threads = 72.144

Formula: Tap Drill Size

Major Dia. of Tap - $.1299 \times$ Percent of Full Thread
Number of threads Per inch

= Drill Size

Example: Determine drill size for 2" -
12N Tap, 70% Full Thread.

Basic Major Diameter of Tap = 2.0000"

$.01299 \times 70 = .9093 \div 12 = .0758"$

Theoretical Drill Size = 1.9242"

Nearest Standard Drill Size 1 59/64 = 1.9219"

	*Deep Hole Tapping	Average Commercial	Thin Sheet Stock or Stamping
FREE CUTTING MATERIAL			
Aluminum			
Brass			
Bronze			
Cast Iron	60%-70%	65%-70%	75%-85%
Copper			
Mild Steel			
Tool Steel			
FREE CUTTING MATERIAL			
Cast Steel			
Drop Forging			
Monel Metal	55%-65%	65%-70%	
Nickel Steel			
Stainless Steel			

* Sizes given permit direct tapping without reaming the hole, but only give a full thread for the first two or three threads

TAP/DRILL SELECTION

Tap	Tap Drill	Decimal Equiv. of Tap Drill	Theo. Oversize Mean	Probable Oversize Mean	Probable Hole Size	% of Threads
1/4-20	9	.1960	83	.0038	.1998	77
	8	.1990	79	.0039	.2028	73
	7	.2010	75	.0038	.2048	70
	13/64	.2031	72	.0038	.2068	66
	6	.2040	71	.0038	.2078	65
	5	.2055	69	.0038	.2093	63
1/4-28	4	.2090	63	.0038	.2128	57
	3	.2130	80	.0038	.2168	72
	7/32	.2188	67	.0038	.2226	59
	2	.2210	63	.0038	.2248	55
	F	.2570	77	.0038	.2608	72
	G	.2610	71	.0041	.2651	66
5/16-18	17/64	.2656	65	.0041	.2697	59
	H	.2660	64	.0041	.2701	59
	H	.2660	86	.0041	.2701	78
	I	.2720	75	.0041	.2761	67
5/16-24	J	.2770	66	.0041	.2811	58
	5/16	.3125	77	.0044	.3169	72
	O	.3160	73	.0044	.3204	68
3/8-16	P	.3230	64	.0044	.3274	59
	21/64	.3281	87	.0044	.3325	79
	Q	.3320	79	.0044	.3364	71
3/8-24	R	.3390	67	.0044	.3434	58
	T	.3580	86	.0046	.3626	81
	23/64	.3594	84	.0046	.3640	79
7/16-14	U	.3680	75	.0046	.3726	70
	3/8	.3750	67	.0046	.3796	62
	V	.3770	65	.0046	.3816	61
7/16-20	W	.3860	79	.0046	.3906	72
	25/64	.3906	72	.0046	.3952	65
	X	.3970	62	.0046	.4016	55
1/2-13	27/64	.4219	78	.0047	.4266	73
	7/16	.4375	63	.0047	.4422	58
1/2-20	29/64	.4531	72	.0047	.4578	65
9/16-12	15/32	.4688	87	.0048	.4736	82
	31/64	.4844	72	.0048	.4892	68
9/16-18	1/2	.5000	87	.0048	.5048	80
	33/64	.5156	65	.0048	.5204	58
	17/32	.5313	79	.0049	.5362	75
5/8-11	35/64	.5469	66	.0049	.5618	62
	9/16	.5628	87	.0049	.5674	80
5/8-18	37/64	.5781	65	.0049	.5831	58
	41/64	.6406	84	.0050	.6456	80
3/4-10	21/32	.6563	72	.0050	.6613	68
	11/16	.6875	77	.0050	.6925	71
7/8-9	49/64	.7656	76	.0052	.7708	72
	25/32	.7812	65	.0052	.7864	61
7/8-14	51/64	.7969	84	.0052	.8021	79
	13/16	.8125	67	.0052	.8177	62
1-8	55/64	.8594	87	.0059	.8653	83
	7/8	.8750	77	.0059	.8809	73
	57/64	.8906	67	.0059	.8965	64
1-12	29/32	.9063	58	.0059	.9122	54
	29/32	.9063	87	.0059	.9122	81
	59/64	.9219	72	.0060	.9279	67
1-14	15/16	.9375	58	.0060	.9435	52
	59/64	.9219	84	.0060	.9279	78
1-1/8-7	15/16	.9375	67	.0060	.9435	61
	31/21	.9688	84	.0062	.9750	81
	63/64	.9844	76	.0067	.9911	72
1-1/8-12	1	1.0000	67	.0070	1.0070	64
	1-1/64	1.0156	59	.0070	1.0226	55
	1-1/32	1.0313	87	.0071	1.0384	80
1-1/4-7	1-3/64	1.0469	72	.0072	1.0541	66
	1-3/32	1.0938				
	1-7/64	1.1094				
1-1/4-12	1-1/8	1.1250				
	1-5/32	1.1563				
	1-11/64	1.1719				
1-3/8-6	1-3/16	1.1875				
	1-13/64	1.2031				
	1-7/32	1.2188				
1-3/8-12	1-15/64	1.2344				
	1-9/32	1.2813				
	1-19/64	1.2969				
1-1/2-6	1-5/16	1.3125				
	1-21/64	1.3281				
	1-11/32	1.3438				
1-1/2-12	1-23/64	1.3594				
	1-13/32	1.4063				
	1-27/64	1.4219				

Reaming
Recommended

Tap/Drill Chart - Metric

METRIC TAP DRILL SIZES

(drill sizes based on approximate 72%-77% Full Thread)

Tap Size	Pitch Form	Tap Drill Size	Alt. Tap Drill	Tap Size	Pitch Form	Tap Drill Size	Alt. Tap Drill
I.S.O. METRIC COARSE				I.S.O. METRIC FINE			
1.6	0.35mm	1.25mm	3/64	3	0.35mm	2.65mm	37
1.7	0.35mm	1.35mm	55	4	0.35mm	3.65mm	27
1.8	0.35mm	1.45mm	54	4	0.50mm	3.50mm	29
2	0.40mm	1.60mm	1/16	4.5	0.45mm	4.06mm	21
2.2	0.45mm	1.75mm	50	5	0.50mm	4.50mm	16
2.3	0.40mm	1.90mm	49	5	0.70mm	4.30mm	18
2.5	0.45mm	2.05mm	46	5	0.75mm	4.25mm	18
2.6	0.45mm	2.15mm	44	5.5	0.50mm	5.00mm	9
3	0.5mm	2.50mm	40	6	0.50mm	5.50mm	7/32
3.5	0.60mm	2.90mm	33	6	0.75mm	5.25mm	5
4	0.70mm	3.30mm	30	7	0.75mm	6.25mm	D
4.5	0.75mm	3.70mm	27	8	0.50mm	7.50mm	M
5	0.80mm	4.20mm	19	8	1.00mm	7.00mm	J
5.5	0.90mm	4.60mm	15	9	0.50mm	8.50mm	Q
6	1.00mm	5.00mm	9	9	1.00mm	8.00mm	O
7	1.00mm	6.00mm	15/64	10	0.50mm	9.50mm	3/8
8	1.25mm	6.80mm	H	10	0.75mm	9.25mm	U
9	1.25mm	7.80mm	5/16	10	1.00mm	9.00mm	T
10	1.50mm	8.50mm	Q	10	1.25mm	8.75mm	11/32
11	1.50mm	9.50mm	3/8	11	1.00mm	10.00mm	X
12	1.75mm	10.20mm	Y	12	1.00mm	11.00mm	7/16
14	2.00mm	12.00mm	15/32	12	1.25mm	10.75mm	27/64
16	2.00mm	14.00mm	35/64	12	1.50mm	10.50mm	Z
18	2.50mm	15.50mm	39/64	13	1.50mm	11.50mm	29/64
20	2.50mm	17.50mm	11/16	13	1.75mm	11.25mm	7/16
22	2.50mm	19.50mm	49/64	14	1.25mm	12.75mm	1/2
24	3.00mm	21.00mm	53/64	14	1.50mm	12.50mm	31/64
27	3.00mm	24.00mm	61/64	15	1.50mm	13.50mm	17/32
30	3.50mm	26.50mm	1-3/64	16	1.00mm	15.00mm	19/32
33	3.50mm	29.50mm	1-5/32	16	1.25mm	14.75mm	37/64
36	4.00mm	32.00mm	1-1/4	16	1.50mm	14.50mm	9/16
39	4.00mm	35.00mm	1-3/8	18	1.00mm	17.00mm	43/64
				18	1.25mm	16.75mm	21/32
				18	1.50mm	16.50mm	41/64
				18	2.00mm	16.00mm	5/8
				20	1.00mm	19.00mm	3/4
				20	1.50mm	18.50mm	47/64
				20	2.00mm	18.00mm	45/64
				22	1.0mm	21.00mm	53/64
				22	1.50mm	20.50mm	13/16
				22	2.00mm	20.00mm	25/32
				24	1.00mm	23.00mm	29/32
				24	1.50mm	22.50mm	7/8
				24	2.00mm	22.00mm	55/64
				24	2.50mm	21.50mm	27/32

DECIMAL EQUIVALENTS

FOR FRACTIONAL, WIRE GAUGE, LETTER & METRIC (MM) SIZE DRILLS

Drill Size	Decimal Inches	Drill Size	Decimal Inches	Drill Size	Decimal Inches	Drill Size	Decimal Inches	Drill Size	Decimal Inches
0.25	0098	2.00	0787	#14	1820	21/64"	3281	35/64"	5469
0.30	0118	2.05	0807	4.70	1850	8.40	3307	14.00	5512
#80	0135	#46	0810	#13	1850	Q	3320	14.25	5610
0.35	0138	#45	0820	3/16"	1875	8.50	3346	9/16"	5625
#79	0145	2.10	0827	4.80	1890	8.60	3386	14.50	5709
1/64"	0156	2.15	0846	#12	1890	R	3390	37/64"	5781
0.40	0157	#44	0860	#11	1910	8.70	3425	14.75	5807
#78	0160	2.20	0866	4.90	1929	11/32"	3437	15.00	5906
0.45	0177	2.25	0886	#10	1935	8.80	3465	19/32"	5937
#77	0180	#43	0890	#9	1960	S	3480	15.25	6004
0.50	0197	2.30	0905	5.00	1968	8.90	3504	39/64"	6094
#76	0200	2.35	0925	#8	1990	9.00	3543	15.50	6102
#75	0210	#42	0935	5.10	2008	T	3580	15.75	6201
0.55	0217	3/32"	0937	#7	2010	9.10	3583	5/8"	6250
#74	0225	2.40	0945	13/64"	2031	23/64"	3594	16.00	6299
0.60	0236	#41	0960	#6	2040	9.20	3622	16.25	6398
#73	0240	2.45	0965	5.20	2047	9.30	3661	41/64"	6406
#72	0250	#40	0980	#5	2055	U	3680	16.50	6496
0.65	0256	2.50	0984	5.30	2087	9.40	3701	21/32"	6562
#71	0260	#39	0995	#4	2090	9.50	3740	16.75	6594
0.70	0276	2.55	1004	5.40	2126	3/8"	3750	17.00	6693
#70	0280	#38	1015	#3	2130	V	3770	43/64"	6719
#69	0292	2.60	1024	5.50	2165	9.60	3780	17.25	6791
0.75	0295	#37	1040	7/32"	2187	9.70	3819	11/16"	6875
#68	0310	2.65	1043	5.60	2205	9.80	3858	17.50	6890
1/32"	0313	2.70	1063	#2	2210	W	3860	17.75	6988
0.80	0315	#36	1065	5.70	2244	9.90	3898	45/64"	7031
#67	0320	2.75	1083	#1	2280	25/64"	3906	18.00	7087
#66	0330	7/64"	1093	5.80	2283	10.00	3937	18.25	7185
0.85	0335	#35	1100	5.90	2323	X	3970	23/32"	7187
#65	0350	2.80	1102	A	2340	10.10	3976	18.50	7283
0.90	0354	#34	1110	15/64"	2344	10.20	4016	47/64"	7344
#64	0360	2.85	1122	6.00	2362	Y	4040	18.75	7382
#63	0370	#33	1130	B	2380	10.30	4055	19.00	7480
0.95	0374	2.90	1142	6.10	2401	13/32"	4062	3/4"	7500
#62	0380	#32	1160	C	2420	10.40	4094	19.25	7579
#61	0390	2.95	1161	6.20	2441	Z	4130	49/64"	7656
1.00	0394	3.00	1181	D	2460	10.50	4134	19.50	7677
#60	0400	#31	1200	6.30	2480	10.60	4173	19.75	7776
#59	0410	3.10	1220	E- 1/4"	2500	10.70	4213	25/32"	7812
1.05	0413	1/8"	1250	6.40	2520	27/64"	4219	20.00	7874
#58	0420	3.20	1260	6.50	2559	10.80	4252	51/64"	7969
#57	0430	#30	1285	F	2570	10.90	4291	20.25	7972
1.10	0433	3.30	1299	6.60	2598	11.00	4330	20.50	8071
1.15	0453	3.40	1339	G	2610	11.10	4370	13/16"	8125
#56	0465	#29	1360	6.70	2638	7/16"	4375	20.75	8169
3/64"	0469	3.50	1378	17/64"	2656	11.20	4409	21.00	8268
1.20	0472	#28-9/64	1405	H	2660	11.30	4449	53/64"	8281
1.25	0492	3.60	1417	6.80	2677	11.40	4488	21.25	8366
1.30	0512	#27	1440	6.90	2716	11.50	4528	27/32"	8437
#55	0520	3.70	1457	I	2720	29/64"	4531	21.50	8465
1.35	0531	#26	1470	7.00	2756	11.60	4567	21.75	8563
1.40	0550	#25	1495	J	2770	11.70	4606	55/64"	8594
#54	0550	3.80	1496	7.10	2795	11.80	4646	22.00	8661
1.45	0571	#24	1520	K-9/32"	2811	11.90	4685	7/8"	8750
1.50	0591	3.90	1535	7.20	2835	15/32"	4687	22.25	8760
#53	0595	#23	1540	7.30	2874	12.00	4724	22.50	8858
1.55	0610	5/32"	1562	L	2900	12.10	4764	57/64"	8906
1/16"	0625	#22	1570	7.40	2913	12.20	4803	22.75	8957
1.60	0629	4.00	1575	M	2950	12.30	4843	23.00	9055
#52	0635	#21	1590	7.50	2953	31/64"	4843	29/32"	9062
1.65	0650	#20	1610	19/64"	2968	12.40	4882	23.25	9154
1.70	0669	4.10	1614	7.60	2992	12.50	4921	59/64"	9219
#51	0670	4.20	1654	N	3020	12.60	4961	23.50	9252
1.75	0689	#19	1660	7.70	3031	12.70	5000	23.15	9350
#50	0700	4.30	1693	7.80	3071	1/2"	5000	15/16"	9375
1.80	0709	#18	1695	7.90	3110	12.80	5039	24.00	9449
1.85	0730	11/64"	1719	5/16"	3125	12.90	5079	61/64"	9531
#49	0730	#17	1730	8.00	3150	13.00	5118	24.25	9541
1.90	0748	4.40	1732	O	3160	33/64"	5156	24.50	9646
#48	0760	#16	1770	8.10	3189	13.20	5197	31/32"	9688
1.95	0768	4.50	1771	8.20	3228	17/32"	5313	24.75	9744
5/64"	0781	#15	1800	P	3230	13.50	5315	25.00	9843
#47	0785	4.60	1811	8.30	3268	13.80	5433	63/64"	9844
						1"	1 0000		

TAP DRILL SIZES

(Drill Sizes Based on Approximate 72% - 77% Full Thread)

TAP SIZE	PITCH FORM	TAP DRILL SIZE	ALT TAP DRILL	TAP SIZE	PITCH FORM	TAP DRILL SIZE	ALT TAP DRILL
UNIFIED TAPS				I.S.O. METRIC COARSE			
0	80 (UNF)	3/64	1.25	1.6	0.35mm	1.25mm	3/64
1	64 (UNC)	53	1.55	1.7	0.35mm	1.35mm	55
	72 (UNF)	53	1.55	1.8	0.35mm	1.45mm	54
2	56 (UNC)	50	1.85	2	0.40mm	1.60mm	1/16
	64 (UNF)	50	1.90	2.2	0.45mm	1.75mm	51
3	48 (UNC)	47	2.10	2.3	0.40mm	1.90mm	49
	56 (UNF)	45	2.15	2.5	0.45mm	2.05mm	46
4	40 (UNC)	43	2.35	2.6	0.45mm	2.15mm	44
	48 (UNF)	42	2.40	3	0.5mm	2.50mm	40
5	40 (UNC)	38	2.65	3.5	0.60mm	2.90mm	33
	44 (UNF)	37	2.70	4	0.70mm	3.30mm	30
6	32 (UNC)	36	2.85	4.5	0.75mm	3.70mm	27
	40 (UNF)	33	2.90	5	0.80mm	4.20mm	19
8	32 (UNC)	29	3.50	5.5	0.90mm	4.60mm	15
	36 (UNF)	29	3.50	6	1.00mm	5.00mm	9
10	24 (UNC)	25	3.90	7	1.00mm	6.00mm	15/64
	32 (UNF)	21	4.10	8	1.25mm	6.80mm	H
12	24 (UNC)	16	4.50	9	1.25mm	7.80mm	5/16
	28 (UNF)	14	4.70	10	1.50mm	8.50mm	Q
1/4	20 (UNC)	7	5.10	11	1.50mm	9.50mm	3/8
	28 (UNF)	3	5.50	12	1.75mm	10.20mm	Y
5/16	18 (UNC)	F	6.60	14	2.00mm	12.00mm	15/32
	24 (UNF)	I	6.90	16	2.00mm	14.00mm	35/64
3/8	16 (UNC)	5/16	8.00	18	2.50mm	15.50mm	39/64
	24 (UNF)	Q	8.50	20	2.50mm	17.50mm	11/16
7/16	14 (UNC)	U	9.40	22	2.50mm	19.50mm	49/64
	20 (UNF)	25/64	9.90	24	3.00mm	21.00mm	53/64
1/2	13 (UNC)	27/64	10.80	27	3.00mm	24.00mm	61/64
	20 (UNF)	29/64	11.50	30	3.50mm	26.50mm	1-3/64
9/16	12 (UNC)	31/64	12.20	33	3.50mm	29.50mm	1-5/32
	18 (UNF)	33/64	12.90	36	4.00mm	32.00mm	1-1/4
5/8	11 (UNC)	17/32	13.50	39	4.00mm	35.00mm	1-3/8
	18 (UNF)	37/64	14.50	I.S.O. METRIC FINE			
3/4	10 (UNC)	21/32	16.50	3	0.35mm	2.65mm	37
	16 (UNF)	11/16	17.50	4	0.35mm	3.65mm	27
7/8	9 (UNC)	49/64	19.50	4	0.50mm	3.50mm	29
	14 (UNF)	13/16	20.40	4.5	0.45mm	4.06mm	21
1	8 (UNC)	7/8	22.25	5	0.50mm	4.50mm	16
	12 (UNF)	59/64	23.25	5	0.70mm	4.30mm	18
1-1/8	14 (UNS)	15/16	23.50	5	0.75mm	4.25mm	18
	7 (UNC)	63/64	25.00	5.5	0.50mm	5.00mm	9
1-1/4	12 (UNF)	1-3/64	26.50	6	0.50mm	5.50mm	7/32
	7 (UNC)	1-7/64	28.00	6	0.75mm	5.25mm	5
1-3/8	12 (UNF)	1-11/64	29.50	7	0.75mm	6.25mm	D
	6 (UNC)	1-7/32	30.75	8	0.50mm	7.50mm	M
1-1/2	12 (UNF)	1-19/64	32.75	8	1.00mm	7.00mm	J
	6 (UNC)	1-11/32	34.00	9	0.50mm	8.50mm	Q
1-3/4	12 (UNF)	1-27/64	36.00	9	1.00mm	8.00mm	O
	5 (UNC)	1-9/16	39.50	10	0.50mm	9.50mm	3/8
2	4-12 (UNC)	1-25/32	45.00	10	0.75mm	9.25mm	U
				10	1.00mm	9.00mm	T
				10	1.25mm	8.75mm	11/32
TAPER PIPE TAPS NPT				11	1.00mm	10.00mm	X
1/16	27 NPT	D	6.30	12	1.00mm	11.00mm	7/16
1/8	27 NPT	R	8.70	12	1.25mm	10.75mm	27/64
1/4	18 NPT	7/16	11.10	12	1.50mm	10.50mm	Z
3/8	18 NPT	37/64	14.50	13	1.50mm	11.50mm	29/64
1/2	14 NPT	23/32	18.25	13	1.75mm	11.25mm	7/16
3/4	14 NPT	59/64	23.25	14	1.25mm	12.75mm	1/2
1	11-1/2 NPT	1-5/32	29.00	14	1.50mm	12.50mm	31/64
1-1/4	11-1/2 NPT	1-1/2	38.00	15	1.50mm	13.50mm	17/32
1-1/2	11-1/2 NPT	1-47/64	44.00	16	1.00mm	15.00mm	19/32
2	11-1/2 NPT	2-7/32	56.00	16	1.25mm	14.75mm	37/64
2-1/2	8 NPT	2-5/8	67.00	16	1.50mm	14.50mm	9/16
3	8 NPT	3-1/4	82.50	18	1.00mm	17.00mm	43/64
				18	1.25mm	16.75mm	21/32
				18	1.50mm	16.50mm	41/64
				18	2.00mm	16.00mm	5/8
STRAIGHT PIPE TAPS (NPS)				20	1.00mm	19.00mm	3/4
1/8	27 NPT	S	8.80	20	1.50mm	18.50mm	47/64
1/4	18 NPT	29/64	11.50	20	2.00mm	18.00mm	45/64
3/8	18 NPT	19/32	15.00	22	1.00mm	21.00mm	53/64
1/2	14 NPT	47/64	18.50	22	1.50mm	20.50mm	13/16
3/4	14 NPT	15/16	23.75	22	2.00mm	20.00mm	25/32
1	11-1/2 NPT	1-3/16	30.25	24	1.00mm	23.00mm	29/32
1-1/4	11-1/2 NPT	1-33/64	38.50	24	1.50mm	22.50mm	7/8
1-1/2	11-1/2 NPT	1-3/4	44.50	24	2.00mm	22.00mm	55/64
2	11-1/2 NPT	2-7/32	56.00	24	2.50mm	21.50mm	27/32

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