



**TAPS**

# SGSP Spiral Taps

## High Performance Tap for a Variety of Materials

Covers a wide range of applications -  
 Aluminum, Cast Iron, Carbon Steel,  
 Alloy Steel and Stainless Steel  
 ANSI Shank DIN Overall Length

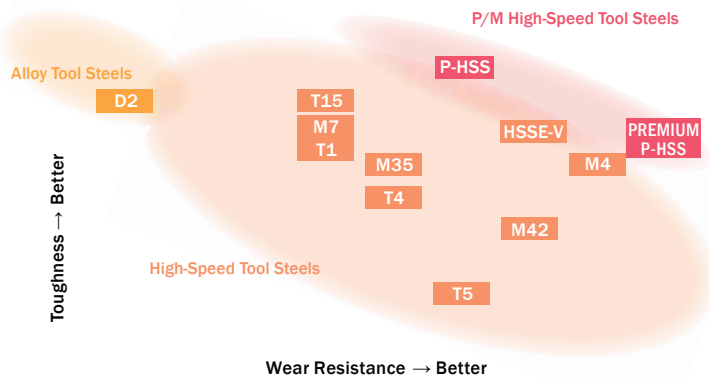


## Features

- Made from high grade powder HSS and SG coating for longer tool life
- Optimized edge and flute shape allow for stable cutting threads, high rigidity and chip ejection
- High flexibility for superior performance on a variety of materials, machines, and cutting conditions
- Stable cutting threads and long tool life regardless of cutting speed
- Achieves easy flow of chips while cutting on Stainless Steels, Structural Steels and Aluminum Alloys

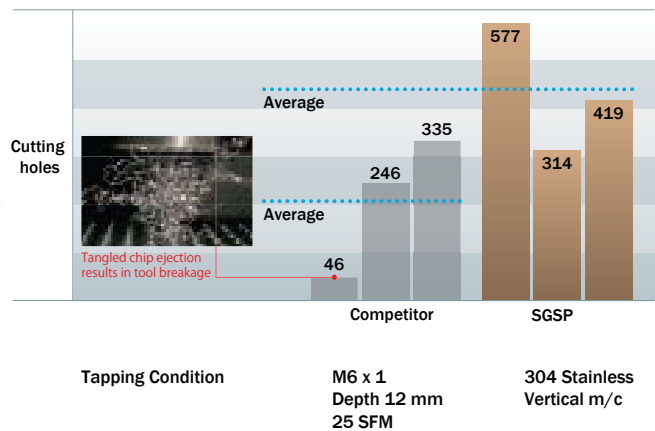
## Properties

Properties of NACHI Premium P-HSS  
 High toughness can be obtained even at high hardness levels



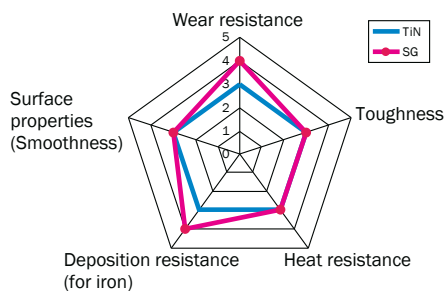
## Performance

Long tool life with Stainless Steels



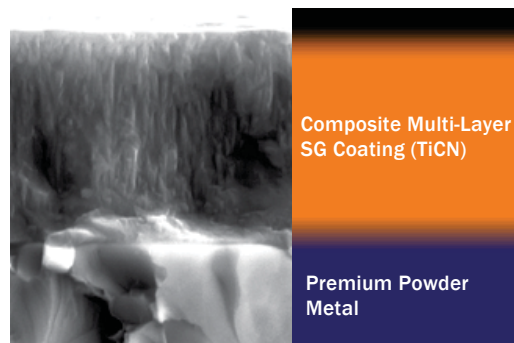
## Characteristics

Characteristics of SG Coating



Composite multi-layer film coating method characterized by improved wear resistance as compared to TiN.

## SG Coating (Tin + TiCN)



## Applications

- Suitable for tapping Structural Steels to Stainless Steels, Aluminum Alloys

## Selection Chart

● : Great ○ : Good △ : OK

Carbon Steel			Alloy Steel 4140,4340	Die Steel ~20Hrc D2,H13	Aluminum 6061 7075	Stainless Steel			Cast Iron Grey Ductile	Nickel Alloy	Titanium Alloy	Hardened Steel >35Hrc
Low Carbon 1010,1018	Medium Carbon 1035,1045	High Carbon 1065,1095				300 Series	400 Series	17-4PH				
●	●	●	●	○	○	●	○	△	○		△	

## Features

1. **Nachi Viper Taflet Taps** are specially engineered for steels, and require less torque than conventional coldform taps. This reduces the chance of breakage.
2. **Nachi Viper Taflet Taps** are steam oxide surface treated to limit adhesion from fusion, and carries coolant to the work area. Bright finish is available when required.
3. **Nachi Viper Taflet Taps** have more radial sections for higher accuracy of internal threads in steel. This compares favorably to coldform internal threads, which aren't always clean and accurate.



VIPER TAFLET

## Work Materials

- Structural Steels, Carbon Steels, Alloy Steels, Stainless Steels, Aluminum Alloys

## Performance

### TAFLET

Fiber flow is:

NOT INTERRUPTED.



Female thread cut by a TAFLET

### Cutting Tap

Fiber flow is:

INTERRUPTED.



Female thread cut by a cutting tap

### Features of TAFLET

Item	Cutting tap	TAFLET	TAFLET features
Tap breakdown	×	○	Does not break because there is no groove
Trouble caused by chips	×	○	No trouble because there is no chip
Accuracy of female thread	×	○	Little variations because of cold forming tapping
Female thread surface roughness	×	○	Excellent because threads are finished by sliding over the tap surface
Tapping torque	○	×	1.5 through 2.5 times the torque of a cutting tap
Female thread strength	×	○	Excellent because fiber flow is not interrupted in plastic working
Workpiece	○	×	Limited to the material of good malleability



DLC TAFLET

## DLC TAFLET

### Semi-Dry Tapping

Forming tap with DLC coating can be used in Aluminum, Aluminum Alloys, Die Cast Aluminum.

The tap shown below, M6x1.0, tapped 1,000 holes in A6061 with mist hole lube applied and has minimum adhesion of material.

Size: M6x1.0

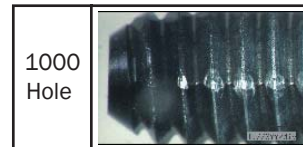
Work Material: A6061-T6

Speed: 15m/min (49.2SFM)

Feed: 1.0mm/rev (0.039IPR)

Depth of Thread: 13mm

Coolant: Mist Lube (25cc x 2 nozzle / h)



1000 Hole

Stocked Size	Taps Name	List No.	Page
	DLC TAFLET THREAD FORMING TAPS / Fractional Sizes	6955	246
	DLC TAFLET THREAD FORMING TAPS / Machine Screw Sizes	6957	246
	DLC TAFLET THREAD FORMING TAPS / Metric Sizes	6956	247
	VIPER TAFLET THREAD FORMING TAPS / Machine Screw Sizes	995	258
	VIPER TAFLET THREAD FORMING TAPS / Fractional Sizes	995	259
	VIPER TAFLET THREAD FORMING TAPS / Metric Sizes	996	260

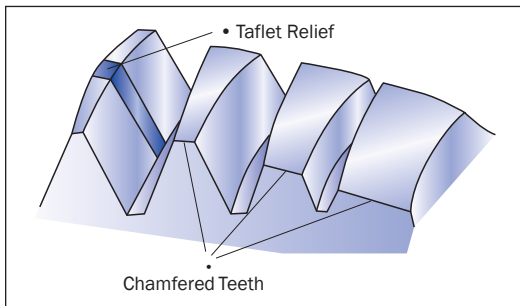
## Features

- Viper T Series are suitable for various material.
- "Viper T for STAINLESS" series are the best taps for STAINLESS STEEL.

## Work Materials

- Structural Steels, Carbon Steels, Alloy Steels, Stainless Steels, Aluminum Alloys

## Performance



Nachi TDT Viper T-Series Taps were specifically designed to overcome the major difficulties of spiral fluted taps: oversizing and chip control. An all-new approach to these limitations also provides double-action tapping - cutting with chamfered teeth, *plus cold rolled forming* with a specially engineered shape of thread that we call *Taflet Relief*.








The results provide two-fold benefits. The first is minimal or no oversized thread diameter over the entire thread length, with smooth thread surfaces. The second is smooth chip ejection, ensuring freedom from chips for trouble-free performance, especially on machining centers and on unattended machining lines.









Conventional Taps    T-Series Taps

Stocked Size	Taps Name	List No.	Page
	VIPER T / Spiral Flute-Machine Screw Sizes	7981	251
	VIPER T / Spiral Flute-Fractional Sizes	7981	251
	VIPER T / Spiral Point-Machine Screw Sizes	7971	252
	VIPER T / Spiral Point-Fractional Sizes	7971	252
	VIPER T / Spiral Flute-Metric Sizes	7980	253
	VIPER T / Spiral Point-Metric Sizes	7970	253
	VIPER T / Spiral Flute-Machine Screw Sizes	7987	254
	VIPER T / Spiral Flute-Fractional Sizes	7987	254
	VIPER T FOR STAINLESS STEEL / Spiral Point-Machine Screw	7977	255
	VIPER T FOR STAINLESS STEEL / Spiral Point-Fractional Sizes	7977	255
	VIPER T FOR STAINLESS STEEL / Spiral Flute-Metric Sizes	7982	256
	VIPER T FOR STAINLESS STEEL / Spiral Point-Metric Sizes	7972	256







## HIGH PERFORMANCE TAPS

LIST No.		Drill Name	Material	Coating		Stock Size	Product Page
<b>DLC Taflet Thread Forming Taps</b>							
6955			HSSE-V	DLC	Fractional	1/4 to 1/2	p.246
6957					Machine Screw	2 to 12	p.246
6956					Metric	M2 to M12	p.247
<b>SG Low Spiral Taps</b>							
6959			HSSE	SG	Fractional Machine Screw	2 to 12, 1/4 to 1	p.248
6958					Metric	M3 to M24	p.249

## VIPER T-SERIES FOR GENERAL PURPOSE

LIST No.		Drill Name	Material	Coating		Stock Size	Product Page
<b>Viper T / Spiral Point</b>							
7971			HSSE-V	Black Oxide	Fractional	1/4 to 1	p.252
7971					Machine Screw	2 to 12	p.252
7970					Metric	M3 to M24	p.253
<b>Viper T / Spiral Flute</b>							
7981			HSSE-V	Black Oxide	Fractional	1/4 to 1	p.251
7981					Machine Screw	2 to 12	p.251
7980					Metric	M3 to M24	p.253

## VIPER T-SERIES FOR STAINLESS STEEL

LIST No.		Drill Name	Material	Coating		Stock Size	Product Page
<b>Viper T / Spiral Point</b>							
7977			HSSE-V	Black Oxide	Fractional	1/4 to 1	p.255
7977					Machine Screw	2 to 12	p.255
7972					Metric	M3 to M24	p.256
<b>Viper T / Spiral Flute</b>							
7987			HSSE-V	Black Oxide	Fractional	1/4 to 1	p.254
7987					Machine Screw	2 to 12	p.254
7982					Metric	M3 to M24	p.256

● : Great ○ : Good △ : OK

LIST No.	Cutting Condition Page	Hole Condition				Workpiece Material										
		Blind Hole		Through Hole		Structural Steel (SS)	Carbon Steel	Alloy Steel (SCM, SCR)	Pre Hardened Steel	Die Steel	Hardened Steel		Stainless Steel	Cast Iron	Aluminum Alloy	Copper Alloy
		<1.5x Dia.	≥1.5x Dia.	<1.5x Dia.	≥1.5x Dia.					HRc	HRc					
25 to 40	45 to 50	50 to 65														
<b>DLC Taflet Thread Forming Taps</b>																
6955	p.271	●	○	●	○										●	●
6957	p.271	●	○	●	○										●	●
6956	p.271	●	○	●	○										●	●
<b>SG Low Spiral Taps</b>																
6959	p.271	●	○	●	○				○	●	△					
6958	p.271	●	○	●	○				○	●	△					

● : Great ○ : Good △ : OK




LIST No.	Cutting Condition Page	Hole Condition				Workpiece Material										
		Blind Hole		Through Hole		Structural Steel (SS)	Carbon Steel	Alloy Steel (SCM, SCR)	Pre Hardened Steel	Die Steel	Hardened Steel		Stainless Steel	Cast Iron	Aluminum Alloy	Copper Alloy
		<1.5x Dia.	≥1.5x Dia.	<1.5x Dia.	≥1.5x Dia.					HRc	HRc					
25 to 40	45 to 50	50 to 65														
<b>Viper T / Spiral Point</b>																
7971	p.271			●	●	○	○	○	○					○	○	○
7971	p.271			●	●	○	○	○	○					○	○	○
7970	p.271			●	●	○	○	○	○					○	○	○
<b>Viper T / Spiral Flute</b>																
7981	p.271	●	○	△	△	○	○	○	○					○	○	○
7981	p.271	●	○	△	△	○	○	○	○					○	○	○
7980	p.271	●	○	△	△	○	○	○	○					○	○	○

● : Great ○ : Good △ : OK







LIST No.	Cutting Condition Page	Hole Condition				Workpiece Material										
		Blind Hole		Through Hole		Structural Steel (SS)	Carbon Steel	Alloy Steel (SCM, SCR)	Pre Hardened Steel	Die Steel	Hardened Steel		Stainless Steel	Cast Iron	Aluminum Alloy	Copper Alloy
		<1.5x Dia.	≥1.5x Dia.	<1.5x Dia.	≥1.5x Dia.					HRc	HRc					
25 to 40	45 to 50	50 to 65														
<b>Viper T / Spiral Point</b>																
7977	p.271			●	○	△	△	△	△					●	△	△
7977	p.271			●	○	△	△	△	△					●	△	△
7972	p.271			●	○	△	△	△	△					●	△	△
<b>Viper T / Spiral Flute</b>																
7987	p.271	●	○	△	△	△	△	△	△					●	△	△
7987	p.271	●	○	△	△	△	△	△	△					●	△	△
7982	p.271	●	○	△	△	△	△	△	△					●	△	△

\*Some sizes do not meet this preference. Please make sure of the flute length of each size before use.










## VIPER TAFLET

LIST No.		Drill Name	Material	Coating		Stock Size	Product Page
<b>Viper Taflet Thread Forming Taps</b>							
995			HSSE-V	Black Oxide	Machine Screw	0 to 12	p.258
995					Fractional	1/4 to 3/4	p.259
996					Metric	2 to 20	p.260

## VTP TAPS

LIST No.		Drill Name	Material	Coating		Stock Size	Product Page
<b>Viper T / Spiral Point</b>							
971			HSSE-V	Black Oxide	Fractional	1/4 to 1	p.263
973					Machine Screw	2 to 10	p.263
982					Metric	3 to 18	p.264
<b>Viper T / Spiral Flute</b>							
981			HSSE-V	Black Oxide	Fractional	1/4 to 1	p.262
983					Machine Screw	2 to 10	p.262
980					Metric	3 to 18	p.264

## STANDARD TAPS

LIST No.		Drill Name	Material	Coating		Stock Size	Product Page
<b>Hand Taps</b>							
911			HSSE-V	Bright	Fractional	1/4 to 1-1/2	p.265
913			HSSE-V	Bright	Machine Screw	0 to 12	p.266
910			HSS	Bright	Metric	M2 to M30	p.270
969			HSSE-V	Black Oxide	Inch	1/4 to 3/4	p.267
<b>Spiral Point</b>							
923			HSS	Bright	Machine Screw	0 to 12	p.268
921			HSSE-V	Bright	Fractional	1/4 to 3/4	p.267
920			HSS	Bright	Metric	M2.5 to M16	p.270
<b>Taper Pipe Taps</b>							
941			HSS	Bright	NPT	1/16 to 2	p.269
947			HSSE-V	Black Oxide	NPT	1/16 to 1	p.269

● : Great   ○ : Good   △ : OK

LIST No.	Cutting Condition Page	Hole Condition				Workpiece Material										
		Blind Hole		Through Hole		Structural Steel (SS)	Carbon Steel	Alloy Steel (SCM, SCR)	Pre Hardened Steel	Die Steel	Hardened Steel		Stainless Steel	Cast Iron	Aluminum Alloy	Copper Alloy
		<1.5x Dia.	≥1.5x Dia.	<1.5x Dia.	≥1.5x Dia.					Hrc	Hrc					
								25 to 40	45 to 50	50 to 65						
<b>Viper Taflet Thread Forming Taps</b>																
995	p.271	●	○	●	○	●	●	○					○			
995	p.271	●	○	●	○	●	●	○					○			
996	p.271	●	○	●	○	●	●	○					○			

● : Great   ○ : Good   △ : OK

LIST No.	Cutting Condition Page	Hole Condition				Workpiece Material										
		Blind Hole		Through Hole		Structural Steel (SS)	Carbon Steel	Alloy Steel (SCM, SCR)	Pre Hardened Steel	Die Steel	Hardened Steel		Stainless Steel	Cast Iron	Aluminum Alloy	Copper Alloy
		<1.5x Dia.	≥1.5x Dia.	<1.5x Dia.	≥1.5x Dia.					Hrc	Hrc					
									25 to 40	45 to 50	50 to 65					
<b>Viper T / Spiral Point</b>																
971	p.271			●	○	●	●	○	○					○	○	○
973	p.271			●	○	●	●	○	○					○	○	○
982	p.271			●	○	●	●	○	○					○	○	○
<b>Viper T / Spiral Flute</b>																
981	p.271	●	○	△	△	●	●	○	○					○	○	○
983	p.271	●	○	△	△	●	●	○	○					○	○	○
980	p.271	●	○	△	△	●	●	○	○					○	○	○

● : Great   ○ : Good   △ : OK

LIST No.	Cutting Condition Page	Hole Condition				Workpiece Material										
		Blind Hole		Through Hole		Structural Steel (SS)	Carbon Steel	Alloy Steel (SCM, SCR)	Pre Hardened Steel	Die Steel	Hardened Steel		Stainless Steel	Cast Iron	Aluminum Alloy	Copper Alloy
		<1.5x Dia.	≥1.5x Dia.	<1.5x Dia.	≥1.5x Dia.					Hrc	Hrc					
									25 to 40	45 to 50	50 to 65					
<b>Hand Taps</b>																
911	p.271	●	○	●	○	△	△	△	△					△	△	△
913	p.271	●	○	●	○	△	△	△	△					△	△	△
910	p.271	●	○	●	○	△	△	△	△					△	△	△
969	p.271	●	○	●	○	△	△	△	△					●		
<b>Spiral Points</b>																
923	p.271			●	○	△	△	△	△					△	△	△
921	p.271			●	○	△	△	△	△					△	△	△
920	p.271	●	○	●	○	△	△	△	△					△	△	△
<b>Taper Pipe Taps</b>																
941	p.271	○	△	○	△	△	△	△	△					△	△	△
947	p.271	○	△	○	△	○	○	○	○					○	○	○

TAPS



**HIGH PERFORMANCE TAPS**

**DLC TAFLET THREAD FORMING TAPS / FRACTIONAL SIZE**  
**DLC TAFLET THREAD FORMING TAPS / MACHINE SCREW SIZES**

**List No. 6955**

Fractional Size



Bottoming Style  
DLC Coating



Forming TAP with DLC coating can be used in Aluminum Alloy, Die Cast Aluminum and Copper.

Nominal Size	Thread/Inch		E. D. P. Numbers								Dimensions			Std. Pack.
	NC UNC	NF UNF	H2	H3	H4	H5	H6	H7	H8	H10	Overall Length	Length of Thread	Shank Dia.	
1/4	20	28			97838		97912				2 1/2	0.591	0.255	1
					97840		97914				2 1/2	0.591	0.255	1
5/16	18	24				97873		97931			2 23/32	0.669	0.318	1
						97875		97933			2 23/32	0.669	0.318	3
3/8	16	24				97877		97935			2 15/16	0.748	0.381	3
						97879		97937			2 15/16	0.748	0.381	3
7/16	14					97881			97961		3 5/32	0.866	0.323	3
1/2	13					97885			97965		3 3/8	0.984	0.367	3

**List No. 6957**

Machine Screw Sizes



Bottoming Style  
DLC Coating



Forming TAP with DLC coating can be used in Aluminum Alloy, Die Cast Aluminum and Copper.

Nominal Size	Thread/Inch		E. D. P. Numbers								Dimensions			Std. Pack.
	NC UNC	NF UNF	H2	H3	H4	H5	H6	H7	H8	H10	Overall Length	Length of Thread	Shank Dia.	
2	56		97738	97776							1 3/4	0.437	0.141	3
4	40			97784		97857					1 7/8	0.354	0.141	1
6	32			97792		97865					2	0.433	0.141	1
8	32			97796		97869					2 1/8	0.472	0.168	1
10	24	32			97830		97904				2 3/8	0.551	0.194	3
					97832		97906			2 3/8	0.551	0.194	1	
12	24				97834		97908				2 3/8	0.551	0.220	3

**List No. 6956**

Metric Sizes



Bottoming Style  
DLC Coating



Forming TAP with DLC coating can be used in Aluminum Alloy,  
Die Cast Aluminum and Copper.

Nominal Size (mm)	Pitch (mm)	E. D. P. Numbers								Dimensions			Std. Pack.
		D3	D4	D5	D6	D7	D8	D9	D10	Overall Length	Length of Thread	Shank Dia.	
2	0.4	91002								1 3/4	0.437	0.119	1
2.5	0.45	91008								1 13/16	0.500	0.119	1
3	0.5	91011								1 15/16	0.394	0.141	1
4	0.7		91017							2 1/8	0.472	0.168	1
5	0.8		91023							2 3/8	0.551	0.194	1
6	1			91026				91027		2 1/2	0.591	0.255	3
8	1.25						91035	91036		2 23/32	0.669	0.318	3
10	1.25						91038			2 15/16	0.748	0.381	3
	1.5							91041		2 15/16	0.748	0.381	1
12	1.75								91047	3 3/8	0.984	0.367	3

**SG LO-SPIRAL FLUTED TAPS /  
MACHINE SCREW SIZES & FRACTIONAL SIZE**

**List No. 6959**



Modified Bottoming Style 2 1/2 to 3 Thread Lead  
SG Coating



\*GT to H-limit conversion chart refer to Page: 310

Nominal Size	Thread/Inch		No. of Flutes	E.D.P. Numbers							Dimensions			Std. Pack.
	NC UNC	NF UNF		GT3	GT4	GT5	GT6	GT7	GT8	GT9	Overall Length	Length of Thread	Shank Dia.	
<b>MACHINE SCREW SIZES</b>														
2	56		3	94597							1 3/4	0.437	0.141	1
		64	3	94598							1 3/4	0.437	0.141	1
3	48		3		94599						1 13/16	0.500	0.141	1
		56	3	94600							1 13/16	0.500	0.141	1
4	40		3			94601					1 7/8	0.236	0.141	3
		48	3		94602						1 7/8	0.236	0.141	1
5	40		3			94603					1 15/16	0.236	0.141	1
		44	3			94604					1 15/16	0.236	0.141	1
6	32		3			94605					2	0.276	0.141	1
		40	3			94606					2	0.276	0.141	1
8	32		3			94607					2 1/8	0.276	0.168	3
		36	3			94608					2 1/8	0.276	0.168	1
10	24		3				94609				2 3/8	0.354	0.194	3
		32	3			94610					2 3/8	0.354	0.194	1
12	24		3				94611				2 3/8	0.354	0.220	1
		28	3				94612				2 3/8	0.354	0.220	1
<b>FRACTIONAL SIZES</b>														
1/4	20		3		94633			94613			2 1/2	0.433	0.255	1
		28	3		94634		94614				2 1/2	0.433	0.255	3
5/16	18		3		94635			94615			2 23/32	0.472	0.318	1
		24	3		94636			94616			2 23/32	0.472	0.318	1
3/8	16		3		94637				94617		2 15/16	0.551	0.381	1
		24	3		94638				94618		2 15/16	0.551	0.381	1
7/16	14		3						94619		3 5/32	0.709	0.323	1
		20	3		94639				94620		3 5/32	0.709	0.323	3
1/2	13		3		94640					94621	3 3/8	0.787	0.367	1
		20	3		94641					94622	3 3/8	0.787	0.367	1
9/16	12		3							94623	3 19/32	0.827	0.429	1
		18	3							94624	3 19/32	0.827	0.429	1
5/8	11		3							94625	3 13/16	0.905	0.480	1
		18	3							94626	3 13/16	0.905	0.480	1
3/4	10		4							94627	4 1/4	0.984	0.590	1
		16	4							94628	4 1/4	0.984	0.590	1
7/8	9		4								4 11/16	1.102	0.697	1
		14	4								4 11/16	1.102	0.697	1
1	8		4								5 1/8	1.260	0.800	1
		12	4								5 1/8	1.260	0.800	1

**List No. 6958** Metric Sizes



Modified Bottoming Style 2 1/2 to 3 Thread Lead  
SG Coating



\*GT to H-limit conversion chart refer to Page: 310

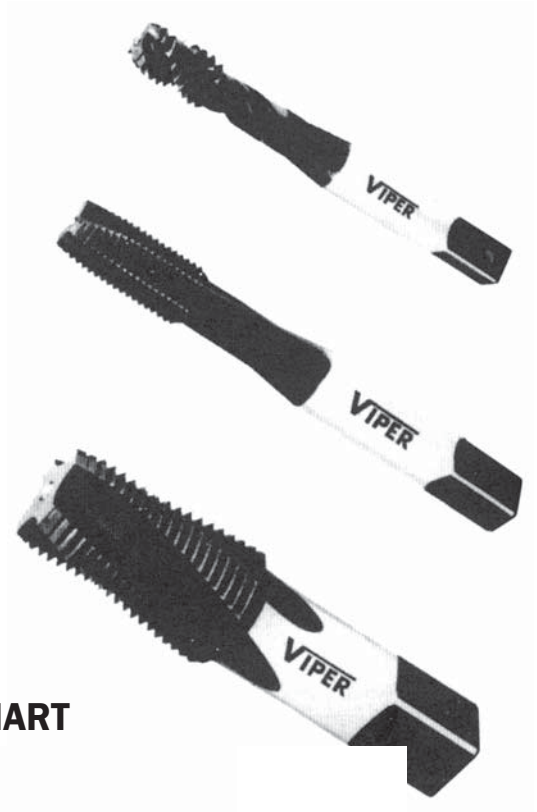
Nominal Size (mm)	Pitch (mm)	No. Of Flutes	E.D.P. Numbers					Dimensions			Std. Pack.	
			GT5	GT6	GT7	GT8	GT9	Overall Length	Length of Thread	Shank Dia.		
<b>METRIC</b>												
3	0.5	3	59615						1 15/16	0.236	0.141	3
4	0.7	3	59617						2 1/8	0.276	0.168	3
5	0.8	3		59619					2 3/8	0.354	0.194	1
6	1	3		59620					2 1/2	0.433	0.255	1
8	1	3		59622					2 23/32	0.472	0.318	3
	1.25	3		59623					2 23/32	0.472	0.318	1
10	1.25	3		59624					2 15/16	0.551	0.381	3
	1.5	3			59625				2 15/16	0.551	0.381	1
12	1.25	3				59626			3 3/8	0.669	0.367	3
	1.75	3				59627			3 3/8	0.669	0.367	1
14	1.5	3				59628			3 19/32	0.787	0.429	1
	2	3				59629			3 19/32	0.787	0.429	3
16	1.5	3				59630			3 13/16	0.787	0.480	1
	2	3				59631			3 13/16	0.787	0.480	1
18	1.5	4				59632			4 1/32	0.984	0.542	1
	2.5	4					59633		4 1/32	0.984	0.542	1
20	1.5	4				59634			4 15/32	0.984	0.652	1
	2.5	4					59635		4 15/32	0.984	0.652	1
22	1.5	4				59636			4 11/16	0.984	0.697	1
	2.5	4					59637		4 11/16	0.984	0.697	1
24	1.5	4				59638			4 29/32	1.181	0.760	1
	3	4					59639		4 29/32	1.181	0.760	1

# NACHI VIPER

Viper taps go straight to the heart of tough work with problem-free tapping of stainless steel and other advanced metals. They provide superior threads and less torque, faster chip removal and cooler tapping job after job.

All this because Viper taps are made exclusively of specialty high speed steels, heat treated to maximize the advanced heat resistance characteristics of Cobalt and Tungsten and the wear resistance of Vanadium.

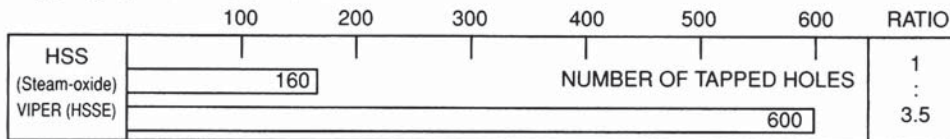
No tap is better engineered than Viper to demonstrate a longer tool life working in advanced materials with less down time and more economy. The special geometry extends tap life and the standard steam oxide maximizes the cooling effect to make rigorous tapping easy. Bright finish taps are also available where required for non-ferrous materials or special coatings as required. CNC manufacturing assures consistent quality time after time.



## COMPARISON CHART

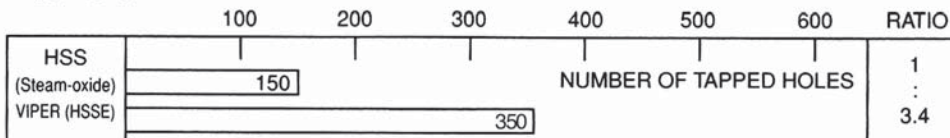
### TOOL LIFE COMPARISON TEST RESULT (1)

Tap: Spiral point tap M10 x 1.5 Plug  
 Material: SUS 630 (HRC=45), Thickness 20mm  
 Drill: 8.5mm dia.  
 Tapping speed: 8.8 m/min.



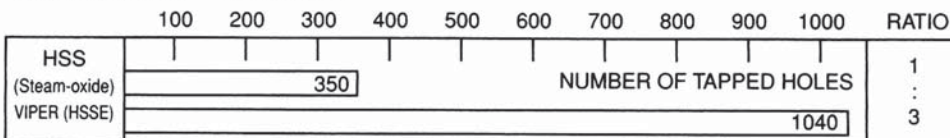
### TOOL LIFE COMPARISON TEST RESULT (2)

Tap: Spiral point tap M12 x 1.75 Plug  
 Material: SUS 304 (HRC=30~35) Cold formed nut, Thickness 15mm  
 Drill: 10.3mm dia.  
 Tapping speed: 9.5 m/min.



### TOOL LIFE COMPARISON TEST RESULT (3)

Tap: Spiral point tap M8 x 1.25 C2.5P Plug  
 Material: SUS 304 (HRC=20~25), Thickness 18mm  
 Drill: 6.7mm dia.  
 Tapping speed: 8.2 m/min.



List No. 7981



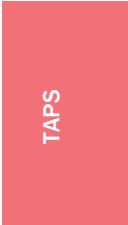
Modified Bottoming Style, 2 1/2 To 3 Thread Lead  
Surface Treated

VANADIUM HIGH SPEED STEEL HSSE-V



\*GT to H-limit conversion chart refer to Page: 310

Nominal Size	Thread/Inch		No. of Flutes	E.D.P. Numbers							Dimensions			Std. Pack.
	NC UNC	NF UNF		GT3	GT4	GT5	GT6	GT7	GT8	GT9	Overall Length	Length of Thread	Shank Dia.	
<b>MACHINE SCREW SIZES</b>														
2	56	64	3	97597	—	—	—	—	—	—	1 3/4	0.437	0.141	1
			3	97598	—	—	—	—	—	—	1 3/4	0.437	0.141	3
3	48	56	3	—	97599	—	—	—	—	—	1 13/16	0.500	0.141	1
			3	97600	—	—	—	—	—	—	1 13/16	0.500	0.141	3
4	40	48	3	—	—	97601	—	—	—	—	1 7/8	0.236	0.141	3
			3	—	97602	—	—	—	—	—	1 7/8	0.236	0.141	3
5	40	44	3	—	—	97603	—	—	—	—	1 15/16	0.236	0.141	3
			3	—	—	97604	—	—	—	—	1 15/16	0.236	0.141	3
6	32	40	3	—	—	97605	—	—	—	—	2	0.276	0.141	1
			3	—	—	97606	—	—	—	—	2	0.276	0.141	1
8	32	36	3	—	—	97607	—	—	—	—	2 1/8	0.276	0.168	1
			3	—	—	97608	—	—	—	—	2 1/8	0.276	0.168	3
10	24	32	3	—	—	—	97609	—	—	—	2 3/8	0.354	0.194	1
			3	—	—	97610	—	—	—	—	2 3/8	0.354	0.194	1
12	24	28	3	—	—	—	97611	—	—	—	2 3/8	0.354	0.220	3
			3	—	—	—	97612	—	—	—	2 3/8	0.354	0.220	1
<b>FRACTIONAL SIZES</b>														
1/4	20	28	3	—	97633	—	—	97613	—	—	2 1/2	0.433	0.255	1
			3	—	97638	—	97614	—	—	—	2 1/2	0.433	0.255	3
5/16	18	24	3	—	97643	—	—	97615	—	—	2 23/32	0.472	0.318	1
			3	—	97648	—	—	97616	—	—	2 23/32	0.472	0.318	3
3/8	16	24	3	—	97653	—	—	—	97617	—	2 15/16	0.551	0.381	1
			3	—	97658	—	—	97618	—	—	2 15/16	0.551	0.381	3
7/16	14	20	3	—	97663	—	—	—	97619	—	3 5/32	0.709	0.323	3
			3	—	97668	—	—	—	97620	—	3 5/32	0.709	0.323	1
1/2	13	20	3	—	97673	—	—	—	97621	—	3 3/8	0.787	0.367	1
			3	—	97678	—	—	—	97622	—	3 3/8	0.787	0.367	3
9/16	12	18	3	—	97683	—	—	—	97623	—	3 19/32	0.827	0.429	3
			3	—	97688	—	—	—	97624	—	3 19/32	0.827	0.429	1
5/8	11	18	3	—	97693	—	—	—	—	97625	3 13/16	0.906	0.480	1
			3	—	97698	—	—	—	97626	—	3 13/16	0.906	0.480	3
3/4	10	16	3	—	97705	—	—	—	—	97627	4 1/4	0.984	0.590	1
			3	—	97710	—	—	—	97628	—	4 1/4	0.984	0.590	1
7/8	9	14	4	—	—	97715	—	—	—	97629	4 11/16	1.102	0.697	1
			4	—	—	97720	—	—	—	97630	4 11/16	1.102	0.697	3
1	8	12	4	—	—	97725	—	—	—	97631	5 1/8	1.260	0.800	1
			4	—	—	97730	—	—	—	97632	5 1/8	1.260	0.800	3



VIPER T SERIES-SPIRAL POINTED / GENERAL PURPOSE

List No. 7971

VANADIUM HIGH SPEED STEEL HSSE-V



Plug Style, 4 To 5 Thread  
Surface Treated



\*GT to H-limit conversion chart refer to Page: 310

Nominal Size	Thread/Inch		No. of Flutes	E.D.P. Numbers							Dimensions			Std. Pack.
	NC UNC	NF UNF		GT3	GT4	GT5	GT6	GT7	GT8	GT9	Overall Length	Length of Thread	Shank Dia.	
<b>MACHINE SCREW SIZES</b>														
2	56	64	2	98597	—	—	—	—	—	—	1 3/4	0.437	0.141	3
		64	2	98598	—	—	—	—	—	—	1 3/4	0.437	0.141	3
3	48	56	2	—	98599	—	—	—	—	—	1 13/16	0.500	0.141	3
		56	2	98600	—	—	—	—	—	—	1 13/16	0.500	0.141	3
4	40	48	2	—	—	98601	—	—	—	—	1 7/8	0.354	0.141	1
		48	2	—	98602	—	—	—	—	—	1 7/8	0.354	0.141	1
5	40	44	3	—	—	98603	—	—	—	—	1 15/16	0.394	0.141	3
		44	3	—	—	98604	—	—	—	—	1 15/16	0.394	0.141	3
6	32	40	3	—	—	98605	—	—	—	—	2	0.433	0.141	1
		40	3	—	—	98606	—	—	—	—	2	0.433	0.141	3
8	32	36	3	—	—	98607	—	—	—	—	2 1/8	0.472	0.168	1
		36	3	—	—	98608	—	—	—	—	2 1/8	0.472	0.168	3
10	24	32	3	—	—	—	98609	—	—	—	2 3/8	0.551	0.194	1
		32	3	—	—	98610	—	—	—	—	2 3/8	0.551	0.194	1
12	24	28	3	—	—	—	98611	—	—	—	2 3/8	0.551	0.220	1
		28	3	—	—	—	98612	—	—	—	2 3/8	0.551	0.220	3
<b>FRACTIONAL SIZES</b>														
1/4	20	28	3	—	98633	—	—	98613	—	—	2 1/2	0.591	0.255	1
		28	3	—	98638	—	98614	—	—	—	2 1/2	0.591	0.255	3
5/16	18	24	3	—	98643	—	—	98615	—	—	2 23/32	0.669	0.318	1
		24	3	—	98648	—	—	98616	—	—	2 23/32	0.669	0.318	3
3/8	16	24	3	—	98653	—	—	—	98617	—	2 15/16	0.748	0.381	1
		24	3	—	98658	—	—	98618	—	—	2 15/16	0.748	0.381	1
7/16	14	20	3	—	98663	—	—	—	98619	—	3 5/32	0.984	0.323	3
		20	3	—	98668	—	—	—	98620	—	3 5/32	0.984	0.323	3
1/2	13	20	3	—	98673	—	—	—	98621	—	3 3/8	1.142	0.367	1
		20	3	—	98678	—	—	—	98622	—	3 3/8	1.142	0.367	3
9/16	12	18	3	—	98683	—	—	—	98623	—	3 19/32	1.181	0.429	3
		18	3	—	98688	—	—	—	98624	—	3 19/32	1.181	0.429	3
5/8	11	18	3	—	98693	—	—	—	—	98625	3 13/16	1.260	0.480	1
		18	3	—	98698	—	—	—	98626	—	3 13/16	1.260	0.480	3
3/4	10	16	3	—	98705	—	—	—	—	98627	4 1/4	1.457	0.590	1
		16	3	—	98710	—	—	—	98628	—	4 1/4	1.457	0.590	3
7/8	9	14	3	—	—	98715	—	—	—	98629	4 11/16	1.496	0.697	3
		14	4	—	—	98720	—	—	—	98630	4 11/16	1.496	0.697	3
1	8	12	3	—	—	98725	—	—	—	98631	5 1/8	1.772	0.800	1
		12	4	—	—	98730	—	—	—	98632	5 1/8	1.772	0.800	3

**List No. 7980**

Spiral Fluted

VANADIUM HIGH SPEED STEEL HSSE-V



Modified Bottoming Style, 2 1/2 To 3 Thread Surface Treated



\*GT to H-limit conversion chart refer to Page: 310

Nominal Size (mm)	Pitch (mm)	No. Of Flutes	E.D.P. Number					Dimensions			Std. Pack.
			GT5	GT6	GT7	GT8	GT9	Overall Length	Length of Thread	Shank Dia.	
<b>METRIC</b>											
3	0.5	3	57615	—	—	—	—	1 15/16	0.236	0.141	1
3.5	0.6	3	57616	—	—	—	—	2	0.276	0.141	3
4	0.7	3	57617	—	—	—	—	2 1/8	0.276	0.168	3
5	0.8	3	—	57619	—	—	—	2 3/8	0.354	0.194	1
6	1	3	—	57620	—	—	—	2 1/2	0.433	0.255	1
7	1	3	—	57621	—	—	—	2 23/32	0.472	0.318	3
8	1	3	—	57622	—	—	—	2 23/32	0.472	0.318	1
8	1.25	3	—	57623	—	—	—	2 23/32	0.472	0.318	3
10	1.25	3	—	57624	—	—	—	2 15/16	0.551	0.381	1
10	1.5	3	—	—	57625	—	—	2 15/16	0.551	0.381	1
12	1.25	3	—	—	—	57626	—	3 3/8	0.669	0.367	3
12	1.75	3	—	—	—	57627	—	3 3/8	0.669	0.367	1
14	1.5	3	—	—	—	57628	—	3 19/32	0.787	0.429	1
14	2	3	—	—	—	57629	—	3 19/32	0.787	0.429	1
16	1.5	3	—	—	—	57630	—	3 13/16	0.787	0.480	3
16	2	3	—	—	—	57631	—	3 13/16	0.787	0.480	1
18	1.5	3	—	—	—	57632	—	4 1/32	0.984	0.542	3
18	2.5	3	—	—	—	—	57633	4 1/32	0.984	0.542	3
20	1.5	4	—	—	—	57634	—	4 15/32	0.984	0.652	3
20	2.5	4	—	—	—	—	57635	4 15/32	0.984	0.652	1
22	1.5	4	—	—	—	57636	—	4 11/16	0.984	0.697	1
22	2.5	4	—	—	—	—	57637	4 11/16	0.984	0.697	1
24	1.5	4	—	—	—	57638	—	4 29/32	1.181	0.760	3
24	3	4	—	—	—	—	57639	4 29/32	1.181	0.760	1

**List No. 7970**

Spiral Pointed

VANADIUM HIGH SPEED STEEL HSSE-V



Plugstyle, 4 To 5 Thread Surface Treated



\*GT to H-limit conversion chart refer to Page: 310

Nominal Size (mm)	Pitch (mm)	No. Of Flutes	E.D.P. Number					Dimensions			Std. Pack.
			GT5	GT6	GT7	GT8	GT9	Overall Length	Length of Thread	Shank Dia.	
<b>METRIC</b>											
3	0.5	3	58615	—	—	—	—	1 15/16	0.394	0.141	1
3.5	0.6	3	58616	—	—	—	—	2	0.433	0.141	1
4	0.7	3	58617	—	—	—	—	2 1/8	0.472	0.168	1
5	0.8	3	—	58619	—	—	—	2 3/8	0.551	0.194	1
6	1	3	—	58620	—	—	—	2 1/2	0.591	0.255	1
7	1	3	—	58621	—	—	—	2 23/32	0.669	0.318	3
8	1	3	—	58622	—	—	—	2 23/32	0.669	0.318	1
8	1.25	3	—	58623	—	—	—	2 23/32	0.669	0.318	1
10	1.25	3	—	58624	—	—	—	2 15/16	0.748	0.381	3
10	1.5	3	—	—	58625	—	—	2 15/16	0.748	0.381	1
12	1.25	3	—	—	—	58626	—	3 3/8	1.142	0.367	1
12	1.75	3	—	—	—	58627	—	3 3/8	1.142	0.367	1
14	1.5	3	—	—	—	58628	—	3 19/32	1.181	0.429	3
14	2	3	—	—	—	58629	—	3 19/32	1.181	0.429	1
16	1.5	3	—	—	—	58630	—	3 13/16	1.260	0.480	3
16	2	3	—	—	—	58631	—	3 13/16	1.260	0.480	1
18	1.5	3	—	—	—	58632	—	4 1/32	1.457	0.542	1
18	2.5	3	—	—	—	—	58633	4 1/32	1.457	0.542	3
20	1.5	3	—	—	—	58634	—	4 15/32	1.457	0.652	1
20	2.5	3	—	—	—	—	58635	4 15/32	1.457	0.652	1
22	1.5	4	—	—	—	58636	—	4 11/16	1.496	0.697	3
22	2.5	3	—	—	—	—	58637	4 11/16	1.496	0.697	1
24	1.5	4	—	—	—	58638	—	4 29/32	1.772	0.760	3
24	3	3	—	—	—	—	58639	4 29/32	1.772	0.760	1



List No. 7987



Modified Bottoming Style 2 1/2 To 3 Thread Lead  
Surface Treated

COBALT/VANADIUM HIGH SPEED STEEL HSSE



\*GT to H-limit conversion chart refer to Page: 310

Nominal Size	Thread/Inch		No. of Flutes	E.D.P. Numbers							Dimensions			Std. Pack.
	NC UNC	NF UNF		GT3	GT4	GT5	GT6	GT7	GT8	GT9	Overall Length	Length of Thread	Shank Dia.	
<b>MACHINE SCREW SIZES</b>														
2	56	64	3	96597	—	—	—	—	—	—	1 3/4	0.437	0.141	1
			3	96598	—	—	—	—	—	—	1 3/4	0.437	0.141	3
3	48	56	3	—	96599	—	—	—	—	—	1 13/16	0.500	0.141	1
			3	96600	—	—	—	—	—	—	1 13/16	0.500	0.141	3
4	40	48	3	—	—	96601	—	—	—	—	1 7/8	0.236	0.141	1
			3	—	96602	—	—	—	—	—	1 7/8	0.236	0.141	1
5	40	44	3	—	—	96603	—	—	—	—	1 15/16	0.236	0.141	3
			3	—	—	96604	—	—	—	—	1 15/16	0.236	0.141	3
6	32	40	3	—	—	96605	—	—	—	—	2	0.276	0.141	1
			3	—	—	96606	—	—	—	—	2	0.276	0.141	1
8	32	36	3	—	—	96607	—	—	—	—	2 1/8	0.276	0.168	1
			3	—	—	96608	—	—	—	—	2 1/8	0.276	0.168	3
10	24	32	3	—	—	—	96609	—	—	—	2 3/8	0.354	0.194	1
			3	—	—	96610	—	—	—	—	2 3/8	0.354	0.194	1
12	24	28	3	—	—	—	96611	—	—	—	2 3/8	0.354	0.220	3
			3	—	—	—	96612	—	—	—	2 3/8	0.354	0.220	3
<b>FRACTIONAL SIZES</b>														
1/4	20	28	3	—	—	—	—	96613	—	—	2 1/2	0.433	0.255	1
			3	—	—	—	96614	—	—	—	2 1/2	0.433	0.255	1
5/16	18	24	3	—	—	—	—	96615	—	—	2 23/32	0.472	0.318	1
			3	—	—	—	—	96616	—	—	2 23/32	0.472	0.318	1
3/8	16	24	3	—	—	—	—	—	96617	—	2 15/16	0.551	0.381	1
			3	—	—	—	—	—	96618	—	2 15/16	0.551	0.381	1
7/16	14	20	3	—	—	—	—	—	96619	—	3 5/32	0.709	0.323	3
			3	—	—	—	—	—	96620	—	3 5/32	0.709	0.323	1
1/2	13	20	3	—	—	—	—	—	96621	—	3 3/8	0.787	0.367	1
			3	—	—	—	—	—	96622	—	3 3/8	0.787	0.367	1
9/16	12	18	3	—	—	—	—	—	96623	—	3 19/32	0.827	0.429	1
			3	—	—	—	—	—	96624	—	3 19/32	0.827	0.429	1
5/8	11	18	3	—	—	—	—	—	—	96625	3 13/16	0.905	0.480	1
			3	—	—	—	—	—	96626	—	3 13/16	0.905	0.480	1
3/4	10	16	3	—	—	—	—	—	—	96627	4 1/4	0.984	0.590	1
			3	—	—	—	—	—	96628	—	4 1/4	0.984	0.590	3
7/8	9	14	4	—	—	—	—	—	—	96629	4 11/16	1.102	0.697	1
			4	—	—	—	—	—	—	96630	4 11/16	1.102	0.697	1
1	8	12	4	—	—	—	—	—	—	96631	5 1/8	1.260	0.800	1
			4	—	—	—	—	—	—	96632	5 1/8	1.260	0.800	3

List No. 7977

COBALT/VANADIUM HIGH SPEED STEEL HSS



Plug Style, 4 To 5 Thread Lead  
Surface Treated



\*GT to H-limit conversion chart refer to Page: 310

Nominal Size	Thread/Inch		No. of Flutes	E.D.P. Numbers							Dimensions			Std. Pack.
	NC UNC	NF UNF		GT3	GT4	GT5	GT6	GT7	GT8	GT9	Overall Length	Length of Thread	Shank Dia.	
<b>MACHINE SCREW SIZES</b>														
2	56	64	2	95597	—	—	—	—	—	—	1 3/4	0.437	0.141	1
			2	95598	—	—	—	—	—	—	1 3/4	0.437	0.141	3
3	48	56	2	—	95599	—	—	—	—	—	1 13/16	0.500	0.141	1
			2	95600	—	—	—	—	—	—	1 13/16	0.500	0.141	1
4	40	48	2	—	—	95601	—	—	—	—	1 7/8	0.354	0.141	1
			2	—	95602	—	—	—	—	—	1 7/8	0.354	0.141	3
5	40	44	3	—	—	95603	—	—	—	—	1 15/16	0.394	0.141	3
			3	—	—	95604	—	—	—	—	1 15/16	0.394	0.141	1
6	32	40	3	—	—	95605	—	—	—	—	2	0.433	0.141	1
			3	—	—	95606	—	—	—	—	2	0.433	0.141	1
8	32	36	3	—	—	95607	—	—	—	—	2 1/8	0.472	0.168	3
			3	—	—	95608	—	—	—	—	2 1/8	0.472	0.168	3
10	24	32	3	—	—	—	95609	—	—	—	2 3/8	0.551	0.194	1
			3	—	—	95610	—	—	—	—	2 3/8	0.551	0.194	1
12	24	28	3	—	—	—	95611	—	—	—	2 3/8	0.551	0.220	1
			3	—	—	—	95612	—	—	—	2 3/8	0.551	0.220	3
<b>FRACTIONAL SIZES</b>														
1/4	20	28	3	—	—	—	—	95613	—	—	2 1/2	0.591	0.255	1
			3	—	—	—	95614	—	—	—	2 1/2	0.591	0.255	1
5/16	18	24	3	—	—	—	—	95615	—	—	2 23/32	0.669	0.318	1
			3	—	—	—	—	95616	—	—	2 23/32	0.669	0.318	3
3/8	16	24	3	—	—	—	—	—	95617	—	2 15/16	0.748	0.381	1
			3	—	—	—	—	95618	—	—	2 15/16	0.748	0.381	1
7/16	14	20	3	—	—	—	—	—	95619	—	3 5/32	0.984	0.323	3
			3	—	—	—	—	—	95620	—	3 5/32	0.984	0.323	1
1/2	13	20	3	—	—	—	—	—	95621	—	3 3/8	1.142	0.367	1
			3	—	—	—	—	—	95622	—	3 3/8	1.142	0.367	1
9/16	12	18	3	—	—	—	—	—	95623	—	3 19/32	1.181	0.429	1
			3	—	—	—	—	—	95624	—	3 19/32	1.181	0.429	1
5/8	11	18	3	—	—	—	—	—	—	95625	3 13/16	1.260	0.480	1
			3	—	—	—	—	—	95626	—	3 13/16	1.260	0.480	1
3/4	10	16	3	—	—	—	—	—	—	95627	4 1/4	1.457	0.590	1
			3	—	—	—	—	—	95628	—	4 1/4	1.457	0.590	1
7/8	9	14	3	—	—	—	—	—	—	95629	4 11/16	1.496	0.697	1
			4	—	—	—	—	—	—	95630	4 11/16	1.496	0.697	1
1	8	12	3	—	—	—	—	—	—	95631	5 1/8	1.772	0.800	1
			4	—	—	—	—	—	—	95632	5 1/8	1.772	0.800	3

VIPER T SERIES METRIC TAPS / FOR STAINLESS STEEL

List No. 7982

Spiral Fluted

COBALT/VANADIUM HIGH SPEED STEEL



Modified Bottoming Style 2 1/2 To 3 Thread Lead  
Surface Treated



\*GT to H-limit conversion chart refer to Page: 310

Nominal Size (mm)	Pitch (mm)	No. Of Flutes	E.D.P. Number					Dimensions			Std. Pack.
			GT5	GT6	GT7	GT8	GT9	Overall Length	Length of Thread	Shank Dia.	
<b>METRIC</b>											
3	0.5	3	56615	—	—	—	—	1 15/16	0.236	0.141	1
3.5	0.6	3	56616	—	—	—	—	2	0.276	0.141	1
4	0.7	3	56617	—	—	—	—	2 1/8	0.276	0.168	1
5	0.8	3	—	56619	—	—	—	2 3/8	0.354	0.194	1
6	1	3	—	56620	—	—	—	2 1/2	0.433	0.255	1
7	1	3	—	56621	—	—	—	2 23/32	0.472	0.318	3
8	1	3	—	56622	—	—	—	2 23/32	0.472	0.318	3
8	1.25	3	—	56623	—	—	—	2 23/32	0.472	0.318	1
10	1.25	3	—	56624	—	—	—	2 15/16	0.551	0.381	1
10	1.5	3	—	—	56625	—	—	2 15/16	0.551	0.381	1
12	1.25	3	—	—	—	56626	—	3 3/8	0.669	0.367	1
12	1.75	3	—	—	—	56627	—	3 3/8	0.669	0.367	3
14	1.5	3	—	—	—	56628	—	3 19/32	0.787	0.429	1
14	2	3	—	—	—	56629	—	3 19/32	0.787	0.429	1
16	1.5	3	—	—	—	56630	—	3 13/16	0.787	0.480	1
16	2	3	—	—	—	56631	—	3 13/16	0.787	0.480	1
18	1.5	4	—	—	—	56632	—	4 1/32	0.984	0.542	1
18	2.5	4	—	—	—	—	56633	4 1/32	0.984	0.542	3
20	1.5	4	—	—	—	56634	—	4 15/32	0.984	0.652	3
20	2.5	4	—	—	—	—	56635	4 15/32	0.984	0.652	1
22	1.5	4	—	—	—	56636	—	4 11/16	0.984	0.697	1
22	2.5	4	—	—	—	—	56637	4 11/16	0.984	0.697	1
24	1.5	4	—	—	—	56638	—	4 29/32	1.181	0.760	1
24	3	4	—	—	—	—	56639	4 29/32	1.181	0.760	1

List No. 7972

Spiral Pointed

COBALT/VANADIUM HIGH SPEED STEEL HSSE



Plug Style, 4 To 5 Thread Lead  
Surface Treated



\*GT to H-limit conversion chart refer to Page: 310

Nominal Size (mm)	Pitch (mm)	No. Of Flutes	E.D.P. Number					Dimensions			Std. Pack.
			GT5	GT6	GT7	GT8	GT9	Overall Length	Length of Thread	Shank Dia.	
<b>METRIC</b>											
3	0.5	3	55615	—	—	—	—	1 15/16	0.394	0.141	1
3.5	0.6	3	55616	—	—	—	—	2	0.433	0.141	1
4	0.7	3	55617	—	—	—	—	2 1/8	0.472	0.168	1
5	0.8	3	—	55619	—	—	—	2 3/8	0.551	0.194	1
6	1	3	—	55620	—	—	—	2 1/2	0.591	0.255	1
7	1	3	—	55621	—	—	—	2 23/32	0.669	0.318	1
8	1	3	—	55622	—	—	—	2 23/32	0.669	0.318	1
8	1.25	3	—	55623	—	—	—	2 23/32	0.669	0.318	1
10	1.25	3	—	55624	—	—	—	2 15/16	0.748	0.381	1
10	1.5	3	—	—	55625	—	—	2 15/16	0.748	0.381	1
12	1.25	3	—	—	—	55626	—	3 3/8	1.141	0.367	3
12	1.75	3	—	—	—	55627	—	3 3/8	1.141	0.367	1
14	1.5	3	—	—	—	55628	—	3 19/32	1.181	0.429	1
14	2	3	—	—	—	55629	—	3 19/32	1.181	0.429	1
16	1.5	3	—	—	—	55630	—	3 13/16	1.260	0.480	1
16	2	3	—	—	—	55631	—	3 13/16	1.260	0.480	1
18	1.5	3	—	—	—	55632	—	4 1/32	1.457	0.542	1
18	2.5	3	—	—	—	—	55633	4 1/32	1.457	0.542	1
20	1.5	3	—	—	—	55634	—	4 15/32	1.457	0.652	1
20	2.5	3	—	—	—	—	55635	4 15/32	1.457	0.652	1
22	1.5	4	—	—	—	55636	—	4 11/16	1.496	0.697	1
22	2.5	3	—	—	—	—	55637	4 11/16	1.496	0.697	1
24	1.5	4	—	—	—	55638	—	4 29/32	1.772	0.760	1
24	3	3	—	—	—	—	55639	4 29/32	1.772	0.760	1

### Taflet Taps for Economical and Efficient Thread Forming

NACHI Viper Taflet taps are designed for economical and efficient tapping of steel. No chips are produced with Taflet taps. The threads are formed by displacement of the metal. Threads produced this way are generally more accurate and stronger than threads produced by conventional tapping.

### Advantages of NACHI Viper Taflet Taps

Conventional coldform taps for steel require high torque. NACHI Viper Taflet taps have been specially engineered for steels and require less torque, reducing the chance of breaking.

In conventional coldform threading, rapid wear and adhesion due to high frictional heat may occur. NACHI Viper Taflet tap's steam oxide surface treatment limits adhesion from fusion and carries coolant to the work area. Bright finish is also available when required.

Conventional coldform internal threads aren't always clean and accurate. NACHI Viper Taflet taps have more radial sections for higher accuracy of internal threads in steel.



**List No. 995** Machine Screw Sizes

VANADIUM HIGH SPEED STEEL HSSE-V



Plug & Bottoming Style  
Surface Treated



Nominal Size	Thread/Inch		Chamfer Style *	E.D.P. Numbers						Dimensions			Std. Pack.
	NC UNC	NF UNF		H2	H3	H4	H5	H6	H10	Overall Length	Length of Thread	Shank Dia.	
0		80	B	77732	—	—	—	—	—	1 5/8	0.311	0.141	1
1	64	72	B	77734	—	—	—	—	—	1 11/16	0.374	0.141	3
			B	77736	—	—	—	—	—	1 11/16	0.374	0.141	3
2	56	64	B	77738	77776	—	—	—	—	1 3/4	0.437	0.141	3
			B	77740	77778	—	—	—	—	1 3/4	0.437	0.141	3
3	48	56	B	77742	77780	—	—	—	—	1 13/16	0.500	0.141	3
			B	—	77782	—	—	—	—	1 13/16	0.500	0.141	3
4	40		P	—	77783	—	77856	—	—	1 7/8	0.354	0.141	3
			B	—	77784	—	77857	—	—	1 7/8	0.354	0.141	3
			P	—	77785	—	77858	—	—	1 7/8	0.354	0.141	3
			B	—	77786	—	77859	—	—	1 7/8	0.354	0.141	3
5	40		P	—	77787	—	77860	—	—	1 15/16	0.394	0.141	3
			B	—	77788	—	77861	—	—	1 15/16	0.394	0.141	3
			P	—	77789	—	77862	—	—	1 15/16	0.394	0.141	3
			B	—	77790	—	77863	—	—	1 15/16	0.394	0.141	3
6	32		P	—	77791	—	77864	—	77970	2	0.433	0.141	3
			B	—	77792	—	77865	—	77971	2	0.433	0.141	3
			P	—	77793	—	77866	—	—	2	0.433	0.141	3
			B	—	77794	—	77867	—	—	2	0.433	0.141	3
8	32		P	—	77795	—	77868	—	77972	2 1/8	0.472	0.168	3
			B	—	77796	—	77869	—	77973	2 1/8	0.472	0.168	3
			P	—	77797	—	77870	—	—	2 1/8	0.472	0.168	3
			B	—	77798	—	77871	—	—	2 1/8	0.472	0.168	3
10	24		P	—	—	77829	—	77903	77974	2 3/8	0.551	0.194	3
			B	—	—	77830	—	77904	77975	2 3/8	0.551	0.194	3
			P	—	—	77831	—	77905	77976	2 3/8	0.551	0.194	3
			B	—	—	77832	—	77906	77977	2 3/8	0.551	0.194	3
12	24		P	—	—	77833	—	77907	—	2 3/8	0.551	0.220	3
			B	—	—	77834	—	77908	—	2 3/8	0.551	0.220	3
			P	—	—	77835	—	77909	—	2 3/8	0.551	0.220	3
			B	—	—	77836	—	77910	—	2 3/8	0.551	0.220	3

\* P : Plug, B : Bottom

**List No. 995** Fractional Sizes

## VANADIUM HIGH SPEED STEEL HSSE-V



Plug & Bottoming Style  
Surface Treated



Nominal Size	Thread/Inch		Chamfer Style *	E.D.P. Numbers						Dimensions			Std. Pack.
	NC UNC	NF UNF		H4	H5	H6	H7	H8	H10	Overall Length	Length of Thread	Shank Dia.	
1/4	20	28	P	77837	—	77911	—	—	77978	2 1/2	0.591	0.255	3
			B	77838	—	77912	—	—	77979	2 1/2	0.591	0.255	3
			P	77839	—	77913	—	—	77980	2 1/2	0.591	0.255	3
			B	77840	—	77914	—	—	77981	2 1/2	0.591	0.255	3
5/16	18	24	P	—	77872	—	77930	—	—	2 23/32	0.669	0.318	3
			B	—	77873	—	77931	—	—	2 23/32	0.669	0.318	3
			P	—	77874	—	77932	—	—	2 23/32	0.669	0.318	3
			B	—	77875	—	77933	—	—	2 23/32	0.669	0.318	3
3/8	16	24	P	—	77876	—	77934	—	—	2 15/16	0.748	0.381	3
			B	—	77877	—	77935	—	—	2 15/16	0.748	0.381	1
			P	—	77878	—	77936	—	—	2 15/16	0.748	0.381	3
			B	—	77879	—	77937	—	—	2 15/16	0.748	0.381	3
7/16	14	20	P	—	77880	—	—	77960	—	3 5/32	0.866	0.323	3
			B	—	77881	—	—	77961	—	3 5/32	0.866	0.323	3
			P	—	77882	—	—	77962	—	3 5/32	0.866	0.323	3
			B	—	77883	—	—	77963	—	3 5/32	0.866	0.323	3
1/2	13	20	P	—	77884	—	—	77964	—	3 3/8	0.984	0.367	3
			B	—	77885	—	—	77965	—	3 3/8	0.984	0.367	3
			P	—	77886	—	—	77966	—	3 3/8	0.984	0.367	3
			B	—	77887	—	—	77967	—	3 3/8	0.984	0.367	3
9/16	12	18	P	—	—	—	77946	—	77990	3 19/32	0.984	0.429	3
			B	—	—	—	77947	—	77991	3 19/32	0.984	0.429	3
			P	—	—	—	77948	—	77992	3 19/32	0.984	0.429	3
			B	—	—	—	77949	—	77993	3 19/32	0.984	0.429	3
5/8	11	18	P	—	—	—	77950	—	77994	3 13/16	1.102	0.480	3
			B	—	—	—	77951	—	77995	3 13/16	1.102	0.480	3
			P	—	—	—	77952	—	77996	3 13/16	1.102	0.480	3
			B	—	—	—	77953	—	77997	3 13/16	1.102	0.480	3
3/4	10	16	P	—	—	—	77954	—	77998	4 1/4	1.181	0.590	3
			B	—	—	—	77955	—	77999	4 1/4	1.181	0.590	3
			P	—	—	—	77956	—	78000	4 1/4	1.181	0.590	3
			B	—	—	—	77957	—	78001	4 1/4	1.181	0.590	3

\* P : Plug, B : Bottom

VIPER TAFLET METRIC TAPS FOR STEELS

List No. 996 Metric Sizes

VANADIUM HIGH SPEED STEEL HSSE-V



Plug & Bottoming Style  
Surface Treated



Nominal Size (mm)	Pitch (mm)	Chamfer Style*	E.D.P. Numbers									Dimensions			Std. Pack.				
			D3	D4	D5	D6	D7	D8	D9	D10	D11	Overall Length	Length of Thread	Shank Dia.					
2	0.4	P	51001	—	—	—	—	—	—	—	—	—	1 3/4	0.437	0.119	3			
		B	51002	—	—	—	—	—	—	—	—	—	—	1 3/4	0.437	0.119	3		
2.2	0.45	P	51004	—	—	—	—	—	—	—	—	—	1 3/4	0.437	0.119	3			
		B	51005	—	—	—	—	—	—	—	—	—	—	1 3/4	0.437	0.119	3		
2.5	0.45	P	51007	—	—	—	—	—	—	—	—	—	1 13/16	0.500	0.119	3			
		B	51008	—	—	—	—	—	—	—	—	—	—	1 13/16	0.500	0.119	3		
3	0.5	P	51010	—	—	—	—	—	—	—	—	—	1 15/16	0.394	0.141	1			
		B	51011	—	—	—	—	—	—	—	—	—	—	1 15/16	0.394	0.141	1		
3.5	0.6	P	51013	—	—	—	—	—	—	—	—	—	2	0.433	0.141	3			
		B	51014	—	—	—	—	—	—	—	—	—	—	2	0.433	0.141	3		
4	0.7	P	—	51016	—	—	—	—	—	—	—	—	2 1/8	0.472	0.168	1			
		B	—	51017	—	—	—	—	—	—	—	—	—	2 1/8	0.472	0.168	3		
4.5	0.75	P	—	51019	—	—	—	—	—	—	—	—	2 3/8	0.551	0.184	3			
		B	—	51020	—	—	—	—	—	—	—	—	—	2 3/8	0.551	0.184	3		
5	0.8	P	—	51022	—	—	—	—	—	—	—	—	2 3/8	0.551	0.194	3			
		B	—	51023	—	—	—	—	—	—	—	—	—	2 3/8	0.551	0.194	3		
6	1	P	—	—	51025	—	—	—	—	—	—	—	2 1/2	0.591	0.255	3			
		B	—	—	51026	—	—	—	—	—	—	—	—	2 1/2	0.591	0.255	1		
7	1	P	—	—	—	51028	—	—	—	—	—	—	2 23/32	0.669	0.318	3			
		B	—	—	—	51029	—	—	—	—	—	—	—	2 23/32	0.669	0.318	3		
8	1	P	—	—	51031	—	—	—	—	—	—	—	2 23/32	0.669	0.318	3			
		B	—	—	51032	—	—	—	—	—	—	—	—	2 23/32	0.669	0.318	3		
	1.25	P	—	—	—	—	—	—	51034	—	—	—	—	2 23/32	0.669	0.318	1		
		B	—	—	—	—	—	—	51035	—	—	—	—	2 23/32	0.669	0.318	1		
10	1.25	P	—	—	—	—	—	—	51037	—	—	—	2 15/16	0.748	0.381	3			
		B	—	—	—	—	—	—	51038	—	—	—	2 15/16	0.748	0.381	3			
	1.50	P	—	—	—	—	—	—	—	51040	—	—	—	2 15/16	0.748	0.381	3		
		B	—	—	—	—	—	—	—	51041	—	—	—	2 15/16	0.748	0.381	1		
12	1.25	P	—	—	—	—	—	—	—	51043	—	—	3 3/8	0.984	0.367	3			
		B	—	—	—	—	—	—	—	51044	—	—	—	3 3/8	0.984	0.367	1		
	1.75	P	—	—	—	—	—	—	—	—	51046	—	—	3 3/8	0.984	0.367	1		
		B	—	—	—	—	—	—	—	—	51047	—	—	3 3/8	0.984	0.367	3		
14	1.5	P	—	—	—	—	—	—	—	—	51049	—	—	3 19/32	0.984	0.429	3		
		B	—	—	—	—	—	—	—	—	51050	—	—	3 19/32	0.984	0.429	3		
	2	P	—	—	—	—	—	—	—	—	—	51052	—	—	3 19/32	0.984	0.429	3	
		B	—	—	—	—	—	—	—	—	—	51053	—	—	3 19/32	0.984	0.429	3	
16	1.5	P	—	—	—	—	—	—	—	—	51055	—	—	3 13/16	1.102	0.480	3		
		B	—	—	—	—	—	—	—	—	51056	—	—	3 13/16	1.102	0.480	1		
	2	P	—	—	—	—	—	—	—	—	—	—	51058	—	—	3 13/16	1.102	0.480	3
		B	—	—	—	—	—	—	—	—	—	—	51059	—	—	3 13/16	1.102	0.480	3
18	1.5	P	—	—	—	—	—	—	—	—	51061	—	—	4 1/32	1.102	0.542	3		
		B	—	—	—	—	—	—	—	—	51062	—	—	4 1/32	1.102	0.542	3		
	2.5	P	—	—	—	—	—	—	—	—	—	—	51064	—	—	4 1/32	1.102	0.542	3
		B	—	—	—	—	—	—	—	—	—	—	51065	—	—	4 1/32	1.102	0.542	3
20	1.5	P	—	—	—	—	—	—	—	—	51067	—	—	4 15/32	1.181	0.652	3		
		B	—	—	—	—	—	—	—	—	51068	—	—	4 15/32	1.181	0.652	3		
	2.5	P	—	—	—	—	—	—	—	—	—	—	51070	—	—	4 15/32	1.181	0.652	3
		B	—	—	—	—	—	—	—	—	—	—	51071	—	—	4 15/32	1.181	0.652	3

\* P : Plug, B : Bottom

Taflet Taps

Nom. Dia	Threads/Inch		Basic Major Dia.	75%		65%		55%	
	NC UNC	NF UNF		Theoretical Core Hole	Nearest Drill Dia.	Theoretical Core Hole	Nearest Drill Dia.	Theoretical Core Hole	Nearest Drill Dia.
0		80	.0600	.0536	1.35mm	.0545	—	.0553	#54
1	64	72	.0730	.0650	1.65mm	.0661	—	.0672	#51
2	56	64	.0860	.0769	1.95mm	.0781	5/64	.0794	2.0mm
3	48	56	.0990	.0884	2.25mm	.0898	#43	.0913	2.3mm
4	40	48	.1120	.0993	2.5mm	.1010	#39	.1027	2.6mm
5	40	44	.1250	.1123	#34	.1140	#33	.1157	#32
6	32	40	.1380	.1221	3.1mm	.1242	—	.1263	3.2mm
8	32	36	.1640	.1481	3.7mm	.1502	#25	.1523	#24
10	24	32	.1900	.1688	—	.1716	11/64	.1746	#17
12	24	28	.2160	.1948	#10	.1976	5.0mm	.2006	5.1mm
1/4	20	28	.2500	.2245	5.7mm	.2280	#1	.2315	—
5/16	18	24	.3125	.2842	7.2mm	.2879	7.3mm	.2917	7.4mm
3/8	16	24	.3750	.3431	11/32	.3474	S	.3516	—
7/16	14	20	.4375	.4011	—	.4059	13/32	.4108	—
1/2	13	20	.5000	.4608	—	.4660	—	.4712	12mm
9/16	12	18	.5625	.5200	—	.5257	—	.5313	17/32
5/8	11	18	.6250	.5787	37/64	.5848	37/64	.5910	15mm
3/4	10	16	.7500	.6990	—	.7058	45/64	.7126	—
			.7500	.7181	23/32	.7224	—	.7266	—

Nom. Dia	Pitch	Theoretical Core Hole Size						Suggested	Taps
		Min.		Max.					
		Inches	mm	5H Class		6H Class			
				Inches	mm	Inches	mm		
3	0.5	.1071	2.72	.1094	2.79	.1098	2.79	H5	H6
3.5	0.6	.1244	3.16	.1268	3.22	.1276	3.24	H5	H7
4	0.7	.1417	3.60	.1445	3.67	.1453	3.69	H6	H7
5	0.8	.1791	4.55	.1823	4.63	.1831	4.65	H6	H8
6	1	.2142	5.44	.2177	5.53	.2185	5.55	H7	H9
8	1.25	.2870	7.29	.2913	7.40	.2925	7.43	H8	H10
10	1.5	.3602	9.15	.3602	9.27	.3665	9.31	H9	H11
12	1.75	.4335	11.01	.4368	11.14	.4402	11.18	H10	H12
14	2	.5067	12.87	.5126	13.02	.5142	13.06	H11	H13
16	2	.5854	14.87	.5913	15.02	.5929	15.06	H11	H13
20	2.5	.7315	18.58	.7386	18.76	.7409	18.82	H11	H14



VTP SPIRAL FLUTED

**List No. 983** Machine Screw Sizes



Modified Bottoming Style 2-1/2 To 3 Thread Lead  
Surface Treated

**List No. 981** Fractional Sizes



Modified Bottoming Style 2-1/2 To 3 Thread Lead  
Surface Treated

VANADIUM HIGH SPEED STEEL HSSE-V



Nominal Size	Thread/Inch		No. of Flutes	E.D.P. Numbers							Dimensions			Price
	NC UNC	NF UNF		H2	H3	H4	H5	H6	H7	H11	Overall Length	Length of Thread	Shank Dia.	
2	56		2	88239	—	—	—	—	—	—	13/4	0.433	0.141	1
3	48		2	88240	—	—	—	—	—	—	1 13/16	0.500	0.141	3
4	40		2	88241	88242	88243	—	—	—	—	1 7/8	0.236	0.141	3
5	40		3	88253	—	—	—	—	—	—	1 15/16	0.236	0.141	3
6	32		3	—	88263	88264	88265	88266	88267	88267	2	0.276	0.141	3
8	32		3	—	88277	88278	88279	88280	88281	88281	2 1/8	0.276	0.168	3
10	24		3	—	88291	—	88292	88293	88294	88294	2 3/8	0.354	0.194	3
		32	3	—	88299	88300	88301	—	88303	88303	2 3/8	0.354	0.194	3
12	24		3	—	88311	—	—	—	—	—	—	—	—	—
		28	3	—	88312	—	—	—	—	—	—	—	—	—

Nominal Size	Thread/Inch		No. of Flutes	E.D.P. Numbers							Dimensions			Price
	NC UNC	NF UNF		H2	H3	H4	H5	H6	H7	H11	Overall Length	Length of Thread	Shank Dia.	
1/4	20		3	—	88057	—	88060	—	88062	88062	2 1/2	0.433	0.255	1
		28	3	—	88071	88072	88073	88074	88075	88075	2 1/2	0.433	0.255	3
5/16	18		3	—	88081	—	88083	—	88085	88085	2 23/32	0.472	0.318	1
		24	3	—	88095	88096	88097	—	88098	88098	2 23/32	0.472	0.318	3
3/8	16		3	—	88103	—	88105	—	88107	88107	2 15/16	0.551	0.381	1
		24	3	—	88111	88112	88113	—	88115	88115	2 15/16	0.551	0.381	3
7/16	14		3	—	88117	—	88119	—	—	—	3 5/32	0.591	0.323	3
		20	3	—	88123	—	88125	—	—	—	3 5/32	0.591	0.323	1
1/2	13		3	—	88131	—	88133	—	88135	88135	3 3/8	0.630	0.367	1
		20	3	—	88139	—	88141	—	—	—	3 3/8	0.630	0.367	1
9/16	12		3	—	88145	—	—	—	—	—	3 19/32	0.709	0.429	3
		18	3	—	88146	—	—	—	—	—	3 19/32	0.709	0.429	1
5/8	11		3	—	88149	—	88151	—	88153	88153	3 13/16	0.748	0.480	1
		18	3	—	88157	—	88159	—	—	—	3 13/16	0.748	0.480	1
3/4	10		3	—	88167	—	—	—	88171	88171	4 1/4	0.827	0.590	1
		16	3	—	88175	—	88177	—	—	—	4 1/4	0.827	0.590	1
7/8	9		4	—	88180	—	—	—	—	—	4 11/16	0.906	0.697	1
		14	4	—	88185	—	—	—	—	—	4 11/16	0.906	0.697	1
1	8		4	—	88190	—	—	—	—	—	5 1/8	0.984	0.800	1
		12	4	—	—	—	—	—	—	—	—	—	—	—

**List No. 973** Machine Screw Sizes



Plug Style 4 to 5 Threads  
Surface Treated

**List No. 971** Fractional Sizes



Plug Style 4 to 5 Threads  
Surface Treated

**VANADIUM HIGH SPEED STEEL HSSE-V**



Nominal Size	Thread/Inch		No. of Flutes	E.D.P. Numbers							Dimensions			Price	
	NC UNC	NF UNF		H2	H3	H4	H5	H6	H7	H11	Overall Length	Length of Thread	Shank Dia.		
2	56		2	87216	87218	—	—	—	—	—	—	1 3/4	0.437	0.141	3
3	48		2	87220	—	—	—	—	—	—	—	1 13/16	0.500	0.141	3
4	40		2	87240	87242	87243	87244	—	—	—	—	1 7/8	0.354	0.141	3
5	40		2	87252	—	—	—	—	—	—	—	1 15/16	0.394	0.141	3
6	32		2	87258	87260	87261	87264	87265	87266	—	—	2	0.433	0.141	3
8	32		3	87272	87274	87275	87278	87279	87280	—	—	2 1/8	0.472	0.168	3
10	24		3	—	87288	—	87290	—	—	—	—	2 3/8	0.551	0.194	3
		32	3	87294	87296	87297	87300	87301	87302	—	—	2 3/8	0.551	0.194	3
12	24		3	—	87311	—	—	—	—	—	—	—	—	—	—
		28	3	—	87312	—	—	—	—	—	—	—	—	—	—

Nominal Size	Thread/Inch		No. of Flutes	E.D.P. Numbers							Dimensions			Price	
	NC UNC	NF UNF		H2	H3	H4	H5	H6	H7	H11	Overall Length	Length of Thread	Shank Dia.		
1/4	20		3	87052	87056	—	87060	—	87062	—	—	2 1/2	0.591	0.255	3
		28	3	87066	87068	87070	87071	87072	87073	—	—	2 1/2	0.591	0.255	3
5/16	18		3	—	87080	—	87084	—	87086	—	—	2 23/32	0.669	0.318	3
		24	3	—	87094	87096	87097	87098	87099	—	—	2 23/32	0.669	0.318	3
3/8	16		3	—	87102	—	87104	—	87106	—	—	2 15/16	0.748	0.381	3
		24	3	—	87110	87112	87113	87114	87115	—	—	2 15/16	0.748	0.381	3
7/16	14		3	—	87116	—	87120	—	—	—	—	3 5/32	0.866	0.323	3
		20	3	—	87122	—	87126	87127	87129	—	—	3 5/32	0.866	0.323	3
1/2	13		3	—	87130	—	87134	—	87136	—	—	3 3/8	0.984	0.367	3
		20	3	—	87138	—	87140	87141	87142	—	—	3 3/8	0.984	0.367	3
9/16	12		3	—	87143	—	—	—	—	—	—	3 19/32	0.984	0.429	1
		18	3	—	87144	—	—	—	—	—	—	3 19/32	0.984	0.429	1
5/8	11		3	—	87148	—	87152	—	87154	—	—	3 13/16	1.102	0.480	3
		18	3	—	87158	—	87159	—	—	—	—	3 13/16	1.102	0.480	3
3/4	10		3	—	87164	—	—	—	87167	—	—	4 1/4	1.181	0.590	3
		16	3	—	87168	—	87169	—	—	—	—	4 1/4	1.181	0.590	1
7/8	9		3	—	87170	—	—	—	—	—	—	4 11/16	1.299	0.697	1
		14	3	—	87171	—	—	—	—	—	—	4 11/16	1.299	0.697	3
1	8		3	—	87172	—	—	—	—	—	—	5 1/8	1.378	0.800	1
			3	—	—	—	—	—	—	—	—	—	—	—	—

TAPS

VTP METRIC TAPS SPIRAL FLUTED  
VTP METRIC TAPS SPIRAL POINTED

**List No. 980** Spiral Fluted



Modified Bottoming Style 2-1/2 To 3 Thread Lead  
Surface Treated

VANADIUM HIGH SPEED STEEL HSSE-V



Nominal Size (mm)	Pitch (mm)	No. Of Flutes	E.D.P. Number						Dimensions			Price
			D3	D4	D5	D6	D7	D8	Overall Length	Length of Thread	Shank Dia.	
3	0.5	3	54615	—	—	—	—	—	1 15/16	0.236	0.141	1
3.5	0.6	3	—	54616	—	—	—	—	2	0.276	0.141	1
4	0.7	3	—	54617	—	—	—	—	2 1/8	0.276	0.168	1
5	0.8	3	—	54619	—	—	—	—	2 3/8	0.354	0.194	1
6	1	3	—	—	54620	—	—	—	2 1/2	0.433	0.255	1
7	1	3	—	—	54621	—	—	—	2 23/32	0.472	0.318	1
8	1	3	—	—	54622	—	—	—	2 23/32	0.472	0.318	3
8	1.25	3	—	—	54623	—	—	—	2 23/32	0.472	0.318	1
10	1.25	3	—	—	54624	—	—	—	2 15/16	0.551	0.381	1
10	1.5	3	—	—	—	54625	—	—	2 15/16	0.551	0.381	1
12	1.25	3	—	—	54626	—	—	—	3 3/8	0.630	0.367	1
12	1.75	3	—	—	—	54627	—	—	3 3/8	0.630	0.367	1
14	1.5	3	—	—	—	54628	—	—	3 19/32	0.551	0.429	1
14	2	3	—	—	—	—	54629	—	3 19/32	0.709	0.429	1
16	1.5	3	—	—	—	54630	—	—	3 13/16	0.551	0.480	1
16	2	3	—	—	—	—	54631	—	3 13/16	0.709	0.480	1
18	1.5	3	—	—	—	54632	—	—	4 1/32	0.551	0.542	1
18	2.5	3	—	—	—	—	54633	—	4 1/32	0.874	0.542	1

**List No. 982** Spiral Pointed



Plug Style, 4 To 5 Thread Lead  
Surface Treated

VANADIUM HIGH SPEED STEEL HSSE-V



Nominal Size (mm)	Pitch (mm)	No. Of Flutes	E.D.P. Number						Dimensions			Price
			D3	D4	D5	D6	D7	D8	Overall Length	Length of Thread	Shank Dia.	
3	0.5	3	52615	—	—	—	—	—	1 15/16	0.394	0.141	1
3.5	0.6	3	—	52616	—	—	—	—	2	0.433	0.141	1
4	0.7	3	—	52617	—	—	—	—	2 1/8	0.472	0.168	1
5	0.8	3	—	52619	—	—	—	—	2 3/8	0.551	0.194	1
6	1	3	—	—	52620	—	—	—	2 1/2	0.591	0.255	1
7	1	3	—	—	52621	—	—	—	2 23/32	0.669	0.318	3
8	1	3	—	—	52622	—	—	—	2 23/32	0.669	0.318	3
8	1.25	3	—	—	52623	—	—	—	2 23/32	0.669	0.318	1
10	1.25	3	—	—	52624	—	—	—	2 15/16	0.748	0.381	1
10	1.5	3	—	—	—	52625	—	—	2 15/16	0.748	0.381	1
12	1.25	3	—	—	52626	—	—	—	3 3/8	0.984	0.367	3
12	1.75	3	—	—	—	52627	—	—	3 3/8	0.984	0.367	1
14	1.5	3	—	—	—	52628	—	—	3 19/32	0.984	0.429	3
14	2	3	—	—	—	—	52629	—	3 19/32	0.984	0.429	1
16	1.5	3	—	—	—	52630	—	—	3 13/16	1.102	0.480	3
16	2	3	—	—	—	—	52631	—	3 13/16	1.102	0.480	1
18	1.5	3	—	—	—	52632	—	—	4 1/32	1.102	0.542	3
18	2.5	3	—	—	—	—	52633	—	4 1/32	1.102	0.542	3
20	2.5	3										
24	3	3										

**List No. 911** Fractional Sizes

HIGH SPEED STEEL



Bright Finish



Size	Thread			Pitch Diameter Limits	Number of Flutes	E.D.P.			Dimensions			Std. Pack.
	UNC	UNF	UNS			Taper	Plug	Bottom	Overall Length	Thread Length	Shank Dia.	
						L911	L911	L911				
1/4	20			H2	4	64059	64060	64061	2 1/2	1	0.255	1
1/4	20			H3	4	64068	64069	64070	2 1/2	1	0.255	1
1/4	20			H5	4		64075	64076	2 1/2	1	0.255	1
1/4		28		H3	4	64089	64090	64091	2 1/2	1	0.255	1
1/4		28		H4	4		64093	64094	2 1/2	1	0.255	3
5/16	18			H2	4	64098	64099	64100	2 23/32	1 1/8	0.318	3
5/16	18			H3	4	64107	64108	64109	2 23/32	1 1/8	0.318	3
5/16	18			H5	4		64111	64112	2 23/32	1 1/8	0.318	3
5/16		24		H3	4	64122	64123	64124	2 23/32	1 1/8	0.318	3
5/16		24		H4	4		64126	64127	2 23/32	1 1/8	0.318	3
3/8	16			H2	4	64131	64132	64133	2 15/16	1 1/4	0.381	1
3/8	16			H3	4	64137	64138	64139	2 15/16	1 1/4	0.381	1
3/8	16			H5	4		64141	64142	2 15/16	1 1/4	0.381	3
3/8		24		H3	4	64152	64153	64154	2 15/16	1 1/4	0.381	3
3/8		24		H4	4		64156	64157	2 15/16	1 1/4	0.381	3
7/16	14			H3	4	64167	64168	64169	3 5/32	1 7/16	0.323	3
7/16		20		H3	4	64182	64183	64184	3 5/32	1 7/16	0.323	3
1/2	13			H3	4	64197	64198	64199	3 3/8	1 21/32	0.367	1
1/2	13			H5	4		64201	64202	3 3/8	1 21/32	0.367	3
1/2		20		H3	4	64212	64213	64214	3 3/8	1 21/32	0.367	3
1/2		20		H5	4		64216	64217	3 3/8	1 21/32	0.367	3
9/16	12			H3	4	64221	64222	64223	3 19/32	1 21/32	0.429	3
9/16		18		H3	4	64230	64231	64232	3 19/32	1 21/32	0.429	3
5/8	11			H3	4	64242	64243	64244	3 13/16	1 13/16	0.480	1
5/8	11			H5	4		64246	64247	3 13/16	1 13/16	0.480	3
5/8		18		H3	4	64254	64255	64256	3 13/16	1 13/16	0.480	3
5/8		18		H5	4		64258	64259	3 13/16	1 13/16	0.480	3
11/16			11	H3	4	64260	64261	64262	4 1/32	1 13/16	0.542	3
11/16			16	H3	4	64263	64264	64265	4 1/32	1 13/16	0.542	3
3/4	10			H3	4	64272	64273	64274	4 1/4	2	0.590	3
3/4	10			H5	4		64276	64277	4 1/4	2	0.590	3
3/4		16		H3	4	64284	64285	64286	4 1/4	2	0.590	1
3/4		16		H5	4		64288	64289	4 1/4	2	0.590	3
7/8	9			H4	4	64293	64294	64295	4 11/16	2 7/32	0.697	3
7/8		14		H4	4	64302	64303	64304	4 11/16	2 7/32	0.697	3
1	8			H4	4	64311	64312	64313	5 1/8	2 1/2	0.800	3
1		12		H4	4	64314	64315	64316	5 1/8	2 1/2	0.800	1
1			14	H4	4	64320	64321	64322	5 1/8	2 1/2	0.800	1
1 1/8	7			H4	4	64323	64324	64325	5 7/16	2 9/16	0.896	1
1 1/8		12		H4	4	64326	64327	64328	5 7/16	2 9/16	0.896	1
1 1/4	7			H4	4	64329	64330	64331	5 3/4	2 9/16	1.021	1
1 1/4		12		H4	6	64332	64333	64334	5 3/4	2 9/16	1.021	1
1 3/8	6			H4	4	64335	64336	64337	6 1/16	3	1.108	1
1 3/8		12		H4	6	64338	64339	64340	6 1/16	3	1.108	1
1 1/2	6			H4	4	64341	64342	64343	6 3/8	3	1.233	1
1 1/2		12		H4	6	64344	64345	64346	6 3/8	3	1.233	1

Order by EDP Number

List No. 913

Machine Screw Size

HIGH SPEED STEEL



Bright Finish



Nominal Tap Size	Threads		Pitch Diameter Limits	Number of Flutes	E.D.P. Numbers			Dimensions			Std. Pack.
	NC UNC	NF UNF			Taper	Plug	Bottom	Overall Length	Thread Length	Shank Dia.	
					L913	L913	L913				
0		80	H1	2	64360	64361	64362	1 5/8	5/16	0.141	3
0		80	H2	2		64364	64365	1 5/8	5/16	0.141	3
1	64		H1	2	64366	64367	64368	1 11/16	3/8	0.141	3
1	64		H2	2		64370		1 11/16	3/8	0.141	3
1		72	H1	2	64372	64373	64374	1 11/16	3/8	0.141	3
1		72	H2	2		64376	64377	1 11/16	3/8	0.141	3
2	56		H1	3	64381	64382	64383	1 3/4	7/16	0.141	3
2	56		H2	3	64387	64388	64389	1 3/4	7/16	0.141	3
2		64	H1	3	64390	64391	64392	1 3/4	7/16	0.141	3
2		64	H2	3	64393	64394	64395	1 3/4	7/16	0.141	3
3	48		H1	3		64397	64397	1 13/16	1/2	0.141	3
3	48		H2	3	64402	64403	64404	1 13/16	1/2	0.141	3
3		56	H1	3		64406		1 13/16	1/2	0.141	3
3		56	H2	3	64408	64409	64410	1 13/16	1/2	0.141	3
4	36NS		H2	3	64411	64412	64413	1 7/8	9/16	0.141	3
4	40		H1	3	64417	64418	64419	1 7/8	9/16	0.141	3
4	40		H2	3	64423	64424	64425	1 7/8	9/16	0.141	3
4		48	H1	3		64427		1 7/8	9/16	0.141	3
4		48	H2	3	64429	64430	64431	1 7/8	9/16	0.141	3
5	40		H1	3		64433	64434	1 15/16	5/8	0.141	3
5	40		H2	3	64438	64439	64440	1 15/16	5/8	0.141	3
5		44	H1	3		64442	64443	1 15/16	5/8	0.141	3
5		44	H2	3	64447	64448	64449	1 15/16	5/8	0.141	3
6	32		H2	3	64459	64460	64461	2	11/16	0.141	3
6	32		H3	3	64465	64466	64467	2	11/16	0.141	3
6	32		H7	3		64469	64470	2	11/16	0.141	3
6		40	H1	3		64472		2	11/16	0.141	3
6		40	H2	3	64477	64478	64479	2	11/16	0.141	3
8	32		H2	4	64495	64496	64497	2 1/8	3/4	0.168	3
8	32		H3	4	64504	64505	64506	2 1/8	3/4	0.168	3
8	32		H7	4		64508	64509	2 1/8	3/4	0.168	3
8		36	H1	4		64515		2 1/8	3/4	0.168	3
8		36	H2	4	64517	64518	64519	2 1/8	3/4	0.168	3
10	24		H2	4	64532	64533	64534	2 3/8	7/8	0.194	3
10	24		H3	4	64541	64542	64543	2 3/8	7/8	0.194	3
10	24		H7	4		64548	64549	2 3/8	7/8	0.194	3
10		32	H2	4	64562	64563	64564	2 3/8	7/8	0.194	3
10		32	H3	4	64571	64572	64573	2 3/8	7/8	0.194	3
10		32	H7	4		64578	64579	2 3/8	7/8	0.194	3
12	24		H3	4	64583	64584	64585	2 3/8	15/16	0.220	3
12		28	H3	4	64589	64590	64591	2 3/8	15/16	0.220	3

Order by EDP Number

STANDARD TAPS SPIRAL POINTED / FRACTIONAL SIZES  
STANDARD HAND TAPS / FOR CAST IRON

**List No. 921** Fractional Sizes



Plug Style  
Bright Finish

**HIGH SPEED STEEL**



Nominal Tap Size	Threads per inch		Pitch Diameter Limits	Number of Flutes	E.D.P. Numbers	Dimensions			Std. Pack.
	NC UNC	NF UNF				Overall Length	Thread Length	Shank Dia.	
1/4	20		H3	2	67054	2 1/2	1	0.255	1
1/4	20		H3	3	67056	2 1/2	1	0.255	1
1/4		28	H3	2	67068	2 1/2	1	0.255	1
5/16	18		H3	2	67078	2 23/32	1 1/8	0.318	3
5/16	18		H3	3	67080	2 23/32	1 1/8	0.318	1
5/16		24	H3	2	67092	2 23/32	1 1/8	0.318	3
3/8	16		H2	3	67100	2 15/16	1 1/4	0.381	3
3/8	16		H3	3	67102	2 15/16	1 1/4	0.381	1
3/8	16		H5	3	67104	2 15/16	1 1/4	0.381	1
3/8		24	H3	3	67110	2 15/16	1 1/4	0.381	1
7/16	14		H3	3	67116	3 5/32	1 7/16	0.323	3
7/16		20	H3	3	67122	3 5/32	1 7/16	0.323	3
1/2	13		H3	3	67130	3 3/8	1 21/32	0.367	1
1/2		20	H3	3	67138	3 3/8	1 21/32	0.367	3
9/16	12		H3	3	67142	3 19/32	1 21/32	0.429	1
5/8	11		H3	3	67148	3 13/16	1 13/16	0.480	1
3/4	10		H3	3	67150	4 1/4	2	0.590	1

Order by EDP Number

**List No. 969** For Cast Iron



Surface Treated

**HIGH SPEED STEEL**



Size	Threads		Thread Limits	Number of Flutes	E.D.P.		Dimensions			Std. Pack.
	UNC	UNF			Plug	Bottom	Overall Length	Thread Length	Shank Dia.	
1/4	20		H3	4	76001	76002	2 1/2	1	0.255	3
	20		H5	4	76003	76004	2 1/2	1	0.255	3
5/16		28	H3	4	76005	76006	2 1/2	1	0.255	3
	18		H3	4	76007	76008	2 23/32	1 1/8	0.318	3
3/8	18		H5	4	76009	76010	2 23/32	1 1/8	0.318	3
		24	H3	4	76011	76012	2 23/32	1 1/8	0.318	3
7/16	16		H3	4	76013	76014	2 15/16	1 1/4	0.381	3
	16		H5	4	76015	76016	2 15/16	1 1/4	0.381	3
1/2		24	H3	4	76017	76018	2 15/16	1 1/4	0.381	3
	14		H3	4	76019	76020	3 5/32	1 7/16	0.323	3
9/16	14		H5	4	76021	76022	3 5/32	1 7/16	0.323	3
		20	H3	4	76023	76024	3 5/32	1 7/16	0.323	3
5/8		20	H5	4	76025	76026	3 5/32	1 7/16	0.323	3
	13		H3	4	76027	76028	3 3/8	1 21/32	0.367	3
3/4	13		H5	4	76029	76030	3 3/8	1 21/32	0.367	3
		20	H3	4	76031	76032	3 3/8	1 21/32	0.367	3
5/8		20	H5	4	76033	76034	3 3/8	1 21/32	0.367	3
	12		H3	4	76035	76036	3 19/32	1 21/32	0.429	3
3/4		18	H3	4	76037	76038	3 19/32	1 21/32	0.429	3
	11		H3	4	76039	76040	3 13/16	1 13/16	0.480	3
5/8		18	H3	4	76041	76042	3 13/16	1 13/16	0.480	3
	10		H3	4	76043	76044	4 1/4	2	0.590	3
3/4		16	H3	4	76045	76046	4 1/4	2	0.590	3

## STANDARD TAPS SPIRAL POINTED / MACHINE SCREW SIZES

**List No. 923** Machine Screw Sizes

Plug Style  
Bright Finish

**HIGH SPEED STEEL**



Nominal Tap Size	Threads per inch		Pitch Diameter Limits	Number of Flutes	E.D.P. Numbers	Dimensions			Std. Pack.
	NC UNC	NF UNF				Plug L923	Overall Length	Thread Length	
0		80	H1	2	67200	1 5/8	5/16	0.141	1
0		80	H2	2	67202	1 5/8	5/16	0.141	1
1	64		H1	2	67206	1 11/16	3/8	0.141	3
1	64		H2	2	67208	1 11/16	3/8	0.141	3
1		72	H1	2	67210	1 11/16	3/8	0.141	1
1		72	H2	2	67212	1 11/16	3/8	0.141	1
2	56		H1	2	67214	1 3/4	7/16	0.141	1
2	56		H2	2	67216	1 3/4	7/16	0.141	3
2		64	H2	2	67224	1 3/4	7/16	0.141	3
3	48		H2	2	67228	1 13/16	1/2	0.141	3
3		56	H2	2	67234	1 13/16	1/2	0.141	1
4	36NS		H2	2	67236	1 7/8	9/16	0.141	3
4	40		H1	2	67238	1 7/8	9/16	0.141	3
4	40		H2	2	67240	1 7/8	9/16	0.141	1
4		48	H2	2	67248	1 7/8	9/16	0.141	3
5	40		H1	2	67250	1 15/16	5/8	0.141	3
5	40		H2	2	67252	1 15/16	5/8	0.141	1
5		44	H2	2	67254	1 15/16	5/8	0.141	3
6	32		H2	2	67258	2	11/16	0.141	1
6	32		H3	2	67260	2	11/16	0.141	1
6	32		H7	2	67264	2	11/16	0.141	3
6		40	H2	2	67268	2	11/16	0.141	3
8	32		H2	2	67272	2 1/8	3/4	0.168	1
8	32		H3	2	67274	2 1/8	3/4	0.168	1
8	32		H7	2	67278	2 1/8	3/4	0.168	3
8		36	H2	2	67282	2 1/8	3/4	0.168	3
10	24		H2	2	67286	2 3/8	7/8	0.194	1
10	24		H3	2	67288	2 3/8	7/8	0.194	1
10	24		H7	2	67290	2 3/8	7/8	0.194	3
10		32	H2	2	67294	2 3/8	7/8	0.194	1
10		32	H3	2	67296	2 3/8	7/8	0.194	1
10		32	H7	2	67300	2 3/8	7/8	0.194	3
12	24		H3	2	67304	2 3/8	15/16	0.220	1

Order by EDP Number

**List No. 941** (NPT)



Taper Pipe Taps  
Bright Finish

**HIGH SPEED STEEL**



Nominal Tap Size	Threads per Inch	Number of Flutes	E.D.P. Number L941	Dimensions					Std. Pack
				Overall Length	Thread Length	Shank Dia.	Square Length	Size of Square	
1/16	27	4	74051	2.1260	0.6890	0.3125	0.3740	0.2339	1
1/8	27	4	74052	2.1260	0.7520	0.4375	0.3740	0.3280	1
1/8SS	27	4	74053	2.1260	0.7520	0.3125	0.3740	0.2339	1
1/4	18	4	74054	2.4370	1.0630	0.5625	0.4370	0.4209	1
3/8	18	4	74055	2.5630	1.0630	0.7	0.5	0.5307	1
1/2	14	4	74056	3.1260	1.3740	0.6875	0.626	0.5150	1
3/4	14	5	74057	3.2520	1.3740	0.9063	0.689	0.6787	1
1	11 1/2	5	74058	3.7520	1.7520	1.125	0.811	0.8429	1
1 1/4	11 1/2	5	74059	4	1.7520	1.3125	0.9370	0.9839	1
1 1/2	11 1/2	7	74060	4.2520	1.7520	1.5	1	1.1248	1
2	11 1/2	7	74061	4.5	1.7520	1.875	1.126	1.4059	1

**List No. 947** (NPT)



Taper Pipe-Spiral Fluted  
Surface Treated

**PREMIUM TYPE STEEL**



Nominal Tap Size	Thread Per Inch	Number of Flutes	E.D.P. Numbers L947	Dimensions					Std. Pack.
				Overall Length	Thread Length	Shank Dia.	Square Length	Size of Square	
1/16	27	4	84051	2.126	0.689	0.3125	0.374	0.2339	1
1/8	27	4	84052	2.126	0.752	0.4375	0.374	0.3280	1
1/8SS	27	4	84053	2.126	0.752	0.3125	0.374	0.2339	1
1/4	18	4	84054	2.437	1.063	0.5625	0.437	0.4209	1
3/8	18	4	84055	2.563	1.063	0.7	0.5	0.5307	1
1/2	14	4	84056	3.126	1.374	0.6875	0.626	0.5150	1
3/4	14	5	84057	3.252	1.374	0.9063	0.689	0.6787	1
1	11 1/2	5	84058	3.752	1.752	1.125	0.811	0.8429	1



STANDARD METRIC HAND TAPS  
STANDARD METRIC TAPS / SPIRAL POINTED

List No. 910



Bright Finish

HIGH SPEED STEEL



Nominal Tap Size (mm)	Millimeter Pitch (mm)	Pitch Dia. Limits	Number of Flutes	E.D.P. Numbers			Dimensions			Std. Pack.
				Taper	Plug	Bottom	Overall Length	Thread Length	Shank Dia.	
M2	0.4	D3	3	54056	54057	54058	1 3/4	7/16	0.141	3
M3	0.5	D3	3	54071	54072	54073	1 15/16	5/8	0.141	1
M3.5	0.6	D4	3	54074	54075	54076	2	11/16	0.141	3
M4	0.7	D4	4	54080	54081	54082	2 1/8	3/4	0.168	1
M5	0.8	D4	4	54095	54096	54097	2 3/8	7/8	0.194	1
M6	1.0	D5	4	54107	54108	54109	2 1/2	1	0.255	3
M7	1.0	D5	4	54113	54114	54115	2 23/32	1 1/8	0.318	3
M8	1.25	D5	4	54125	54126	54127	2 23/32	1 1/8	0.318	1
M10	1.5	D6	4	54140	54141	54142	2 15/16	1 1/4	0.381	1
M12	1.75	D6	4	54155	54156	54157	3 3/8	1 21/32	0.367	1
M14	1.25	D5	4	54161	54162	54163	3 19/32	1 21/32	0.429	3
M14	2.0	D7	4	54167	54168	54169	3 19/32	1 21/32	0.429	3
M16	2.0	D7	4	54176	54177	54178	3 13/16	1 13/16	0.480	3
M18	1.5	D7	4	54182	54183	54184	4 1/32	1 13/16	0.542	3
M18	2.5	D7	4	54188	54189	54190	4 1/32	1 13/16	0.542	3
M20	2.5	D7	4	54200	54201	54202	4 15/32	2	0.652	3
M22	2.5	D7	4	54212	54213	54214	4 11/16	2 7/32	0.697	3
M24	3.0	D8	4	54224	54225	54226	4 29/32	2 7/32	0.760	3
M27	3.0	D8	4	54239	54240	54241	5 1/8	2 1/2	0.896	3
M30	3.5	D9	4	54251	54252	54253	5 7/16	2 9/16	1.021	1

Order by EDP Number

List No. 920



Bright Finish

HIGH SPEED STEEL



Nominal Tap Size (mm)	Pitch (mm)	Pitch Diameter Limits	Number of Flutes	E.D.P. Numbers	Dimensions			Std. Pack.
					Overall Length	Thread Length	Shank Dia.	
M2.5	0.45	D3	2	57054	1 13/16	1/2	0.141	1
M3	0.50	D3	2	57055	1 15/16	5/8	0.141	1
M4	0.70	D4	2	57058	2 1/8	3/4	0.168	1
M5	0.80	D4	2	57061	2 3/8	7/8	0.194	1
M6	1.00	D5	2	57063	2 1/2	1	0.255	1
M8	1.25	D5	2	57068	2 23/32	1 1/8	0.318	1
M10	1.50	D6	3	57082	2 15/16	1 1/4	0.381	1
M12	1.75	D6	3	57073	3 3/8	1 21/32	0.367	1
M14	2.00	D7	3	57076	3 19/32	1 21/32	0.429	1
M16	2.00	D7	3	57078	3 13/16	1 13/16	0.480	1

Order by EDP Number

SG-Low Spiral Taps List No. 6958, 6959  
SFM : Surface Feet per Minutes

Work Materials		Tapping Speed SFM
Low Carbon Steel	1010,1018	25-50
Medium Carbon Steel	1035,1045	20-50
High Carbon Steel	1065,1095	15-30
Alloy Steel	4140,4130	15-30
Die Steels	D2,H13	15-35
Hardened Die Steels(20-40HRC)	D2,H13	8-15
Stainless steel (Austenitic)	303,304,316	15-45
Stainless steel (Martensitic)	410,430	12-20
Stainless steel (PH) up to 35HRC	17-4PH	12-20
Titanium Alloy Up to 32HRC	6AL4V	15-20
Magnesium Alloy		40-80
Ductile cast Irons	80-55-06	20-50
Cast Irons	Nodular,Grey	30-65

- These are general tapping condition, may be altered by your condition.
- These conditions are for tapping depth 1.5D. In case of deeper thread you may multiply these values by the coefficient of next table.

Thread depth	Coefficient
Up to 1.5D	1
1.5D~2.5D	0.9
2.5D~3D	0.8
Over 3D	0.7

VIPER T Series

SFM:Surface Feet per Minutes

Viper T SPIRAL Flute TAP List 7981,7980,7987,7982

Work Materials		Tapping Speed SFM
Low Carbon Steel	1010,1018	30-60
Medium Carbon Steel	1035,1045	15-40
High Carbon Steel	1065,1095	15-25
Alloy Steel	4140,4130	15-40
Die Steels	D2,H13	10-25
Hardened Die Steels(20-40HRC)	D2,H13	6-12
Stainless steel (Austenitic)	303,304,316	10-25
Stainless steel (Martensitic)	410,430	10-25
Stainless steel (PH) up to 35HRC	17-4PH	8-15
Titanium Alloy Up to 32HRC	6AL4V	10-15
Magnesium Alloy		30-60
Ductile cast Irons	80-55-06	15-40
Cast Irons	Nodular,Grey	-
Copper		15-40
Brass, Brass casting		40-60
Bronze, Brass casting		25-50

- These are general tapping condition, may be altered by your condition.
- These conditions are for tapping depth 1.5D. In case of deeper thread you may multiply these values by the coefficient of next table

Thread depth	Coefficient
Up to 1.5D	1
1.5D ~ 2.5D	0.9
2.5D ~ 3D	0.8
Over 3D	0.7

SFM:Surface Feet per Minutes

Viper T SPIRAL POINTED TAP List7971,7970,7977,7972

Work Materials		Tapping Speed SFM
Low Carbon Steel	1010,1018	35-75
Medium Carbon Steel	1035,1045	20-50
High Carbon Steel	1065,1095	15-30
Alloy Steel	4140,4130	20-50
Die Steels	D2,H13	15-30
Hardened Die Steels(20-40HRC)	D2,H1	38-15
Stainless steel (Austenitic)	303,304,316	15-35
Stainless steel (Martensitic)	410,430	15-35
Stainless steel (PH) up to 35HRC	17-4PH	10-20
Titanium Alloy Up to 32HRC	6AL4V	15-20
Magnesium Alloy		40-80
Ductile cast Irons	80-55-06	20-50
Cast Irons	Nodular,Grey	30-60
Copper		20-50
Brass, Brass casting		50-80
Bronze, Brass casting		30-60

- These are general tapping condition, may be altered by your condition.
- These conditions are for tapping depth 1.5D. In case of deeper thread you may multiply these values by the coefficient of next table

Thread depth	Coefficient
Up to 1.5D	1
1.5D ~ 2.5D	0.9
2.5D ~ 3D	0.8
Over 3D	0.7

DLC TAFLET THREAD FORMING TAPS List No. 6955, 6956, 6957

Work Materials	Tapping Speed SFM
Aluminum Alloys	70 - 130

Other TAPS

Material	Tapping Speed SFM
Aluminum Alloys	90-100
Brass	60-100
Bronze	40-60
Copper	40-60
High Temperature Alloys	5-10
Cobalt Base	5-10
Iron Base	10-15
Nickel Base	5-10
Iron, Ductile,	60
Annealed	30
as Cast	15-20
Tempered	80
Annealed	35-60
as Cast	60
Malleable	25-50
Heat Treated	175
Magnesium Alloys	20
Manganese	50
Molybdenum Alloys	20
Monel	25
Nickel Alloys	20
Plastics, Reinforced	25
Thermoplastics	50
Thermosetting Plastics	50
Steels, Alloys, Annealed or Cold Drawn	40-60
Quenched & Tempered	15-35
Armor Plate	10

Material	Tapping Speed SFM
(Steels, Cont.)	
Carbon Steel, Plain	40-80
Annealed	15-40
Tempered	40-50
Cast, Carbon	30
Annealed	30
Tempered	20-30
Cast, Corrosion Resistant,	20-25
Heat Resistant,	30-45
Low Alloy	15-25
Annealed	10-15
Tempered	15-45
Precipitation Hardening,	15-75
Stainless	45-75
Annealed	15-25
Tempered	50
Free Machining,	35
Tool Steels, High Speed,	20
Water Hardening,	3-7
Ultra High Strength Steels	20-15
Annealed	5-10
Normalized	3
Tempered	3
Maraging Steels	20-15
Annealed	5-10
Maraged	3
Tantalum Alloys	3
Titanium Alloys,	
Commercial Pure,	40-60
Alpha & Alpha Beta Alloys,	10-25
Annealed	50
Tungsten Alloys, Pressed & Sintered	150
Zinc Alloys	150
Die Cast	

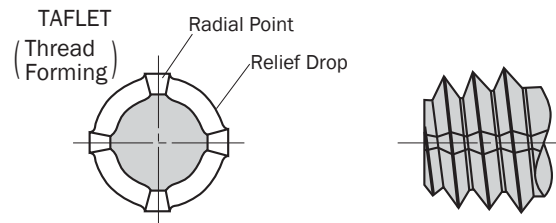
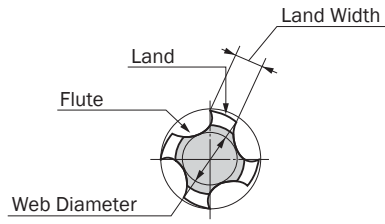
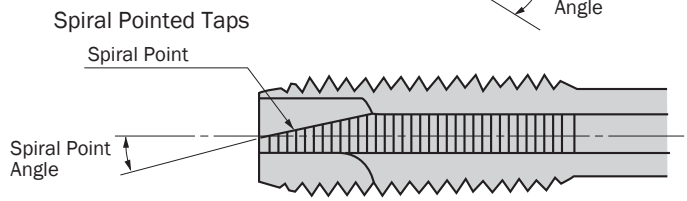
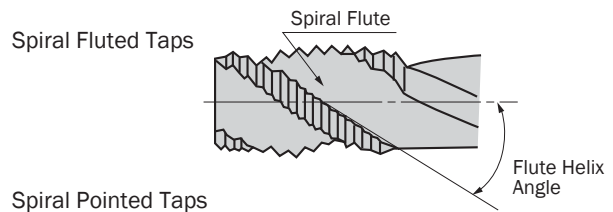
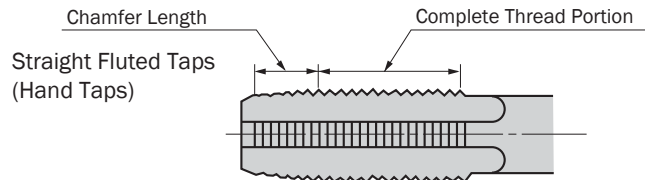
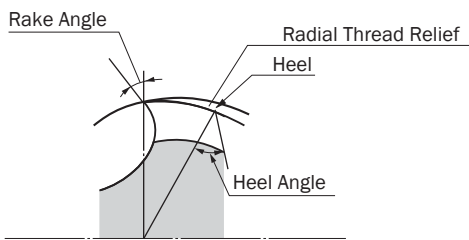
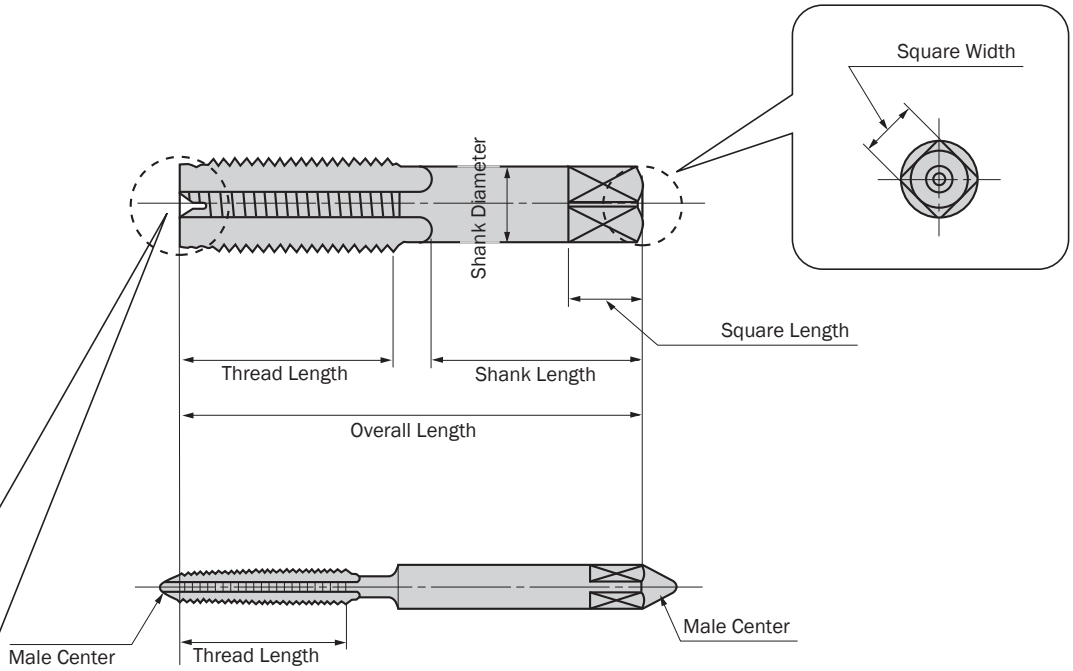
CONVERSION TABLE

Surface Feet Per Minute to Revolutions Per Minute

SFM	20	25	30	40	50	60	70	80	90	100	110	120	130	140	150
TAP SIZE	REVOLUTIONS PER MINUTE														
0	1270	1590	1910	2540	3100	3850	4450	5100	5750	6350	7000	7650	8200	8900	9550
1	1040	1310	1550	2100	2600	3140	3650	4150	4710	5200	5750	6250	6800	7300	7850
2	850	1100	1300	1750	2250	2650	3100	3550	4000	4450	4850	5350	5750	6200	6650
3	750	950	1150	1550	1900	2300	2700	3050	3450	3850	4250	4600	5000	5400	5750
4	650	850	1050	1350	1700	2050	2300	2700	3050	3400	3750	4100	4450	4750	5100
5	600	750	900	1200	1550	1850	2100	2400	2750	3100	3350	3650	3950	4250	4550
6	550	650	850	1100	1350	1650	1950	2200	2450	2750	3050	3300	3600	3850	4150
8	450	580	700	950	1150	1400	1650	1850	2100	2350	2550	2800	3000	3250	3500
10	400	500	600	800	1005	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000
12	350	450	550	700	850	1050	1250	1400	1550	1750	1950	2100	2300	2450	2650
1/4	300	380	450	600	750	900	1050	1200	1350	1500	1650	1800	1950	2150	2300
5/16	250	300	350	480	600	750	850	950	1100	1250	1350	1450	1550	1700	1850
3/8	200	250	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500
7/16	170	210	250	350	450	520	600	700	750	850	950	1050	1150	1250	1300
1/2	150	190	220	300	350	450	530	600	650	750	850	900	950	1050	1150
9/16	130	170	200	250	350	400	450	550	600	650	750	800	900	950	1050
5/8	120	150	180	250	300	350	400	450	550	600	650	750	800	850	900
3/4	100	120	150	200	250	300	350	400	450	500	550	600	650	700	750
7/8	80	100	130	170	200	250	300	350	400	450	480	520	550	600	650
1	70	90	100	150	190	230	260	300	350	380	420	450	500	530	570

The material being tapped is the primary factor in determining the most effective TAPPING SPEED. However there are a number of other factors which may require consideration. Among these are: thread pitch, thread length, percent of thread, lubrication, tap flute style and chamfer, equipment and method of tapping. The best speed is determined by experiment on the job. The table below lists speeds which have proven satisfactory under average conditions.

### TAP NOMENCLATURE



## STANDARDS &amp; DIMENSIONS

## Standard System of Marking

## General

Taps, dies, and other threading tools will be marked with the nominal size, number of threads per inch, and the proper symbol to identify the thread form. These symbols are in agreement with the ANSIB94.9 1979 Standard on Nomenclature, Definitions and Letter Symbols for Screw Threads.

Symbols used for American Threads are:  
Symbol Reference

<b>NC</b>	American National Coarse Thread Series
<b>NF</b>	American National Fine Thread Series
<b>NEF</b>	American National Extra Fine Thread Series
<b>N</b>	American National 8,12 and 16 Thread Series (8N, 12N, i6N)
<b>NH</b>	American (National) Hose Coupling and Fire Hose Coupling Threads
<b>NM</b>	National Miniature Screw Thread
<b>NGO</b>	American (National) Gas Outlet Thread
<b>NS</b>	American Special Thread
<b>NPT</b>	American (National) Taper Pipe Thread
<b>NPTF</b>	Dryseal American (National) Taper Pipe Thread
<b>ANPT</b>	Military Aeronautical Pipe Thread Specification MIL-P-71 05
<b>NPS</b>	American (National) Straight Pipe Thread
<b>NPSC</b>	American (National) Straight Pipe Thread in Pipe Couplings
<b>NPSF</b>	Dryseal American (National) Fuel Internal Straight Pipe Thread
<b>NPSH</b>	American (Standard) Straight Pipe Thread for Hose Couplings and Nipples
<b>NPSI</b>	Dryseal American (National) Intermediate Internal Straight Pipe Thread
<b>NPSL</b>	American (National) Internal Straight Pipe Thread for Locknut Connections (Loose Fitting Mechanical Joints)
<b>NPSM</b>	American (National) Internal Straight Pipe Thread for Mechanical Joints (Free Fitting)
<b>NPTR</b>	American (National) Internal Taper Pipe Thread for Railing Joints (Mechanical Joints)
<b>AMO</b>	American Standard Microscope Objective Thread
<b>ACME C</b>	Acme Screw Thread — Centralizing Type
<b>ACME G</b>	Acme Screw Thread — General Purpose Type
<b>STUB ACME</b>	Stub Acme Threads

<b>NBUTT</b>	National Buttress Screw Thread
<b>V</b>	A 60° "V" Thread with Truncated Crests and Roots. The Theoretical "V" Form is usually flattened several thousandths of an inch to the user's specifications.
<b>SB</b>	Manufacturers Stovebolt Standard Thread
<b>STI</b>	Special Threads for Helical Coil Wire Screw Thread Inserts.

## Group Thread Taps — Limit Numbers

All standard Ground Thread Taps will be marked with the letter G to designate Ground Thread. The letter G will be followed by the letter H to designate above basic (L below basic) and a numeral to designate the Pitch Diameter limits.

Example: GH3 indicates a Group thread Tap with Pitch Diameter limits .0010 to .0015 over basic.

Pitch Diameter limits for Taps to 1" diameter inclusive.

L1	= Basic to Basic minus .0005
H1	= Basic to Basic plus .0005
H2	= Basic plus .0005 to Basic plus .0010
H3	= Basic plus .0010 to Basic plus .0015
H4	= Basic plus .0015 to Basic plus .0020
H5	= Basic plus .0020 to Basic plus .0025
H6	= Basic plus .0025 to Basic plus .0030

Pitch Diameter limits for Taps over 1" diameter to 1 1/2" diameter inclusive.

H4	= Basic plus .0010 to Basic plus .0020
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## American National 8, 12, 16 and NEF Thread Series

National 8 pitch Series	1" to 2 1/4" by 1/8ths	2 1/4" to 6" by 1/4ths
National 12 pitch Series	1/2" to 1 1/2" 1/16ths	1 1/2" to 4" by 1/8ths
	4" to 6" by 1/4ths	
National 16 pitch Series	3/4" to 2 1/2" by 1/16ths	2 1/2" to 4" by 1/8ths
	4" to 6" by 1/4ths	

## National Extra Fine Thread Series

#12	-32	1 1/6"	-18
1/4"	-32	1 1/16"	-18
5/16"	-32	1 1/18"	-18
3/8"	-32	1 3/16"	-18
7/16"	-28	1 1/4"	-18
1/2"	-28	1 5/16"	-18
9/16"	-24	1 3/8"	-18
5/8"	-24	1 7/16"	-18
11/16"	-24	1 1/2"	-18
3/4"	-20	1 9/16"	-18
13/16"	-20	1 5/8"	-18
7/8"	-20	1 11/16"	-18
15/16"	-20	1 3/4"	-16
1"	-20	2"	-16

STANDARD TAP BLANK DIMENSIONS

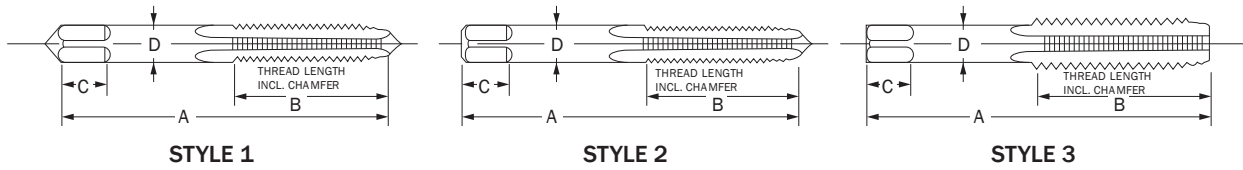


TABLE 302 — GENERAL DIMENSIONS

Nominal Diameter Range - Inches		Mach. Screw Size No.	Nominal Fractional Diameter Inches	Nominal Metric Diameter Mill.	Style*	Tap Dimensions — Inches				
Over	To (Incl)					Overall Length A	Thread Length B	Square Length C	Shank Diameter D	Size of Square
.052	.065	0	1/16	M1.6	1	1-5/8	5/16	3/16	.141	.110
.065	.078	1		M1.8	1	1-11/16	3/8	3/16	.141	.110
.078	.091	2		M2,MZ2	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	.385		3/8	M10	2	2-15/16	1 1/4	7/16	.381	.286
.385	.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	3/4	.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
3.260	3.385		3 3/8		3	10	4 9/16	1 3/4	2.883	2.162
3.385	3.510		3 1/2		3	10 1/4	4 15/16	2	3.008	2.256
3.510	3.635		3 5/8	M90	3	10 1/4	4 15/16	2	3.133	2.350
3.635	3.760		3 3/4		3	10 1/2	5 5/16	2 1/8	3.217	2.413
3.760	3.885		3 7/8		3	10 1/2	5 5/16	2 1/8	3.342	2.506
3.885	4.010		4	M100	3	10 3/4	5 5/16	2 1/4	3.467	2.600

\* Styles shown are for ground thread taps

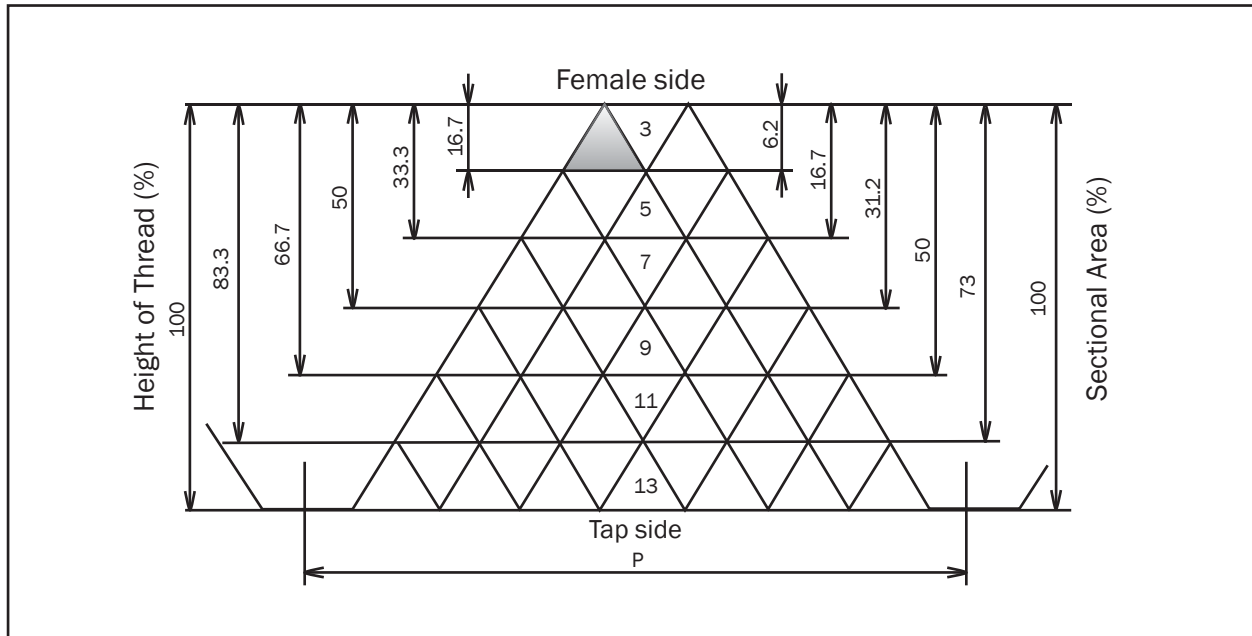
## TAP RECOMMENDATION FOR CLASSES 2B & 3B UNIFIED INCH SCREW THREADS

Size	Threads Per Inch		Recommended Tap Limits		Internal Thread Pitch Diameter Units		
	NC UNC	NF UNF	Class 2B	Class 3B	Min. All Classes (BASIC)	Max. Class 2B	Max. Class 3B
0	-	80	H2	H1	.0519	.0542	.0536
1	64	-	H2	H1	.0629	.0655	.0648
1	-	72	H2	H1	.0640	.0665	.0659
2	56	-	H2	H1	.0744	.0772	.0765
2	-	64	H2	H1	.0759	.0786	.0779
3	48	-	H2	H1	.0855	.0885	.0877
3	-	56	H2	H1	.0874	.0902	.0895
4	40	-	H2	H2	.0958	.0991	.0982
4	-	48	H2	H1	.0985	.1016	.1008
5	40	-	H2	H2	.1088	.1121	.1113
5	-	44	H2	H1	.1102	.1134	.1126
6	32	-	H3	H2	.1177	.1214	.1204
6	-	40	H2	H2	.1218	.1252	.1243
8	32	-	H3	H2	.1437	.1475	.1465
8	-	36	H2	H2	.1460	.1496	.1487
10	24	-	H3	H3	.1629	.1672	.1661
10	-	32	H3	H2	.1697	.1736	.1726
12	24	-	H3	H3	.1889	.1933	.1922
12	-	28	H3	H3	.1928	.1970	.1959
1/4	20	-	H5	H3	.2175	.2223	.2211
1/4	-	28	H4	H3	.2268	.2311	.2300
5/16	18	-	H5	H3	.2764	.2817	.2803
5/16	-	24	H4	H3	.2854	.2902	.2890
3/8	16	-	H5	H3	.3344	.3401	.3387
3/8	-	24	H4	H3	.3479	.3528	.3516
7/16	14	-	H5	H3	.3911	.3972	.3957
7/16	-	20	H5	H3	.4050	.4104	.4091
1/2	13	-	H5	H3	.4500	.4565	.4548
1/2	-	20	H5	H3	.4675	.4731	.4717
9/16	12	-	H5	H3	.5084	.5152	.5135
9/16	-	18	H5	H3	.5264	.5323	.5308
5/8	11	-	H5	H3	.5660	.5732	.5714
5/8	-	18	H5	H3	.5889	.5949	.5934
3/4	10	-	H5	H5	.6850	.6927	.6907
3/4	-	16	H5	H3	.7094	.7159	.7143
7/8	9	-	H6	H4	.8028	.8110	.8089
7/8	-	14	H6	H4	.8286	.8356	.8339
1	8	-	H6	H4	.9188	.9276	.9254
1	-	12	H6	H4	.9459	.9535	.9516
1	14 NS		H6	H4	.9536	.9609	.9590
1 1/8	7	-	H8	H4	1.0332	1.0416	1.0393
1 1/8	-	12	H6	H4	1.0709	1.0787	1.0768
1 1/4	7	-	H8	H4	1.1572	1.1668	1.1644
1 1/4	-	12	H6	H4	1.1959	1.2039	1.2019
1 3/8	6	-	H8	H4	1.2667	1.2771	1.2745
1 3/8	-	12	H6	H4	1.3209	1.3291	1.3270
1 1/2	6	-	H8	H4	1.3917	1.4022	1.3996
1 1/2	-	12	H6	H4	1.4459	1.4542	1.4522

The above recommended taps normally produce the Class of Thread indicated average materials when used with reasonable care. However, if the tap specified does not give a satisfactory gage fit in the work, a choice of some other limit tap will be necessary.

## PRE-TAPPING DRILLING SIZES

Drilling size is strictly concerned Percent of Thread. The following picture shows the relations between the height of the female thread and its sectional area. Here, it's very important to choose the minimized Percent of Thread as possible the thread needs. Because too much Percent of Thread brings increased cutting torque which causes excess wear and breakage of the taps.



$$\text{Percent of Thread} = \frac{\text{Basic thread OD.} \times \text{Pre-Tapping Diameter}}{2 \times (\text{Basic Height of Thread})} \times 100\%$$

- Pre-tapping diameter for Cutting Taps

$$\text{Pre-tapping Diameter} = \text{Basic thread OD.} - \frac{.01299 \times \text{Percent of Thread}}{\text{No. of threads per inch}}$$

- Pre-tapping Diameter for Roll Forming Taps

$$\text{Pre-tapping Diameter} = \text{Basic thread OD.} - \frac{.0068 \times \text{Percent of Thread}}{\text{No. of threads per inch}}$$

### TAP DRILL SIZES

The following tables show the Theoretical Percentage of Thread obtained from stock sizes of drills and also the Probable Percentage after allowance for oversize drilling.

Tap	Tap Drill	Decimal Equiv. of Tap Drill	Probable Hole Size	Percent of Thread	Tap	Tap Drill	Decimal Equiv. of Tap Drill	Probable Hole Size	Percent of Thread	Tap	Tap Drill	Decimal Equiv. of Tap Drill	Probable Hole Size	Percent of Thread
0-80	56	.0465	.0480	74	8-32	29	.1360	.1389	62	3/8-16	5/16	.3125	.3160	72
	3/64	.0469	.0484	71		28	.1405	.1434	51		0	.3160	.3204	68
1-64	54	.0550	.0565	81	8-36	29	.1360	.1389	70	3/8-24	P	.3230	.3274	59
	53	.0595	.0610	59		28	.1405	.1434	57		21/64	.3281	.3325	79
1-72	53	.0595	.0610	67	10-24	9/64	.1406	.1435	57	7/16-14	Q	.3320	.3364	71
	1/16	.0625	.0640	50		27	.1440	.1472	79		R	.3390	.3434	58
2-56	51	.0670	.0687	74	10-32	26	.1470	.1502	74	7/16-20	T	.3580	.3626	81
	50	.0700	.0717	62		25	.1495	.1527	69		23/64	.3594	.3640	79
2-64	49	.0730	.0747	49	10-32	24	.1520	.1552	64	7/16-20	U	.3680	.3726	70
	50	.0700	.0717	70		23	.1540	.1572	61		3/18	.3750	.3796	62
3-48	49	.0730	.0747	56	10-32	5/32	.1563	.1595	56	7/16-20	V	.3770	.3816	60
	48	.0760	.0779	78		22	.1570	.1602	73		W	.3860	.3906	72
3-56	5/64	.0781	.0800	70	12-24	5/32	.1563	.1595	75	1/2-13	25/64	.3906	.3952	65
	47	.0785	.0804	69		22	.1570	.1602	73		X	.3970	.4016	55
4-40	46	.0810	.0829	60	12-24	21	.1590	.1622	68	1/2-20	27/64	.4219	.4216	73
	45	.0820	.0839	56		20	.1610	.1642	64		7/16	.4375	.4422	58
4-48	46	.0810	.0829	69	12-28	19	.1660	.1692	51	9/16-12	29/64	.4531	.4578	65
	45	.0820	.0839	65		11/64	.1719	.1754	75		15/32	.4688	.4736	82
5-40	44	.0860	.0879	48	12-28	17	.1730	.1765	73	9/16-18	31/64	.4844	.4892	68
	44	.0860	.0880	74		16	.1770	.1805	66		1/2	.5000	.5048	80
5-44	43	.0890	.0910	65	12-28	15	.1800	.1835	60	5/8-11	33/64	.5156	.5204	58
	42	.0935	.0955	55		14	.1820	.1855	56		17/32	.5313	.5362	75
6-32	3/32	.0938	.0958	50	1/4-20	16	.1770	.1805	77	5/8-18	35/64	.5469	.5518	62
	42	.0935	.0955	61		15	.1800	.1835	70		9/16	.5625	.5674	80
6-40	3/32	.0938	.0958	60	1/4-20	14	.1820	.1855	66	3/4-10	37/64	.5781	.5831	58
	41	.0960	.0980	52		13	.1850	.1885	59		41/64	.6406	.6456	80
6-48	40	.0980	.1003	76	1/4-20	3/16	.1875	.1910	54	7/8-9	21/32	.6563	.6613	68
	39	.0995	.1018	71		9	.1960	.1998	77		11/16	.6875	.6925	71
7-48	38	.1015	.1038	65	5/16-18	8	.1990	.2028	73	1"-8	49/64	.7656	.7708	72
	37	.1040	.1063	58		7	.2010	.2048	70		25/32	.7812	.7864	61
7-56	38	.1015	.1038	72	5/16-18	13/64	.2031	.2069	66	1"-12	51/64	.7969	.8021	79
	37	.1040	.1063	63		6	.2040	.2078	65		13/16	.8125	.8177	62
8-48	36	.1065	.1088	55	5/16-24	5	.2055	.2093	63	1"-14	55/64	.8594	.8653	83
	37	.1040	.1063	78		4	.2090	.2128	57		7/8	.8750	.8809	73
8-56	36	.1065	.1091	71	5/16-24	3	.2130	.2168	72	1"-14	57/64	.8906	.8965	64
	7/64	.1094	.1120	64		2	.2210	.2248	55		29/32	.9063	.9123	54
9-48	35	.1100	.1126	63	5/16-24	7/32	.2188	.2226	59	1"-14	29/32	.9063	.9123	81
	34	.1110	.1136	60		F	.2570	.2608	72		59/64	.9219	.9279	67
9-56	33	.1130	.1156	55	5/16-24	G	.2610	.2651	66	1"-14	15/16	.9375	.9435	52
	34	.1110	.1136	75		17/64	.2656	.2697	59		59/64	.9219	.9279	78
10-48	33	.1130	.1156	69	5/16-24	H	.2660	.2701	59	1"-14	15/16	.9375	.9435	61
	32	.1160	.1186	60		H	.2660	.2701	78					
						I	.2720	.2761	67					

### FORMULA FOR OBTAINING TAP DRILL SIZES

(Select nearest commercial stock drill)

$$\left\{ \begin{array}{c} \text{Outside Diam.} \\ \text{of Thread} \end{array} \right\} \text{ minus } \left\{ \frac{.01299 \text{ Amount of percentage of full thread}}{\text{Number of threads per inch}} \right\} = \text{Drilled Hole Size}$$

$$\left\{ \begin{array}{c} \text{No. of Threads} \\ \text{per inch} \end{array} \right\} \times \left\{ \frac{\text{Outside Diam. of thread - Selected Drill Diam}}{.01299} \right\} = \text{Percentage of full Thread}$$



TAP DRILL SIZES

For Thread Forming Taps

Nominal Size	Threads per Inch		75% THREAD			70% THREAD			65% THREAD			60% THREAD		
			Theor. Hole Core Size	Nearest Drill Size	Dec. Equiv.	Theor. Hole Core Size	Nearest Drill Size	Dec. Equiv.	Theor. Hole Core Size	Nearest Drill Size	Dec. Equiv.	Theor. Hole Core Size	Nearest Drill Size	Dec. Equiv.
	NC UNC	NF UNF												
0	—	80	.0536	1.35mm	.0531	.0540	1.35mm	.0531	.0545	—	—	.0549	54	.0550
1	64	—	.0650	1.65mm	.0650	.0655	1.65mm	.0650	.0661	—	—	.0666	—	—
1	—	72	.0659	1.65mm	.0650	.0663	—	—	.0669	1.7mm	.0669	.0673	51	.0670
2	56	—	.0769	1.95mm	.0768	.0774	1.95mm	.0768	.0781	3/64	.0781	.0787	47	.0785
2	—	64	.0780	5/64	.0781	.0785	47	.0785	.0791	2.0mm	.0787	.0796	2.0mm	.0787
3	48	—	.0884	2.25mm	.0886	.0890	43	.0890	.0898	43	.0890	.0905	2.3mm	.0906
3	—	56	.0899	43	.0890	.0904	—	—	.0911	2.3mm	.0906	.0917	2.3mm	.0906
4	40	—	.0993	2.5mm	.0984	.1000	39	.0995	.1010	39	.0995	.1018	38	.1015
4	—	48	.1014	38	.1015	.1020	38	.1015	.1028	2.6mm	.1024	.1035	2.6mm	.1024
5	40	—	.1123	34	.1110	.1130	33	.1130	.1140	33	.1130	.1148	2.9mm	.1142
5	—	44	.1134	33	.1130	.1141	2.9mm	.1142	.1150	2.9mm	.1142	.1157	—	—
6	32	—	.1221	2.1mm	.1220	.1230	3.1mm	.1220	.1243	—	—	.1252	1/8	.1250
6	—	40	.1253	1/8	.1250	.1260	3.2mm	.1260	.1270	3.2mm	.1260	.1278	3.25mm	.1280
8	32	—	.1481	3.75mm	.1476	.1490	—	—	.1503	25	.1495	.1512	3.8mm	.1496
8	—	36	.1498	25	.1495	.1507	3.8mm	.1496	.1518	24	.1520	.1526	24	.1520
10	24	—	.1688	—	—	.1700	18	.1695	.1717	11/64	.1719	.1729	11/64	.1719
10	—	32	.1741	17	.1730	.1750	—	—	.1763	—	—	.1772	16	.1770
12	24	—	.1948	10	.1935	.1960	9	.1960	.1977	5.0mm	.1968	.1989	8	.1990
12	—	28	.1978	5.0mm	.1968	.1989	8	.1990	.2003	8	.1990	.2014	7	.2010
1/4	20	—	.2245	5.7mm	.2244	.2260	—	—	.2280	1	.2280	.2295	1	.2280
1/4	—	28	.2318	—	—	.2329	5.9mm	.2323	.2343	A	.2340	.2354	15/64	.2344
5/16	18	—	.2842	7.2mm	.2835	.2861	7.25mm	.2854	.2879	7.3mm	.2874	.2898	L	.2900
5/16	—	24	.2912	7.4mm	.2913	.2927	—	—	.2941	M	.2950	.2955	7.5mm	.2953
3/8	16	—	.3431	11/32	.3437	.3452	8.75mm	.3445	.3474	S	.3480	.3495	8.9mm	.3504
3/8	—	24	.3537	9.0mm	.3543	.3552	9.0mm	.3543	.3566	—	—	.3580	T	.3580
7/16	14	—	.4011	—	—	.4035	Y	—	.4059	13/32	—	.4084	—	—
7/16	—	20	.4120	Z	—	.4137	10.5mm	—	.4154	—	—	.4171	—	—
1/2	13	—	.4608	—	—	.4634	—	—	.4660	—	—	.4686	15/32	—
1/2	—	20	.4745	—	—	.4762	—	—	.4779	—	—	.4796	—	—
9/16	12	—	.5200	—	—	.5229	—	—	.5257	—	—	.5285	—	—
9/16	—	18	.5342	13.5mm	.5315	.5361	—	—	.5380	—	—	.5398	—	—
5/8	11	—	.5787	37/64	.5781	.5817	37/64	.5781	.5848	—	—	.5879	—	—
5/8	—	18	.5967	19/32	.5937	.5986	—	—	.6004	—	—	.6023	—	—
3/4	10	—	.6990	—	—	.7024	—	—	.7058	45/64	.7031	.7092	18.0mm	.7087
3/4	—	16	.7181	23/32	.7187	.7202	23/32	.7187	.7224	—	—	.7245	—	—

For Pipe Taps

Nominal Pipe Size	Threads Per Inch	NPT-NPTF (When Drilled Only)		NPT-NPTF-ANPT (When Taper Reamed)		NPS-NPSF	
		Dr. Size	Dec. Equiv.	Dr. Size	Dec. Equiv.	Dr. Size	Dec. Equiv.
1/16	27	D	.2460	15/64	.2344	1/4	.2500
1/8	27	R	.3390	21/64	.3281	11/32	.3438
1/4	18	7/16	.4375	27/64	.4219	7/16	.4375
3/8	18	37/64	.5781	9/16	.5625	37/64	.5781
1/2	14	45/64	.7031	11/16	.6875	23/32	.7188
3/4	14	59/64	.9219	57/64	.8906	59/64	.9218
1	11-1/2	1 5/32	1.1562	1 1/8	1.1250	1 5/32	1.1562
1 1/4	11-1/2	1 1/2	1.5000	1 15/32	1.4688		
1 1/2	11-1/2	1 47/64	1.7344	1 45/64	1.7031		
2	11-1/2	2 7/32	2.2188	2 3/16	2.1875		

## TAP DRILL SIZES (METRIC)

## For Cutting Taps

Nominal size	Pitch	Percentage of thread engagement hole diameter				Minor dia of internal thread
		100%	90%	80%	70%	
M2	0.4	1.57	1.61	1.65	1.7	1.567~1.679
M3	0.5	2.46	2.51	2.57	2.62	2.459~2.599
M3.5	0.6	2.85	2.92	2.98	3.05	2.850~3.010
M4	0.7	3.24	3.32	3.39	3.47	3.242~3.422
M5	0.8	4.13	4.22	4.31	4.39	4.134~4.334
M6	1	4.92	5.03	5.13	5.24	4.917~5.153
M7	1	5.92	6.03	6.13	6.24	5.917~6.153
M8	1.25	6.65	6.78	6.92	7.05	6.647~6.912
	1	6.92	7.03	7.13	7.24	6.917~7.153
M10	1.5	8.38	8.54	8.7	8.86	8.376~8.676
	1.25	8.65	8.78	8.92	9.05	8.647~8.912
M12	1.75	10.11	10.3	10.5	10.7	10.106~10.441
	1.25	10.65	10.78	10.92	11.05	10.647~10.912
M14	2	11.8	12.1	12.3	12.5	11.835~12.210
	1.25	12.65	12.78	12.92	13.05	12.647~19.912

Unit : mm

Nominal size	Pitch	Percentage of thread engagement hole diameter				Minor dia of internal thread
		100%	90%	80%	70%	
M16	2	13.8	14.1	14.3	14.5	13.835~14.210
	1.5	14.38	14.54	14.7	14.86	14.376~14.676
M18	2.5	15.3	15.6	15.8	16.1	15.294~15.744
	1.5	16.38	16.54	16.7	16.86	16.376~16.676
M20	2.5	17.3	17.6	17.8	18.1	17.294~17.744
	1.5	18.38	18.54	18.7	18.86	18.376~18.676
M22	2.5	19.3	19.6	19.8	20.1	19.264~19.744
	1.5	20.38	20.54	20.7	20.86	20.367~20.676
M24	3	20.8	21.1	21.4	21.7	20.752~21.252
	1.5	22.38	22.54	22.7	22.86	22.376~22.676
M27	3	23.8	24.1	24.4	24.7	23.752~24.252
M30	3.5	26.2	26.6	27.0	27.3	26.211~26.711

## For Thread Forming Taps

Nominal size	Pitch	Percentage of thread engagement hole diameter			
		100%	90%	80%	70%
M2	0.4	1.77	1.80	1.82	1.84
M2.2	0.45	1.94	1.97	2.00	2.02
M2.5	0.45	2.24	2.27	2.30	2.32
M3	0.5	2.72	2.74	2.77	2.80
M3.5	0.6	3.16	3.19	3.23	3.26
M4	0.7	3.60	3.64	3.68	3.72
M4.5	0.75	4.07	4.12	4.16	4.20
M5	0.8	4.55	4.59	4.64	4.68
M6	1	5.43	5.49	5.55	5.60
M7	1	6.43	6.49	6.55	6.60
M8	1.25	7.29	7.36	7.43	7.50
	1	7.43	7.49	7.55	7.60

Unit : mm

Nominal size	Pitch	Percentage of thread engagement hole diameter			
		100%	90%	80%	70%
M10	1.5	9.15	9.23	9.32	9.40
	1.25	9.29	9.36	9.43	9.50
M12	1.75	11.01	11.11	11.21	11.31
	1.25	11.29	11.36	11.43	11.50
M14	2	12.87	12.98	13.09	13.21
	1.5	13.15	13.23	13.32	13.40
M16	2	14.87	14.98	15.09	15.21
	1.5	15.15	15.23	15.32	15.40
M18	2.5	16.58	16.72	16.87	17.01
	1.5	17.15	17.23	17.32	17.40
M20	2.5	18.58	18.72	18.87	19.01
	1.5	19.15	19.23	19.32	19.40

Note:

1. Determine hole diameter by tapping test. The dimensions in this table are for reference only.

## THE MANY ADVANTAGES OF NACHI TDT VIPER T-SERIES TAPS

These taps are made of high vanadium E grade high speed steel (HSSEV), which is primarily used for heavy duty taps. The taps are heat treated, followed by a special steam oxide treatment that prevents adhesion. This results in the ability to obtain suitable internal threads from the start, which also extends tap life to more than double that of other taps!

### The Specific Advantages

#### 1. Less Oversizing

Taflet Relief reforms cut threads and controls the thrust of the tap completely. Even if tapped material is mild steel, cutting stops within one thread! High precision uniformity of the tapped limit is obtainable with little oversizing, regardless of the rigidity of the tapping mechanism. Even when slight oversizing occurs, the chip-bite between taps and internal threads gets hard so tap breakage and/or torn threads are reduced.

#### 2. Ideal Flute Shape

All cutting edges on the chamfered portion are at exactly the same angle, so the chip shape is consistent. Smaller than conventional curvature on the bottom flute stretching from the cutting face results in small curled chips. In addition, Nachi Viper T-Series Taps release chips smoothly, thanks to their specially designed helix angle.

#### 3. Shorter Thread Length

Shorter than conventional thread lengths prevent chips from clogging the flutes; reduce bite, twine-round and breakage of the cutting edge. Flute length also provides for excellent chip ejection.

#### 4. GT System For Thread Limit

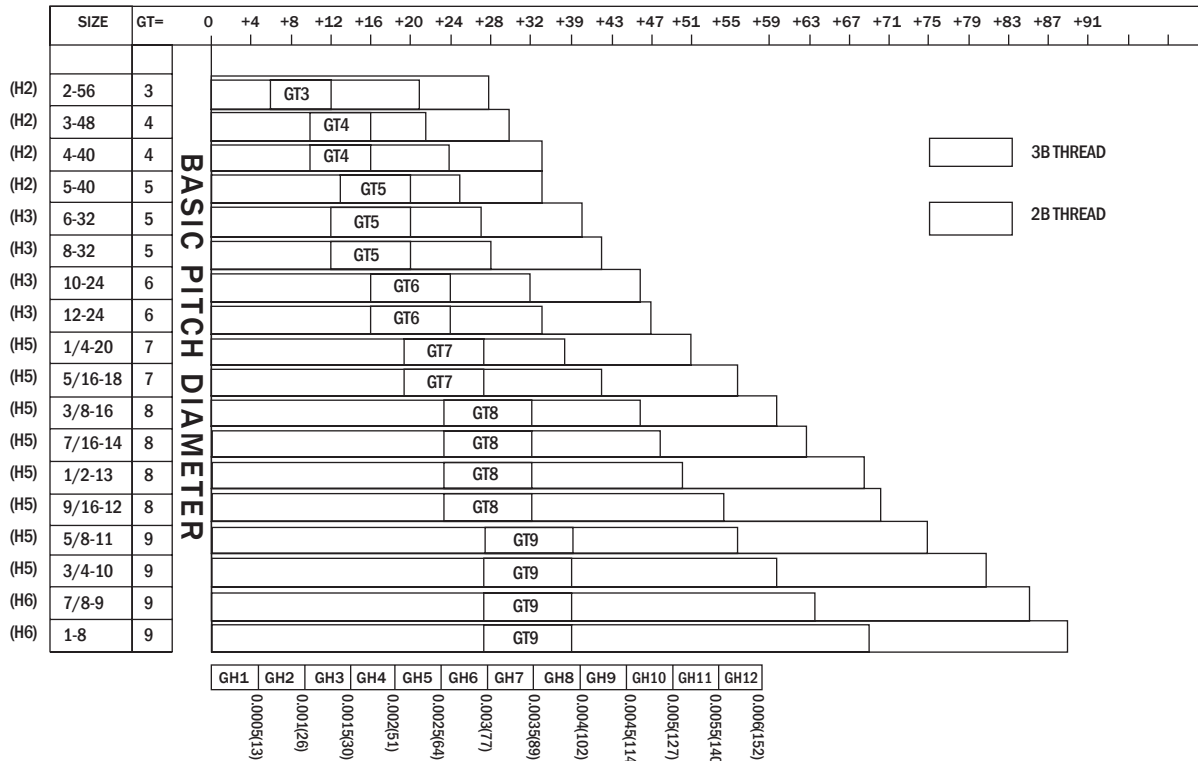
Instead of the usual GH limits, GT limits are applied to Nachi Viper T-Series Taps. Each top has just one GT number instead of several GH numbers, eliminating troublesome limit selection (see Comparison Chart, below, for details).

## COMPARISON OF NACHI GT AND ANSI GH NUMBERS

THREAD TOLERANCE IN TEN THOUSANDTHS OF AN INCH (.0001")

### COMPARISON OF NACHI GT AND ANSI GH NUMBERS

THREAD TOLERANCE IN TEN THOUSANDTHS OF AN INCH (.0001")



## TAP TOLERANCE TABLE

## GT Limits Table

Fractional, Machine screw, and Metric Taps  
Over 42 TPI, or less than 0.6mm pitch

Class	MIN	MAX
GT2	0.0002	0.0008
GT3	0.0006	0.0012
GT4	0.0010	0.0016
GT5	0.0014	0.0020
GT6	0.0018	0.0024
GT7	0.0022	0.0028

Fractional, Machine screw, and Metric Taps  
Less than 42 TPI, or over 0.6mm pitch

Class	MIN	MAX
GT2	0.0000	0.0008
GT3	0.0004	0.0012
GT4	0.0008	0.0016
GT5	0.0012	0.0020
GT6	0.0016	0.0024
GT7	0.0020	0.0028
GT8	0.0024	0.0031
GT9	0.0028	0.0035
GT10	0.0031	0.0039

## GT LIMITS

## CONVERSION CHART

Recommended tap limits for 2B and 3B

TAP SIZE	CLASS 2B		CLASS 3B	
	H LIMITS	GT LIMITS	H LIMITS	GT LIMITS
2-56	H2	GT3	H1	-
2-64	H2	GT3	H1	-
3-48	H2	GT4	H1	-
3-56	H2	GT3	H1	-
4-40	H2	GT5	H2	-
4-48	H2	GT4	H1	-
5-40	H2	GT5	H2	-
5-44	H2	GT5	H2	-
6-32	H3	GT5	H2	-
6-40	H2	GT5	H2	-
8-32	H3	GT5	H2	-
8-36	H2	GT5	H2	-
10-24	H3	GT6	H3	-
10-32	H3	GT5	H2	-
12-24	H3	GT6	H3	-
12-28	H3	GT6	H3	-
1/4-20	H5	GT7	H3	GT4
1/4-28	H4	GT6	H3	GT4
5/16-18	H5	GT7	H3	GT4
5/16-24	H4	GT7	H3	GT4
3/8-16	H5	GT8	H3	GT4
3/8-24	H4	GT7	H3	GT4
7/16-14	H5	GT8	H3	GT4
7/16-20	H5	GT8	H3	GT4
1/2-13	H5	GT8	H3	GT4
1/2-20	H5	GT8	H3	GT4
9/16-12	H5	GT8	H3	GT4
9/16-18	H5	GT8	H3	GT4
5/8-11	H5	GT9	H3	GT4
5/8-18	H5	GT8	H3	GT4
3/4-10	H5	GT9	H5	GT4
3/4-16	H5	GT8	H3	GT4
7/8-9	H6	GT9	H4	GT5
7/8-14	H6	GT9	H4	GT5
1-8	H6	GT9	H4	GT5
1-12	H6	GT9	H4	GT5

## TAP TOLERANCE TABLE

## H Limits Table

Fractional and Machine screw types

Class	MIN	MAX
H1	0.0000	0.0005
H2	0.0005	0.0010
H3	0.0010	0.0015
H4	0.0015	0.0020
H5	0.0020	0.0025
H6	0.0025	0.0030
H7	0.0030	0.0035
H8	0.0035	0.0040
H9	0.0040	0.0045
H10	0.0045	0.0050
H11	0.0050	0.0055
H12	0.0055	0.0060

## D Limits Table

Metric Taps

Tap Size	D Class	MIN	MAX
M2X0.4	D3	0.0009	0.0015
M2.5X0.45	D3	0.0009	0.0015
M3X0.5	D3	0.0009	0.0015
M3.5X0.6	D4	0.0012	0.0020
M4X0.7	D4	0.0012	0.0020
M5X0.8	D4	0.0012	0.0020
M6X1	D5	0.0015	0.0025
M7X1	D5	0.0015	0.0025
M8X1	D5	0.0015	0.0025
M8X1.25	D5	0.0013	0.0025
M10X1.25	D5	0.0013	0.0025
M10X1.5	D6	0.0018	0.0030
M12X1.25	D5	0.0013	0.0025
M12X1.75	D6	0.0018	0.0030
M14X1.5	D6	0.0018	0.0030
M14X2	D7	0.0019	0.0035
M16X1.5	D6	0.0018	0.0030
M16X2.0	D7	0.0019	0.0035
M18X1.50	D6	0.0018	0.0030
M18X2.5	D7	0.0019	0.0035
M20X2.5	D7	0.0019	0.0035
M22X2.5	D7	0.0019	0.0035
M24X3.0	D8	0.0024	0.0040
M27X3.0	D8	0.0024	0.0040
M30X3.5	D9	0.0025	0.0045

## RESHARPENING OF TAPS

### When to Resharpen Taps

1. When the taps get or appear to be damaged.
2. When the dimensions of the tapped threads begin to get out of tolerance.
3. When the surface roughness on threads decreases.
4. When the cutting torque starts to increase.
5. When the taps start to make a squealing noise.
6. When the shape of the tapping chips begin to change.

### A. Flute Grinding Way

1. The following table shows the common grinding condition for resharpening the taps.

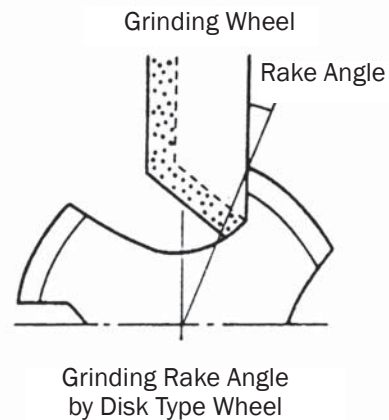
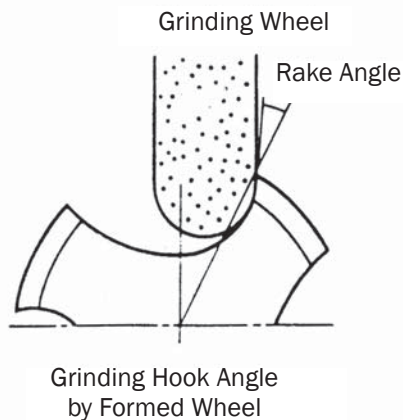
Item	General	Mass Production
Wheel Dimension	WA 60–80K	CBN 120 –170
Wheel Speed	1970 ft/mm	4,900–5,900 ft/mm
Depth of Grinding	.0012"	.0004 – .002"
Feed Rate	3.3 ft/mm	3.3–10.0 ft/min
Coolant	Wet	Wet

The depth of regrind can be 2–3 times the thread height; it is not necessary to regrind full depth of the flute. However, it must be as smooth as possible from the ground rake face position to the root radius.

### 2. Setting the rake angle

To grind the rake face is to remove wear and the damaged portion.

It is very important to set the rake angle very carefully, otherwise it brings unstable accuracy of female thread, bad surface roughness, short tool life and chipping. The following picture indicates two types of resharpening, which are Grinding Hook Angle by Formed wheel and Grinding Rake Angle by Disk Type wheel.

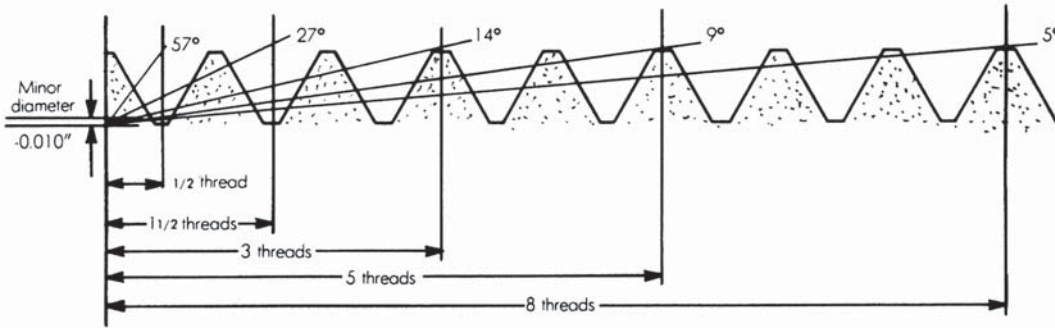


### RESHARPENING OF TAPS

#### B. Chamfer Grinding Way

The Chamfer Grinding is carried out by some chamfer grinding machines with being held by collet or between centers. Chamfer length and angle are specified as follows:

Kind of Taps	Chamfer Length	Chamfer Angle
hand taps (Taper)	8~9 threads	≈4°~5°
hand taps (Plug)	5 threads	≈7.5°
hand taps (Bottoming)	1.5 threads	≈24°
taper pipe taps	2.5 threads	≈15°
parallel pipe taps	4 threads	≈11°
spiral fluted taps	2.5 threads	≈15°
spiral pointed taps	4 threads	≈9.5°



Relation between length and angle of taper

Relief Angle ( $\alpha$ ) is calculated as next.

$$\alpha = \tan^{-1}(P \times \tan \lambda / \pi d) \cong \alpha_0$$

$\alpha$  : relief angle on taper

P : pitch

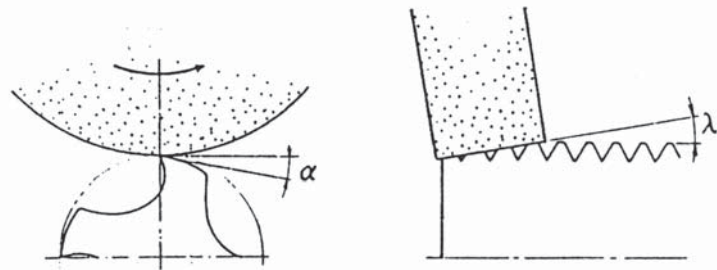
$\lambda$  : taper angle

d : basic minor diameter

$\alpha_0$  : effective minimum relief angle

$\alpha_0$  is decided as table

Material	Relief Angle
Steel	4 ~ 5
Hard Steel	2 ~ 3
Stainless Steel	5°
Cast Iron	3°
Aluminum	6°



Resharpener of taper

## TROUBLE-SHOOTING GUIDE FOR TAPPING PROBLEMS

	Troubles	Factors	Countermeasures
Surface Roughness	Torn or Rough Thread	Chamfer length too short	• Increase chamfer length
		Wrong cutting angle	• Apply proper cutting angle
		Galling	• Use thread relieved taps • Reduce land width • Apply surface treatment such as steam oxide or chrome • Use proper cutting lubricant • Reduce tapping speed • Use larger drill size • Obtain proper alignment between tap and work
		Chip Packing	• Use spiral pointed or spiral fluted taps • Use larger drill size
	Chattering on Tapped Thread	Tool Free Cutting	• Avoid too narrow land width • Reduce amount of thread relief
		Tool Condition	• Reduce cutting angle • Do not grind the bottom of the flute
Dimensional Error	Oversize Pitch Diameter	Incorrect Taps	• Use proper GH limits • Use longer chamfered taps
		Chip Packing	• Use spiral point or spiral fluted taps • Reduce number of flutes to provide extra chip room • Use National fine pitch, if applicable • Use larger drill size • If tapping a blind hole, allow deeper hole where applicable or shorten the thread length of the parts • Use proper lubricant
		Galling	• Apply proper surface treatment such as steamoxide • Use proper cutting lubricant • Reduce tapping speed • Use proper cutting angle in accordance with material being tapped. • Use larger drill size
		Operating Conditions	• Apply proper tapping speed • Correct alignment of tap and drill hole • Free cutting either tap or workpiece • Use proper tapping speed to avoid torn or rough thread • Use lead screw tapper • Use proper tapping machine with suitable power • Avoid misalignment of tap and drill hole from loose spindle or worn holder
		Tool Conditions	• Obtain proper indexing angle for the flutes at the cutting edge • Grind proper indexing angle and chamfer angle • Avoid too narrow land width • Remove burrs from reground edge
	Oversize Internal Diameter	Drill Hole Size	• Use minimum size drill hole • Avoid tapered hole • Use proper chamfered taps
		Galling	• Galling solutions 1 through 4 above can be applied to this specific problem



	Troubles	Factors	Countermeasures
Dimensional Error	Undersize Pitch Diameter	Incorrect Tap Selection	<ul style="list-style-type: none"> <li>• Use one oversize taps               <ol style="list-style-type: none"> <li>1) Use for cuffing materials such as copper alloy, aluminum alloy, and cast iron</li> <li>2) Use for cuffing tubing which will have "spring back" action after tapping</li> </ol> </li> <li>• Apply proper chamfer angle</li> <li>• Increase cutting angle</li> </ul>
		Damaged Thread	<ul style="list-style-type: none"> <li>• Use proper reversing speed to avoid damaging tapped thread on the way out of the hole</li> </ul>
		Left over Chips	<ul style="list-style-type: none"> <li>• Increase cutting performance to avoid any leftover chip in the hole</li> <li>• Remove leftover chip from the hole for gauge checking</li> </ul>
	Undersize Internal Diameter	Drill Hole size	<ul style="list-style-type: none"> <li>• Use maximum drill size</li> </ul>
Tool Life	Breakage	Incorrect Tap Selection	<ul style="list-style-type: none"> <li>• Use high speed steel taps</li> <li>• Avoid chip packing in the flutes or the bottom of hole</li> <li>• Use spiral pointed or spiral fluted taps or Roll Taps</li> <li>• Apply correct surface treatment such as steam oxide or other coating</li> </ul>
		Excessive Tapping Torque	<ul style="list-style-type: none"> <li>• Use larger drill size</li> <li>• Try to shorten thread length</li> <li>• Apply National Fine Pitch if applicable</li> <li>• Increase cutting angle</li> <li>• Apply a tap with more thread relief and reduced land width</li> <li>• Use spiral pointed or spiral fluted taps</li> </ul>
		Operating Conditions	<ul style="list-style-type: none"> <li>• Reduce tapping speed</li> <li>• Avoid misalignment between tap and the hole and tapered hole</li> <li>• Use floating type of tapping holder</li> <li>• Use tapping holder with torque adjustment</li> <li>• Avoid hitting bottom of the hole with tap</li> </ul>
		Tool Condition	<ul style="list-style-type: none"> <li>• Do not grind the bottom of the flutes</li> <li>• Avoid too narrow a land width</li> <li>• Do not leave sections on the reground flutes which tapping wear still remains</li> <li>• Regrind tool more frequently</li> </ul>
	Chipping	Incorrect Tap Selection	<ul style="list-style-type: none"> <li>• Reduce cutting angle</li> <li>• Use a different kind of high speed steel taps</li> <li>• Reduce hardness of the taps</li> <li>• Increase chamfer length</li> <li>• Avoid chip packing in the flutes or the bottom of the hole by using spiral pointed or fluted taps</li> </ul>
		Operating Conditions	<ul style="list-style-type: none"> <li>• Reduce tapping speed</li> <li>• Avoid misalignment between tap and hole</li> <li>• Avoid sudden return or reverse in blind hole tapping</li> <li>• Avoid galling</li> <li>• Use larger drill size</li> </ul>
	Wear	Incorrect Tap Selection	<ul style="list-style-type: none"> <li>• Apply specially designed taps for tapping heat treated material</li> <li>• Change to a type of high speed steel material contained vanadium</li> <li>• Apply special surface treatment such as nitriding or TiN</li> <li>• Increase chamfer length</li> </ul>
		Operating Conditions	<ul style="list-style-type: none"> <li>• Reduce tapping speed</li> <li>• Apply proper cutting lubricants</li> <li>• Avoid work hardened hole</li> <li>• Use larger drill size</li> </ul>
		Tool Condition	<ul style="list-style-type: none"> <li>• Grind proper cutting angle</li> <li>• Avoid hardness reduction from grind process</li> </ul>



Description	U.S.A.		Japan	Germany	ISO
	ASTM	AISI	JIS	DIN	
Pipe Steel	1026 1025 1026  1050		STS480 STKM12A STKM12C STKM13B STKM14B  STKM14C STKM15A STKM15C STKM16A STKM16C STKM17A STKM17C STKM18A STKM18B STKM20A	St52.4	R33    R50
Heat Resistant Steel	S65007  S63008 S63017  S30900 S31000 N08330 S40900  S44600  S42200 S66286 R30155		SUH1 SUH3 SUH4 SUH11 SUH21 SUH31 SUH35 SUH36 SUH37 SUH38 SUH309 SUH310 SUH330 SUH409 SUH409L SUH446 SUH600 SUH616 SUH660 SUH661	X6CrTi12	1Ti          H7
Free Cutting Steel		1110 1108 1212 1213  1215  12L14  1117  1137 1141 1144	SUM11 SUM12 SUM21 SUM22 SUM22L SUM23 SUM23L SUM24L SUM25 SUM31 SUM31L SUM32 SUM41 SUM42 SUM43	9SMn28 9SMnPb28  9SMnPb28 9SMn36 15S10	9S20 11SMn28 11SMnPb  11SMnPb28 12SMn35  44SMn28
Spring Steel		1075 1078  9260 5155 5160 6150 51B60  4161	SUP3  SUP6 SUP7 SUP9 SUP9A SUP10 SUP11A SUP12 SUP13	55Cr3  50CrV4  54SiCr6	1 1 5 9 7 4 8
Stainless Steel	S30400 S40500 S42020 S43000 S44002 S17400 S17700 S41000		SUS304 SUS405 SUS420F SUS430 SUS440A SUS630 SUS631 SUS410	X5CrNi1810 X6CrAl13  X6Cr17  X7CrNiAl177 X10Cr13	11 2  8  1 2 3
Cast Steel	HT		SCH15		
Cast Iron	40 45		FC250 FC300		
Ductile Cast Iron	60-40-18 80-55-06		FCD400 FCD600	GGG-60	
Aluminum Alloy	1100  2014  2014 2024 2024 2024		A1080 A1070 A1050 A1100 A1200 A2014 A2017 A2017 A2024BD A2024BE A2024 P	AI99.8 AI99.7 AI99.5  AI99 AI-CuSiMn AI-CuMg1 AI-CuSiMn AI-CuMg2 AI-CuMg2 EN AW-2024	AI99.5 AI99.0Cu AI99.0 AI-Cu4SiMg AI-Cu4MgSi AI-Cu4SiMg AI-Cu4Mg1 AI-Cu4Mg1 AI-Cu4Mg1

Description	U.S.A.		Japan	Germany	ISO
	ASTM	AISI	JIS	DIN	
Aluminum Alloy	2024 2024 2024 2024 3003 5052 5052  5052 5052 5052 5052 5052 5083 6061 6063 7075 7075 7075 7075 7075 7075 7075 7075		A2024 S A2024 TD A2024 TE A2024 W A3003 A5052 BD A5052 BE A5052 FH A5052 P A5052 S A5052 TD A5052 TE A5052 W A5056 A5083 A6061 A6063 A7075 BD A7075 BE A7075 FD A7075 FH A7075 P A7075 S A7075 TD A7075 TE	AlCuMg2 AlCuMg2 AlCuMg2 AlCu4Mg1  AlMg2.5  EN AW-5052  AlMg2.5 AlMg5 AlMg4.5Mn AlZnMgCu1.5 AlZnMgCu1.5 AlZnMgCu1.5 AlZnMgCu1.5 EN AW-7075 AlZnMgCu1.5 AlZnMgCu1.5 AlZnMgCu1.5	AlCu4Mg1 AlCu4Mg1 AlCu4Mg1  AlMg2.5  AlMg2.5 AlMg2.5 AlMg4.5Mn0.7 Al-Mg1SiCu Al-Mg0.7Si AlZn5.5MgCu AlZn5.5MgCu AlZn5.5MgCu AlZn5.5MgCu AlZn5.5MgCu
Aluminum Alloy Casting	295.0 204.0  319.0  333.0 356.0 A356.0 355.0 242.0 514.0 520.0 336.0  332.0  A413.0 A360.0 518.0  A380.0 A380.0 383.0 383.0 A390.0		AC1A AC1B AC2A AC2B AC3A AC4A AC4B AC4C AC4CH AC4D AC5A AC7A AC7B AC8A AC8B AC8C AC9A AC9B ADC1 ADC3 ADC5 ADC6 ADC10 ADC10Z ADC12 ADC12Z ADC14	G(GK)-AlCu4Ti G(GK)-AlCu4TiMg  G(GK)-AlSi2 G(GK)-AlSi10Mg G(GK)-AlSiCu3  G(GK)-AlMg5  GD-AlSi12(Cu) GD-AlSi10Mg GD-AlMg9  GD-AlSi9Cu3 GD-AlSi9Cu3	Al-Cu4MgTi Al-Si5Cu3 Al-Si6Cu4 Al-Si2 Al-Si10Mg  Al-Si7Mg Al-Si7Mg Al-Si5Cu1Mg Al-Cu4Ni2Mg2  Al-Mg10  Al-Si2CuFe Al-Si8Cu3Fe Al-Si9Cu3Fe
Magnesium Alloy	AZ91A AZ91B AZ91D AZ60A AZ60B AZ41A AZ80A AM20A AM50A AM60B AS22A AS41B AE42A		MD1A MD1B MD1D  MB3  MD2B	DG-MgAl9Zn1 DG-MgAl9Zn1  MgAl8Zn	Mg-Al8Zn
Copper, Copper Casting	C10200(B187:94) C10200(B152:94) C10200(B152:94)		C1020 B C1020 P C1020 R	OF-Cu OF-Cu OF-Cu	Cu-OF Cu-OF Cu-OF
Brass, Brass Casting	C26000(B36:95) C26000(B36:95) C26000(B36:95)		C2600 B C2600 P C2600 R	CuZn30.17660:83 CuZn30.17660:83 CuZn30.17660:83 CuZn30.17670:83	426/183 CuZn30 426/183 CuZn30 426/183 CuZn30
Bronze, Bronze Casting	C26000(B135:95) C26000(B134:93) C61400(B169:95)		C2600 T C2600 W C6140 P	CuZn30 CuZn30	CuZn30 CuZn30 428/83 CuAl8Fe3

Approximate relationship between various hardness scales

(HRC) Rockwell hardness C scale 150kg Brale	(HV) Diamond Pyramid hardness number, Vickers	(HB) Brinell hardness 29.42kN			Rockwell hardness			Rockwell hardness			(Hs) Shore scleroscope hardness number	Approx. tensile strength N/mm <sup>2</sup>	(HRC) Rockwell hardness C scale 150kg Brale
		Standard 10mm ball	Hultgren 10mm ball	Tungsten carbide 10mm	(HRA) A scale 588.4N (60kg) Brale	(HRB) B scale 980.7N (100kg) 1/16 in Ball	(HRD) D scale 980.7N (100kg) Brale	15N Superficial Load 147.1N	30N Superficial Load 294.2N	45N Superficial Load 441.3N			
68	940	—	—	—	85.6	—	76.9	93.2	84.4	75.4	97	—	68
67	900	—	—	—	85.0	—	76.1	92.9	83.6	74.2	95	—	67
66	865	—	—	—	84.5	—	75.4	92.5	82.8	73.3	92	—	66
65	832	—	—	739	83.9	—	74.5	92.2	81.9	72.0	91	—	65
64	800	—	—	722	83.4	—	73.8	91.8	81.1	71.0	88	—	64
63	772	—	—	705	82.8	—	73.0	91.4	80.1	69.9	87	—	63
62	746	—	—	688	82.3	—	72.2	91.1	79.3	68.8	85	—	62
61	720	—	—	670	81.8	—	71.5	90.7	78.4	67.7	83	—	61
60	697	—	613	654	81.2	—	70.7	90.2	77.5	66.6	81	—	60
59	674	—	599	634	80.7	—	69.9	89.8	76.6	65.5	80	—	59
58	653	—	587	615	80.1	—	69.2	89.3	75.7	64.3	78	—	58
57	633	—	575	595	79.6	—	68.5	88.9	74.8	63.2	76	—	57
56	613	—	561	577	79.0	—	67.7	88.3	73.9	62.0	75	—	56
55	595	—	546	560	78.5	—	66.9	87.9	73.0	60.9	74	2079	55
54	577	—	534	543	78.0	—	66.1	87.4	72.0	59.8	72	2010	54
53	560	—	519	525	77.4	—	65.4	86.9	71.2	58.6	71	1952	53
52	544	500	508	512	76.8	—	64.6	86.4	70.2	57.4	69	1883	52
51	528	487	494	496	76.3	—	63.8	85.9	69.4	56.1	68	1824	51
50	513	475	481	481	75.9	—	63.1	85.5	68.5	55.0	67	1755	50
49	498	464	469	469	75.2	—	62.1	85.0	67.6	53.8	66	1687	49
48	484	451	455	455	74.7	—	61.4	84.5	66.7	52.5	64	1638	48
47	471	442	443	443	74.1	—	60.8	83.9	65.8	51.4	63	1579	47
46	458	432	432	432	73.6	—	60.0	83.5	64.8	50.3	62	1530	46
45	446	421	421	421	73.1	—	59.2	83.0	64.0	49.0	60	1481	45
44	434	409	409	409	72.5	—	58.5	82.5	63.1	47.8	58	1432	44
43	423	400	400	400	72.0	—	57.7	82.0	62.2	46.7	57	1383	43
42	412	390	390	390	71.5	—	56.9	81.5	61.3	45.5	56	1334	42
41	402	381	381	381	70.9	—	56.2	80.9	60.4	44.3	55	1294	41
40	392	371	371	371	70.4	—	55.4	80.4	59.5	43.1	54	1245	40
39	382	362	362	362	69.9	—	54.6	79.9	58.6	41.9	52	1216	39
38	372	353	353	353	69.4	—	53.8	79.4	57.7	40.8	51	1177	38
37	363	344	344	344	68.9	—	53.1	78.8	56.8	39.6	50	1157	37
36	354	336	336	336	68.4	(109.0)	52.3	78.3	55.9	38.4	49	1118	36
35	345	327	327	327	67.9	(108.5)	51.5	77.7	55.0	37.2	48	1079	35
34	336	319	319	319	67.4	(108.0)	50.8	77.2	54.2	36.1	47	1059	34
33	327	311	311	311	66.8	(107.5)	50.0	76.6	53.3	34.9	46	1030	33
32	318	301	301	301	66.3	(107.0)	49.2	76.1	52.1	33.7	44	1000	32
31	310	294	294	294	65.8	(106.0)	48.4	75.6	51.3	32.5	43	981	31
30	302	286	286	286	65.3	(105.5)	47.7	75.0	50.4	31.3	42	951	30
29	294	279	279	279	64.7	(104.5)	47.0	74.5	49.5	30.1	41	932	29
28	286	271	271	271	64.3	(104.0)	46.1	73.9	48.6	28.9	41	912	28
27	279	264	264	264	63.8	(103.0)	45.2	73.3	47.7	27.8	40	883	27
26	272	258	258	258	63.3	(102.5)	44.6	72.8	46.8	26.7	38	863	26
25	266	253	253	253	62.8	(101.5)	43.8	72.2	45.9	25.5	38	843	25
24	260	247	247	247	62.4	(101.0)	43.1	71.6	45.0	24.3	37	824	24
23	254	243	243	243	62.0	100.0	42.1	71.0	44.0	23.1	36	804	23
22	248	237	237	237	61.5	99.0	41.6	70.5	43.2	22.0	35	785	22
21	243	231	231	231	61.0	98.5	40.9	69.9	42.3	20.7	35	775	21
20	238	226	226	226	60.5	97.8	40.1	69.4	41.5	19.6	34	755	20
(18)	230	219	219	219	—	96.7	—	—	—	—	33	736	(18)
(16)	222	212	212	212	—	95.5	—	—	—	—	32	706	(16)
(14)	213	203	203	203	—	93.9	—	—	—	—	31	677	(14)
(12)	204	194	194	194	—	92.3	—	—	—	—	29	647	(12)
(10)	196	187	187	187	—	90.7	—	—	—	—	28	618	(10)
( 8)	188	179	179	179	—	89.5	—	—	—	—	27	598	( 8)
( 6)	180	171	171	171	—	87.1	—	—	—	—	26	579	( 6)
( 4)	173	165	165	165	—	85.5	—	—	—	—	25	549	( 4)
( 2)	166	158	158	158	—	83.5	—	—	—	—	24	530	( 2)
( 0)	160	152	152	152	—	81.7	—	—	—	—	24	520	( 0)

In the above chart, figures with ( ) are not commonly used.

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6403	AG Heavy, Inch	184	216	941	Taper Pipe Straight Fluted	269	271
6404	AG Heavy Long	188	216	947	Taper Pipe Spiral Fluted	269	271
6406	AG Roughing Short	185	215	969	Standard Hand for Cast Iron	267	271
6450	DLC-HSS, Metric	183	214	971	VTP Spiral, Fractional	263	271
6484	AG Roughing Regular	185	215	973	VTP Spiral, Machine Screw	263	271
6485	AG Roughing, Inch	184	215	980	VTP Spiral Fluted, Metric	264	271
6486	AG Roughing Medium	186	215	981	VTP Spiral Fluted, Fractional	262	271
6488	AG Roughing Long	186	215	982	VTP Spiral Pointed, Metric	264	271
9251X	Genac SG Coated Carbide	190	219	983	VTP Spiral Fluted, Machine Screw	262	271
9261X	Genac SG Coated Carbide Regular	189	217	995	Viper Taflet for Steel, Fractional & M.S.	258,259	271
9263X	Genac SG Coated Carbide Regular	189	217	996	Viper Taflet for Steel, Metric	260	271
9267X	Genac SG Coated Carbide	190	217	6955	DLC Taflet Thread Forming, Fractional	246	271
9271X	Genac SG Coated Carbide Ball	189	218	6956	DLC Taflet Thread Forming, Metric	247	271
9273X	Genac SG Coated Carbide Ball	189	218	6957	DLC Taflet Thread Forming, Machine Screw	246	271
9302	DLC Radius	180	210	6958	SG Lo-Spiral Fluted, Metric	249	271
9321	X's Geo, Inch	173	205	6959	SG Lo-Spiral Fluted, Fractional & M.S.	248	271
9322	X's Geo, Metric	172	205	7970	Viper T-Series Spiral Pointed, Metric	253	271
9324	X's Geo Radius	174	205	7971	Viper T-Series Spiral Pointed	252	271
9330	DLC for Aluminum, Metric	179	210	7972	Viper T-Series for Stainless SP, Metric	256	271
9332	X's Geo Microball	178	208	7977	Viper T-Series for Stainless SP	255	271
9338	X's Geo Slot	175	206	7980	Viper T-Series Spiral Fluted, Metric	253	271
9340	X's Geo Ball	177	207	7981	Viper T-Series Spiral Fluted	251	271
9360	DLC Ball	182	213	7982	Viper T-Series for Stainless SF, Metric	256	271
9366	X's Geo KV 2-Flutes	176	209	7987	Viper T-Series for Stainless SF	254	271
9368	X's Geo KV 4-Flutes	176	209				
9378	DLC Sharp Corner 2-Flute	179	210				

Decimal	Fraction	Wire, Letter	mm	Tap Sizes To be used with drills as indicated	Decimal	Fraction	Wire, Letter	mm	Tap Sizes To be used with drills as indicated	Decimal	Fraction	Wire, Letter	mm	Tap Sizes To be used with drills as indicated	Decimal	Fraction	Wire, Letter	mm	Tap Sizes To be used with drills as indicated	Decimal	Fraction	Wire, Letter	mm	Tap Sizes To be used with drills as indicated
.0059	97	.15			.0610		.155			.1614		4.1			.3071		7.8		M9x1.25	.5781	37/64			{ 5/8-18 5/8-20
.0063	96	.16			.0625	1/16				.1654		4.2		M5x0.8	.3110		7.9			.5807		14.75		
.0067	95	.17			.0630		1.6		M2x0.4	.1660		19			.3125	5/16			3/8-16	.5906		15.0		
.0071	94	.18			.0635		52			.1693		4.3			.3150		8.0			.5938	19/32			{ 5/8-24 5/8-28 5/8-32
.0075	93	.19			.0650		1.65			.1695		18			.3160		O			.6004		15.25		
.0079	92	.2			.0669		1.7			.1719	11/64				.3189		8.1			.6094	39/64			11/16-12
.0083	91				.0670		51			.1730		17			.3228		8.2			.6102		15.5		M18x2.5
.0087	90	.22			.0689		1.75		M2.2x0.45 No.2-56 No.2-64	.1732		4.4			.3230		P			.6201		15.75		
.0091	89				.0700		50			.1770		16		No.12-24	.3268		8.3			.6250	5/8			11/16-16
.0095	88				.0709		1.8			.1772		4.5			.3281	21/64			3/8-20	.6299		16.0		
.0098		.25			.0728		1.85			.1800		15			.3307		8.4			.6398		16.25		
.0100	87				.0730		49			.1811		4.6			.3320		Q		M10x1.5	.6406	41/64			11/16-20
.0105	86				.0748		1.9			.1820		14		No.12-28	.3346		8.5			.6496		16.5		
.0110	85	.28			.0760		48			.1850		13	4.7	No.12-32	.3386		8.6			.6562	21/32			{ 11/16-24 11/16-28 11/16-32 3/4-10
.0115	84				.0768		1.95			.1875	3/16				.3390		R		3/8-24	.6594		16.75		
.0118		.3			.0781	5/64				.1890		12	4.8		.3425		8.7			.6619	43/64			3/4-12
.0120	83				.0785		47			.1910		11			.3438	11/32			{ 3/8-28 3/8-32	.6719		17.25		
.0125	82				.0787		2.0			.1929		4.9			.3465		8.8			.6791		17.5		3/4-16
.0126		.32			.0807		2.05		M2.5x0.45	.1935		10			.3480		S			.6890		17.5		M22x2.5
.0130	81				.0810		46			.1960		9			.3504		8.9			.7031	45/64			3/4-20
.0135	80				.0820		45		No.3-56	.1969		5.0		M6x1	.3543		9.0			.7087		18.0		
.0138		.35			.0827		2.1			.1990		8			.3580		T			.7188	23/32			{ 3/4-28 3/4-32
.0145	79				.0846		2.15			.2008		5.1			.3583		9.1			.7283		18.5		
.0150		.38			.0860		44			.2010		7		1/4-20	.3594	23/64				.7344	47/64			13/16-12
.0156	1/64				.0866		2.2			.2031	13/64				.3622		9.2			.7480		19.0		
.0157		.4			.0886		2.25			.2040		6			.3661		9.3			.7500	3/4			13/16-16
.0160	78				.0890		43		No.4-40	.2047		5.2			.3680		U		7/16-14	.7656	49/64			7/8-9
.0177		.45			.0906		2.3			.2055		5			.3701		9.4			.7677		19.5		M22x2.5
.0180	77				.0925		2.35			.2087		5.3			.3740		9.5			.7812	25/32			{ 13/16-28 13/16-32
.0197		.5			.0935		42		No.4-48	.2090		4			.3750	3/8			7/16-16	.7874		20.0		
.0200	76				.0938	3/32				.2126		5.4			.3770		V			.7874		20.0		
.0210	75				.0945		2.4			.2130		3			.3780		9.6			.7969	51/64			7/8-12
.0217		.55			.0945		2.4			.2165		5.5			.3819		9.7			.8071		20.5		
.0225	74				.0960		41			.2188	7/32			{ 1/4-28 1/4-32	.3858		9.8			.8125	13/16			{ 7/8-14 7/8-16 7/8-20 7/8-28 7/8-32
.0236		.6			.0965		2.45			.2205		5.6			.3860		W			.8268		21.0		M24x3
.0240	73				.0980		40			.2210		2			.3898		9.9			.8281	53/64			7/8-20
.0250	72				.0984		2.5		M3x0.5	.2244		5.7			.3906	25/64			7/16-20	.8438	27/32			{ 7/8-28 7/8-32
.0256		.65			.0995		39			.2280		1			.3937		10.0			.8465		21.5		
.0260	71				.1015		38		No.5-40	.2283		5.8			.3970		X			.8594	55/64			15/16-12
.0276		.7			.1024		2.6			.2323		5.9			.4016		10.2		M12x1.75	.8661		22.0		
.0280	70				.1040		37		No.5-44	.2340		A			.4040		Y		7/16-28	.8750	7/8			{ 15/16-16 1-8
.0292	69				.1063		2.7			.2344	15/64				.4062	13/32			7/16-32	.8858		22.5		
.0295		.75		M1x0.25	.1065		36		No.6-32	.2362		6.0		M7x1	.4130		Z			.8906	57/64			15/16-20
.0310	68				.1094	7/64				.2380		B			.4134		10.5			.9055		23.0		
.0312	1/32				.1100		35			.2402		6.1			.4219	27/64			1/2-13	.9062	29/32			15/16-28
.0315		.8			.1110		34			.2420		C			.4252		10.8			.9219	59/64			15/16-32
.0320	67				.1120		33		No.6-40	.2441		6.2			.4331		11.0			.9252		23.5		1-12
.0330	66				.1130		33		No.6-40	.2441		6.2			.4375	7/16			1/2-16	.9375	15/16			{ 1-16 1 1/16-8
.0335		.85		M1.1x0.25	.1142		2.9		M3.5x0.6	.2460		D			.4409		11.2			.9449		24.0		M27x3
.0350	65				.1160		32			.2480		6.3			.4528		11.5			.9531	61/64			1-20
.0354		.9			.1181		3.0			.2500	1/4	E			.4531	29/64			1/2-20	.9646		24.5		
.0360	64				.1200		31			.2520		6.4			.4646		11.8			.9688	3/64			{ 1-28 1-32
.0370	63				.1220		3.1			.2559		6.5			.4688	15/32			{ 1/2-28 1/2-32	.9843		25.0		
.0374		.95		M1.2x0.25	.1250	1/8				.2570		F		5/16-18	.4724		12.0		M14x2	.9844	63/64			{ 1 1/16-12 1 1/8-7 1 1/16-16 1 1/8-8
.0380	62				.1260		3.2			.2598		6.6			.4803		12.2			1.0000	1			
.0390	61				.1285		30			.2610		G			.4844	31/64			9/16-12					
.0394		1.0			.1299		3.3		M4x0.7	.2638		6.7			.4921		12.5							
.0400	60				.1339		3.4			.2656	17/64			5/16-20	.5000	1/2			9/16-16					
.0410	59				.1360		29		{ No.8-32 No.8-36	.2660		H			.5039		12.8							
.0413		1.05			.1378		3.5			.2677		6.8		M8x1.25	.5118		13.0							
.0420	58				.1405		28			.2717		6.9			.5156	33/64			9/16-18					
.0430	57				.1417	9/64				.2720		I		5/16-24	.5197		13.2							
.0433		1.1		M1.4x0.3	.1417		3.6			.2756		7.0			.5312	17/32			{ 9/16-24 9/16-28 9/16-32 5/8-11					
.0453	56	1.15			.1440		27			.2770		J		5/16-28	.5315		13.5							
.0465		.56			.1440		27			.2795		7.1			.5433		13.8							
.0469	3/64			No.0-80	.1457		3.7		M4.5x0.75	.2810		K			.5469	35/64			5/8-12					
.0472		1.2			.1470		26			.2812	9/32			5/16-32	.5512		14.0		M16x2					
.0492		1.25		M1.6x0.35	.1495		25		No.10-24	.2835		7.2			.5610		14.25							
.0512		1.3			.1496		3.8			.2874		7.3			.5625	9/16			5/8-16					
.0520	55				.1520		24			.2900		L			.5709		14.5							
.0531		1.35			.1535		3.9			.2913		7.4												
.0550	54				.1540		23			.2950		M												