

# YMW-USA

## 2013-2014



**Spiral Pointed Taps**



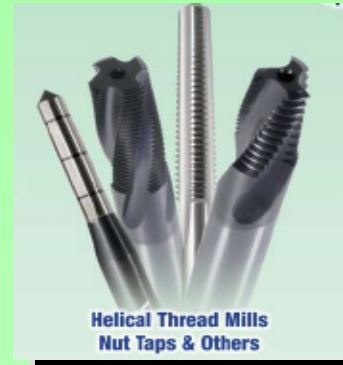
**Spiral Fluted Taps  
(For through hole)**



**Spiral Fluted Taps  
(For blind hole)**



**Cemented Carbide Taps**



**Helical Thread Mills  
Nut Taps & Others**



**Roll Taps**



**Pipe Taps**



**Hand Taps**

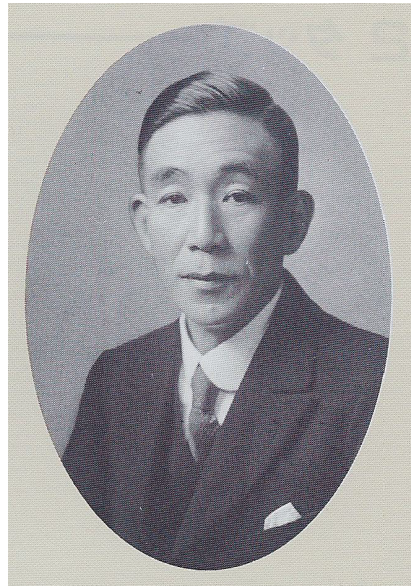


**Center Drills  
Centering Tools**



**Dies & Rolling Dies**

# HIGH PERFORMANCE TAPS, DIES, CENTER DRILLS AND GAGES



Mr. Jokichi Watanabe, founder of Yamawa Manufacturing, located his company in Shibuya-Ku, Tokyo during 1923. Since then, Yamawa continues a strong effort to evolve its manufacturing technology along with the progress of machine tool development worldwide. As a group, Yamawa responds to the customers needs by continuously focusing on research and development of products, processes and quality improvements.

The definition of YAMWA is "greater prosperity, more united". In these words, Jokichi Watanabe had a vision, as the company becomes prosperous, the harmony among its employees become more precious. From its inauguration in 1923, the Yamawa Group has continued to invest in the development and manufacturing of the highest quality cutting tools to meet the demanding needs of the worldwide technology industries.

The many users of Yamawa high quality taps and cutting tools include aerospace, defense, telecommunications, automotive, oil tool, wind generation, ship building, machine tools, electronic appliances, IT industries and others. Year after year, Yamawa branded products continue to receive the highest recognition for consistent reliance from the worldwide market.

Yamawa continues the investigation of excellence in development and manufacturing by seeking the best technology available in today's market. When there are no major improvements available in machine tool technology, Yamawa continues to manufacture its own precise machinery to manufacture the highest quality cutting tools available in the worldwide market. It is with great pride that Yamawa was the first manufacturer in Japan to obtain ISO9001 not only through technology but quality control.

Yoshi Watanabe, current President of Yamawa states "The Yamawa spirit contributes to industries by producing the most Reliable Screw Threads. These reliable threads are indispensable as the basis of manufacturing. Yamawa realizes that a consistent supply of high quality and high performance products satisfies our customers requirements and contributes to the technological evolution of industrial fields and advancement of society.

Realizing that enterprise gives influence to earthy environment, Yamawa contributes to our society by manufacturing the highest quality cutting tools, and proceeds with the continuous development of activities while protecting environment. All employees participate in the activities of protecting our mutual environment.

We thank you for your continued support.

# Creating high quality, high performance taps, cutting tools and to support technical innovation in metal machining.

As rapid technical innovation unfolds in every field of industry, metal cutting and threading are faced with demands for higher quality and more efficient machining.

By developing and supplying more precise, high performance taps and center drills to meet these evolving needs, YAMAWA is contributing to the advancement of global machining.

## Product Line *Precision*

### *Cutting Tools*

- Taps
- Center Drills
- Gages
- Dies

### *Regrind Fixtures*

- Tap and Drill Sharpeners

### *Precision Pitch Diameter Measuring Machines*

- Three-wire measuring machine for highly accurate pitch diameter measurement

**YAMAWA products respond to a wide variety of technical demands, addressing a wide range of metal processing needs, including:**

### **Tapping hard to machine materials**

Technological advances in the aerospace industry and other fields have prompted the use of various new light weight, heat resistant materials such as titanium and nickel based alloys. The extreme hardness and toughness of these materials accelerate wear on cutting tools, making conventional taps inadequate. YAMAWA continues to develop specific high performance tap designs for such hard to machine materials. We supply a broad range of new products in response to evolving customer needs, supporting the cutting edge of the next generation of metal processing.

### **New tap innovation**

Yamawa has introduced new taps for high-performance threading of high-silicon aluminum and wrought aluminums.

YAMAWA is continuously updating tap designs based on meeting and exceeding our customers' tapping needs for increased quality at higher production rates.

### **Industry demand for high production and higher quality screw threads.**

High-speed, high-precision, multi-function CNC machine tools in the field of metal machining, have provided the platforms for threading improvements. YAMAWA has been quick to respond to this emerging trend, leading the industry in the development and introduction of taps for CNC and high-speed and ultra high-speed machining. We continue to produce a steady stream of high-performance taps in response to today's increasingly high demand for quality threads at reduced tapping costs.

### **Environmental protection and increased efficiency**

YAMAWA is actively engaged in finding solutions for the increasing important problems of coolant management. Our proprietary oil-less thread forming taps have eliminated the need for cutting oil during tapping for popular thread sizes. This not only enables cleaner threading but also makes the entire process more efficient by eliminating chips during threading and reducing the cleanup step.

# Our technical expertise continues to create high quality, high performance products while protecting the environment.

For more than 89 years, YAMAWA has continued to develop superior technical expertise as a pioneer in the tap and die industry.

The Yamawa employees technological know-how throughout has helped to produce many of the diverse products that have supported our growth over the years. We have established a flexible production system and a research and development system geared to the needs of our customers.

We remain committed to the development of high-quality, high-performance products, while continuing to refine and advance our technical capabilities.

## YAMAWA's Unique Capabilities

Tap production involves the grinding of many features on a tap blank to produce a finished precision tool. For many years, YAMAWA has recognized the need to build these precision tap grinding machines "in house" as a means of achieving greater tool precision and higher quality tools. Today, YAMAWA makes more than 90% of its own production machines, thereby controlling tap quality from cutoff to final laser marking and measurement. Machines manufactured include machine tools to thread, flute grind, chamfer, tap square, OD grind, and machines to measure all of the taps' critical elements such as thread pitch diameter. The self-reliance at YAMAWA allows us to control product quality and production capabilities by custom engineering machines not readily available in the open market. At YAMAWA, we understand how to make taps, tap manufacturing machines and tap measuring equipment.

## Research and Development

To achieve maximum tapping efficiency, we analyze materials to be tapped in detail. After carefully selecting a tap base material we thoroughly control heat treatment and design. This allows us to develop and supply taps that are ideally suited to their application.

In addition to the basic tap research taking place at our technical research center, we also have a test center where we conduct performance and durability tests on the taps produced at Yamawa to evaluate tool performance with the goal of continuous improvement.

## Quality Control

Equipped with many measuring machines manufactured in-house, YAMAWA maintains a rigorous quality system that includes inspection of both the machine stage and for finished goods. This quality control system has received widespread acclaim, along with numerous awards. In 1996, the Yonezawa Plant stepped ahead of our competitors by receiving ISO 9001. The Fukushima Plant and Aizu Plant were ISO 9001 certified in 2000 facilities. The Tsutsumi plant and the head quarters were certified with ISO9001 in 2012..

## ISO 14001

Yamawa is proud to announce the certification of ISO14001 for all manufacturing facilities and operations. Our aim is to preserve the environment for future generation under the themes as an ecological friend while producing the best screw threads available today. Yamawa recognizes that enterprise activities have a major influence on the earth's environments and as a large corporation we proceed with the protection and continuous improvement of the environment. Yamawa decreases the burden on environment, and respects the environmental rules as it continues to pursue an environment friend enterprise.



**Yonezawa Plant (ISO 9001: 2000)**



Yonezawa is the main manufacturing plant of the Yamawa Group, this location is equipped with production lines and is the Quality Control Center. The plant obtained ISO 9001 certification in 1996. Of the four Yamawa plants, the Yonezawa location has the longest history of manufacturing and the highest production capacity. Products include roll taps, spiral point, pipe and hand taps.

The Yonezawa Plant stepped ahead of our competitors by receiving ISO 9001 before any other cutting tool manufacturing in Japan.

**Fukushima Plant (ISO 9001: 2000)**



The Fukushima plant provides both tap production lines and in house facilities for the manufacturing of specialized production machine tools to produce the exceptional high quality cutting tools . This plant develops and manufactures special tap and die production equipment. It also supplies these machines to our other manufacturing sites. Products include spiral flute taps, dies and combined drills/countersinks as well as production machinery.

The Fukushima Plant and Aizu Plant were ISO 9001 certified in 2000.

**Aizu Plant (ISO 9001: 2000)**



Equipped with the most sophisticated machine tools available, this plant is famous for its automation and robotized labor saving manufacturing processes. The plant is designed for mass production of the highest quality cutting tools and screw thread tools. Products include spiral fluted taps and carbide taps.

**Tsutsumi plant (ISO 9001;2000)**



The Tsutsumi plant is the main tool blank manufacturing operation of Yamawa group. This location is also the testing center where Yamawa executes the innovation in metal machining and performance tests of the products for the Yamawa group.

**Head Office**



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FAX : 03-3564-6838

**Quality, Consistency, Performance and Product Development. All of the 800 Yamawa employees are committed to these principles and this is reflected in each tool we produce.**

























## HISTORY OF YAMAWA TAP CO., LTD.















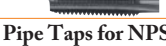



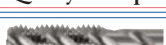





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|---------------|--|
| November 1923 | Founded by Jokici Watanabe in Shibuya-ku, Tokyo.   |
| December 1937 | Company Incorporated.  |
| May 1945      | Factory established in Yonezawa City in Yamagata prefecture.                                   |
| January 1953  | Spun off Yonezawa Factory into a seprate company as Yamawa Tap Co. LTD.                        |
| June 1955     | All products certified to Japanese Industrial Standards (JIS) catagories.                      |
| October 1956  | Award by the Department of Trade and Industry for superiority in industrial standardization.   |
| April 1964    | Newly constructed Fukushima Factory began operation.   |
| November 1973 | Award by the Department of Trade and Industry for superiority in industrial standardization.   |
| October 1983  | Established YAMAWA ENGINEERING Co., LTD.   |
| December 1984 | New machine tool manufacturing facility constructed inside the Fukushima Factory.              |
| October 1986  | Newly completed Aizu Factory opened.   |
| April 1991    | Spun off Fukushima Factory and Aizu Factory into a seprate company, YAMAWA PRECISION Co., LTD. |
| November 1995 | Established TC (Total Cutting) CENTER Co., LTD.  |
| June 1996     | <a href="#"><u>YAMAWA TAP Co., LTD. obtained ISO 9001 certification.</u></a>                   |

## HISTORY OF YAMAWA TAP CO., LTD..

- July 2000 [YAMAWA PRECISION Company, LTD. in Aizu obtained ISO 9001 certification.](#)
- October 2000 [YAMAWA PRECISION Company, LTD., in Fukushima obtained ISO 9001 certification](#)
- August 2001 Establish YAMAWA TC CENTER Company, LTD. from TC CENTER.
- October 2002 Obtain ISO 14001 certification in YAMAWA PRECISION Company, LTD. at Fukushima Plant.
- December 2002 Obtain ISO 14001 certification in YAMAWA PRECISION Company, LTD. at Aizu Plant.
- January 2003 Obtain ISO 14001 certification in YAMAWA TAP Company, LTD.
- October 2006 Obtain ISO 14001 certification in YAMAWA MFG. Company, LTD.
- October 2006 Spun off overseas sales division into a seperate company as YAMAWA INTERNATIONAL Company, LTD.
- January 2007 Spun off overseas sales division into a seperate company as YAMAWA ASIA LTD.
- September 2008 obtain [YAMAWA ENGINEERING Company LTD. and YAMAWA TC CENTER., LTD. ISO 14001.](#)
- June 2012 **YAMAWA assigns a new importer, YMW Taps USA, for the U.S.A. and Canadian markets.**

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# Product Offering Summary

Series	Tap Type	Style	Sizes	Tap Dimensions	Tap Material	Tap Application
3218 3228	Spiral Point	Plug	Machine Screw Fractional	ANSI	Vanadium HSS	Stainless & Alloy Steel, Ductile Irons
3318 3228	Spiral Flute	Modified Bottoming	Machine Screw Fractional	ANSI	Vanadium HSS	Stainless & Alloy Steel, Ductile Irons
3218T 3228T	Spiral Point, TiN	Plug	Machine Screw Fractional	ANSI	Vanadium HSS	Stainless & Alloy Steel, Ductile Irons
3318T 3328T	Spiral Flute	Modified Bottoming	Machine Screw Fractional	ANSI	Vanadium HSS	Stainless & Alloy Steel, Ductile Irons
3718 3728	Extended Spiral Point	Plug	Machine Screw Fractional	ANSI	Vanadium HSS	Stainless & Alloy Steel, Ductile Irons
3818 3828	Extended Spiral Flute	Modified Bottoming	Machine Screw Fractional	ANSI	Vanadium HSS	Stainless & Alloy Steel, Ductile Irons
3438 3448	Slow Spiral Flute	NPT NPTF	NPT Pipe NPTF Pipe	ANSI	Vanadium HSS	Stainless & Alloy Steel, Ductile Irons
3114 3124	Straight Flute	Plug	Machine Screw Fractional	ANSI	Cobalt HSS	Mold Steel & Alloy Steels >30 Rc
3434	Taper Pipe	Straight Flute	NPT Pipe	ANSI	Cobalt HSS	Mold Steel & Alloy Steels >30 Rc
3278 3278T	Spiral Point Spiral Point, TiN	Plug	Metric	ANSI	Vanadium HSS	Stainless & Alloy Steel, Ductile Irons
3378 3378T	Spiral Flute Spiral Flute, TiN	Modified Bottoming	Metric	ANSI	Vanadium HSS	Stainless & Alloy Steel, Ductile Irons
3613 3623	Spiral Point	Plug	Machine Screw Fractional	ANSI	Cobalt Vanadium Premium Steel	Titanium, Copper Alloys, Soft Plastics
3673	Spiral Point	Plug	Metric	ANSI	Cobalt Vanadium Premium Steel	Titanium, Copper Alloys, Soft Plastics
3616 3626 3676	Spiral Flute	Modified Bottoming	Machine Screw Fractional Metric	ANSI	Cobalt, Vanadium Premium Steel	Titanium, Copper Alloys, Soft Plastics
3612 3622 3672	Spiral Point	Plug	Machine Screw Fractional Metric	ANSI	Cobalt, Vanadium Premium Steel	Nickel Base & Exotic Alloy, Stainless >30 Rc
3615 3625 3675	Spiral Flute	Plug/ Bottoming	Machine Screw Fractional Metric	ANSI	Cobalt, Vanadium Premium Steel	Nickel Base & Exotic Alloy, Stainless >30 Rc
3619 3629	Spiral Point STI	Plug	Machine Screw Fractional	ANSI	Cobalt, Vanadium Premium Steel	Nickel Base & Exotic Alloy, Stainless >30 Rc
3617 3627	Spiral Flute STI	Plug/ Bottoming	Machine Screw Fractional	ANSI	Cobalt, Vanadium Premium Steel	Nickel Base & Exotic Alloy, Stainless >30 Rc
3814 3824 3884	Spiral Point	Plug	Machine Screw Fractional Metric	ANSI/DIN LENGTH	Vanadium HSS	Cast Silicon Aluminum and Wrought Aluminum
3701 3711 3771	Spiral Flute, 45°	Modified Bottoming	Machine Screw Fractional Metric	ANSI DIN/ LENGTH	Vanadium HSS	Wrought Aluminum Alloys, Soft Plastics
3804 3834 3874	Slow Spiral Flute, 25°	Modified Bottoming	Machine Screw Fractional Metric	ANSI DIN/ LENGTH	Vanadium HSS	Cast Silicon Aluminum Alloys
3570 3580	Roll Form, Dry	Plug	Metric Machine Screw & Fractional	ANSI DIN/ LENGTH	Cobalt, Vanadium Premium Steel	Stainless Steel and Other Soft Alloys
3502 3512 3572	Roll Form, Wet	Plug / Bottoming	Machine Screw Fractional Metric	ANSI DIN/ LENGTH	Cobalt, Vanadium Premium Steel	Stainless Steel and Other Soft Alloys
3550 3552 3750	Roll Form	Plug / Bottoming	Machine Screw Fractional Metric	ANSI DIN/ LENGTH	Vanadium HSS	Aluminum, Brass, Copper Alloys
3560 3565 3575	Roll Form	Plug / Bottoming	Machine Screw Fractional Metric	ANSI DIN/ LENGTH	Vanadium HSS	Stainless Steels, Alloy Steels
3317 3327	RH Spiral Flute	Modified Bottoming	Machine Screw Fractional	ANSI	Vanadium HSS	Fast, Rigid, Synchronized Tapping
3315 3325	LH Spiral Flute	Plug	Machine Screw Fractional	ANSI	Vanadium HSS	Fast, Rigid, Synchronized Tapping

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382500-382523 ..... 3718 .....9	385062-385104 ..... 3121 .....39	389512-389535 ..... 3575 .....47
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382590-382710 ..... 3228 .....8	385231-385245 ..... 3221 .....39	389613-389628 ..... 3124 .....16
382600-382699 ..... 3218 .....8	385501-385570 ..... 3612 .....19	389641-389646 ..... 3434 .....16
382704-382742 ..... 3219 .....66	385513-385586 ..... 3622 .....19	
382758-382769 ..... 3229 .....66	385601-385670 ..... 3613 .....24	
























Thin Film Coatings

COATINGS

MATERIAL CLASS	MATERIAL TYPE	MATERIAL EXAMPLES	TiN	TiCN	TiAlN	NITRIDE	OXIDE	OXIDE	CrN	BRIGHT
STEEL	CARBON STEEL	1010, 1045	A	P	N	N	A	A	N	N
	ALLOY STEELS	4140, 8620	A	P	A	N	A	A	N	N
	TOOL STEELS	A2, D2, H13	A	P	A	N	A	A	N	N
	MARTENSITIC STAINLESS	414, 440	A	P	A	N	A	A	N	N
	PH STAINLESS	15-5PH, 17-4PH	A	P	A	N	A	A	N	N
STAINLESS STEEL	AUSTENITIC STAINLESS	304, 316	A	P	A	N	A	A	N	N
CAST IRON	CAST IRON, DUCTILE		A	P	A	A	A	A	N	N
	CAST IRON, GRAY	CLASS 20-50	A	P	A	A	A	A	N	N
NON-FERROUS	ALUMINUM, WROUGHT	2024, 6061, 7071	N	N	N	A	N	N	A	P
	ALUMINUM, SILICON, CAST	319, 360, 380	A	A	N	A	N	N	A	P
	COPPER & ALLOYS		N	N	N	A	N	N	A	P
	BRASS		N	N	N	P	N	N	A	A
	BRONZE		N	N	N	P	N	N	A	A
	ZINC		N	N	N	A	N	N	A	P
	MAGNESIUM & ALLOYS		N	N	N	A	N	N	A	P
HIGH-TEMP ALLOY	TITANIUM, PURE	CP TI	N	N	N	A	N	P	A	N
	TITANIUM, ALLOYS	Ti-6Al4V	A	A	N	A	N	P	A	N
	NICKEL BASED ALLOYS	MONEL, INCONEL	A	P	A	A	A	A	A	N
	IRON BASED ALLOYS	A286, INCOLOY	A	P	A	A	A	A	N	N
	COBALT ALLOYS	HAYNES	A	P	A	A	A	A	N	N
OTHER	PLASTIC, SOFT		P	A	N	N	N	N	A	A
	PLASTIC, ABRASIVE		A	P	N	N	N	N	A	N
	GRAPHITE		A	P	N	N	N	N	A	N
SPEED INCREASE COMBINED TO UNCOATED TAPS			+50%	+50%	+100%	USE SAME SPEED AS UNCOATED				
			P=PREFERRED			A=ACCEPTABLE		N=NOT RECOMMENDED		



Explanation of icons

 High Speed Steel + 3% Vanadium	 Oxide and nitride surface toughening treatment	 For left-hand screw threads
 Cobalt High Speed Steels	 Titanium Nitride coating	 For synchronized tapping
 Powder High Speed Steels	 Titanium Carbon Nitride coating	 Number of pitches for chamfer part
 Ultra micro grain tungsten carbide	 Titanium Nitride Aluminum coating	 For through hole
 Cemented carbide	 With oil hole for blind hole tapping	 For horizontal blind hole
 Alloy tool steels	 With oil hole for through hole tapping	 For vertical blind hole
 Oxide surface treatment	 Helix angle of spiral flute	 For blind hole
 Nitride surface toughening treatment	 Helix angle of left-hand spiral flute	

How to Order YMW Standard Taps

**Ordering Instructions:** Use EDP numbers when ordering to save time and avoid errors.

**Packaging:** To insure your YMW taps arrive in good condition, we request purchases be made in full package quantities only. Standard Package Quantities:

Package Quantity	Product Size Ranges				
	Taps			Center Drills	Dies
3 pieces per pkg.	Unified Screw Threads No. 0-12 1/2" - 7/8"	Pipe 1/16" - 3/4"	Metric M1 - M24	00-8	—
1 piece per pkg.	1" & over and all extended taps	1" & over	M25 & over	—	13/16" O.D. to 2" O.D.



BASED ON 65-75% THREADS, 1-2X DIAMETER, THROUGH HOLE

Material	Condition	Hardness		Speed SFPM	YMW ZELX							IQ		Forming Tap			
		BHN	HRC		SS	SS TiN	Mold	NI	TI	AL	ALS	IQ CI	IQ SP	HP-RZ	*OL-RZ	N-RS	N-RZ
<b>Low Carbon Steel, Wrought</b>																	
1005-1029, 1108-1211, 1212-1215,	Normalized or	< 175	< 9	50-75	●	●						○	○	○	●		●
1513-1522, 12L13-12L14	Cold Drawn	< 276	< 30	40-60	●	●						○	○				●
<b>Medium Carbon Steel, Wrought</b>																	
1030-1055, 1525-1541, 41L30-41L50,	Normalized	< 250	< 25	30-50	●	●						○	○	○	●		●
43L47, 51L32, 52L100, 86L20-86L40	Hardened	< 350	< 38	15-25	○	○	●	●									
<b>High Carbon Steel, Wrought</b>																	
1060-1069, 1070-1078	Annealed	< 275	< 30	30-50	●	●						○	○		○		●
1080-1086, 1090-1095, 1547-1572	Hardened	< 350	< 38	15-25	○	○	○	●									
<b>Alloy Steel Low Carbon, Wrought</b>																	
4012-4028, 4118, 4320, 4419-4427,	Normalized	< 250	< 25	30-45	●	●						○	○		●	●	●
4615-4626, 5015-5120, 8115, 8615-27	Hardened	< 350	< 38	25-35		○	●	●									
<b>Alloy Steel Medium Carbon, Wrought</b>																	
1330-1345, 4032-4047, 4130-4161, 4340	Normalized	< 250	< 25	25-35	●	●						○	○		●	●	●
50B40-50B60, 5046-5060, 5135-5160,	Hardened	< 350	< 38	15-20	○	○	●	●									
8630-8660, 8740-8742, 9254-9260	Hardened	< 425	< 40	10-12		○	●	●									
<b>Tool Steels, Wrought</b>																	
H10, H11, H12, H13, H14	Annealed	< 250	< 25	15-25	●	○	●					○	○				●
H19, H21, H24, H25, H26, H42, H43	Hardened	< 375	< 41	15-20			●	○									
D2, D3, D4, D5, D7, A7	Annealed	< 150		30-45	●	○	●					○	○				
A2-A10, O1-O7, S1-S7, P2, P4, P5, P6	Annealed	< 250	< 25	10-15	○		●					○	○				●
P20, P21	Annealed	< 200	< 16	25-35	○	○	●					○	○				●
<b>Armor Plate, Wrought</b>																	
HY80, HY100	Annealed	< 250	< 25	25-35	●		○	●				○	○				●
MIL-S-12560, MIL-S-16216	Hardened	< 300	< 33	18-30	○		○	●									
	Hardened	< 350	< 38	15-25			○	●									
<b>High Strength Steels, Wrought</b>																	
300M, 4330V, 4340, D6ac, H11, H13,	Normalized	< 350	< 38	15-20	○	○	○	●									
4340Si, 988V40	Normalized	< 400	< 43	10-15			○	●									
	Hardened	< 460	< 48	5-7				●									
HP9-4-20, HP9-4-25, HP9-4-30, HP9-4-45	Annealed	< 375	< 41	10-15			○	●									
HP25, HP30, HP45	Hardened	< 460	< 48	7-10				●									
<b>Maraging Steels, Wrought</b>																	
200Grade, 250Grade,	Annealed	< 325	< 35	15-20	○		○	●									
300 Grade, 350Grade, HY230																	
120Grade, 180Grade	Annealed	< 325	< 35	25-35	○		○	●									
	Maraged	< 425	< 45	7-10				●									
<b>Free Machining Stainless Steel</b>																	
303, 430F, 430F Se, 416, 420, 440Se, 440	Annealed	< 195		50-70	●	●						○	○				●
<b>Ferritic Stainless Steel, Wrought</b>																	
405, 409, 430, 434, 436, 442, 446, 502	Annealed	< 185	< 12	25-40	●	●						○	○	●	○		●
<b>Austenitic Stainless Steel, Wrought</b>																	
201, 202, 301, 302, 304, 304L	Annealed	< 185	< 12	18-25	●	●						○	○	●	○		●
305, 308, 309, 310, 314, 316, 316L	Cold Drawn	< 275	< 30	12-20	●	●		●				○	○	●	○		●
317, 321, 330, 347, 384, 385						●											
Nitronic	Annealed	< 250	< 25	12-20	●	●		●				○	○	●	○		●
	Cold Drawn	< 375	< 41	7-15			○	●									
<b>Martensitic Stainless Steel Wrought</b>																	
403, 410, 420, 422	Annealed	< 175	< 9	25-40	●	●		○				○	○	●	○		●
501, 502	Annealed	< 225	< 21	18-30	●	●		○				○	○	●	○		●
	Hardened	< 325	< 35	18-25	○	●		●									
	Hardened	< 425	< 45	10-18		○		●									
414, 431, Greek Ascology	Annealed	< 275	< 30	18-25	○	○		●									
	Hardened	< 325	< 35	12-20	○	○		●									
	Hardened	< 425	< 45	7-15				●									
440A, 440B, 440C	Annealed	< 275	< 30	12-20	○	○		●									
	Hardened	< 325	< 35	10-18				●									
	Hardened	< 425	< 45	7-15				●									
<b>Precipitation Hardening</b>																	
<b>Stainless Steel Wrought</b>																	
PH13-8Mo, 15-5PH, 16-6PH, 17-4PH	Annealed	< 200	< 16	18-30		○	●	●				○	○				
17-7PH, AF71, AFC-77, AM350, AM355	Hardened	< 325	< 35	15-25			○	○	●								
PH13-8MO, PH14-8MO, PH15-7MO	Hardened	< 375	< 41	12-20				○	●								
Custom 455, HNM, Stainless W	Hardened	< 440	< 47	6-12			○	●									
<b>Aluminum Alloys, Wrought</b>																	
10660-1100, 1145-1175, 2011-2025, 5050	Cold Drawn	< 80	-	95-125	○*	●						●	○	○	○	○	●
2011-2618, 5005-5657, 6061-6951, 7075	Treated	< 150	-	75-100	○*	●						●	○	○	○	○	●
Aluminum Die Cast, X201.0, 208.0-295.0	As Cast	< 100	-	100-150	○*	●						●	○	○	○	○	●
308.0-357.0, 514.0-535.0, 707.0-771.0	Treated	< 125	-	70-100	○*	●						●	○	○	○	○	●
High Silicon Aluminum	Si > 10%	< 125	-	25-40	○*	●						●	○	○	○	○	○
<b>Brass, Cast</b>																	
		-	-	50-70	○*	●		○				○	○	○	○	○	○
<b>Bronze, Cast</b>																	
		-	-	40-60	○*	●		○				○	○	○	○	○	○
<b>Copper, Wrought</b>																	
	Annealed	< 100Rs	-	40-100	○*	●		○				○	○	○	○	○	○
<b>Copper, Beryllium</b>																	
		-	-	35-80	○*	●		○				○	○	○	○	○	○
<b>Magnesium Alloys, Wrought</b>																	
	Treated & Aged	< 125	-	70-100	○*	●		○				○	○	○	○	○	○
<b>Plastics, Therosetting &amp; Thermoplastic</b>																	
		UP TO 125Rm		30 to 50	○*	●		○				○	○	○	○	○	○

● FIRST CHOICE ○ ALTERNATE \* BRIGHT FINISH

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BASED ON 65-75% THREADS, 1-2X DIAMETER, THROUGH HOLE

Material	Condition	Hardness		Speed SFPM	YMW ZELX					IQ		Forming Tap			
		BHN	HRC		SS	SS TiN	Mold	NI	TI	IQ CI	IQ SP	HP-RZ	*OL-RZ	N-RS	N-RZ
<b>Cast Iron, Gray</b>															
Ferritic ASTM A48: CL 20 SAE G1800	Annealed	120 to 150		50-80	●						○	○			
Pearlitic-Ferritic A48: CL25 SAE G2500	As Cast	160 to 200		40-60	●						○	○			
Pearlitic A48: CL30, 35 & 40 SAE G3000	As Cast	190 to 220		30-50	●						○	○			
Pearlitic + Free Carbides	As Cast	220 to 260			○			●			○	○			
Pearlitic or Acicular + Free Carbides	As Cast	250 to 320		15-20	○			●			○	○			
Austenitic (NI-RESIST) A436: 1, 1b, 5	As Cast	120 to 200			○			●			○	○			
A436: TYPE 2,3,6, 2b, 4		120 to 175		30-45	○			○							
<b>Cast Iron, Ductile</b>															
		BHN	HRC												
Ferritic, 60-40-18, 65-45-12	Annealed	140 to 190		40-60	●			○			○	○			○
Ferritic-Pearlitic, 80-55-06	As Cast	190 to 225		25-45	○			●			○	○			○
Pearlitic-Martensitic, 100-70-03	Normalized	240 to 300		15-20	○			●			○	○			○
	& Tempered														
Martensitic, 120-90-02	Quenched	270 to 300		15	○			●			○				
	& Tempered														
Austenitic (IN-RISIT Ductile)	Annealed	120 to 220		15-20	○			●							
ASTM A439: D-2, D-2C, D-5, D-3A, D-5															
ASTM A571: D-2M															
<b>Cast Iron, Malleable</b>															
		BHN	HRC												
Ferritic 32510, 35018	Malleablized	110 to 160		40-60	●						○				○
Pearlitic 40010, 45008	Malleablized	160 to 200		30-50	●						○				○
43010, 48005, 45006, 50005	& Heat Treated	200 to 240		20-40	○			●			○				○
Martensitic 53004, 60003, 60004	Malleablized	200 to 255		20-40	○			●			○				
	& Heat Treated														
70002, 70003	Malleablized	220 to 260		15-35	○			●			○				
	& Heat Treated														
800002	Malleablized	240 to 280		15-30				●							
	& Heat Treated														
900001	Malleablized	250 to 320		15-25				●							
	& Heat Treated														
<b>Nickel Alloys, Wrought and Cast</b>															
		BHN	HRC												
Nickel 200 - Nickel 270	Annealed	< 170	< 7	15-25	●	●		○	○				●		
Monel 400, 401, 404, Monel R405	Annealed	< 240	< 23	15-20	○	○		●	○						
Monel 502, Monel K500	Treated	< 360	< 39	3-5				●	○						
Perma Nickel 300, Duranickel 301								●							
Inconel 625, 702, 706, 718, 721, 722	Annealed	< 300	< 33	7-10				●	○						
Inconel X-750, 751, 901, Haynes 263	Treated	< 400	< 43	4-7				●	○						
M252, Nimonic 75, 80, Waspaloy								●							
Astroloy, Inconel 700	Treated	< 300	< 33	5-8				●	○						
Nimonic 90, 95, Rene 41, 63	Treated	< 400	< 43	3-5				●	○						
Udimett 500, 700, 710								●							
AF2-1DA, Rene 77, Rene 95	Treated	< 390	< 43	4-7				●	○						
Unitemp 1753	Treated	< 475	< 49	3-5				●	○						
Hastelloy B, C, G, S, X	Annealed	< 220	< 20	7-10	○	○		●	○						
Incoloy 804, Incoloy 825	Cold Drawn	< 310	< 34	4-7				●	○						
Inconel 600, Inconel 601								●							
Udimet 630, Retractaloy 26								●							
M252, Rene 80, Rene 125	As cast or	< 320	< 34	3-5				●	○						
B-1900, GMR-235, IN-100, IN-738	Cast/Aged							●							
MAR-M200, 426, 421, 432								●							
Inconel 718, Udimet 500, 700								●							
<b>Cobalt Base Alloys, Wrought and Cast</b>															
		BHN	HRC												
AiResist 13, 213, 215, V36, S-816	Treated	< 230	< 22	5-8	○			●					●		
Haynes 25(L-605), 25 & HS-31 (X-40)	Treated/Aged	<320	<34	3-5				●	○						
Haynes 188, MAR-M905, 918, V-36								●							
AiResist 13, 215, X45, HS-6, HS-21, HS-31 (X-40) Stellite, HS-151	Cast/Aged	<290	<32	3-5				●	○						
HOWMET 3, NASA-Co-W-Re								●							
MAR-M302, M322, M509, W1-52 X-45								●							
<b>Iron Base Alloys, Wrought</b>															
		BHN	HRC												
A-286, Discaloy, N-155	Treated	<230	<22	10-15	○	○		●					●		●
V57, W-545, Incoloy 800, Incoloy 801, Incoloy 802, 16-25-6, 19-90L	Treated/Aged	<320	<34	7-10				○	●						
<b>Titanium Alloys, Wrought</b>															
		BHN	HRC												
Commercial Pure	Annealed	< 170	< 7	40-60	○	●			●						○
Commercial Pure	Annealed	< 200	< 16	30-50	○	○			●						○
Commercial Pure	Annealed	< 275	< 30	25-40		○			●						○
Ti-3AL-2.5V	Annealed	< 340	< 37	15-25	○				●						○
Ti-5AL-2.5Sn	Annealed	< 340	< 37	15-25					●						○
Ti-6AL-4V	Annealed	< 350	< 38	15-20	○				●						○
Ti-6AL-6V-2Sn	Annealed	< 370	< 40	10-15	○				●						
Ti-6AL-4V	Treated	< 380	< 41	7-10	○				●						
Ti-6AL-6V-2Sn	Treated	< 440	< 46	5-7					●						
<b>Tungsten Alloys</b>															
	As Cast	<320		15-25				●							
<b>Molybdenum</b>															
	Relieved	<290		30-50				●	●						

● FIRST CHOICE ○ ALTERNATE \* BRIGHT FINISH

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# SUGGESTED SFM TO RPM CONVERSION CHART BY SIZE

S  
F  
M  
  
T  
O  
  
R  
P  
M

Tap Sizes	Taper Pipe Taps	Surface Feet per Minute																	
		5'	10'	15'	20'	25'	30'	40'	50'	60'	70'	80'	90'	100'	110'	120'	130'	140'	150'
		Revolutions per Minute																	
0		318	637	955	1273	1592	1910	2546	3183	3820	4456	5093	5729	6366	7003	7639	8276	8913	9549
1		273	546	819	1046	1308	1570	2093	2617	3140	3663	4186	4710	5233	5756	6279	6805	7326	7849
2		212	424	637	888	1110	1333	1777	2221	2665	3109	3554	3999	4442	4886	5330	5774	6218	6662
3		191	382	573	772	964	1157	1543	1929	2315	2701	3086	3472	3858	4244	4629	5015	5401	5787
4		174	347	521	682	853	1023	1364	1705	2046	2387	2728	3069	3411	3751	4092	4434	4775	5116
5		147	294	441	611	764	917	1222	1528	1833	2139	2445	2750	3056	3361	3667	3973	4278	4584
6		136	273	409	553	691	829	1106	1382	1659	1935	2212	2488	2766	3042	3318	3595	3871	4148
8		119	239	358	466	583	699	932	1165	1398	1631	1864	2097	2330	2563	2796	3029	3262	3495
10		101	201	302	402	502	603	804	1005	1205	1406	1607	1808	2009	2210	2411	2612	2813	3014
12		87	174	260	354	442	531	707	884	1061	1238	1415	1592	1769	1945	2122	2300	2476	2653
1/4		76	153	229	306	382	458	611	764	917	1070	1222	1375	1528	1681	1833	1986	2139	2292
5/16		62	123	185	245	306	367	489	611	733	856	978	1100	1222	1345	1467	1589	1711	1833
3/8		50	101	151	204	255	305	407	509	611	713	815	917	1019	1120	1222	1324	1426	1528
7/16	1/8	43	87	130	175	219	262	349	437	524	611	698	786	873	960	1048	1135	1222	1310
1/2	-	38	76	115	153	191	229	305	382	458	535	611	688	764	840	917	993	1070	1146
9/16	1/4	34	68	102	137	172	206	274	342	410	478	547	616	683	752	820	888	952	1020
5/8	-	32	64	96	122	153	183	244	306	367	428	489	550	611	672	733	794	856	917
11/16	3/8	28	55	83	111	138	167	222	278	333	389	444	500	556	611	667	722	778	833
3/4	-	25	51	76	102	128	153	203	255	305	357	407	458	509	560	611	662	713	764
7/8	1/2	22	43	65	87	109	131	175	218	262	306	350	392	437	480	524	568	611	655
1	-	19	38	57	76	96	115	153	191	230	268	305	344	382	420	458	497	535	573
1-1/8	3/4	17	34	51	68	84	102	136	170	204	238	272	306	340	373	407	441	475	509
1-1/4	-	15	31	46	61	76	92	122	153	183	214	244	275	305	336	367	397	428	458
1-3/8	1	14	28	42	56	69	83	111	139	167	194	222	250	278	306	333	361	389	417
1-1/2	-	13	25	38	51	63	76	102	127	153	178	204	229	255	280	305	331	356	382
1-5/8		12	23	35	47	59	71	94	118	141	165	188	212	235	259	282	306	329	353
1-3/4		11	22	33	44	55	65	87	109	131	153	175	196	218	240	262	284	306	327
1-7/8		10	20	30	41	51	61	81	102	122	143	163	183	204	224	244	265	285	306
2		9	19	29	38	48	57	76	96	115	134	153	172	191	210	229	248	267	287
M1		490	979	1469	1959	2449	2938	3918	4897	5877	6856	7836	8815	9795	10774	11754	12733	13713	14692
M2		242	484	725	967	1209	1451	1934	2418	2901	3385	3868	4352	4835	5319	5803	6286	6770	7253
M3		162	324	486	647	829	971	1295	1619	1942	2266	2590	2914	3237	3561	3885	4208	4532	4856
M3.5		138	277	415	557	692	830	1107	1384	1661	1938	2214	2491	2768	3045	3322	3599	3875	4152
M4		122	243	365	487	608	730	973	1217	1460	1698	1946	2190	2433	2676	2920	3163	3406	3650
M5		97	194	291	388	485	582	776	970	1163	1357	1551	1745	1939	2133	2327	2521	2715	2909
M6		81	162	243	324	405	486	647	809	971	1133	1295	1457	1619	1781	1942	2104	2266	2428
M7		69	138	208	277	346	415	554	692	830	969	1107	1246	1384	1522	1661	1799	1938	2076
M8		61	121	182	243	303	364	485	606	728	849	970	1091	1213	1334	1455	1577	1698	1819
M10		48	97	145	194	242	291	388	485	582	679	776	873	970	1067	1163	1260	1357	1454
M12		40	81	121	162	202	243	324	405	486	567	647	728	809	890	971	1052	1133	1214
M14		35	69	104	139	173	208	277	347	416	485	555	624	693	763	832	901	971	1040
M16		30	61	91	121	152	182	243	303	364	424	485	546	606	667	728	788	849	910
M18		27	54	81	108	135	162	216	269	323	377	431	485	539	593	647	700	754	808
M20		24	49	73	97	121	146	194	243	291	340	388	437	485	534	582	631	680	728
M22		22	44	66	88	110	132	176	221	265	309	353	397	441	485	529	573	618	662
M24		20	40	61	81	101	121	162	202	243	283	323	364	404	445	485	526	566	606
M27		18	36	54	72	90	108	144	180	216	252	287	323	359	395	431	467	503	539
M30		16	32	49	65	81	97	129	162	194	226	259	291	323	356	388	420	453	485





# Spiral Pointed Taps for Stainless Steels

For Unified threads

## ZELX SS

ZELX SS Spiral Fluted Taps are designed for difficult jobs including the stainless steel family of materials as well as alloy steels, high carbon steel and ductile irons. Our unique design ZELX SS taps increase productivity through longer tool life. The unique spiral point chamfer makes them ideally suited for difficult to machine materials. All SS taps are designed with ANSI dimensions.



High Speed Steel +3% Vanadium Taps

### For Stainless Steels, Alloy Steels and Ductile Irons.

ZELX SS taps are suitable for UNJ Aerospace internal threading applications

- List 3218** Machine Screw sizes with oxide surface treatment
- 3228** Fractional sizes with oxide surface treatment
- 3218T** Machine Screw sizes with TiN (Titanium Nitride)
- 3228T** Fractional sizes with TiN (Titanium Nitride)

#### Plug Style

(3 to 5 threads chamfered)

Nominal Size	TPI		No. of Flutes	Pitch Diameter Limit / EDP Numbers									Dimensions		
	NC UNC	NF UNF		H2	H2 TiN	H3	H3 TiN	H4	H4 TiN	H5	H6	H7	Length of Thread	Length of Neck	Length Overall
2	56	—	2	382623	—	382624	—	—	—	—	—	—	.256	.181	1-3/4
3	48	—	2	382600	—	—	—	—	—	—	—	—	.295	.205	1-13/16
4	40	—	2	382601	382901*	382602	—	382612	—	382634	—	—	.335	.227	1-7/8
4	—	48	2	382683	—	—	—	—	—	—	—	—	.335	.227	1-7/8
5	40	—	3	382603	382903*	—	—	—	—	—	—	—	.374	.251	1-15/16
6	32	—	3	382604	—	382605	382905*	382608	—	382635	382659	382665	.413	.274	2
6	—	40	3	382684	—	—	—	—	—	—	—	—	.413	.274	2
8	32	—	3	382606	—	382607	382907*	382629	—	382637	382660	382667	.453	.297	2-1/8
8	—	36	3	382686	—	—	—	—	—	—	—	—	.453	.297	2-1/8
10	24	—	3	—	—	382609	382909*	—	—	382639	382690	382669	.531	.344	2-3/8
10	—	32	3	382611	—	382610	382910*	382630	—	382640	382661	382670	.531	.344	2-3/8
12	24	—	3	—	—	382688	—	—	—	—	—	—	.571	.366	2-3/8
12	—	28	3	—	—	382689	—	—	—	—	—	—	.571	.366	2-3/8
1/4	20	—	3	—	—	382613	382913*	—	—	382643	382590	382673	.591	.409	2-1/2
1/4	—	28	3	—	—	382614	382914*	382631	—	382644	382662	382674	.591	.409	2-1/2
5/16	18	—	3	—	—	382615	382915*-	—	—	382645	—	382675	.669	.456	2-23/32
5/16	—	24	3	—	—	382616	382916*	382632	—	382646	382663	382676	.669	.456	2-23/32
3/8	16	—	3	—	—	382617	382917*	—	—	382647	—	382668	.748	.502	2-15/16
3/8	—	24	3	—	—	382618	382918*	382633	—	382648	382664	382678	.748	.502	2-15/16
7/16	14	—	3	—	—	382619	382919*	—	—	382649	—	—	.866	—	3-5/32
7/16	—	20	3	—	—	382620	382920*	—	—	382650	382691	382680	.866	—	3-5/32
1/2	13	—	3	—	—	382621	382921*	—	—	382651	—	382681	.984	—	3-3/8
1/2	—	20	3	—	—	382622	382922*	—	—	382652	382692	382682	.984	—	3-3/8
9/16	12	—	3	—	—	382653	382953*	—	—	—	—	—	.984	—	3-19/32
9/16	—	18	3	—	—	382654	382954*	—	—	—	—	—	.984	—	3-19/32
5/8	11	—	3	—	—	382625	382925*	—	—	382655	—	—	1.083	—	3-13/16
5/8	—	18	3	—	—	382626	382926*	382636	—	382656	382694	382591	1.083	—	3-13/16
3/4	10	—	3	—	—	382627	382927*	—	—	382657	—	—	1.201	—	4-1/4
3/4	—	16	3	—	—	382628	382928*	—	—	382658	—	382592	1.201	—	4-1/4

\* Available in bright, add "B" to EDP No.

\* **TICN COATED TAPS AVAILABLE ON REQUEST. WHEN ORDERING USE THE SAME PART NUMBER AS THE TIN COATED TAP WITH A SUFFIX OF TICN, i.e., 382913TICN.**

Necked design enhances flow of cutting fluid to cutting teeth and reduces surface contact between the tool and work-piece for more efficient threading

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## Spiral Pointed Taps for Stainless Steels

For Metric threads

# ZELX SS



ZELX SS Spiral Fluted Taps are designed for difficult jobs including the stainless steel family of materials as well as alloy steels, high carbon steel and ductile irons. Our unique design ZELX SS taps increase productivity through longer tool life. The unique spiral point chamfer makes them ideally suited for difficult to machine materials.

All SS taps are designed with ANSI dimensions.  
High Speed Steel +3% Vanadium Taps

## For Stainless Steels, Alloy Steels and Ductile Irons.

### (continued) SPIRAL POINTED TAPS

- List 3218** Machine Screw sizes with oxide surface treatment
- 3228** Fractional sizes with oxide surface treatment
- 3218T** Machine Screw sizes with TiN (Titanium Nitride)
- 3228T** Fractional sizes with TiN (Titanium Nitride)

**Plug Style**  
(3 to 5 threads chamfered)

TPI		No. of Flutes	Pitch Diameter Limit / EDP Numbers										Dimensions		
Nominal Size	NC UNC		NF UNF	H2	H2 TiN	H3	H3 TiN	H4	H4 TiN	H5	H6	H7	Length of Thread	Length of Neck	Length Overall
7/8	9	—	3	—	—	—	—	382695	382995*	—	—	—	1.339	—	4-11/16
7/8	—	14	3	—	—	—	—	382696	382996*	—	382699	—	1.339	—	4-11/16
1	8	—	3	—	—	—	—	382697	382997*	—	—	—	1.496	—	5-1/8
1	—	12	3	—	—	—	—	382679	—	—	—	—	1.496	—	5-1/8
1-1/8	7	—	4	—	—	—	—	—	—	—	382700	—	1.535	—	5-7/16
1-1/8	—	12	4	—	—	—	—	—	382701	—	—	—	1.535	—	5-7/16
1-1/4	7	—	4	—	—	—	—	—	—	—	382702	—	1.535	—	5-3/4
1-1/4	—	12	4	—	—	—	—	—	382703	—	—	—	1.535	—	5-3/4
1-3/8	6	—	4	—	—	—	—	—	—	—	382705	—	1.811	—	6-1/16
1-3/8	—	12	4	—	—	—	—	—	382706	—	—	—	1.811	—	6-1/16
1-1/2	6	—	4	—	—	—	—	—	—	—	382707	—	1.811	—	6-3/8
1-1/2	—	12	4	—	—	—	—	—	382708	—	—	—	1.811	—	6-3/8
1-3/4	5	—	4	—	—	—	—	—	—	—	382709	—	1.929	—	7
2	—	4-1/2	4	—	—	—	—	—	—	—	382710	—	1.929	—	7-5/8



\* Available in bright, add "B" to EDP No.

## Extended Spiral Pointed Taps for Stainless Steels

**Plug Style** For Unified threads

3 to 5 thread chamfer  
Taps have oxide surface treatment

- List 3718** Machine Screw sizes
- 3728** Fractional sizes

ZELX SS Spiral Fluted Taps are designed for difficult jobs including the stainless steel family of materials as well as alloy steels, high carbon steel and ductile irons. Our unique design ZELX SS taps increase productivity through longer tool life. The unique spiral point chamfer makes them ideally suited for difficult to machine materials.

All SS taps are designed with ANSI dimensions.  
High Speed Steel +3% Vanadium Taps

Nominal Size	Threads per inch		No. of Flutes	Pitch Diameter Limit / EDP Numbers		Dimensions
	NC UNC	NF UNF		H2	H3	Overall Length
2	56	—	2	382523	—	6"
3	48	—	2	382500	—	6"
4	40	—	2	382501	—	6"
6	32	—	3	—	382505	6"
8	32	—	3	—	382507	6"
10	24	—	3	—	382509	6"
10	—	32	3	—	382510	6"
1/4	20	—	3	—	382513	6"
1/4	—	28	3	—	382514	6"
5/16	18	—	3	—	382515	6"
5/16	—	24	3	—	382516	6"
3/8	16	—	3	—	382517	6"
3/8	—	24	3	—	382518	6"
7/16	14	—	3	—	382519	6"
7/16	—	20	3	—	382520	6"
1/2	13	—	3	—	382521	6"
1/2	—	20	3	—	382522	6"



## Spiral Pointed Taps for Stainless Steels

### Metric Taps

ZELX SS Spiral Fluted Taps are designed for difficult jobs including the stainless steel family of materials as well as alloy steels, high carbon steel and ductile irons. Our unique design ZELX SS taps increase productivity through longer tool life. The unique spiral point chamfer makes them ideally suited for difficult to machine materials. All SS taps are designed with ANSI dimensions.

### Custom Blended Vanadium High Speed Steel Taps For Stainless Steels, Alloy Steels and Ductile Irons



High Speed Steel +3% Vanadium Taps

#### Plug Style

(3 to 5 threads chamfered)

#### METRIC SPIRAL POINTED TAPS

List **3278** with oxide surface treatment  
**3278T** with TiN (Titanium Nitride)

Nominal Size	No. of Flutes	Pitch Diameter Limit / EDP Numbers									Dimensions			
		D3	D3 TiN	D4	D4 TiN	D5	D5 TiN	D6	D6 TiN	D7	Thread Length	Neck Length	Length Overall	
M3 x 0.5	3	372615	372915*	—	—	—	—	—	—	—	—	.374	.251	1-15/16
M3.5 x 0.6	3	—	—	372616	—	—	—	—	—	—	—	.413	.274	2
M4 x 0.7	3	—	—	372617	372917*	—	—	—	—	—	—	.453	.297	2-1/8
M5 x 0.8	3	—	—	372619	372919*	—	—	—	—	—	—	.531	.344	2-3/8
M6 x 1.0	3	—	—	—	—	372620	372920*	—	—	—	—	.591	.409	2-1/2
M7 x 1.0	3	—	—	—	—	372621	—	—	—	—	—	.669	.456	2-23/32
M8 x 1.0	3	—	—	—	—	372622	—	—	—	—	—	.669	.456	2-23/32
M8 x 1.25	3	—	—	—	—	372623	372923*	—	—	—	—	.669	.456	2-23/32
M10 x 1.25	3	—	—	—	—	372624	—	—	—	—	—	.748	.502	2-15/16
M10 x 1.5	3	—	—	—	—	—	—	372625	372925*	—	—	.748	.502	2-15/16
M12 x 1.25	3	—	—	—	—	372626	—	—	—	—	—	.984	—	3-3/8
M12 x 1.75	3	—	—	—	—	—	—	372627	372927*	—	—	.984	—	3-3/8
M14 x 1.5	3	—	—	—	—	—	—	372628	—	—	—	.984	—	3-19/32
M14 x 2.0	3	—	—	—	—	—	—	—	—	372629	—	.984	—	3-19/32
M16 x 1.5	3	—	—	—	—	—	—	372630	—	—	—	1.083	—	3-13/16
M16 x 2.0	3	—	—	—	—	—	—	—	—	372631	—	1.083	—	3-13/16
M18 X 1.5	3	—	—	—	—	—	—	372632	—	—	—	1.083	—	4-1/32
M18 x 2.5	3	—	—	—	—	—	—	—	—	372633	—	1.083	—	4-1/32

\* Available in bright, add "B" to EDP No.

\* TICN COATED TAPS AVAILABLE ON REQUEST. WHEN ORDERING USE THE SAME PART NUMBER AS THE TIN COATED TAP WITH A SUFFIX OF TICN, i.e., 382917TICN.

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# Spiral Fluted Taps for Stainless Steels

For Unified threads



## ZELX SS

ZELX SS Spiral Fluted Taps are designed for difficult jobs including the stainless steel family of materials as well as alloy steels, high carbon steel and ductile irons. Our unique design ZELX SS taps increase productivity through longer tool life. The modified bottom chamfer makes them ideally suited to blind hole tapping.

ZELX Spiral Fluted Taps are oxide surface treated or Titanium Nitride (TiN) coated to reduce loading and galling of product material, improving tap wearlife and thread quality.

Necked design enhances flow of cutting fluid to cutting teeth and reduces surface contact between the tool and work-piece for more efficient threading.

All SS taps are designed with ANSI dimensions.

The special ZELX tool geometry creates less torque, better removal of chips and runs cooler.

High Speed Steel +3% Vanadium Taps

ZELX SS taps are suitable for UNJ Aerospace internal threading applications.

### SPIRAL FLUTED TAPS

- List 3318** Machine Screw sizes with steam oxide surface treatment
- 3328** Fractional sizes with steam oxide surface treatment
- 3318T** Machine Screw sizes with TiN (Titanium Nitride)
- 3328T** Fractional sizes with TiN (Titanium Nitride)

### Modified Bottoming Style

(2-1/2 to 3-1/2 threads chamfered)  
Available in bright, add "B" to EDP No.

Nominal Size	TPI		No. of Flutes	Pitch Diameter Limit / EDP Numbers									Dimensions		
	NC UNC	NF UNF		H2	H2 TiN	H3	H3 TiN	H4	H4 TiN	H5	H6	H7	Length of Thread	Length of Neck	Length Overall
2	56	—	2	384623	—	—	—	—	—	—	—	.157	.280	1-3/4	
3	48	—	2	384600	—	—	—	—	—	—	—	.197	.303	1-13/16	
4	40	—	2	384601	384901*	384602*	—	384629	—	384634	—	.236	.326	1-7/8	
4	—	48	2	384683	—	—	—	—	—	—	—	.236	.326	1-7/8	
5	40	—	3	384603	384903*	—	—	—	—	—	—	.236	.389	1-15/16	
6	32	—	3	384604	—	384605	384905*	384636	—	384635	384659	.276	.411	2	
6	—	40	3	384684	—	384685	—	—	—	—	—	.276	.411	2	
8	32	—	3	384606	—	384607	384907*	384638	—	384637	384660	.276	.474	2-1/8	
8	—	36	3	—	—	384687	—	—	—	—	—	.276	.474	2-1/8	
10	24	—	3	384624	—	384609	384909*	—	—	384639	384690	.354	.521	2-3/8	
10	—	32	3	384611	—	384610	384910*	384630	—	384640	384662	.276	.599	2-3/8	
12	24	—	3	—	—	384688	—	—	—	—	—	.354	.583	2-3/8	
12	—	28	3	—	—	384689	—	—	—	—	—	.276	.661	2-3/8	
1/4	20	—	3	—	—	384613	384913*	—	—	384643	—	.433	.567	2-1/2	
1/4	—	28	3	—	—	384614	384914*	384631	—	384644	384664	.354	.646	2-1/2	
5/16	18	—	3	—	—	384615	384915*	—	—	384645	—	.472	.653	2-23/32	
5/16	—	24	3	—	—	384616	384916*	384632	—	384646	—	.394	.731	2-23/32	
3/8	16	—	3	—	—	384617	384917*	—	—	384647	—	.551	.699	2-15/16	
3/8	—	24	3	—	—	384618	384918*	384633	—	384648	—	.394	.856	2-15/16	
7/16	14	—	3	—	—	384619	384919*	—	—	384649	—	.591	—	3-5/32	
7/16	—	20	3	—	—	384620	384920*	—	—	384650	384691	.472	—	3-5/32	
1/2	13	—	3	—	—	384621	384921*	—	—	384651	—	.630	—	3-3/8	
1/2	—	20	3	—	—	384622	384922*	—	—	384652	384692	.472	—	3-3/8	
9/16	12	—	3	—	—	384653	384953*	—	—	—	—	.709	—	3-19/32	
9/16	—	18	3	—	—	384654	384954*	—	—	384698	—	.512	—	3-19/32	
5/8	11	—	3	—	—	384625	384925*	—	—	384655	—	.748	—	3-13/16	
5/8	—	18	3	—	—	384626	384926*	—	—	384656	—	.512	—	3-13/16	
3/4	10	—	4	—	—	384627	384927*	—	—	384657	—	.827	—	4-1/4	
3/4	—	16	4	—	—	684628	384928*	—	—	384658	—	.591	—	4-1/4	
7/8	9	—	4	—	—	—	—	384695	384995*	—	—	.827	—	4-11/16	
7/8	—	14	4	—	—	—	—	384696	384996*	—	—	.709	—	4-11/16	

\* Available in bright, add "B" to EDP No.

\* TICN COATED TAPS AVAILABLE ON REQUEST. WHEN ORDERING USE THE SAME PART NUMBER AS THE TITANIUM NITRIDE COATED TAP WITH A SUFFIX OF TICN, i.e., 382917TICN.

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## ZELX SS Spiral Fluted Taps for Stainless Steels Cont.

For Unified threads.



High Speed Steel +3% Vanadium Taps



ZELX SS taps are suitable for UNJ Aerospace internal threading applications

### Modified Bottoming Style

(2-1/2 to 3-1/2 threads chamfered) \*

\*Available in bright, add "B" to EDP No.

- List **3318** Machine Screw sizes with steam oxide surface treatment
- 3328** Fractional sizes with steam oxide surface treatment
- 3318T** Machine Screw sizes with TiN (Titanium Nitride)
- 3328T** Fractional sizes with TiN (Titanium Nitride)

Nominal Size	TPI		No. of Flutes	Pitch Diameter Limit / EDP Numbers									Dimensions		
	NC UNC	NF UNF		H2	H2 TiN	H3	H3 TiN	H4	H4 TiN	H5	H6	H7	Length of Thread	Length of Neck	Length Overall
1	8	—	4	—	—	—	—	384697	384997 *	—	—	—	.984	—	5-1/8
1	—	12	4	—	—	—	—	384668	—	—	—	—	.709	—	5-1/8
1-1/8	7	—	4	—	—	—	—	—	—	—	384701	—	1.181	—	5-7/16
1-1/8	—	12	4	—	—	—	—	—	—	384702	—	—	0.787	—	5-7/16
1-1/4	7	—	4	—	—	—	—	—	—	—	384703	—	1.181	—	5-3/4
1-1/4	—	12	4	—	—	—	—	—	—	384705	—	—	0.787	—	5-3/4
1-3/8	6	—	4	—	—	—	—	—	—	—	384706	—	1.575	—	6-1/16
1-3/8	—	12	4	—	—	—	—	—	—	384707	—	—	0.787	—	6-1/16
1-1/2	6	—	4	—	—	—	—	—	—	—	384709	—	1.575	—	6-3/8
1-1/2	—	12	4	—	—	—	—	—	—	384711	—	—	0.787	—	6-3/8
1-3/4	5	—	4	—	—	—	—	—	—	—	—	384714	1.772	—	7
2	4-1/2	—	4	—	—	—	—	—	—	—	—	—	1.969	—	7-5/8

TICN COATED TAPS AVAILABLE ON REQUEST. WHEN ORDERING USE THE SAME PART NUMBER AS THE TIN COATED TAP WITH A SUFFIX OF TICN, i.e., 382917TICN.



## ZELX SS Spiral Fluted Taps for Stainless Steels

ZELX SS taps are suitable for UNJ Aerospace internal threading applications:

High Speed Steel +3% Vanadium Taps



### Bottoming Style

(1 to 2 Threads Chamfered)

Taps have oxide surface treatment

- List **3318** Machine Screw Sizes
- 3328** Fractional Sizes

Nominal Size	TPI		No. of Flutes	Pitch Diameter Limit / EDP Numbers					Dimensions		
	NC UNC	NF UNF		H2	H3	H4	H5	H7	Length of Thread	Length of Neck	Length Overall
4	40	—	2	384001	384002	—	384034	—	.236	.326	1-7/8
4	—	48	2	384083	—	—	—	—	.236	.326	1-7/8
5	40	<b>15°</b>	3	384003	—	—	—	—	.236	.389	—
6	32	—	3	384004	384005	—	384035	—	.276	.411	2
6	—	40	3	384084	384085	—	—	—	.276	.411	2
8	32	—	3	384006	384007	—	384037	—	.276	.474	2-1/8
10	24	—	3	—	384009	—	384039	—	.354	.521	2-3/8
10	—	32	3	—	384010	—	384040	—	.276	.599	2-3/8
1/4	20	—	3	—	384013	—	384043	—	.433	.567	2-1/2
1/4	—	28	3	—	384014	—	384044	—	.354	.646	2-1/2
5/16	18	—	3	—	384015	—	384045	—	.472	.653	2-23/32
5/16	—	24	3	—	384016	—	384046	—	.394	.731	2-23/32
3/8	16	—	3	—	384017	—	384047	384077	.551	.699	2-15/16
3/8	—	24	3	—	384018	384033	384048	—	.394	.856	2-15/16
7/16	14	—	3	—	384019	—	384049	—	.591	—	3-5/32
7/16	—	20	3	—	384020	—	384050	—	.472	—	3-5/32
1/2	13	—	3	—	384021	—	384051	—	.630	—	3-3/8
1/2	—	20	3	—	384022	—	384052	—	.472	—	3-3/8
9/16	12	—	3	—	384053	—	—	—	.709	—	3-19/32
9/16	—	18	3	—	384054	—	—	—	.512	—	3-19/32
5/8	11	—	3	—	384025	—	384055	—	.748	—	3-13/16
5/8	—	18	3	—	384026	—	384056	—	.512	—	3-13/16
3/4	10	—	4	—	384027	—	—	—	.827	—	4-1/4

## ZELX SS Metric Spiral Fluted Taps for Stainless Steels Cont.

All SS metric taps are designed with ANSI shank dimensions.



ZELX SS Spiral Fluted Taps are designed for difficult jobs including the stainless steel family of materials as well as alloy steels, high carbon steel and ductile irons. Our unique design ZELX SS taps increase productivity through longer tool life. The modified bottom chamfer makes them ideally suited to blind hole tapping.

# ZELX SS

Custom Blended Vanadium High Speed Steel Taps

For Stainless Steels, Alloy Steels and Ductile Irons

List **3378** with oxide surface treatment  
**3378T** with TiN (Titanium Nitride)

**Modified Bottoming Style**

(2-1/2 to 3-1/2 threads chamfered)

TICN COATED TAPS AVAILABLE ON REQUEST. WHEN ORDERING USE THE SAME PART NUMBER AS THE TIN COATED TAP WITH A SUFFIX OF TICN, i.e., 382917TICN

Nominal Size	No. of Flutes	Pitch Diameter Limit / EDP Numbers										Dimensions		
		D3	D3 TiN	D4	D4 TiN	D5	D5 TiN	D6	D6 TiN	D7	Thread Length	Neck Length	Length Overall	
M3 x 0.5	3	374615	374915*	—	—	—	—	—	—	—	—	.197	.428	1-15/16
M3.5 x 0.6	3	—	—	374616	—	—	—	—	—	—	—	.276	.411	2
M4 x 0.7	3	—	—	374617	374917*	—	—	—	—	—	—	.276	.474	2-1/8
M5 x 0.8	3	—	—	374619	374919*	—	—	—	—	—	—	.354	.521	2-3/8
M6 x 1.0	3	—	—	—	—	374620	374920*	—	—	—	—	.433	.567	2-1/2
M7 x 1.0	3	—	—	—	—	374621	—	—	—	—	—	.433	.692	2-23/32
M8 x 1.0	3	—	—	—	—	374622	—	—	—	—	—	.472	.653	2-23/32
M8 x 1.25	3	—	—	—	—	374623	374923*	—	—	—	—	.472	.653	2-23/32
M10 x 1.25	3	—	—	—	—	374624	—	—	—	—	—	.472	.778	2-15/16
M10 x 1.5	3	—	—	—	—	—	—	374625	374925*	—	—	.512	.738	2-15/16
M12 x 1.25	3	—	—	—	—	374626	374926*	—	—	—	—	.551	—	3-3/8
M12 x 1.75	3	—	—	—	—	—	—	374627	374927*	—	—	.591	—	3-3/8
M14 x 1.5	3	—	—	—	—	—	—	374628	—	—	—	.551	—	3-19/32
M14 x 2.0	3	—	—	—	—	—	—	—	—	374629	—	.709	—	3-19/32
M16 x 1.5	3	—	—	—	—	—	—	374630	—	—	—	.551	—	3-13/16
M16 x 2.0	3	—	—	—	—	—	—	—	—	374631	—	.709	—	3-13/16
M18 x 1.5	4	—	—	—	—	—	—	374632	—	—	—	.551	—	4-1/32
M18 x 2.5	4	—	—	—	—	—	—	—	—	374633	—	.787	—	4-1/32

## ZELX SS Metric Spiral Fluted Taps for Stainless Steels

All SS metric taps are designed with ANSI shank dimensions.



\* Available in bright. Add "B" to EDP No

# ZELX SS

List **3378**

**Bottoming Style**

(1 to 2 threads chamfered)

Taps have oxide surface treatment

Nominal Size	No. of Flutes	Pitch Diameter Limit / EDP Numbers					Dimensions		
		D3	D4	D5	D6	D7	Length of Thread	Length of Neck	Length Overall
M3 x 0.5	3	374015	—	—	—	—	.197	.428	1-15/16
M3.5 x 0.6	3	—	374016	—	—	—	.276	.411	2
M4 x 0.7	3	—	374017	—	—	—	.276	.474	2-1/8
M5 x 0.8	3	—	374019	—	—	—	.354	.521	2-3/8
M6 x 1	3	—	—	374020	—	—	.433	.567	2-1/2
M7 x 1	3	—	—	374021	—	—	.433	.692	2-23/32
M8 x 1	3	—	—	374022	—	—	.472	.653	2-23/32
M8 x 1.25	3	—	—	374023	—	—	.472	.653	2-23/32
M10 x 1.25	3	—	—	374024	—	—	.472	.778	2-15/16
M10 x 1.5	3	—	—	—	374025	—	.512	.738	3-3/8
M12 x 1.25	3	—	—	374026	—	—	.551	—	3-3/8
M12 x 1.75	3	—	—	—	374027	—	.591	—	3-19/32
M14 x 1.5	3	—	—	—	374028	—	.551	—	3-19/32
M14 x 2	3	—	—	—	—	374029	.709	—	3-13/16
M16 x 1.5	3	—	—	—	374030	—	.551	—	3-13/16
M16 x 2	3	—	—	—	—	374031	.709	—	4-1/32
M18 x 1.5	3	—	—	—	374032	—	.551	—	4-1/32

## ZELX SS Spiral Fluted Taps for Stainless Steels



For Unified threads

### 6" EXTENDED SPIRAL FLUTED TAPS



All SS taps are designed with ANSI shank dimensions.

ZELX SS taps are suitable for UNJ Aerospace internal threading applications

**Custom Blended Vanadium High Speed Steel Taps For  
Stainless Steels Alloy Steels and Ductile Irons  
Modified Bottoming Style**

(2-1/2 to 3-1/2 threads chamfered) Taps have oxide surface treatment

**List 3818** Machine Screw sizes  
**3828** Fractional sizes

Nominal Size	Threads per inch		No. of Flutes	Pitch Diameter Limit / EDP Numbers		Dimensions
	NC UNC	NF UNF		H2	H3	Overall Length
2	56	—	2	384523	—	6"
3	48	—	2	384500	—	6"
4	40	—	2	384501	—	6"
6	32	—	3	—	384505	6"
8	32	—	3	—	384507	6"
10	24	—	3	—	384509	6"
10	—	32	3	—	384510	6"
1/4	20	—	3	—	384513	6"
1/4	—	28	3	—	384514	6"
5/16	18	—	3	—	384515	6"
5/16	—	24	3	—	384516	6"
3/8	16	—	3	—	384517	6"
3/8	—	24	3	—	384518	6"
7/16	14	—	3	—	384519	6"
7/16	—	20	3	—	384520	6"
1/2	13	—	3	—	384521	6"
1/2	—	20	3	—	384522	6"

**6" extended taps have the same approximate thread lengths as corresponding non-extended taps.**

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## Slow Spiral Fluted Pipe Taps for Stainless Steels, for NPT and NPTF Threads

For American Taper Pipe Threads



Custom Blended Vanadium High Speed Steel Taps For Stainless Steels, Alloy Steels and Ductile Irons

# ZELX SS PIPE



**List 3438** NPT Pipe Tap      Taps have oxide surface treatment  
**3448** NPTF Pipe Tap Dryseal Taper      Pipe Taps are standard with 2-1/2 to 3-1/2 threads chamfered

Nominal Size	Threads per Inch	No. of Flutes	EDP Numbers		Dimensions	
			NPT	NPTF	Length of Thread	Length Overall
1/16	27	4	383640	383660	11/16	2-1/8
1/8 (Lg. Shank)	27	4	383641	383661	3/4	2-1/8
1/8 (Sm. Shank)	27	4	383642	383662	3/4	2-1/8
1/4	18	4	383643	383663	1-1/16	2-7/16
3/8	18	4	383644	383664	1-1/16	2-9/16
1/2	14	4	383645	383665	1-3/8	3-1/8
3/4	14	4	383646	383666	1-3/8	3-1/4
1	11-1/2	4	383647	383667	1-3/4	3-3/4

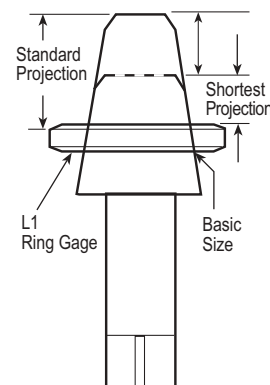
\*The nominal size of a Pipe Tap is that of the pipe fitting to be tapped, not the actual size of the tap. The thread tapers 3/4 of an inch per foot.

ZELX SS Spiral Fluted Pipe Taps are designed for difficult jobs including the stainless steel family of materials as well as alloy steels, high carbon steel and ductile irons. Our unique design ZELX SS Pipe taps increase productivity through longer tool life.

ZELX Spiral Fluted Pipe Taps are oxide surface treated or Titanium Nitride (TiN) coated to reduce loading and galling of product material, improving tap wearlife and thread quality.

### Taper Pipe Tap Standard Projection

ZELX Pipe Taps are designed for difficult jobs including stainless steels, alloy steels and ductile irons.



## TAPER PIPE TAPS - General Dimensions - Inches

*Nominal Pipe Size	Length Overall		Length of Thread		Length of Square		Diameter of Shank		Size of Square		†Gage Measurement		Taper Per Foot		Tap Drill Sizes First 2 or 3 Threads(Full)
	Length	Tol.	Length	Tol.	Length	Tol.	Dia.	Tol.	Size	Tol.	Projection	Tol.	Min.	Max.	
1/16	2-1/8	±1/32	11/16	±1/16	3/8	±1/32	.3125	-0.015	.234	-0.004	.312	±1/16	23/32	25/32	C
1/8	2-1/8	±1/32	3/4	±1/16	3/8	±1/32	.3125	-0.015	.234	-0.004	.312	±1/16	23/32	25/32	Q
1/8	2-1/8	±1/32	3/4	±1/16	3/8	±1/32	.4375	-0.015	.328	-0.004	.312	±1/16	23/32	25/32	Q
1/4	2-7/16	±1/32	1-1/16	±1/16	7/16	±1/32	.5625	-0.002	.421	-0.006	.459	±1/16	23/32	25/32	7/16
3/8	2-9/16	±1/32	1-1/16	±1/16	1/2	±1/32	.7000	-0.002	.531	-0.006	.454	±1/16	23/32	25/32	9/16
1/2	3-1/8	±1/32	1-3/8	±1/16	5/8	±1/32	.6875	-0.002	.515	-0.006	.579	±1/16	23/32	25/32	45/64
3/4	3-1/4	±1/32	1-3/8	±1/16	11/16	±1/32	.9063	-0.002	.679	-0.006	.565	±1/16	23/32	25/32	29/32
1	3-3/4	±1/16	1-3/4	±3/32	13/16	±1/16	1.1250	-0.002	.843	-0.008	.678	±3/32	23/32	25/32	1-9/64
1-1/4	4	±1/16	1-3/4	±3/32	15/16	±1/16	1.3125	-0.003	.984	-0.008	.686	±3/32	23/32	25/32	1-31/64
1-1/2	4-1/4	±1/16	1-3/4	±1/8	1	±1/16	1.5000	-0.003	1.125	-0.008	.699	±3/32	23/32	25/32	1-23/32
2	4-1/2	±1/16	1-3/4	±1/8	1-1/8	±1/16	1.8750	-0.003	1.406	-0.008	.667	±3/32	23/32	25/32	2-3/16

†Taper Pipe tap standard projection is the distance the small end of the tap projects through an American National Standard Pipe Thread Ring Gage.



Hand Taps for Hard-to-Machine Materials

**MOLD HAND TAPS**

Ideal for tapping mold steels, tool steels and gray cast irons, YMW offers this series of ZELX Mold Taps made of Cobalt High Speed Steel, ZELX Mold Hand Taps and Mold Pipe Taps.

Combined with specially designed geometry, Cobalt High Speed Steel improves the toughness of ZELX Taps for use in Prehardened Mold Steels. Furnished bright without surface treatment, taps can be surface treated upon request.

Ideal for tapping mold steels, tool steels and gray cast irons. (35 to 45 HRC)  
 YMW offers this series of ZELX Mold Taps made of Cobalt High Speed Steel.

**ZELX MOLD**



Pitch Diameter Limit / EDP Numbers

**First Choice For Tapping Mold Steels**

For Unified threads

- List 3114** Machine Screw sizes  
**3124** Fractional sizes

**Plug Style**

(4 to 6 threads chamfered)

Nominal Size	Threads per inch		No. of Flutes	EDP Numbers		Dimensions	
	NC UNC	NF UNF		H2	H3	Length of Thread	Length Overall
4	40	—	3	389599	—	9/16	1-7/8
5	40	—	3	389601	—	5/8	1-15/16
6	32	—	3	—	389602	11/16	2
8	32	—	3	—	389604	3/4	2-1/8
10	24	—	3	—	389606	7/8	2-3/8
10	—	32	3	—	389607	7/8	2-3/8
1/4	20	—	3	—	389613	1	2-1/2
1/4	—	28	3	—	389614	1	2-1/2
5/16	18	—	4	—	389615	1-1/8	2-23/32
5/16	—	24	4	—	389616	1-1/8	2-23/32
3/8	16	—	4	—	389617	1-1/4	2-15/16
3/8	—	24	4	—	389618	1-1/4	2-15/16
7/16	14	—	4	—	389619	1-7/16	3-5/32
7/16	—	20	4	—	389620	1-7/16	3-5/32
1/2	13	—	4	—	389621	1-21/32	3-3/8
1/2	—	20	4	—	389622	1-21/32	3-3/8
5/8	11	—	4	—	389625	1-13/16	3-13/16
5/8	—	18	4	—	389626	1-13/16	3-13/16
3/4	10	—	4	—	389627	2	4-1/4
3/4	—	16	4	—	389628	2	4-1/4

Pipe Taps for Mold Steels, for NPT Threads

First Choice For Tapping Mold Steels

Ideal for tapping mold steels, tool steels and gray cast irons. (35 to 45 HRC)

YMW offers this series of ZELX Mold Taps made of Cobalt High Speed Steel.

**ZELX MOLD PIPE**



- List 3434 NPT Straight Flute Style**

Nominal Size	Threads per Inch	No. of Flutes	EDP Numbers	Dimensions	
			NPT	Length of Thread	Length Overall
1/8 (Lg. Shank)	27	4	389641	3/4	2-1/8
1/4	18	4	389643	1-1/16	2-7/16
3/8	18	4	389644	1-1/16	2-9/16
1/2	14	4	389645	1-3/8	3-1/8
3/4	14	5	389646	1-3/8	3-1/4

For American Taper Pipe Threads Pipe Taps are standard with 2-1/2 to 3-1/2 threads chamfered

Titanium Nitride coating (TiN) is available upon request.

TiN coating approaches the hardness of carbide.

TiN's smooth, hard finish increases tool life and helps to improve product thread flank finish.



## Carbide Taps for Non-Ferrous Materials

For Unified threads



YMW solid ultra fine grain carbide taps are manufactured from the finest micro grain carbide for exceptional wear life and reduced chipping.

For the longest tool life available from any tap, YMW offers two carbide tap designs — one for tapping cast irons and another for aluminums.

Ideal for long production runs where reduced tool changes mean improved production efficiency. Thin film coatings such as TiN (Titanium Nitride) and TiCN (Titanium Carbonitride) are available upon request.

YMW carbide taps have also proven to be an excellent choice for threading very abrasive materials below 40Rc, such as alloy steels, stainless steels, exotic alloys and non metallics.

### ZELX® CARB CI CARBIDE HAND TAPS

For Cast Irons, Hard Plastics, Fiberglass, Cast Brass, Cobalt, Chrome Alloys Steels

List 3917 Machine Screw sizes  
3927 Fractional sizes



### ZELX® CARB AL CARBIDE HAND TAPS

For Aluminum Alloys, Zinc Die Castings, Copper Alloys and Soft Plastics

LIST 3910 Machine Screw sizes Straight flute  
3920 Fractional sizes Plug (3 to 5 threads chamfered) for through hole tapping  
Bottoming (1 to 2 threads chamfered) for blind hole tapping  
TiN or TiCN coating available upon request.

Nominal Size	Threads per Inch		Ground Thread Limits	EDP Numbers				Dimensions	
	NC UNC	NF UNF		FOR CAST IRONS		FOR ALUM. ALLOYS		Length of Thread	Length Overall
				4 Flutes Plug	Bottoming	3 Flutes Plug	Bottoming		
				LIST 3917		LIST 3910			
5	40	—	H3	—	—	384800	384801	5/8	1-5/16
6	32	—	H3	—	—	384802	384803	11/16	2
8	32	—	H3	—	—	384804	384805	3/4	2-1/8
10	24	—	H3	383806	383807	384806	384807	7/8	2-3/8
10	—	32	H3	383808	383809	384808	384809	7/8	2-3/8
				LIST 3927		LIST 3920			
1/4	20	—	H3	383810	383811	384810	384811	1	2-1/2
1/4	20	—	H5	383860	383861	384860	384861	1	2-1/2
1/4	—	28	H3	383812	383813	384812	384813	1	2-1/2
1/4	—	28	H5	383862	383863	384862	384863	1	2-1/2
5/16	18	—	H3	383814	383815	384814	384815	1-1/8	2-23/32
5/16	18	—	H5	383864	383865	384864	384865	1-1/8	2-23/32
5/16	—	24	H3	383816	383817	384816	384817	1-1/8	2-23/32
5/16	—	24	H5	383866	383867	384866	384867	1-1/8	2-23/32
3/8	16	—	H3	383818	383819	384818	384819	1-1/4	2-15/16
3/8	16	—	H5	383868	383869	384868	384869	1-1/4	2-15/16
3/8	—	24	H3	383820	383821	384820	384821	1-1/4	2-15/16
3/8	—	24	H5	383870	383871	384870	384871	1-1/4	2-15/16
7/16	14	—	H3	383822	383823	384822	384823	1-7/16	3-5/32
7/16	14	—	H5	383872	383873	384872	384873	1-7/16	3-5/32
7/16	—	20	H3	383824	383825	384824	384825	1-7/16	3-5/32
7/16	—	20	H5	383874	383875	384874	384875	1-7/16	3-5/32
1/2	13	—	H3	383826	383827	384826	384827	1-21/32	3-3/8
1/2	13	—	H5	383876	383877	384876	384877	1-21/32	3-3/8
1/2	—	20	H3	383828	383829	384828	384829	1-21/32	3-3/8
1/2	—	20	H5	383878	383879	384878	384879	1-21/32	3-3/8
5/8	11	—	H3	383834	383835	—	—	1-13/16	3-13/16
5/8	11	—	H5	383884	383885	—	—	1-13/16	3-13/16
5/8	—	18	H3	383836	383837	—	—	1-13/16	3-13/16
5/8	—	18	H5	383886	383887	—	—	1-13/16	3-13/16



**Carbide Taps for Cast Irons. Hard Plastics,  
Fiberglass, Cast Brass, Cobalt, Chrome Alloys Steels**

**ZELX® CARB CI CARBIDE HAND TAPS**



Straight flute

**Plug** (3 to 5 threads chamfered) for through hole tapping

**Bottoming** (1 to 2 threads chamfered) for blind hole tapping  
TiN or TiCN coating available upon request.

Straight Flute

**Plug** (3 - 5 threads chamfered)  
for through hole tapping

**Bottoming** (1 to 2 threads chamfered)  
for blind hole tapping

**ZELX® CARB AL CARBIDE HAND TAPS**

**For Aluminum Alloys, Zinc Die Castings,  
Copper Alloys and Soft Plastics**

List 3977 Metric sizes

List 3970 Metric sizes

Nominal Size	Ground Thread Limits	EDP Numbers				Dimensions	
		FOR CAST IRONS 4 Flutes		FOR ALUM. ALLOYS 3 Flutes		Length of Thread	Length Overall
		Plug	Bottoming	Plug	Bottoming		
		LIST 3977		LIST 3970			
M3 x 0.5	D3	370000	370001	371000	371001	5/8	1-15/16
M4 x 0.7	D4	370002	370003	371002	371003	3/4	2-1/8
M5 x 0.8	D4	370004	370005	371004	371005	7/8	2-3/8
M6 x 1	D5	370006	370007	371006	371007	1	2-1/2
M8 x 1	D5	370008	370009	371008	371009	1-1/8	2-23/32
M8 x 1.25	D5	370010	370011	371010	371011	1-1/8	2-23/32
M10 x 1.25	D5	370012	370013	371012	371013	1-1/4	2-15/16
M10 x 1.5	D6	370014	370015	371014	371015	1-1/4	2-15/16
M12 x 1.25	D5	370016	370017	371016	371017	1-21/32	3-3/8
M12 x 1.5	D6	370018	370019	371018	371019	1-21/32	3-3/8
M12 x 1.75	D6	370020	370021	371020	371021	1-21/32	3-3/8
M14 x 1.5	D6	370022	370023	—	—	1-21/32	3-19/32
M14 x 2	D7	370024	370025	—	—	1-21/32	3-19/32
M16 x 1.5	D6	370026	370027	—	—	1-13/16	3-13/16
M16 x 2	D7	370028	370029	—	—	1-13/16	3-13/16

## Spiral Pointed Taps for Nickel Base Alloys

For Unified threads



# ZELX NI

ZELX NI Taps have been designed for extended tap life in Cobalt, Nickel and Iron base exotic materials such as: Inconel, Hastelloy, Waspalloy and harder Stainless Steels, Mold and Tool Steels >30Rc.



PM High Speed Steel

Taps have an oxide and nitride surface toughening treatment.

ZELX NI Taps are suitable for UNJ Aerospace internal threading applications.

"NI" of code No. stands for Nitride finish taps.

- List**    **3612**    Machine Screw sizes  
           **3622**    Fractional sizes

### Plug Style

(3 to 5 threads chamfered)

Taps have an oxide and nitride surface toughening treatment

Nominal Size	TPI		No. of Flutes	Pitch Diameter Limit / EDP Numbers							Dimensions		
	NC UNC	NF UNF		H2	H3	H4	H5	H6	H7	Length of Thread	Length of Neck	Length Overall	
2	56	—	2	385523	—	—	—	—	—	.256	.181	1-3/4	
4	40	—	2	385501	385502	385504	—	—	—	.335	.227	1-7/8	
5	40	—	3	385503	—	—	—	—	—	.374	.251	1-5/16	
6	32	—	3	—	385505	385524	385535	—	—	.413	.274	2	
6	—	40	3	385512	—	—	—	—	—	.413	.274	2	
8	32	—	3	—	385507	385529	385537	385560	385567	.453	.297	2-1/8	
10	24	—	3	—	385509	—	385539	—	—	.531	.344	2-3/8	
10	—	32	3	—	385510	385530	385540	385561	385570	.531	.344	2-3/8	
1/4	20	—	3	—	385513	—	385543	—	—	.591	.409	2-1/2	
1/4	—	28	3	—	385514	385531	385544	385562	385574	.591	.409	2-1/2	
5/16	18	—	3	—	385515	—	385545	—	—	.669	.456	2-23/32	
5/16	—	24	3	—	385516	385532	385546	385563	385576	.669	.456	2-23/32	
3/8	16	—	3	—	385517	—	385547	—	385553	.748	.502	2-15/16	
3/8	—	24	3	—	385518	385533	385548	385564	385578	.748	.502	2-15/16	
7/16	14	—	3	—	385519	—	385549	—	—	.866	—	3-5/32	
7/16	—	20	3	—	385520	—	385550	—	—	.866	—	3-5/32	
1/2	13	—	3	—	385521	—	385551	—	385581	.984	—	3-3/8	
1/2	—	20	3	—	385522	—	385552	—	385582	.984	—	3-3/8	
5/8	11	—	3	—	385525	—	385555	—	385585	1.083	—	3-13/16	
5/8	—	18	3	—	385526	—	385556	—	385586	1.083	—	3-13/16	
3/4	10	—	3	—	385527	—	385557	—	—	1.201	—	4-1/4	
3/4	—	16	3	—	385528	—	385558	—	—	1.201	—	4-1/4	

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## Spiral Pointed Metric Taps for Nickel Base Alloys

For Metric threads

ZELX NI Taps have been designed for extended tap life in Cobalt, Nickel and Iron base exotic materials such as: Inconel, Hastelloy, Waspalloy and harder Stainless Steels, Mold and Tool Steels >30Rc.

# ZELX NI



PM High Speed Steel

\*BR\* of code No. stands for Bright finish taps  
 \*\*NI\* of code No. stands for Nitride finish taps

### Plug Style

(3 to 5 Threads Chamfered)

For Nickel Alloys, Inconel & Stainless Steels > 30Rc

Taps have an oxide and nitride surface toughening treatment

List 3672 Metric sizes

Nominal Size	No. of Flutes	Pitch Diameter Limit / EDP Numbers				Dimensions		
		D3	D4	D5	D6	Length of Thread	Length of Neck	Length Overall
M2.5 x 0.45	2	387320	—	—	—	.295	.205	1-13/16
M3 x 0.5	3	387321	—	—	—	.374	.251	1-15/16
M3.5 x 0.6	3	—	387322	—	—	.413	.274	2
M4 x 0.7	3	—	387323	—	—	.453	.297	2-1/8
M5 x 0.8	3	—	387324	—	—	.531	.344	2-3/8
M6 x 1	3	—	—	387325	—	.591	.409	2-1/2
M7 x 1	3	—	—	387326	—	.669	.456	2-23/32
M8 x 1	3	—	—	387327	—	.669	.456	2-23/32
M8 x 1.25	3	—	—	387328	—	.669	.456	2-23/32
M10 x 1.25	3	—	—	387329	—	.748	.502	2-15/16
M10 x 1.5	3	—	—	—	387330	.748	.502	2-15/16
M12 x 1.25	3	—	—	387331	—	.984	—	3-3/8
M12 x 1.75	3	—	—	—	387332	.984	—	3-3/8

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## Spiral Fluted Taps for Nickel Base Alloys

For Unified threads



# ZELX NI

ZELX NI Taps have been designed for extended for extended tap life in Cobalt, Nickel and Iron base exotic materials such as: Inconel, Hastelloy, Waspalloy and harder Stainless Steels, Mold and Tool Steels.



ZELX NI taps are suitable for UNJ Aerospace internal threading applications

All SS taps are designed with ANSI dimensions.

## Cobalt, Vanadium Premium Steel Taps

(1 to 2 threads chamfered)

Taps have an oxide and nitride surface toughening treatment.

List  
**3615** Machine Screw sizes  
**3625** Fractional sizes

Nominal Size	Threads Per Inch		No. of Flutes	Pitch Diameter Limit / EDP Numbers				Dimensions		
	NC UNC	NF UNF		H2	H3	H4	H5	Length of Thread	Length of Neck	Length Overall
4	40	—	3	387583	387002	—	387072	.236	.326	1-7/8
4	—	48	3	387003	—	—	—	.236	.326	1-7/8
5	40	—	3	381581	—	—	—	.236	.389	1-15/16
6	32	—	3	387006	387005	—	387035	.276	.411	2
6	—	40	3	387011	—	—	—	.276	.411	2
8	32	—	3	387024	387580	—	387037	.276	.474	2-1/8
10	24	—	3	—	387009	—	387039	.354	.521	2-3/8
10	—	32	3	—	381556	—	387040	.276	.599	2-3/8
1/4	20	—	3	—	387013	—	387043	.433	.567	2-1/2
1/4	—	28	3	—	387579	387031	387443	.354	.646	2-1/2
5/16	18	—	3	—	387015	—	387045	.472	.653	2-23/32
5/16	—	24	3	—	387577	387032	387046	.394	.731	2-23/32
3/8	16	—	3	—	387017	—	387047	.551	.699	2-15/16
3/8	—	24	3	—	387575	387033	387048	.394	.856	2-15/16
7/16	14	—	3	—	387019	—	387049	.591	—	3-5/32
7/16	—	20	3	—	387573	—	387050	.472	—	3-5/32
1/2	13	—	3	—	387500	—	387051	.630	—	3-3/8
1/2	—	20	3	—	387022	—	387052	.472	—	3-3/8
5/8	11	—	4	—	387025	—	—	.748	—	3-13/16
5/8	—	18	4	—	381508	—	—	.512	—	3-13/16
3/4	10	—	4	—	387027	—	—	.827	—	4-1/4

ZELX NI





Spiral Fluted Taps for Nickel Base Alloys

For Unified threads

ZELX NI



Available in bright; add "B" to EDP No. ZELX NI taps are suitable for UNJ Aerospace internal threading applications

Modified Bottoming Style

(3 to 4 threads chamfered)

Taps have an oxide and nitride surface toughening treatment.

List 3615 Machine Screw sizes  
3625 Fractional sizes

Nominal Size	TPI		No. of Flutes	Pitch Diameter Limit / EDP Numbers							Dimensions		
	NC UNC	NF UNF		H2	H3	H4	H5	H6	H7	Length of Thread	Length of Neck	Length Overall	
2	56	—	3	387523	—	—	—	—	—	.157	.280	1-3/4	
4	40	—	3	387501	387502	387512	—	—	—	.236	.326	1-7/8	
5	40	—	3	—	387504	—	—	—	—	.236	.389	1-15/16	
6	32	—	3	—	387505	387508	387535	—	—	.276	.411	2	
8	32	—	3	—	387507	387529	387537	387560	387567	.276	.474	2-1/8	
10	24	—	3	—	387509	—	387539	—	—	.354	.521	2-3/8	
10	—	32	3	—	387510	387530	387540	387561	387570	.276	.599	2-3/8	
1/4	20	—	3	—	387513	—	387543	—	—	.433	.567	2-1/2	
1/4	—	28	3	—	387514	387531	387544	387562	387574	.354	.646	2-1/2	
5/16	18	—	3	—	387515	—	387545	—	—	.472	.653	2-23/32	
5/16	—	24	3	—	387516	387532	387546	387563	387576	.394	.731	2-23/32	
3/8	16	—	3	—	387517	—	387547	—	—	.551	.699	2-15/16	
3/8	—	24	3	—	387518	387533	387548	387564	387578	.394	.856	2-15/16	
7/16	14	—	3	—	387519	—	387549	—	—	.591	1.259	3-5/32	
7/16	—	20	3	—	387520	—	387050	—	—	.472	1.378	3-5/32	
1/2	13	—	3	—	387521	—	387551	—	387581	.630	1.417	3-3/8	
1/2	—	20	3	—	387522	—	387552	—	387582	.472	1.575	3-3/8	
5/8	11	—	4	—	387525	—	387555	—	387585	.748	1.456	3-13/16	
5/8	—	18	4	—	387526	—	387556	—	387586	.512	1.692	3-13/16	
3/4	10	—	4	—	387527	—	387557	—	—	.827	1.574	4-1/4	
3/4	—	16	4	—	387528	—	387558	—	—	.591	1.810	4-1/4	

ZELX NI Taps have been designed for extended tap life in Cobalt, Nickel and Iron base exotic materials such as: Inconel, Hastelloy, Waspalloy and harder Stainless Steels, Mold and Tool Steels >30Rc.



Spiral Fluted Metric Taps for Nickel Base Alloys

For Metric threads



# ZELX NI METRIC



ZELX NI Taps have been designed for extended for extended tap life in Cobalt, Nickel and Iron base exotic materials such as: Inconel, Hastelloy, Waspalloy and very hard Stainless Steels, Mold and Tool Steels >30Rc. All SS metric taps are designed with ANSI shank dimensions.

**Modified Bottoming Style**

(3 to 4 threads chamfered)

For Nickel Alloys, Inconel & Stainless Steels > 30Rc

Taps have an oxide and nitride surface toughening treatment

List 3675 Metric sizes

Nominal Size	No. of Flutes	Pitch Diameter Limit / EDP Numbers				Dimensions		
		D3	D4	D5	D6	Length of Thread	Length of Neck	Length Overall
M2.5 x 0.45	2	388320	—	—	—	.295	.205	1-13/16
M3 x 0.5	3	388321	—	—	—	.197	.428	1-15/16
M3.5 x 0.6	3	—	388322	—	—	.276	.411	2
M4 x 0.7	3	—	388323	—	—	.276	.474	2-1/8
M5 x 0.8	3	—	388324	—	—	.354	.521	2-3/8
M6 x 1	3	—	—	388325	—	.433	.567	2-1/2
M7 x 1	3	—	—	388326	—	.433	.692	2-23/32
M8 x 1	3	—	—	388327	—	.472	.653	2-23/32
M8 x 1.25	3	—	—	388328	—	.472	.653	2-23/32
M10 x 1.25	3	—	—	388329	—	.472	.778	2-15/16
M10 x 1.5	3	—	—	—	388330	.512	.738	2-15/16
M12 x 1.25	3	—	—	388331	—	.551	—	3-3/8
M12 x 1.75	3	—	—	—	388332	.591	—	3-3/8

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## Spiral Fluted Taps for Titanium Alloys, Magnesium and Beryllium Copper

Cobalt, Vanadium Premium Steel Taps  
For Titanium, Titanium Alloys, Magnesium and Beryllium Copper  
ZELX TI taps are suitable for UNJ Aerospace internal threading applications.

For Unified threads

# ZELX TI



ZELX TI Slow Spiral Flute Taps have a left hand spiral flute design specifically designed to tap R.H. Threads in Titanium and Titanium Alloys. The Left Hand Slow Spiral makes this series of taps ideal for through hole tapping of right hand threads. The ZELX TI Taps are made from a cobalt, high vanadium base tool material to provide increased productivity as well as increased tap life while tapping Titanium.

### Plug Style

(4.5 to 6 threads chamfered)

Taps have a nitride surface toughening treatment

List **3613** Machine Screw sizes  
**3623** Fractional sizes

Nominal Size	Threads per Inch		No. of Flutes	Pitch Diameter Limit / EDP Numbers						Dimensions		
	NC UNC	NF UNF		H2	H3	H4	H5	H6	H7	Length of Thread	Length of Neck	Length Overall
2	56	—	3	385623	—	—	—	—	—	.256	.181	1-3/4
4	40	—	3	385601	—	—	—	—	—	.335	.227	1-7/8
5	40	—	3	385603	—	—	—	—	—	.374	.251	1-15/16
6	32	—	3	—	385605	—	385635	—	—	.413	.274	2
8	32	—	3	—	385607	385629	385637	385660	385667	.453	.297	2-1/8
10	24	—	3	—	385609	—	385639	—	—	.531	.344	2-3/8
10	—	32	3	—	385610	385630	385640	385661	385670	.531	.344	2-3/8
1/4	20	—	3	—	385613	—	385643	—	—	.591	.409	2-1/2
1/4	—	28	3	—	385614	385631	385644	385662	385674	.591	.409	2-1/2
5/16	18	—	3	—	385615	—	385645	—	—	.669	.456	2-23/32
5/16	—	24	3	—	385616	385632	385646	385663	385676	.669	.456	2-23/32
3/8	16	—	3	—	385617	—	385647	—	—	.748	.502	2-15/16
3/8	—	24	3	—	385618	385633	385648	385664	385678	.748	.502	2-15/16
7/16	14	—	3	—	385619	—	385649	—	—	.866	.984	3-5/32
7/16	—	20	3	—	385620	—	385650	—	—	.866	.984	3-5/32
1/2	13	—	3	—	385621	—	385651	—	—	.984	1.063	3-3/8
1/2	—	20	3	—	385622	—	385652	—	—	.984	1.063	3-3/8



Cobalt, Vanadium Premium Steel Taps

## METRIC SPIRAL POINT for Titanium Alloys, Magnesium and Beryllium Copper

### Plug Style

(3 to 4 threads chamfered)

Taps have a nitride surface toughening treatment

LIST **3673** Metric sizes

Nominal Size	No. of Flutes	Pitch Diameter Limits/EDP Numbers				Dimensions		
		D3	D4	D5	D6	Length of Thread	Length of Neck	Length Overall
M2.5 x 0.45	2	385700	—	—	—	.295	.205	1-13/16
M3 x 0.5	3	385701	—	—	—	.374	.251	1-15/16
M3.5 x 0.6	3	—	385702	—	—	.413	.274	2
M4 x 0.7	3	—	385703	—	—	.453	.297	2-1/8
M5 x 0.8	3	—	385704	—	—	.531	.344	2-3/8
M6 x 1	3	—	—	385705	—	.591	.409	2-1/2
M7 x 1	3	—	—	385706	—	.669	.456	2-23/32
M8 x 1	3	—	—	385707	—	.669	.456	2-23/32
M8 x 1.25	3	—	—	385708	—	.669	.456	2-23/32
M10 x 1.25	3	—	—	385709	—	.748	.502	2-15/16
M10 x 1.5	3	—	—	—	385710	.748	.502	2-15/16
M12 x 1.25	3	—	—	385711	—	.984	—	3-3/8
M12 x 1.75	3	—	—	—	385712	.984	—	3-3/8

# Spiral Fluted Taps for Titanium Alloys

For Unified threads



## ZELX TI



**For Titanium, Titanium Alloys, Magnesium and Beryllium Copper.**

ZELX NI taps are suitable for UNJ Aerospace internal threading applications

### Bottoming Style

(1 to 2 threads chamfered)

Taps have a nitride surface toughening treatment.

**List 3616** Machine Screw sizes  
**3626** Fractional sizes

Nominal Size	Threads per inch		No. of Flutes	Pitch Diameter Limit / EDP Numbers			Dimensions		
	NC UNC	NF UNF		H3	H4	H5	Length of Thread	Length of Neck	Length Overall
4	40	—	2	—	387001	—	.236	.326	1-7/8
6	32	—	3	387606	—	—	.276	.411	2
8	32	—	3	387007	—	—	.276	.474	2-1/8
10	24	—	3	381608	—	—	.354	.521	2-3/8
10	—	32	3	387010	—	—	.276	.599	2-3/8
1/4	20	—	3	387628	—	387627	.433	.567	2-1/2
1/4	—	28	3	387014	—	—	.354	.646	2-1/2
5/16	18	—	3	387695	—	387079	.472	.653	2-23/32
5/16	—	24	3	387016	—	—	.394	.731	2-23/32
3/8	16	—	3	387611	—	387685	.551	.699	2-15/16
3/8	—	24	3	387018	—	—	.394	.856	2-15/16
7/16	14	—	3	381629	—	—	.591	1.259	3-5/32
7/16	—	20	3	387020	—	387050	.472	1.378	3-5/32
1/2	13	—	3	387021	—	—	.630	1.417	3-3/8
1/2	—	20	3	387023	—	—	.472	1.575	3-3/8

# Spiral Fluted Taps for Titanium Alloys

For Unified threads



## ZELX TI



**For Titanium, Titanium Alloys, Magnesium and Beryllium Copper.**

ZELX NI taps are suitable for UNJ Aerospace internal threading applications

### Modified Bottoming Style

(3 to 4 threads chamfered)

Taps have a nitride surface toughening treatment

**List 3616** Machine Screw sizes  
**3626** Fractional sizes

Nominal Size	TPI		No. of Flutes	Pitch Diameter Limit / EDP Numbers							Dimensions		
	NC UNC	NF UNF		H2	H3	H4	H5	H6	H7	Length of Thread	Length of Neck	Length Overall	
2	56	—	3	387623	—	—	—	—	—	—	.157	.280	1-3/4
4	40	—	3	387601	—	387612	—	—	—	—	.236	.326	1-7/8
6	32	—	3	—	387605	387608	387635	—	—	—	.276	.411	2
8	32	—	3	—	387607	387629	387637	387660	387667	—	.276	.474	2-1/8
10	24	—	3	—	387609	—	—	—	—	—	.354	.521	2-3/8
10	—	32	3	—	387610	387630	387640	387661	387670	—	.276	.599	2-3/8
1/4	20	—	3	—	387613	—	—	—	—	—	.433	.567	2-1/2
1/4	—	28	3	—	387614	387631	387644	387662	387674	—	.354	.646	2-1/2
5/16	18	—	3	—	387615	—	—	—	—	—	.472	.653	2-23/32
5/16	—	24	3	—	387616	387632	387646	387663	387676	—	.394	.731	2-23/32
3/8	16	—	3	—	387617	—	—	—	—	—	.551	.699	2-15/16
3/8	—	24	3	—	387618	387633	387648	387664	387678	—	.394	.856	2-15/16
7/16	14	—	3	—	387619	—	—	—	—	—	.591	1.259	3-5/32
7/16	—	20	3	—	387620	—	387650	—	—	—	.472	1.378	3-5/32
1/2	13	—	3	—	387621	—	387626	—	—	—	.630	1.417	3-3/8
1/2	—	20	3	—	387622	—	387652	—	—	—	.472	1.575	3-3/8



**Spiral Fluted Taps for Titanium Alloys**  
For Metric threads

**For Titanium, Titanium Alloys,  
Magnesium and Beryllium Copper.**

Cobalt, Vanadium Premium Steel Taps

**ZELX TI**



**Modified Bottoming Style**

(3 to 4 threads chamfered)

Taps have a nitride surface toughening treatment

List **3676** Metric

Nominal Size	No. of Flutes	Pitch Diameter Limit / EDP Numbers				Dimensions		
		D3	D4	D5	D6	Length of Thread	Length of Neck	Length Overall
M2.5 x 0.45	2	387700	—	—	—	.295	.205	1-13/16
M3 x 0.5	3	387701	—	—	—	.197	.428	1-15/16
M3.5 x 0.6	3	—	387702	—	—	.276	.411	2
M4 x 0.7	3	—	387703	—	—	.276	.474	2-1/8
M5 x 0.8	3	—	387704	—	—	.354	.521	2-3/8
M6 x 1	3	—	—	387705	—	.433	.567	2-1/2
M7 x 1	3	—	—	387706	—	.433	.692	2-23/32
M8 x 1	3	—	—	387707	—	.472	.653	2-23/32
M8 x 1.25	3	—	—	387708	—	.472	.653	2-23/32
M10 x 1.25	3	—	—	387709	—	.472	.778	2-15/16
M10 x 1.5	3	—	—	—	387710	.512	.738	2-15-16
M12 x 1.25	3	—	—	387711	—	.551	—	3-3/8
M12 x 1.75	3	—	—	—	387712	.591	—	3-3/8





## Spiral Pointed Taps for Non-Ferrous Materials

For Unified threads



# ZELX AL



Custom Blended Vanadium High Speed Steel Taps  
For Silicon Die Cast, Zinc Die Cast Aluminum and  
Wrought Aluminum Alloys  
DIN tap lengths, USCTI shank dimensions

ZELX SS taps are suitable for UNJ Aerospace internal threading applications

- List**    **3814**    Machine Screw sizes  
          **3824**    Fractional sizes

### Plug Style

(4 to 5 threads chamfered)  
DIN tap lengths, USCTI shank dimensions  
Taps have a nitride surface toughening treatment  
TiN (Titanium Nitride) or TiCN (Titanium Carbon Nitride) available  
for an extra charge.

Nominal Size	Threads per inch		No. of Flutes	Pitch Diameter Limit / EDP Numbers					DIN Lengths - USCTI shanks Dimensions		
	NC UNC	NF UNF		H2	H3	H4	H5	H7	Length of Thread	Length of Neck	Length Overall
2	56		2	386200	—	—	—	—	.276	.196	1.772
4	40		2	386201	—	—	—	—	.433	.276	2.205
5	40		3	386202	—	—	—	—	.433	.276	2.205
6	32		3	—	386203	—	—	—	.512	.275	2.205
8	32		3	—	386204	—	—	—	.512	.315	2.480
10	24		3	—	386205	—	—	—	.630	.354	2.756
10		32	3	—	386206	—	—	—	.630	.354	2.756
1/4	20		3	—	386207	—	386208	—	.748	.433	3.150
1/4		28	3	—	386209	386211	—	—	.748	.433	3.150
5/16	18		3	—	386212	—	386213	—	.866	.512	3.543
5/16		24	3	—	386214	386215	—	—	.866	.512	3.543
3/8	16		3	—	386216	—	386217	—	.945	.590	3.937
3/8		24	3	—	386218	386219	—	—	.787	.748	3.543
7/16	14		3	—	386220	—	386221	—	.945	.709	3.937
7/16		20	3	—	386222	—	386223	—	.945	.709	3.937
1/2	13		3	—	386224	—	386225	—	1.142	.630	4.331
1/2		20	3	—	386226	—	386227	—	.866	.906	3.937

## METRIC SPIRAL POINTED TAPS



### Plug Style

(4 to 5 threads chamfered)  
DIN tap lengths, USCTI shank dimensions  
Taps have nitride surface toughening treatment  
TiN (Titanium Nitride) or TiCN (Titanium Carbon Nitride)  
available for an extra charge.

- List**    **3884**    Metric sizes



Nominal Size	No. of Flutes	Pitch Diameter Limit / EDP Numbers				DIN lengths - USCTI shanks Dimensions		
		D3	D4	D5	D6	Length of Thread	Length of Neck	Length Overall
M3 x 0.5	3	386228	—	—	—	.433	.276	2.205
M3.5 x 0.6	3	—	386229	—	—	.512	.275	2.205
M4 x 0.7	3	—	386230	—	—	.512	.315	2.480
M5 x 0.8	3	—	386231	—	—	.630	.354	2.756
M6 x 1	3	—	—	386232	—	.748	.433	3.150
M7 x 1	3	—	—	386233	—	.748	.433	3.150
M8 x 1	3	—	—	386234	—	.866	.512	3.543
M8 x 1.25	3	—	—	386235	—	.866	.512	3.543
M10 x 1.25	3	—	—	386236	—	.945	.590	3.937
M10 x 1.5	3	—	—	—	386237	.945	.590	3.937
M12 x 1.25	3	—	—	386238	—	.866	.906	3.937
M12 x 1.5	3	—	—	386239	—	.866	.906	3.937
M12 x 1.75	3	—	—	—	386240	1.142	.630	4.331

## Spiral Fluted Taps for Non-Ferrous Materials

For Unified threads



# ZELX AL

**Custom Blended Vanadium High Speed Steel Taps**  
**For Wrought Aluminum Alloys 6061-T6, 7075 type), Copper,**  
**Zinc Alloys, Magnesium Alloys Will also thread deep blind**  
**holes in Silicon Die Cast Aluminum > 1-1/2 diameters in depth**

DIN tap lengths, USCTI shank dimensions  
 Taps have nitride surface tougheneing treatment  
 TiN (Titanium Nitride) and TiCN (Titanium Carbonitride) available  
 for an extra charge



Modified Bottoming  
 (2-1/2 to 3 threads chamfered)

**List 3701** Machine Screw sizes  
**3711** Fractional sizes

Nominal Size	Threads Per Inch		No. of Flutes	Diameter Limit / EDP Numbers					DIN lengths - USCTI shanks Dimensions		
	UNC UNJC	UNF UNJF		H2	H3	H4	H5	H7	Length of Thread	Length of Neck	Length Overall
2	56		2	386500	—	—	—	—	.276	.196	1.772
4	40		2	386501	—	—	—	—	.433	.276	2.205
5	40		3	386502	—	—	—	—	.433	.276	2.205
6	32		3	—	386503	—	—	—	.512	.275	2.205
8	32		3	—	386504	—	—	—	.512	.315	2.480
10	24		3	—	386505	—	—	—	.630	.354	2.756
10		32	3	—	386506	—	—	—	.630	.354	2.756
1/4	20		3	—	386507	—	386508	—	.748	.433	3.150
1/4		28	3	—	386509	386511	—	—	.748	.433	3.150
5/16	18		3	—	386512	—	386513	—	.866	.512	3.543
5/16		24	3	—	386514	386515	—	—	.866	.512	3.543
3/8	16		3	—	386516	—	386517	—	.945	.590	3.937
3/8		24	3	—	386518	386519	—	—	.787	.748	3.543
7/16	14		3	—	386520	—	386521	—	.945	.709	3.937
7/16		20	3	—	386522	—	386523	—	.945	.709	3.937
1/2	13		3	—	386524	—	386525	—	1.142	.630	4.331
1/2		20	3	—	386526	—	386527	—	.866	.906	3.937

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## Spiral Fluted Taps for Non-Ferrous Materials

**For Silicon Die Cast, Zinc Die Cast Aluminum**  
**and Wrought Aluminum Alloys.**

DIN tap lengths, ANSI shank dimensions.

Custom Blended Vanadium High Speed Steel Taps



# ZELX AL



**Modified Bottoming**  
 (2-1/2 to 3 threads chamfered)

**List 3771**

Nominal Size	No. of Flutes	Pitch Diameter Limit / EDP Numbers				DIN lengths - USCTI shanks Dimensions		
		D3	D4	D5	D6	Length of Thread	Length of Neck	Length Overall
M3 x 0.5	3	386528	—	—	—	.433	.276	2.205
M3.5 x 0.6	3	—	386529	—	—	.512	.275	2.205
M4 x 0.7	3	—	386530	—	—	.512	.315	2.480
M5 x 0.8	3	—	386531	—	—	.630	.354	2.756
M6 x 1	3	—	—	386532	—	.748	.433	3.150
M7 x 1	3	—	—	386533	—	.748	.433	3.150
M8 x 1	3	—	—	386534	—	.866	.512	3.543
M8 x 1.25	3	—	—	386535	—	.866	.512	3.543
M10 x 1.25	3	—	—	386536	—	.945	.590	3.937
M10 x 1.5	3	—	—	—	386537	.945	.590	3.937
M12 x 1.25	3	—	—	386538	—	.866	.906	3.937
M12 x 1.5	3	—	—	386539	—	.866	.906	3.937
M12 x 1.75	3	—	—	—	386540	1.142	.630	4.331

**Spiral Fluted Taps for Non-Ferrous Materials**

For Unified threads

Custom Blended Vanadium High Speed Steel Taps



**ZELX ALS**



**For Silicon Die Cast Aluminum Alloys,  
Soft Plastics and Copper Alloys**

DIN tap lengths, ANSI shank dimensions.

**25° SPIRAL FLUTED TAPS**

- List**    **3804**    Machine Screw sizes  
           **3834**    Fractional sizes

**Modified Bottoming**  
 (2-1/2 to 3 thread chamfered)  
 Taps have nitride surface  
 toughening treatment

Nominal Size	Threads per inch		No. of Flutes	Pitch Diameter Limit / EDP Numbers					Dimensions		
	UNC UNJC	UNF UNJF		H2	H3	H4	H5	H7	Length of Thread	Length of Neck	Length Overall
2	56		3	386400	—	—	—	—	.276	.196	1.772
4	40		3	386401	—	—	—	—	.433	.276	2.205
5	40		3	386402	—	—	—	—	.433	.276	2.205
6	32		3	—	386403	—	—	—	.512	.275	2.205
8	32		3	—	386404	—	—	—	.512	.315	2.480
10	24		3	—	386405	—	—	—	.630	.354	2.756
10		32	3	—	386406	—	—	—	.630	.354	2.756
1/4	20		3	—	386407	—	386408	—	.748	.433	3.150
1/4		28	3	—	386409	386411	—	—	.748	.433	3.150
5/16	18		3	—	386412	—	386413	—	.866	.512	3.543
5/16		24	3	—	386414	386415	—	—	.866	.512	3.543
3/8	16		3	—	386416	—	386417	—	.945	.590	3.937
3/8		24	3	—	386418	386419	—	—	.787	.748	3.543
7/16	14		3	—	386420	—	386421	—	.945	.709	3.937
7/16		20	3	—	386422	—	386423	—	.945	.709	3.937
1/2	13		3	—	386424	—	386425	—	1.142	.630	4.331
1/2		20	3	—	386426	—	386427	—	.866	.906	3.937

**ZELX ALS taps are suitable for UNJ Aerospace internal threading applications**

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## Spiral Fluted Taps for Non-Ferrous Materials

For Metric threads

Custom Blended Vanadium High Speed Steel Taps

**For Silicon Die Cast Aluminum Alloys,  
Soft Plastics and Copper Alloys**

# ZELX ALS

DIN tap lengths, ANSI shank dimensions.



**Modified Bottoming**  
(2-1/2 to 3 thread chamfered)  
Taps have nitride surface  
toughening treatment

**List 3874** Metric sizes

Nominal Size	No. of Flutes	Pitch Diameter Limit/EDP Numbers				Dimensions		
		D3	D4	D5	D6	Length of Thread	Length of Neck	Length Overall
M3 x 0.5	3	386428	—	—	—	.433	.276	2.205
M3.5 x 0.6	3	—	386429	—	—	.512	.275	2.205
M4 x 0.7	3	—	386430	—	—	.512	.315	2.480
M5 x 0.8	3	—	386431	—	—	.630	.354	2.756
M6 x 1	3	—	—	386432	—	.748	.433	3.150
M7 x 1	3	—	—	386433	—	.748	.433	3.150
M8 x 1	3	—	—	386434	—	.866	.512	3.543
M8 x 1.25	3	—	—	386435	—	.866	.512	3.543
M10 x 1.25	3	—	—	386436	—	.945	.590	3.937
M10 x 1.5	3	—	—	—	386437	.945	.590	3.937
M12 x 1.25	3	—	—	386438	—	.866	.630	3.937
M12 x 1.5	3	—	—	386439	—	.866	.630	3.937
M12 x 1.75	3	—	—	—	386440	1.142	.906	4.331

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Left Hand Spiral Fluted Taps for High Speed Tapping



For Unified threads

ZELX FR LHSP

Custom Blended Vanadium High Speed Steel Taps  
 For Fast Tapping and Rigid, Computer Controlled Setups  
 For Low and Medium Carbon Steels, Die Cast Aluminums and Zinc Alloys  
 For synchronized tapping at 2 to 3 times faster than conventional taps



**List**    **3315**    Machine Screw sizes  
           **3325**    Fractional sizes

**Plug Style**  
 (4 to 5 threads chamfered)  
 DIN tap lengths, USCTI shank dimensions  
 Taps have a TiN Titanium Nitride Surface

Nominal Size	Threads per inch		Pitch Diameter Limit / EDP Numbers		Dimensions		
	NC	NF	H2	H3	Length of Thread	Length of Neck	Length Overall
	UNC	UNF					
4	40	—	384201	—	.335	.0768	1-7/8
5	40	—	384203	—	.374	.0898	1-15/16
6	32	—	—	384205	.413	.0938	2
8	32	—	—	384207	.453	.1197	2-1/8
10	24	—	—	384209	.531	.1312	2-3/8
10	—	32	—	384210	.531	.1312	2-3/8
1/4	20	—	—	384213	.591	.1796	2-1/2
1/4	—	28	—	384214	.591	.1796	2-1/2
5/16	18	—	—	384215	.669	.2343	2-23/32
5/16	—	24	—	384216	.669	.2343	2-23/32
3/8	16	—	—	384217	.748	.2871	2-15/16
3/8	—	24	—	384218	.748	.2871	2-15/16
7/16	14	—	—	384219	.984	—	3-5/32
7/16	—	20	—	384220	.866	—	3-5/32
1/2	13	—	—	384221	1.142	—	3-3/8
1/2	—	20	—	384222	.945	—	3-3/8
5/8	11	—	—	384225	1.260	—	3-13/16
5/8	—	18	—	384226	.984	—	3-13/16
3/4	10	—	—	384227	1.467	—	4-1/4
3/4	—	16	—	384228	1.142	—	4-1/4



Spiral Fluted Taps for High Speed Tapping

For Unified threads

Custom Blended Vanadium High Speed Steel Taps  
 For Fast Tapping and Rigid, Computer Controlled Setups  
 For Low and Medium Carbon Steels, Die Cast Aluminums and Zinc Alloys  
 For synchronized tapping at 2 to 3 times faster than conventional taps

ZELX FR



Modified Bottoming Style

(2-1/2 to 3-1/2 threads chamfered)  
 Available in bright, add "B" to EDP No.

List 3317 Machine Screw sizes  
 3327 Fractional sizes

Nominal Size	Threads per inchPitch		Diameter Limit / EDP Numbers		Dimensions		
	NC UNC	NF UNF	H2	H3	Length of Thread	Length of Neck	Length Overall
4	40	—	384401	—	.236	.0768	1-7/8
5	40	—	384403	—	.236	.0898	1-15/16
6	32	—	—	384405	.276	.0938	2
8	32	—	—	384407	.276	.1197	2-1/8
10	24	—	—	384409	.354	.1312	2-3/8
10	—	32	—	384410	.276	.1312	2-3/8
1/4	20	—	—	384413	.433	.1796	2-1/2
1/4	—	28	—	394414	.354	.1796	2-1/2
5/16	18	—	—	384415	.472	.2343	2-23/32
5/16	—	24	—	384416	.394	.2343	2-23/32
3/8	16	—	—	384417	.551	.2871	2-15/16
3/8	—	24	—	384418	.394	.2871	2-15/16
7/16	14	—	—	384419	.591	—	3-5/32
7/16	—	20	—	384420	.472	—	3-5/32
1/2	13	—	—	384421	.630	—	3-3/8
1/2	—	20	—	384422	.472	—	3-3/8
5/8	11	—	—	384425	.748	—	3-13/16
5/8	—	18	—	384426	.572	—	3-13/16
3/4	10	—	—	384427	.827	—	4-1/4
3/4	—	16	—	384428	.591	—	4-1/4





## Industrial Quality Hand Taps for Cast Irons

For Unified and Metric threads



# IQHT-CI



These taps have a geometry suited for tapping gray irons and irons that produce broken chips. This design is also appropriate for some non-metallics such as Bakelite and Cast Brass.

Straight flute

**Plug** (3 to 5 threads chamfered)

**Bottoming** (1 to 2 threads chamfered)

Taps have a surface toughening tap treatment

List 3127 Fractional sizes

Nominal Size	Threads per inch		No. of Flutes	Ground Thread Limits	EDP Numbers		Dimensions	
	NC UNC	NF UNF			Plug	Bottoming	Length of Thread	Length Overall
1/4	20	—	4	H3	386001	386002	1	2-1/2
1/4	20	—	4	H5	386003	386004	1	2-1/2
1/4	—	28	4	H3	386005	386006	1	2-1/2
5/16	18	—	4	H3	386007	386008	1-1/8	2-23/32
5/16	18	—	4	H5	386009	386010	1-1/8	2-23/32
5/16	—	24	4	H3	386011	386012	1-1/8	2-23/32
3/8	16	—	4	H3	386013	386014	1-1/4	2-15/16
3/8	16	—	4	H5	386015	386016	1-1/4	2-15/16
3/8	—	24	4	H3	386017	386018	1-1/4	2-15/16
7/16	14	—	4	H3	386019	386020	1-7/16	3-5/32
7/16	14	—	4	H5	386021	386022	1-7/16	3-5/32
7/16	—	20	4	H3	386023	386024	1-7/16	3-5/32
7/16	—	20	4	H5	386025	386026	1-7/16	3-5/32
1/2	13	—	4	H3	386027	386028	1-21/32	3-3/8
1/2	13	—	4	H5	386029	386030	1-21/32	3-3/8
1/2	—	20	4	H3	386031	386032	1-21/32	3-3/8
1/2	—	20	4	H5	386033	386034	1-21/32	3-3/8
9/16	12	—	4	H3	386035	386036	1-21/32	3-19/32
9/16	—	18	4	H3	386037	386038	1-21/32	3-19/32
5/8	11	—	4	H3	386039	386040	1-13/16	3-13/16
5/8	—	18	4	H3	386041	386042	1-13/16	3-13/16
3/4	10	—	4	H3	386043	386044	2	4-1/4
3/4	—	16	4	H3	386045	386046	2	4-1/4

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# IQ PO

Vanadium High Speed Steel Taps  
Ideal for steels, irons, brass and plastics in through hole applications.

These taps are designed to tap steels and ferrous materials that produce stringy chips. They are also ideal for brass, plastics in through hole applications.

Spiral Pointed taps are recommended for tapping through holes or blind bottoming holes where the hole depth is great enough to allow for chip accumulation at bottom of the hole.

ZELX IQ taps are suitable for UNJ Aerospace internal threading applications. All SS taps are designed with ANSI shank dimensions.

## Industrial Quality Spiral Pointed Taps

For Unified threads



**Plug Style** (3 to 5 threads chamfered)  
USCTI dimensions  
Taps have oxide surface treatment

**3210** Machine Screw sizes  
**3220** Fractional sizes

Nominal Size	Threads per Inch		No. of Flutes	Pitch Diameter Limit / EDP Numbers						Dimensions	
	NC UNC	NF UNF		H1	H2	H3	H4	H5	H7	Length of Thread	Length Overall
0	—	80	2	382000*	382050*	382100*	382146*	382150*	—	5/16	1-5/8
1	64	—	2	382002*	382052	—	—	—	—	3/8	1-11/16
1	—	72	2	382004*	382054	—	—	—	—	3/8	1-11/16
2	56	—	2	382006*	382056	382106	382147	382156	—	7/16	1-3/4
2	—	64	2	382008	382058*	—	—	—	—	7/16	1-3/4
3	48	—	2	382010	382060*	382110*	—	—	—	1/2	1-13/16
3	—	56	2	382012	382062*	—	—	—	—	1/2	1-13/16
4	40	—	2	382014	382064	382114	382148	382164	382190	9/16	1-7/8
4	—	48	2	382016	382066*	—	—	—	—	9/16	1-7/8
4	—	36(NS)	2	—	382068	—	—	—	—	9/16	1-7/8
5	40	—	2	382020	382070*	—	—	—	—	5/8	1-15/16
5	—	44	2	—	382072	—	—	—	—	5/8	1-15/16
6	32	—	2	382024	382074	382124*	382149	382174*	382192*	11/16	2
6	—	40	2	382026	382076	—	—	—	—	11/16	2
8	32	—	2	382028	382078*	382128*	382151	382178*	382194*	3/4	2-1/8
8	—	36	2	382032	382082*	—	—	—	—	3/4	2-1/8
10	24	—	2	382034	382084	382134*	—	—	382196*	7/8	2-3/8
10	—	32	2	382038	382088	382138	382152	382188*	382198	7/8	2-3/8
12	24	—	2	382042	—	382142*	—	—	—	15/16	2-3/8
12	—	28	2	—	—	382144	—	—	—	15/16	2-3/8
1/4	20	—	2	382200*	382250*	382300	382352	382400*	—	1	2-1/2
1/4	20	—	3	—	—	382302*	—	382402*	—	1	2-1/2
1/4	—	28	2	382204*	382256*	382304*	382356*	382404	382442	1	2-1/2
1/4	—	28	3	—	382257*	382306	382357*	—	—	1	2-1/2
5/16	18	—	2	382208*	382258*	382308	—	382408*	—	1-1/8	2-23/32
5/16	18	—	3	—	382260	382310*	—	382410*	—	1-1/8	2-23/32
5/16	—	24	2	382212*	382262*	382312*	382362*	—	—	1-1/8	2-23/32
5/16	—	24	3	—	382264*	382314*	382364*	—	—	1-1/8	2-23/32
3/8	16	—	3	382216*	382266	382316	—	382416*	—	1-1/4	2-15/16
3/8	—	24	3	382218*	382268*	382318*	382368*	—	—	1-1/4	2-15/16
7/16	14	—	3	—	382270*	382320*	—	382420	—	1-7/16	3-5/32
7/16	—	20	3	—	382272*	382322*	—	382422*	—	1-7/16	3-5/32
1/2	13	—	3	382224*	382274*	382324	—	382424*	—	1-21/32	3-3/8
1/2	—	20	3	382226*	382276*	382326*	—	382426*	—	1-21/32	3-3/8
5/8	11	—	3	—	—	382332	—	382432*	—	1-13/16	3-13/16
5/8	—	18	3	—	—	382334*	—	—	—	1-13/16	3-13/16
3/4	10	—	3	—	—	382336*	—	382436*	—	2	4-1/4
3/4	—	16	3	—	—	382338*	—	—	—	2	4-1/4

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# Industrial Quality Spiral Pointed Metric Taps

For Unified and Metric threads

## IQ



YMW Spiral Pointed Taps are engineered to shear product material efficiently during the threading operation. Spiral pointed taps shoot chips out ahead of the tap during threading, reducing loading and clogging of the flutes with product chips.

### YMW Metric Taps

Metric taps are available in the most popular "D" Limits for ISO 6H Tolerance Class threading. Metric taps are manufactured to ANSI inch blank dimensions.

### Vanadium High Speed Steel Taps

Ideal for steels, irons, brass and plastics in through hole applications.

These taps are designed to tap steels and ferrous materials that produce stringy chips. They are also ideal for brass, plastics in through hole applications.

Spiral Pointed taps are recommended for tapping through holes or blind bottoming holes where the hole depth is great enough to allow for chip accumulation at bottom of the hole.

List 3270 Metric Taps

Plug (3 to 5 threads chamfered)  
All taps have a Bright finish‡

Nominal Size	No. of Flutes	Ground Thread Limits	EDP Numbers		Dimensions	
			Plug		Length of Thread	Length Overall
M3 x 0.5	3	D3	378115		5/8	1-15/16
M3.5 x 0.6	3	D4	378116		11/16	2
M4 x 0.7	3	D4	378117		3/4	2-1/8
M4.5 x 0.75	3	D4	378118		7/8	2-3/8
M5 x 0.8	3	D4	378119		7/8	2-3/8
M6 x 1	3	D5	378120		1	2-1/2
M7 x 1	3	D5	378121		1-1/8	2-23/32
M8 x 1	3	D5	378122		1-1/8	2-23/32
M8 x 1.25	3	D5	378123		1-1/8	2-23/32
M10 x 1.25	3	D5	378124		1-1/4	2-15/16
M10 x 1.5	3	D6	378125		1-1/4	2-15/16
M12 x 1.25	3	D5	378126		1-21/32	3-3/8
M12 x 1.75	3	D6	378127		1-21/32	3-3/8
M14 x 1.5	3	D6	378128		1-21/32	3-19/32
M14 x 2	3	D7	378129		1-21/32	3-19/32
M16 x 1.5	3	D6	378130		1-13/16	3-13/16
M16 x 2	3	D7	378131		1-13/16	3-13/16
M18 x 1.5	3	D6	378132		1-13/16	4-1/32
M18 x 2.5	3	D7	378133		1-13/16	4-1/32



## Industrial Quality Spiral Pointed Taps

For Unified and Metric threads

These taps are designed to tap steels and ferrous materials that produce stringy chips. They are also ideal for brass, plastics in through hole applications.

Spiral Pointed taps are recommended for tapping through holes or blind bottoming holes where the hole depth is great enough to allow for chip accumulation at bottom of the hole. Taps have oxide surface treatment

YMW Spiral Pointed Taps are engineered to shear product material efficiency during the threading operation. Spiral pointed taps shoot chips out ahead of the tap during threading, reducing loading and clogging of the flutes with product chips.

# IQ PO BOTTOM



Vanadium High Speed Steel Taps

Ideal for steels, irons, brass and plastics in through hole applications.

Available in Bright, add "B" to the end of the EDP number for uncoated tap.

### BOTTOMING

(1 to 2 threads chamfered)

List **3210B**  
**3220B**

Machine Screw sizes  
Fractional sizes

Nominal Size	Threads per Inch		No. of Flutes	Pitch Diameter Limit / EDP Numbers					Dimensions	
	NC UNC	NF UNF		H1	H2	H3	H4	H7	Length of Thread	Length Overall
0	—	80	2	382001*	—	—	—	—	5/16	1-5/8
1	64	—	2	—	382053*	—	—	—	3/8	1-11/16
1	—	72	2	382005*	382055*	—	—	—	3/8	1-11/16
2	56	—	2	382007*	382057	—	—	—	7/16	1-3/4
3	48	—	2	—	382061	—	—	—	1/2	1-13/16
3	—	56	2	—	382063*	—	—	—	1/2	1-13/16
4	40	—	2	—	382065	—	—	382191	9/16	1-7/8
4	—	48	2	—	382067*	—	—	—	9/16	1-7/8
5	40	—	2	—	382071*	—	—	—	5/8	1-15/16
5	—	44	2	—	382073*	—	—	—	5/8	1-15/16
6	32	—	2	—	382075*	382125*	—	382193*	11/16	2
6	—	40	2	—	382077*	—	—	—	11/16	2
8	32	—	2	—	382079	382129*	—	382195*	3/4	2-1/8
8	—	36	2	—	382083	—	—	—	3/4	2-1/8
10	24	—	2	—	—	382135*	—	—	7/8	2-3/8
10	—	32	2	—	382089*	382139*	—	—	7/8	2-3/8
12	24	—	2	—	—	382143*	—	—	15/16	2-3/8
12	—	28	2	—	—	382145*	—	—	15/16	2-3/8
1/4	20	—	2	—	—	382301*	—	—	1	2-1/2
1/4	—	28	2	—	382255*	382305*	—	—	1	2-1/2
5/16	18	—	2	—	—	382309*	—	—	1-1/8	2-23/32
5/16	—	24	2	—	—	382313*	382365*	—	1-1/8	2-23/32
3/8	16	—	3	—	—	382317	—	—	1-1/4	2-15/16
7/16	14	—	3	—	—	382321*	—	—	1-7/16	3-5/32

ZELX IQ taps are suitable for UNJ Aerospace internal threading applications

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## Industrial Quality Spiral Fluted Taps

For Unified threads



# IQ SP

Vanadium High Speed Steel Taps  
Ideal for blind hole tapping ferrous materials that produce stringy chips.



YMW Spiral Fluted Taps are engineered for improved chip lifting action in threading blind bottoming holes. The spiral flute design helps lift the chips up and out of the product hole during threading, improving threading efficiency. The approximate 45° spiral flutes also permit the spanning of keyways or cross drilled holes during threading.

These taps are ideal for blind hole tapping ferrous materials that produce stringy chips. For more difficult alloy steel and exotic alloy tapping, see ZELX® taps for application recommendations on page 10.

The secret to threading deep blind holes is the handling and disposal of the chips generated during the threading process. Spiral fluted taps lift chips up and out of the product hole during threading. Handling product chips in this way reduces chip clogging of the tap's flutes and reduces tap breakage during deep hole threading (more than 1 to 1-1/2 tap diameters in depth).

ZELX IQ taps are suitable for UNJ Aerospace internal threading applications

Taps have oxide surface treatment for uncoated tap.

**LIST 3310** Machine Screw sizes  
**3320** Fractional sizes

**Plug** (3 to 5 threads chamfered)  
**Bottoming** (1 to 2 threads chamfered)  
USCTI dimensions

Nominal Size	Threads per inch		No. of Flutes	Ground Thread Limits	EDP Numbers		Dimensions	
	NC UNC	NF UNF			Plug	Bottoming	Length of Thread	Length Overall
3	48	—	2	H2	384060*	384061*	1/2	1-13/16
4	40	—	2	H2	384064*	384065	9/16	1-7/8
5	40	—	3	H2	384070*	384071*	5/8	1-15/16
6	32	—	3	H3	384124	384125	11/16	2
8	32	—	3	H3	384128*	384129*	3/4	2-1/8
10	24	—	3	H3	384132*	384133	7/8	2-3/8
10	—	32	3	H3	384134*	384135*	7/8	2-3/8
12	24	—	3	H3	384136*	384137*	15-16	2-3/8
1/4	20	—	3	H3	384300*	384301*	1	2-1/2
1/4	—	28	3	H3	384302*	384303*	1	2-1/2
5/16	18	—	3	H3	384304*	384305	1-1/8	2-23/32
5/16	—	24	3	H3	384306*	384307*	1-1/8	2-23/32
3/8	16	—	3	H3	384308*	384309*	1-1/4	2-15/16
3/8	—	24	3	H3	384310*	384311	1-1/4	2-15/16
7/16	14	—	3	H3	384312*	384313	1-7/16	3-5/32
7/16	—	20	3	H3	384316*	384317	1-7/16	3-5/32
1/2	13	—	3	H3	384320*	384321	1-21/32	3-3/8
1/2	—	20	3	H3	384324*	384325*	1-21/32	3-3/8
5/8	11	—	3	H3	384328	384329*	1-13/16	3-13/16
5/8	—	18	3	H3	384332*	384333*	1-13/16	3-13/16
3/4	10	—	4	H3	384336*	384337*	2	4-1/4
3/4	—	16	4	H3	384340*	384341*	2	4-1/4

\* Available in Bright, add "B" to end of EDP Number



## Industrial Quality Spiral Fluted Taps Metric

For Metric threads

# IQ SP

Vanadium High Speed Steel Taps  
Ideal for blind hole tapping ferrous materials that produce stringy chips.



YMW Spiral Fluted Taps are engineered for improved chip lifting action in threading blind bottoming holes. The spiral flute design helps lift the chips up and out of the product hole during threading, improving threading efficiency. The approximate 45° spiral flutes also permit the spanning of keyways or cross drilled holes during threading.

These taps are ideal for blind hole tapping ferrous materials that produce stringy chips. For more difficult alloy steel and exotic alloy tapping, see ZELX® taps for application recommendations on page 10.

The secret to threading deep blind holes is the handling and disposal of the chips generated during the threading process. Spiral fluted taps lift chips up and out of the product hole during threading. Handling product chips in this way reduces chip clogging of the tap's flutes and reduces tap breakage during deep hole threading (more than 1 to 1-1/2 tap diameters in depth).

### Metric Taps

List 3370

**Plug** (2-1/2 to 3-1/2 threads chamfered)  
All taps have a Bright finish‡

Nominal Size	No. of Flutes	Ground Thread Limits	EDP Numbers	Dimensions	
			Plug	Length of Thread	Length Overall
M3 x 0.5	3	D3	378215	5/8	1-15/16
M3.5 x 0.6	3	D4	378216	11/16	2
M4 x 0.7	3	D4	378217	3/4	2-1/8
M4.5 x 0.75	3	D4	378218	7/8	2-3/8
M5 x 0.8	3	D4	378219	7/8	2-3/8
M6 x 1	3	D5	378220	1	2-1/2
M7 x 1	3	D5	378221	1-1/8	2-23/32
M8 x 1	3	D5	378222	1-1/8	2-23/32
M8 x 1.25	3	D5	378223	1-1/8	2-23/32
M10 x 1.25	3	D5	378224	1-1/4	2-15/16
M10 x 1.5	3	D6	378225	1-1/4	2-15/16
M12 x 1.25	3	D5	378226	1-21/32	3-3/8
M12 x 1.75	3	D6	378227	1-21/32	3-3/8
M14 x 1.5	3	D6	378228	1-21/32	3-19/32
M14 x 2	3	D7	378229	1-21/32	3-19/32
M16 x 1.5	3	D6	378230	1-13/16	3-13/16
M16 x 2	3	D7	378231	1-13/16	3-13/16
M18 x 1.5	4	D6	378232	1-13/16	4-1/32
M18 x 2.5	4	D7	378233	1-13/16	4-1/32

‡ Supplemental surface treatments available upon request: oxide surface treatment and Titanium Nitride (TiN).







## Industrial Quality **+.005" Oversize Taps** Vanadium High Speed Steel Taps

Oversize taps are **+.005"** larger than basic pitch diameter (equivalent to an H11).

Oversize taps are supplied in the popular plug chamfer which is 3-5 pitches in length.



### **+.005" OVERSIZE HAND TAPS FOR FERROUS MATERIALS**

- List**    **3111**    Machine Screw sizes    **Plug** (3 to 5 threads chamfered)  
           **3121**    Fractional sizes                    USCTI dimensions  
    Taps have oxide surface treatment



### **+.005" OVERSIZE SPIRAL POINT TAPS FOR FERROUS MATERIALS**

- List**    **3211**    Machine Screw sizes    **Plug Style** (3 to 5 threads chamfered)  
           **3221**    Fractional sizes                    Straight Flute  
    Taps have oxide surface treatment

Nominal Size	Threads per inch		Hand Taps		Spiral Pointed Taps		Dimensions	
	NC UNC	NF UNF	No. of Flutes	EDP Numbers	No. of Flutes	EDP Numbers	Length of Thread	Length Overall
			List 3111		List 3211			
6	32	—	3	385035	2	385212	11/16	2
8	32	—	4	385041	2	385214	3/4	2-1/8
10	24	—	4	385047	2	385216	7/8	2-3/8
10	—	32	4	385050	2	385217	7/8	2-3/8
			List 3121		List 3221			
1/4	20	—	4	385062	2	385231	1	2-1/2
1/4	—	28	4	385065	2	385232	1	2-1/2
5/16	18	—	4	385068	2	385233	1-1/8	2-23/32
5/16	—	24	4	385071	2	385234	1-1/8	2-23/32
3/8	16	—	4	385074	3	385235	1-1/4	2-15/16
3/8	—	24	4	385077	3	385236	1-1/4	2-15/16
7/16	14	—	4	385080	3	385237	1-7/16	3-5/32
7/16	—	20	4	385083	3	385238	1-7/16	3-5/32
1/2	13	—	4	385086	3	385239	1-21/32	3-3/8
1/2	—	20	4	385089	3	385240	1-21/32	3-3/8
5/8	11	—	4	385098	3	385243	1-13/16	3-13/16
3/4	10	—	4	385104	3	385245	2	4-1/4

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Industrial Quality Hand Taps



For Tapping Steels, Irons, Brass and Plastics Hand

taps are manufactured from YMW's own high speed steel for maximum toughness and wear life.

Hand taps are the most popular style of general purpose taps for hand use, or for tapping under power.

Vanadium High Speed Steel Taps

Hand Taps

USCTI dimensions

**Taper** (7 to 10 threads chamfered)

**Plug** (3 to 5 threads chamfered)

**Bottoming** (1 to 2 threads chamfered)

Oxide coated

List 3110 Machine Screw sizes

\* Available in Bright. Add "B" to end of EDP for uncoated tap.

Nominal Size	Threads per inch		No. of Flutes	Ground Thread Limits	EDP Numbers			Dimensions	
	NC UNC	NF UNF			Taper	Plug	Bottoming	Length of Thread	Length Overall
0	—	80	2	H1	380000*	380001*	380002*	5/16	1-5/8
0	—	80	2	H2	—	380101	380102	5/16	1-5/8
1	64	—	2	H1	380003*	380004*	380005*	3/8	1-11/16
1	64	—	2	H2	—	380104	—	3/8	1-11/16
1	—	72	2	H1	380006*	380007*	380008*	3/8	1-11/16
1	—	72	2	H2	—	380107	380108	3/8	1-11/16
2	56	—	3	H1	380009	380010	380011	7/16	1-3/4
2	56	—	3	H2	380109*	380110*	380111*	7/16	1-3/4
2	—	64	3	H1	—	380013	380014	7/16	1-3/4
2	—	64	3	H2	380112*	380113*	380114*	7/16	1-3/4
3	48	—	3	H1	—	380016	—	1/2	1-13/16
3	48	—	3	H2	380115*	380116*	380117*	1/2	1-13/16
3	—	56	3	H1	—	380019	—	1/2	1-13/16
3	—	56	3	H2	380118*	380119*	380120*	1/2	1-13/16
4	40	—	3	H1	380021	380022	380023	9/16	1-7/8
4	40	—	3	H2	380121*	380122*	380123*	9/16	1-7/8
4	—	48	3	H1	—	380025	—	9/16	1-7/8
4	—	48	3	H2	380124*	380125*	380126*	9/16	1-7/8
4	—	36(NS)	3	H2	380127*	380128*	380129*	9/16	1-7/8
5	40	—	3	H1	—	380031	380032	5/8	1-15/16
5	40	—	3	H2	380130*	380131*	380132*	5/8	1-15/16
5	—	44	3	H1	—	380034	—	5/8	1-15/16
5	—	44	3	H2	380133*	380134*	380135*	5/8	1-15/16
6	32	—	3	H1	380036	380037	380038	11/16	2
6	32	—	3	H2	380136*	380137*	380138*	11/16	2
6	32	—	3	H3	380236*	380237*	380238*	11/16	2
6	—	40	3	H1	—	380040	—	11/16	2
6	—	40	3	H2	380139*	380140*	380141*	11/16	2
8	32	—	4	H1	380042	380043	380044	3/4	2-1/8
8	32	—	4	H2	380142	380143	380144	3/4	2-1/8
8	32	—	4	H3	380242*	380243*	380244*	3/4	2-1/8
8	—	36	4	H1	—	380046	—	3/4	2-1/8
8	—	36	4	H2	380145*	380146*	380147*	3/4	2-1/8
10	24	—	4	H1	380048	380049	380050	7/8	2-3/8
10	24	—	4	H2	380148	380149	380150	7/8	2-3/8
10	24	—	4	H3	380248*	380249*	380250*	7/8	2-3/8
10	—	32	4	H1	380051	380052	380053	7/8	2-3/8
10	—	32	4	H2	380151	380152	380153	7/8	2-3/8
10	—	32	4	H3	380251*	380252*	380253	7/8	2-3/8
12	24	—	4	H1	—	380055	—	15/16	2-3/8
12	24	—	4	H3	380254*	380255*	380256*	15/16	2-3/8
12	—	28	4	H1	—	380058	—	15/16	2-3/8
12	—	28	4	H3	380257*	380258*	380259*	15/16	2-3/8

YMW hand taps are designed to thread a wide variety of materials—steels, irons, brass and plastics—in through or blind hole conditions.

Hand taps store chips in their flutes adjacent to the chamfered teeth during the tapping operation.

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# Industrial Quality Hand Taps

## Vanadium High Speed Steel Taps For Tapping Steels, Irons, Brass and Plastics



### Taper (7 to 10 threads)

Has the longest standard chamfer ensuring easier starting and requires less tapping torque because of more working teeth.

### Plug (3 to 5 threads)

The most common chamfer for use by hand or machine in through or blind holes.

### Bottoming (1 to 2 threads)

For threading close to the bottom of blind holes, the least efficient standard chamfer.

Hand taps are manufactured from YMW's own high speed steel for maximum toughness and wear life.

Hand taps are the most popular style of general purpose taps for hand use, or for tapping under power.

YMW hand taps are designed to thread a wide variety of materials—steels, irons, brass and plastics—in through or blind hole conditions.

Hand taps store chips in their flutes adjacent to the chamfered teeth during the tapping operation.

USCTI dimensions

**Taper** (7 to 10 threads chamfered)

**Plug** (3 to 5 threads chamfered)

**Bottoming** (1 to 2 threads chamfered)

Oxide coated

List **3120** Fractional sizes

\* Available in Bright. Add "B" to end of EDP for uncoated tap.

Nominal Size	Threads per inch		No. of Flutes	Ground Thread Limits	EDP Numbers			Dimensions	
	NC UNC	NF UNF			Taper	Plug	Bottoming	Length of Thread	Length Overall
1/4	20	—	4	H1	381000	381001	381002	1	2-1/2
1/4	20	—	4	H2	381100	381101	381102	1	2-1/2
1/4	20	—	4	H3	381200*	381201*	381202	1	2-1/2
1/4	20	—	4	H5	—	381401	381402	1	2-1/2
1/4	—	28	4	H1	—	381004	381005	1	2-1/2
1/4	—	28	4	H2	—	381104	381105	1	2-1/2
1/4	—	28	4	H3	381203	381204*	381205	1	2-1/2
1/4	—	28	4	H4	—	381304	381305	1	2-1/2
5/16	18	—	4	H1	—	381007	381008	1-1/8	2-23/32
5/16	18	—	4	H2	—	381107	381108	1-1/8	2-23/32
5/16	18	—	4	H3	381206*	381207*	381208*	1-1/8	2-23/32
5/16	18	—	4	H5	—	381407	381408	1-1/8	2-23/32
5/16	—	24	4	H1	—	381010	381011	1-1/8	2-23/32
5/16	—	24	4	H2	—	381110	381111	1-1/8	2-23/32
5/16	—	24	4	H3	381209*	381210*	381211*	1-1/8	2-23/32
5/16	—	24	4	H4	—	381310	381311	1-1/8	2-23/32
3/8	16	—	4	H1	—	381013	381014	1-1/4	2-15/16
3/8	16	—	4	H2	—	381113	381114	1-1/4	2-15/16
3/8	16	—	4	H3	381212*	381213*	381214*	1-1/4	2-15/16
3/8	16	—	4	H5	—	381413	381414	1-1/4	2-15/16
3/8	—	24	4	H1	—	381016	381017	1-1/4	2-15/16
3/8	—	24	4	H2	—	381116	381117	1-1/4	2-15/16
3/8	—	24	4	H3	381215*	381216*	381217	1-1/4	2-15/16
3/8	—	24	4	H4	—	381316	381317	1-1/4	2-15/16
7/16	14	—	4	H3	381218*	381219*	381220*	1-7/16	3-5/32
7/16	14	—	4	H5	—	381419	381420	1-7/16	3-5/32
7/16	—	20	4	H2	—	381122	—	1-7/16	3-5/32
7/16	—	20	4	H3	381221*	381222*	381223*	1-7/16	3-5/32
7/16	—	20	4	H5	—	381422*	381423	1-7/16	3-5/32
1/2	13	—	4	H1	—	381025	381026	1-21/32	3-3/8
1/2	13	—	4	H2	—	381125	381126	1-21/32	3-3/8
1/2	13	—	4	H3	381224	381225*	381226	1-21/32	3-3/8
1/2	13	—	4	H5	—	381425	381426	1-21/32	3-3/8
1/2	—	20	4	H1	—	381028	381029	1-21/32	3-3/8
1/2	—	20	4	H3	381227*	381228*	381229	1-21/32	3-3/8
1/2	—	20	4	H5	—	381428	381429	1-21/32	3-3/8

continued on next page



**Industrial Quality Hand Taps**  
**Vanadium High Speed Steel Taps**  
**For Tapping Steels, Irons, Brass and Plastics**



**(continued) HAND TAPS**

List 3120 Fractional sizes  
 (continued)

USCTI dimensions

**Taper** (7 to 10 threads chamfered)

**Plug** (3 to 5 threads chamfered)

**Bottoming** (1 to 2 threads chamfered)

Oxide coated

Nominal Size	Threads per inch		No. of Flutes	Ground Thread Limits	EDP Numbers			Dimensions	
	NC UNC	NF UNF			Taper	Plug	Bottoming	Length of Thread	Length Overall
9/16	12	—	4	H3	381230*	381231*	381232*	1-21/32	3-19/32
9/16	12	—	4	H5	—	381431	—	1-21/32	3-19/32
9/16	—	18	4	H2	—	381134	—	1-21/32	3-19/32
9/16	—	18	4	H3	381233*	381234*	381235*	1-21/32	3-19/32
9/16	—	18	4	H5	—	381434	381435	1-21/32	3-19/32
5/8	11	—	4	H1	—	381037	381038*	1-13/16	3-13/16
5/8	11	—	4	H2	—	381137	—	1-13/16	3-13/16
5/8	11	—	4	H3	381236*	381237*	381238*	1-13/16	3-13/16
5/8	11	—	4	H5	—	381437	318438	1-13/16	3-13/16
5/8	—	18	4	H1	—	381040	—	1-13/16	3-13/16
5/8	—	18	4	H2	—	381140	—	1-13/16	3-13/16
5/8	—	18	4	H3	381239*	381240*	381241*	1-13/16	3-13/16
5/8	—	18	4	H5	—	381440	381441	1-13/16	3-13/16
11/16	—	11(NS)	4	H3	381242*	381243*	381244*	1-13/16	4-1/32
11/16	—	16(NS)	4	H3	381245*	381246*	381247*	1-13/16	4-1/32
3/4	10	—	4	H2	—	381149	—	2	4-1/4
3/4	10	—	4	H3	381248*	381249*	381250*	2	4-1/4
3/4	10	—	4	H5	—	381449	381450	2	4-1/4
3/4	—	16	4	H1	—	381052	—	2	4-1/4
3/4	—	16	4	H2	—	381152	—	2	4-1/4
3/4	—	16	4	H3	381251*	381252*	381253*	2	4-1/4
3/4	—	16	4	H5	—	381452	381453*	2	4-1/4
7/8	9	—	4	H4	381354*	381355	381356*	2-7/32	4-11/16
7/8	9	—	4	H6	—	381455	—	2-7/32	4-11/16
7/8	—	14	4	H2	—	381158	—	2-7/32	4-11/16
7/8	—	14	4	H4	381357*	381358*	381359*	2-7/32	4-11/16
7/8	—	14	4	H6	—	381458	—	2-7/32	4-11/16
1	8	—	4	H2	—	381161	—	2-1/2	5-1/8
1	8	—	4	H4	381360*	381361	381362	2-1/2	5-1/8
1	8	—	4	H6	—	381461	—	2-1/2	5-1/8
1	—	12	4	H4	381363*	381364*	381365*	2-1/2	5-1/8
1	—	14(NS)	4	H2	—	381167*	—	2-1/2	5-1/8
1	—	14(NS)	4	H4	381366*	381367*	381368*	2-1/2	5-1/8
1-1/8	7	—	4	H4	381369*	381370*	381371*	2-9/16	5-7/16
1-1/8	—	12	4	H4	381372*	381373*	381374*	2-9/16	5-7/16
1-1/4	7	—	4	H4	381375*	381376*	381377*	2-9/16	5-3/4
1-1/4	—	12	6	H4	381378*	381379*	381380*	2-9/16	5-3/4
1-3/8	6	—	4	H4	381381*	381382*	381383*	3	6-1/16
1-3/8	—	12	6	H4	381384*	381385*	381386*	3	6-1/16
1-1/2	6	—	4	H4	381387*	381388*	381389*	3	6-3/8
1-1/2	—	12	6	H4	381390*	381391*	381392*	3	6-3/8

\* Available in Bright. Add "B" to end of EDP for uncoated tap.

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**Industrial Quality Hand Taps**  
**Vanadium High Speed Steel Taps**  
**For Tapping Steels, Irons, Brass and Plastics**



**YMW Optional Three Flute Taps**

Hand Taps with 3 flutes provide more storage space for chips when threading holes greater than 1-1/2 tap diameters in depth. Using hand taps with fewer than the standard 4 flutes reduces tap breakage caused by flutes clogging with product chips during deep blind hole tapping.

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**HAND TAPS FOR FERROUS MATERIALS**

**Plug** (3 to 5 threads chamfered)  
**Bottoming** (1 to 2 threads chamfered)  
 Oxide coated

- List**    **3113**    Machine Screw sizes  
           **3123**    Fractional sizes

\* Available in Bright, add "B" to end of EDP number for uncoated tap.

Nominal Size	Threads per inch		No. of Flutes	Ground Thread Limits	EDP Numbers		Dimensions	
	NC UNC	NF UNF			Plug	Bottoming	Length of Thread	Length Overall
8	32	—	3	H1	380401	380402	3/4	2-1/8
8	32	—	3	H2	380451	380452*	3/4	2-1/8
8	32	—	3	H3	380501*	380502*	3/4	2-1/8
10	24	—	3	H1	380407	—	7/8	2-3/8
10	24	—	3	H2	380457	—	7/8	2-3/8
10	24	—	3	H3	380507*	380508*	7/8	2-3/8
10	—	32	3	H2	380460	380461	7/8	2-3/8
10	—	32	3	H3	380510*	380511*	7/8	2-3/8
1/4	20	—	3	H1	381601	—	1	2-1/2
1/4	20	—	3	H2	381651	—	1	2-1/2
1/4	20	—	3	H3	381701*	381702*	1	2-1/2
1/4	20	—	3	H5	381801	381802	1	2-1/2
1/4	—	28	3	H3	381704*	381705	1	2-1/2
5/16	18	—	3	H1	381607	—	1-1/8	2-23/32
5/16	18	—	3	H3	381707*	381708*	1-1/8	2-23/32
5/16	18	—	3	H5	381807	381808	1-1/8	2-23/32
5/16	—	24	3	H3	381710*	381711*	1-1/8	2-23/32
3/8	16	—	3	H1	381613	—	1-1/4	2-15/16
3/8	16	—	3	H3	381713*	381714*	1-1/4	2-15/16
3/8	16	—	3	H5	381813	381814	1-1/4	2-15/16
3/8	—	24	3	H3	381716*	381717*	1-1/4	2-15/16
7/16	14	—	3	H3	381719*	381720*	1-7/16	3-5/32
7/16	—	20	3	H3	381722*	—	1-7/16	3-5/32
1/2	13	—	3	H3	381725*	381726*	1-21/32	3-3/8
1/2	—	20	3	H3	381728	—	1-21/32	3-3/8



**Industrial Quality Hand Taps**  
**Vanadium High Speed Steel Taps**



**YMW Optional Two Flute Taps**

Hand Taps with 2 flutes provide more storage space for chips when threading holes greater than 1-1/2 tap diameters in depth. Using hand taps with fewer than the standard 4 flutes reduces tap breakage caused by flutes clogging with product chips during deep blind hole tapping.

Optional Two Flutes

**Plug** (3 to 5 threads chamfered)

**Bottoming** (1 to 2 threads chamfered)

Oxide coated

**HAND TAPS FOR FERROUS MATERIALS**

List 3112  
 3122

Nominal Size	Threads per inch		No. of Flutes	Ground Thread Limits	EDP Numbers		Dimensions	
	NC UNC	NF UNF			Plug	Bottoming	Length of Thread	Length Overall
2	56	—	2	H1	380601	380602	7/16	1-3/4
2	56	—	2	H2	380651*	380652*	7/16	1-3/4
3	48	—	2	H2	380657*	380658*	1/2	1-13/16
4	40	—	2	H1	380613	—	9/16	1-7/8
4	40	—	2	H2	380663	380664*	9/16	1-7/8
5	40	—	2	H2	380672*	380673*	5/8	1-15/16
5	—	44	2	H2	380675	—	5/8	1-15/16
6	32	—	2	H1	380628	—	11/16	2
6	32	—	2	H2	380678	380679	11/16	2
6	32	—	2	H3	380728*	380729*	11/16	2
6	—	40	2	H2	380681	—	11/16	2
8	32	—	2	H2	380684	380685	3/4	2-1/8
8	32	—	2	H3	380734*	380735*	3/4	2-1/8
10	24	—	2	H2	380690	380691	7/8	2-3/8
10	24	—	2	H3	380740*	380741*	7/8	2-3/8
10	—	32	2	H2	380693	380694	7/8	2-3/8
10	—	32	2	H3	380743*	380744*	7/8	2-3/8
1/4	20	—	2	H3	381951	381952	1	2-1/2
1/4	—	28	2	H3	381954*	381955*	1	2-1/2
5/16	18	—	2	H3	381957*	381958*	1-1/8	2-23/32

\* Available in Bright, add "B" to end of EDP number for uncoated tap.

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Industrial Quality Metric Taps



Vanadium High Speed Steel Taps



YMW Metric Taps

Metric taps are available in the most popular "D" Limits for ISO 6H Tolerance Class threading. Metric taps are manufactured to U.S.C.T.I. inch blank dimensions.

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HAND TAPS FOR FERROUS MATERIALS

HAND TAPS—GENERAL PURPOSE

LIST 3170 Metric Hand Taps

Straight flute  
**Plug** (3 to 5 threads chamfered)  
**Bottoming** (1 to 2 threads chamfered)  
 All taps have a Bright finish‡

Nominal Size	No. of Flutes	Ground Thread Limits	EDP Numbers		Dimensions	
			Plug	Bottoming	Length of Thread	Length Overall
M1.6 x 0.35	2	D3	377995	377996	5/16	1-5/8
M1.8 x 0.35	2	D3	377998	377999	3/8	1-11/16
M2 x 0.4	3	D3	378001	378002	7/16	1-3/4
M2.2 x 0.45	3	D3	378004	378005	7/16	1-3/4
M2.5 x 0.45	3	D3	378007	378008	1/2	1-13/16
M3 x 0.5	3	D3	378010	378011	5/8	1-15/16
M3.5 x 0.6	3	D4	378013	378014	11/16	2
M4 x 0.7	4	D4	378016	378017	3/4	2-1/8
M4.5 x 0.75	4	D4	378019	378020	7/8	2-3/8
M5 x 0.8	4	D4	378022	378023	7/8	2-3/8
M6 x 1	4	D5	378025	378026	1	2-1/2
M7 x 1	4	D5	378028	378029	1-1/8	2-23/32
M8 x 1	4	D5	378031	378032	1-1/8	2-23/32
M8 x 1.25	4	D5	378034	378035	1-1/8	2-23/32
M10 x 1.25	4	D5	378037	378038	1-1/4	2-15/16
M10 x 1.5	4	D6	378040	378041	1-1/4	2-15/16
M12 x 1.25	4	D5	378043	378044	1-21/32	3-3/8
M12 x 1.75	4	D6	378046	378047	1-21/32	3-3/8
M14 x 1.5	4	D6	378049	378050	1-21/32	3-19/32
M14 x 2	4	D7	378052	378053	1-21/32	3-19/32
M16 x 1.5	4	D6	378055	378056	1-13/16	3-13/16
M16 x 2	4	D7	378058	378059	1-13/16	3-13/16
M18 x 1.5	4	D6	378061	378062	1-13/16	4-1/32
M18 x 2.5	4	D7	378064	378065	1-13/16	4-1/32
M20 x 1.5	4	D6	378067	378068	2	4-15/32
M20 x 2.5	4	D7	378070	378071	2	4-15/32
M22 x 1.5	4	D6	378073	378074	2-7/32	4-11/16
M22 x 2.5	4	D7	378076	378077	2-7/32	4-11/16
M24 x 2	4	D7	378079	378080	2-7/32	4-29/32
M24 x 3	4	D8	378082	378083	2-7/32	4-29/32
M27 x 2	4	D7	378085	378086	2-1/2	5-1/8
M27 x 3	4	D8	378088	378089	2-1/2	5-1/8
M30 x 2	4	D7	378091	378092	2-9/16	5-7/16
M30 x 3.5	4	D9	378094	378095	2-9/16	5-7/16
M33 x 2	4	D7	378097	378098	2-9/16	5-3/4
M33 x 3.5	4	D9	378100	378101	2-9/16	5-3/4
M36 x 3	4	D8	378103	378104	3	6-1/16
M36 x 4	4	D9	378106	378107	3	6-1/16
M39 x 3	6	D8	378109	378110	3-3/16	6-11/16
M39 x 4	6	D10	378112	378113	3-3/16	6-11/16

# N-RZ

## INDURTRIAL QUALITY N-RZ ROLL TAPS



### Custom Blended Vanadium High Speed Steel Taps

#### Bottoming Style

(2 to 2-1/2 threads chamfered)

Improved performance, new tap design

DIN tap lengths, USCTI shank dimensions

Taps have an oxide coating for improved roll tapping in steels

Replaces #3510 and #3520 Roll Tap styles

For Stainless Steels, Alloy Steels and Ferrous Materials

DIN tap lengths, USCTI shank dimensions

List **3560** Machine Screw sizes  
**3565** Fractional sizes

Nominal Size	Threads per Inch		Pitch Diameter Limit / EDP Numbers							No. of Lube Grooves	DIN lengths - USCTI shanks		
	UNC UNJC	UNF UNJF	H2	H3	H4	H5	H6	H7	Length of Thread		Length of Neck	Length Overall	
0		80	389410	—	—	—	—	—	0	.315	—	1.575	
1	64		389411	—	—	—	—	—	0	.315	—	1.575	
1		72	389412	—	—	—	—	—	0	.315	—	1.575	
2	56		389413	389414	—	—	—	—	0	.354	—	1.772	
2		64	389415	389416	—	—	—	—	0	.354	—	1.772	
3	48		389417	389418	—	—	—	—	0	.276	.217	1.969	
3		56	389419	389420	—	—	—	—	0	.276	.217	1.969	
4	40		—	389421	—	389422	—	—	0	.433	.276	2.205	
4		48	—	389425	—	389426	—	—	0	.433	.276	2.205	
5	40		—	389429	—	389430	—	—	4	.433	.276	2.205	
5		44	—	389433	—	389434	—	—	4	.433	.276	2.205	
6	32		—	389437	—	389438	—	—	4	.512	.276	2.205	
6		40	—	389442	—	389443	—	—	4	.512	.276	2.205	
8	32		—	389446	—	389447	—	—	4	.512	.315	2.480	
8		36	—	389450	—	389451	—	—	4	.512	.315	2.480	
10	24		—	—	389454	—	389455	—	4	.630	.354	2.756	
10		32	—	—	389458	—	389459	—	4	.630	.354	2.756	
12	24		—	—	389462	—	389463	—	4	.630	.354	3.150	
12		28	—	—	389466	—	389467	—	4	.630	.354	3.150	
1/4	20		—	—	389470	—	389471	—	4	.748	.433	3.150	
1/4		28	—	—	389474	—	389475	—	4	.748	.433	3.150	
5/16	18		—	—	—	389478	—	389479	3	.866	.512	3.543	
5/16		24	—	—	—	389482	—	389483	3	.866	.512	3.543	
3/8	16		—	—	—	389486	—	389487	3	.945	.597	3.937	
3/8		24	—	—	—	389490	—	389491	3	.787	.748	3.543	
7/16	14		—	—	—	389494	—	389495	4	.945	—	3.937	
7/16		20	—	—	—	389498	—	389499	4	.945	—	3.937	
1/2	13		—	—	—	389504	—	389505	4	1.142	—	4.331	
1/2		20	—	—	—	389508	—	389509	4	.866	—	3.937	

N-RZ Roll taps can be run 1.5 times faster than the tapping speeds recommended for thread cutting taps.

### Calculating Min and Max Drill Size for Roll Tapping

#### For Unified Inch Threads

##### Maximum Drill Size:

$$\text{Basic Major Diameter} - \frac{3}{8N}$$

##### Minimum Drill Size:

$$\text{Basic Major Diameter} - \frac{1}{2N}$$

N = Number of Threads per Inch

#### For 60° Metric Threads

##### Maximum Drill Size:

$$\text{Basic Major Diameter} - 0.375P$$

##### Minimum Drill Size:

$$\text{Basic Major Diameter} - 0.5P$$

P = Pitch

Note: Use millimeter value for basic major diameter and pitch: the drill size will be in millimeters

# Thread Forming Taps for Ferrous Materials

For Unified and Metric threads



## N-RZ

Stainless Steels & Alloy Steels  
(for Ferrous Materials)  
DIN tap lengths, USCTI shank dimensions



### Custom Blended Vanadium High Speed Steel Tap

- List 3560** Machine Screw sizes  
**3565** Fractional sizes

**Plug Style** (3 to 5 threads chamfered)  
Improved performance, new tap design  
DIN tap lengths, USCTI shank dimensions  
Taps have an oxide coating for improved roll tapping in steels

Nominal Size	Threads per Inch		Pitch Diameter Limit / EDP Numbers							DIN lengths - USCTI shanks		
	UNC UNJC	UNF UNJF	H2	H3	H4	H5	H6	H7	No. of Lube Grooves	Length of Thread	Length of Neck	Length Overall
4	40		—	389423	—	389424	—	—	0	.433	.276	2.205
4		48	—	389427	—	389428	—	—	0	.433	.276	2.205
5	40		—	389431	—	389432	—	—	4	.433	.276	2.205
5		44	—	389435	—	389436	—	—	4	.433	.276	2.205
6	32		—	389440	—	389441	—	—	4	.512	.276	2.205
6		40	—	389444	—	389445	—	—	4	.512	.276	2.205
8	32		—	389448	—	389449	—	—	4	.512	.315	2.480
8		36	—	389452	—	389453	—	—	4	.512	.315	2.480
10	24		—	—	389456	—	389457	—	4	.630	.354	2.756
10		32	—	—	389460	—	389461	—	4	.630	.354	2.756
12	24		—	—	389464	—	389465	—	4	.630	.354	3.150
12		28	—	—	389468	—	389469	—	4	.630	.354	3.150
1/4	20		—	—	389472	—	389473	—	4	.748	.433	3.150
1/4		28	—	—	389476	—	389477	—	4	.748	.433	3.150
5/16	18		—	—	—	389480	—	389481	3	.866	.512	3.543
5/16		24	—	—	—	389484	—	389485	3	.866	.512	3.543
3/8	16		—	—	—	389488	—	389489	3	.945	.597	3.937
3/8		24	—	—	—	389492	—	389493	3	.787	.748	3.543
7/16	14		—	—	—	389496	—	389497	4	.945	—	3.937
7/16		20	—	—	—	389502	—	389503	4	.945	—	3.937
1/2	13		—	—	—	389506	—	389507	4	1.142	—	4.331
1/2		20	—	—	—	389510	—	389511	4	.866	—	3.937

### N-RZ METRIC ROLL TAPS



- List 3575** Metric

**Plug Style** (3 to 5 threads chamfered)  
**Bottoming Style** (2 to 2 1/2 threads chamfered)  
DIN tap lengths, USCTI shank dimensions  
Taps have an oxide coating for improved roll tapping in steels

Nominal Size	Ground Thread Limits	EDP Numbers		No. of Lube Grooves	DIN lengths - USCTI shanks		
		Plug	Bottoming		Length of Thread	Length of Neck	Length Overall
M3 x 0.5	D5	389513	389512	4	.433	.276	2.205
M3.5 x 0.6	D6	389515	389514	4	.512	.276	2.205
M4 x 0.7	D6	389517	389516	4	.512	.315	2.480
M5 x 0.8	D7	389519	389518	4	.630	.354	2.756
M6 x 1	D8	389521	389520	4	.748	.433	3.150
M7 x 1	D9	389523	389522	4	.748	.433	3.150
M8 x 1	D9	389525	389524	3	.866	.512	3.543
M8 x 1.25	D9	389527	389526	3	.866	.512	3.543
M10 x 1.25	D9	389529	389528	4	.945	.591	3.937
M10 x 1.5	D10	389531	389530	4	.945	.591	3.937
M12 x 1.25	D9	389533	389532	4	.866	—	3.937
M12 x 1.75	D11	389535	389534	4	1.142	—	4.331



### Thread Forming Taps for Non-Ferrous Materials

For Unified and Metric threads

# N-RS



For Aluminums, Brass, Copper Alloys (Non-Ferrous Materials)

DIN tap lengths, USCTI shank dimensions

Custom Blended Vanadium High Speed Steel Taps  
For Aluminums, Brass, Copper Alloys (Non-Ferrous Materials)

DIN tap lengths, USCTI shank dimensions

**Bottoming Style** (2 to 2-1/2 threads chamfered)

DIN tap lengths, USCTI shank dimensions

Improved performance, new tap design

Taps have a nitride surface toughening treatment

List 3550 Machine Screw sizes  
3552 Fractional sizes

Nominal Size	Threads per Inch		Pitch Diameter Limit/EDP Numbers							DIN Lengths - USCTI Shanks			
	UNC UNJC	UNF UNJF	H2	H3	H4	H5	H6	H7	No. of Lube Grooves	Length of Thread	Length of Neck	Length Overall	
0		80	388410	—	—	—	—	—	0	.315	—	1.575	
1	64		388411	—	—	—	—	—	0	.315	—	1.575	
1		72	388412	—	—	—	—	—	0	.315	—	1.575	
2	56		388413	388414	—	—	—	—	0	.354	—	1.772	
2		64	388415	388416	—	—	—	—	0	.354	—	1.772	
3	48		388417	388418	—	—	—	—	0	.276	.217	1.969	
3		56	388419	388420	—	—	—	—	0	.276	.217	1.969	
4	40		—	388421	—	388422	—	—	0	.433	.276	2.205	
4		48	—	388425	—	388426	—	—	0	.433	.276	2.205	
5	40		—	388429	—	388430	—	—	1	.433	.276	2.205	
5		44	—	388433	—	388434	—	—	1	.433	.276	2.205	
6	32		—	388437	—	388438	—	—	1	.512	.276	2.205	
6		40	—	388442	—	388443	—	—	1	.512	.276	2.205	
8	32		—	388446	—	388447	—	—	1	.512	.315	2.480	
8		36	—	388450	—	388451	—	—	1	.512	.315	2.480	
10	24		—	—	388454	—	388455	—	1	.630	.354	2.756	
10		32	—	—	388458	—	388459	—	1	.630	.354	2.756	
12	24		—	—	388462	—	388463	—	1	.630	.354	3.150	
12		28	—	—	388466	—	388467	—	1	.630	.354	3.150	
1/4	20		—	—	388470	—	388471	—	1	.748	.433	3.150	
1/4		28	—	—	388474	—	388475	—	1	.748	.433	3.150	
5/16	18		—	—	—	388478	—	388479	1	.866	.512	3.543	
5/16		24	—	—	—	388482	—	388483	1	.866	.512	3.543	
3/8	16		—	—	—	388486	—	388487	1	.945	.591	3.937	
3/8		24	—	—	—	388490	—	388491	1	.787	.748	3.543	
7/16	14		—	—	—	388494	—	388495	1	.945	—	3.937	
7/16		20	—	—	—	388498	—	388499	1	.945	—	3.937	
1/2	13		—	—	—	388504	—	388505	1	1.142	—	4.331	
1/2		20	—	—	—	388508	—	388509	1	.866	—	3.937	

N-RS Roll taps can be run 1.5 times faster than the tapping speeds recommended for thread cutting taps.

### N-RS Metric Roll Taps List 3750

Nominal Size	Metric Ground Thread Limits	EDP Numbers		No. of Lube Grooves	DN lengths - USCTI shanks		
		Plug	Bottoming		Length of Thread	Length of Neck	Length Overall
M3 x 0.5	D5	388513	388512	1	.433	.276	2.205
M3.5 x 0.6	D6	388515	388514	1	.512	.276	2.205
M4 x 0.7	D6	388517	388516	1	.512	.315	2.480
M5 x 0.8	D7	388519	388518	1	.630	.354	2.756
M6 x 1	D8	388521	388520	1	.748	.433	3.150
M7 x 1	D9	388523	388522	1	.748	.433	3.150
M8 x 1	D9	388525	388524	1	.866	.512	3.543
M8 x 1.25	D9	388527	388526	1	.866	.512	3.543
M10 x 1.25	D9	388529	388528	1	.945	.591	3.937
M10 x 1.5	D10	388531	388530	1	.945	.591	3.937
M12 x 1.25	D9	388533	388532	1	.866	—	3.937
M12 x 1.75	D11	388535	388534	1	1.142	—	4.331

Thread Forming Taps for Ferrous Materials  
For Unified threads



N-RS



Stainless Steels & Alloy Steels  
(for Ferrous Materials)  
DIN tap lengths, USCTI shank dimensions

Custom Blended Vanadium High Speed Steel Taps

**Plug Style**  
(3 to 5 threads chamfered)  
DIN tap lengths, USCTI shank dimensions  
Improved performance, new tap design.  
Taps have a nitride surface toughening treatment.

List 3550 Machine Screw sizes  
3552 Fractional sizes

Nominal Size	Threads per Inch		Pitch Diameter Limit/EDP Numbers							No. of Lube Grooves	DIN lengths - USCTI shanks		
	UNC UNJC	UNF UNJF	H2	H3	H4	H5	H6	H7	Length of Thread		Length of Neck	Length Overall	
4	40		—	388423	—	388424	—	—	0	.433	.276	2.205	
4		48	—	388427	—	388428	—	—	0	.433	.276	2.205	
5	40		—	388431	—	388432	—	—	1	.433	.276	2.205	
5		44	—	388435	—	388436	—	—	1	.433	.276	2.205	
6	32		—	388440	—	388441	—	—	1	.512	.276	2.205	
6		40	—	388444	—	388445	—	—	1	.512	.276	2.205	
8	32		—	388448	—	388449	—	—	1	.512	.315	2.480	
8		36	—	388452	—	388453	—	—	1	.512	.315	2.480	
10	24		—	—	388456	—	388457	—	1	.630	.354	2.756	
10		32	—	—	388460	—	388461	—	1	.630	.354	2.756	
12	24		—	—	388464	—	388465	—	1	.630	.354	3.150	
12		28	—	—	388468	—	388469	—	1	.630	.354	3.150	
1/4	20		—	—	388472	—	388473	—	1	.748	.433	3.150	
1/4		28	—	—	388476	—	388477	—	1	.748	.433	3.150	
5/16	18		—	—	—	388480	—	388481	1	.866	.512	3.543	
5/16		24	—	—	—	388484	—	388485	1	.866	.512	3.543	
3/8	16		—	—	—	388488	—	388489	1	.945	.590	3.937	
3/8		24	—	—	—	388492	—	388493	1	.787	.748	3.543	
7/16	14		—	—	—	388496	—	388497	1	.945	—	3.937	
7/16		20	—	—	—	388502	—	388503	1	.945	—	3.937	
1/2	13		—	—	—	388506	—	388507	1	1.142	—	4.331	
1/2		20	—	—	—	388510	—	388511	1	.866	—	3.937	



Thread Forming Taps for Non-Ferrous Materials

For Unified and Metric threads

N-RS



Custom Blended Vanadium High Speed Steel Taps  
For Aluminums, Brass, Copper Alloys (Non-Ferrous Materials)  
DIN tap lengths, USCTI shank dimensions

List 3550 Machine Screw sizes  
3552 Fractional sizes

**Bottoming Style**

(2 to 2-1/2 threads chamfered) DIN tap lengths, USCTI shank dimensions Improved performance, new tap design.  
Taps have a nitride surface toughening treatment

Nominal Size	Threads per Inch		Pitch Diameter Limit/EDP Numbers							DIN Lengths - USCTI Shanks		
	UNC UNJC	UNF UNJF	H2	H3	H4	H5	H6	H7	No. of Lube Grooves	Length of Thread	Length of Neck	Length Overall
0		80	388410	—	—	—	—	—	0	.315	—	1.575
1	64		388411	—	—	—	—	—	0	.315	—	1.575
1		72	388412	—	—	—	—	—	0	.315	—	1.575
2	56		388413	388414	—	—	—	—	0	.354	—	1.772
2		64	388415	388416	—	—	—	—	0	.354	—	1.772
3	48		388417	388418	—	—	—	—	0	.276	.217	1.969
3		56	388419	388420	—	—	—	—	0	.276	.217	1.969
4	40		—	388421	—	388422	—	—	0	.433	.276	2.205
4		48	—	388425	—	388426	—	—	0	.433	.276	2.205
5	40		—	388429	—	388430	—	—	1	.433	.276	2.205
5		44	—	388433	—	388434	—	—	1	.433	.276	2.205
6	32		—	388437	—	388438	—	—	1	.512	.276	2.205
6		40	—	388442	—	388443	—	—	1	.512	.276	2.205
8	32		—	388446	—	388447	—	—	1	.512	.315	2.480
8		36	—	388450	—	388451	—	—	1	.512	.315	2.480
10	24		—	—	388454	—	388455	—	1	.630	.354	2.756
10		32	—	—	388458	—	388459	—	1	.630	.354	2.756
12	24		—	—	388462	—	388463	—	1	.630	.354	3.150
12		28	—	—	388466	—	388467	—	1	.630	.354	3.150
1/4	20		—	—	388470	—	388471	—	1	.748	.433	3.150
1/4		28	—	—	388474	—	388475	—	1	.748	.433	3.150
5/16	18		—	—	—	388478	—	388479	1	.866	.512	3.543
5/16		24	—	—	—	388482	—	388483	1	.866	.512	3.543
3/8	16		—	—	—	388486	—	388487	1	.945	.591	3.937
3/8		24	—	—	—	388490	—	388491	1	.787	.748	3.543
7/16	14		—	—	—	388494	—	388495	1	.945	—	3.937
7/16		20	—	—	—	388498	—	388499	1	.945	—	3.937
1/2	13		—	—	—	388504	—	388505	1	1.142	—	4.331
1/2		20	—	—	—	388508	—	388509	1	.866	—	3.937

N-RS Roll taps can be run 1.5 times faster than the tapping speeds recommended for thread cutting taps.

N-RS Metric Roll Taps

List	3750	Metric Ground Thread Limits	EDP Numbers		No. of Lube Grooves	DN lengths - USCTI shanks		
			Plug	Bottoming		Length of Thread	Length of Neck	Length Overall
M3 x 0.5		D5	388513	388512	1	.433	.276	2.205
M3.5 x 0.6		D6	388515	388514	1	.512	.276	2.205
M4 x 0.7		D6	388517	388516	1	.512	.315	2.480
M5 x 0.8		D7	388519	388518	1	.630	.354	2.756
M6 x 1		D8	388521	388520	1	.748	.433	3.150
M7 x 1		D9	388523	388522	1	.748	.433	3.150
M8 x 1		D9	388525	388524	1	.866	.512	3.543
M8 x 1.25		D9	388527	388526	1	.866	.512	3.543
M10 x 1.25		D9	388529	388528	1	.945	.591	3.937
M10 x 1.5		D10	388531	388530	1	.945	.591	3.937
M12 x 1.25		D9	388533	388532	1	.866	—	3.937
M12 x 1.75		D11	388535	388534	1	1.142	—	4.331



High Performance Thread Forming Taps

For Unified and Metric threads



ZELX HP -RZ



Cobalt, Vanadium Premium Steel Taps  
For Stainless Steels, Low, Medium, High Carbon Steels < 35 HRC  
HP-RZ Roll taps can be run 2 times faster than the tapping speeds recommended for thread cutting taps.  
DIN tap lengths, USCTI shank dimensions

DIN tap lengths, USCTI shank dimensions  
Taps have TiCN coating for tapping with coolant  
HP-RZ Roll taps can be run 2 times faster than the tapping speeds recommended for thread cutting taps.

List 3502 Machine Screw sizes Plug Style (3 to 5 threads chamfered)  
3512 Fractional sizes

Nominal Size	Threads per inch		Pitch Diameter Limit / EDP Numbers							DIN lengths - USCTI shanks Dimensions			
	UNC UNJC	UNF UNJF	H2	H3	H4	H5	H6	H7	No. of Lube Grooves	Length of Thread	Length of Neck	Length Overall	
6	32	—	—	386810	—	386811	—	—	2	.512	.276	2.205	
8	32	—	—	386814	—	386815	—	—	2	.512	.375	2.480	
10	24	—	—	—	386818	—	386819	—	2	.630	.354	2.756	
10	—	32	—	—	386822	—	386823	—	2	.630	.354	2.756	
1/4	20	—	—	—	386826	—	386827	—	2	.748	.433	3.150	
1/4	—	28	—	—	386830	—	386831	—	2	.748	.433	3.150	
5/16	18	—	—	—	—	386834	—	386835	3	.866	.512	3.543	
5/16	—	24	—	—	—	386838	—	386839	3	.866	.512	3.543	
3/8	16	—	—	—	—	386842	—	386843	3	.945	.591	3.937	
3/8	—	24	—	—	—	386846	—	386847	3	.787	.748	3.543	
7/16	14	—	—	—	—	386850	—	386851	4	.945	—	3.937	
7/16	—	20	—	—	—	386854	—	386855	4	.945	—	3.937	
1/2	13	—	—	—	—	386858	—	386859	4	1.142	—	4.331	
1/2	—	20	—	—	—	386862	—	386863	4	.866	—	3.937	

HIGH PERFORMANCE ROLL TAPS



List 3502 Machine Screw sizes  
3512 Fractional sizes

Bottoming Style

(2 to 2-1/2 threads chamfered)  
DIN tap lengths, USCTI shank dimensions  
Taps have TiCN coating for tapping with coolant  
HP-RZ Roll taps can be run 2 times faster than the tapping speeds recommended for thread cutting taps.

Nominal Size	Threads per Inch		Pitch Diameter Limit / EDP Numbers							DIN lengths - USCTI shanks Dimensions			
	UNC UNJC	UNF UNJF	H2	H3	H4	H5	H6	H7	No. of Lube Grooves	Length of Thread	Length of Neck	Length Overall	
0	—	80	386800	—	—	—	—	—	0	.315	—	1.575	
2	56	—	—	386801	—	—	—	—	0	.354	—	1.772	
3	48	—	—	386802	—	—	—	—	0	.276	.217	1.969	
3	—	56	—	386803	—	—	—	—	0	.276	.217	1.969	
4	40	—	—	386804	—	386805	—	—	0	.433	.276	2.205	
4	—	48	—	386806	—	386807	—	—	0	.433	.276	2.205	
5	40	—	—	—	—	386799	—	—	2	.433	.276	2.205	
6	32	—	—	386808	—	386809	—	—	2	.512	.276	2.205	
8	32	—	—	386812	—	386813	—	—	2	.512	.315	2.480	
10	24	—	—	—	386816	—	386817	—	2	.630	.354	2.756	
10	—	32	—	—	386820	—	386821	—	2	.630	.354	2.756	
1/4	20	—	—	—	386824	—	386825	—	2	.748	.433	3.150	
1/4	—	28	—	—	386828	—	386829	—	2	.748	.433	3.150	
5/16	18	—	—	—	—	386832	—	386833	3	.866	.512	3.543	
5/16	—	24	—	—	—	386836	—	386837	3	.866	.512	3.543	
3/8	16	—	—	—	—	386840	—	386841	3	.945	.597	3.937	
3/8	—	24	—	—	—	386844	—	386845	3	.787	.748	3.543	
7/16	14	—	—	—	—	386848	—	386849	4	.945	—	3.937	
7/16	—	20	—	—	—	386852	—	386853	4	.945	—	3.937	
1/2	13	—	—	—	—	386856	—	386857	4	1.142	—	4.331	
1/2	—	20	—	—	—	386860	—	386861	4	.866	—	3.937	



High Performance METRIC Thread Forming Taps For  
Unified and Metric threads

# ZELX HP-RZ



**Plug Style**

(3 to 5 threads chamfered)

Bottoming Style (1 to 2 threads chamfered)

DIN tap lengths, USCTI shank dimensions

Taps have TiCN coating for tapping with coolant

List 3572 Metric sizes

Nominal Size	Ground Thread Limits	EDP Numbers		No. of Lube Grooves	DIN lengths - USCTI shanks		
		Plug	Bottoming		Length of Thread	Length of Neck	Length Overall
M3 x 0.5	D5	386885	386864	2	.433	.276	2.205
M3.5 x 0.6	D6	386886	386865	2	.512	.275	2.205
M4 x 0.7	D6	386887	386866	2	.512	.315	2.480
M5 x 0.8	D7	386888	386867	2	.630	.354	2.756
M6 x 1	D8	386889	386868	2	.748	.433	3.150
M7 x 1	D9	386870	386869	2	.748	.433	3.150
M8 x 1	D9	386872	386871	3	.866	.512	3.543
M8 x 1.25	D9	386874	386873	3	.866	.512	3.543
M10 x 1.25	D9	386876	386875	4	.945	.590	3.937
M10 x 1.5	D10	386878	386877	4	.945	.590	3.937
M12 x 1.25	D9	386880	386879	4	.866	—	3.937
M12 x 1.5	D9	386882	386881	4	.866	—	3.937
M12 x 1.75	D11	386884	386883	4	1.142	—	4.331

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High Performance Thread Forming Taps for Dry Tapping

For Unified and Metric threads



# ZELX OL - RZ



Cobalt, Vanadium Premium Steel Taps  
For Stainless Steels and Other Soft, Low and Carbon Steels

DIN tap lengths, USCTI shank dimensions

**Designed for shallow hole tapping < 1-1/2 diameters in depth.**

**OL-RZ Roll taps can be run 1.5 to 2 times faster than the tapping speeds recommended for thread cutting taps. Taps can be run dry or with mist coolant.**

List 3580

Machine screw sizes  
Fractional sizes

**Plug Style**

(3 to 5 threads chamfered)

DIN tap lengths, USCTI shank dimensions

Taps have TiCN coating for coolant free roll tapping

Nominal Size	Threads per inch		Pitch Diameter Limit / EDP Numbers					DIN lengths - ANSI shanks Dimensions			
	UNC UNJC	UNF UNJF	H2	H3	H4	H5	H6	No. of Lube Grooves	Length of Thread	Length of Neck	Length Overall
2	56	—	—	386600	—	—	—	0	.354	—	1.772
4	40	—	—	—	—	386601	—	0	.433	.276	2.205
4	—	48	—	—	—	386602	—	0	.433	.276	2.205
5	40	—	—	—	—	386603	—	0	.433	.276	2.205
6	32	—	—	—	—	386604	—	0	.512	.275	2.205
8	32	—	—	—	—	386605	—	0	.512	.315	2.480
10	24	—	—	—	—	—	386606	0	.630	.354	2.756
10	—	32	—	—	—	—	386607	0	.630	.354	2.756
1/4	20	—	—	—	—	—	386608	0	.748	.433	3.150
1/4	—	28	—	—	—	—	386609	0	.748	.433	3.150

## METRIC HIGH PERFORMANCE ROLL TAPS FOR DRY TAPPING



List 3570

Metric sizes

**Plug Style**

(3 to 5 threads chamfered)

DIN tap lengths, USCTI shank dimensions

Taps have TiCN coating for coolant free roll tapping.

OL-RZ Roll taps can be run 1.5 to 2 times faster than the tapping speeds recommended for thread cutting taps. Taps can be run dry or with mist coolant.

Nominal Size	Pitch Diameter Limit / EDP Numbers							DIN lengths - ANSI shanks Dimensions			
	D5	D6	D7	D8	D9	D10	D11	No. of Lube Grooves	Length of Thread	Length of Neck	Length Overall
M3 x 0.5	386610	—	—	—	—	—	—	0	.433	.276	2.205
M3.5 x 0.6	—	386611	—	—	—	—	—	0	.512	.275	2.205
M4 x 0.7	—	386612	—	—	—	—	—	0	.512	.315	2.480
M5 x 0.8	—	—	386614	—	—	—	—	0	.630	.354	2.756
M6 x 1	—	—	—	386615	—	—	—	0	.748	.433	3.150



## Industrial Quality Roll Taps

For Unified and Metric threads

# ROLL



### Vanadium High Speed Steel Taps

YMW Roll Taps do not cut product threads, they form the threads, eliminating the problem of chip disposal in through or blind hole threading.

Roll tap tapping speeds can be increased by as much as double the speeds recommended for use with cutting style taps. Roll taps improve production rates due to the elimination of chips during threading, their stronger tool design and higher possible tapping speeds.

Roll taps require a larger drilled hole size prior to tapping. See the table "Recommended Drill Size for Roll Taps."

- Plug (3 to 5 threads chamfered)
- Bottoming (1 to 2 threads chamfered)
- USCTI dimensions
- For tapping ductile materials
- Taps have oxide surface treatment
- 7/16 to 1/2" taps have 4 lubrication grooves;
- 9/16 and larger have 6 grooves.

List 3510 Machine Screw sizes

Nominal Size	Threads per inch		Style	Pitch Diameter Limit / EDP Numbers						Dimensions		
	NC UNC	NF UNF		H2	H3	H4	H5	H6	H10 ‡	Length of Thread	Length Overall	
0	—	80	Bot	387732*	—	—	—	—	—	—	5/16	1-5/8
1	64	—	Bot	387734*	—	—	—	—	—	—	3/8	1-11/16
1	—	72	Bot	387736*	—	—	—	—	—	—	3/8	1-11/16
2	56	—	Bot	387738*	387776*	—	—	—	—	—	7/16	1-3/4
2	—	64	Bot	387740*	387778*	—	—	—	—	—	7/16	1-3/4
3	48	—	Bot	387742*	387780*	—	—	—	—	—	1/2	1-13/16
3	—	56	Bot	387744*	387782*	—	—	—	—	—	1/2	1-13/16
4	40	—	Plg	—	387783	—	387856*	—	—	—	9/16	1-7/8
4	40	—	Bot	—	387784*	—	387857*	—	—	—	9/16	1-7/8
4	—	48	Plg	—	387785*	—	387858*	—	—	—	9/16	1-7/8
4	—	48	Bot	—	387786*	—	387859*	—	—	—	9/16	1-7/8
5	40	—	Plg	—	387787*	—	387860*	—	—	—	5/8	1-15/16
5	40	—	Bot	—	387788*	—	387861*	—	—	—	5/8	1-15/16
5	—	44	Plg	—	387789*	—	387862*	—	—	—	5/8	1-15/16
5	—	44	Bot	—	387790*	—	387863*	—	—	—	5/8	1-15/16
6	32	—	Plg	—	387791*	—	387864*	—	387970*	—	11/16	2
6	32	—	Bot	—	387792*	—	387865*	—	387971*	—	11/16	2
6	—	40	Plg	—	387793*	—	387866*	—	—	—	11/16	2
6	—	40	Bot	—	387794*	—	387867*	—	—	—	11/16	2
8	32	—	Plg	—	387795*	—	387868*	—	387972	—	3/4	2-1/8
8	32	—	Bot	—	387796*	—	387869*	—	387973*	—	3/4	2-1/8
8	—	36	Plg	—	387797*	—	387870*	—	—	—	3/4	2-1/8
8	—	36	Bot	—	387798*	—	387871*	—	—	—	3/4	2-1/8
10	24	—	Plg	—	—	387829*	—	387903*	387974*	—	7/8	2-3/8
10	24	—	Bot	—	—	387830*	—	387904*	387975*	—	7/8	2-3/8
10	—	32	Plg	—	—	387831	—	387905*	387976*	—	7/8	2-3/8
10	—	32	Bot	—	—	387832*	—	387906*	387977*	—	7/8	2-3/8
12	24	—	Plg	—	—	387833*	—	387907*	—	—	15/16	2-3/8
12	24	—	Bot	—	—	387834*	—	387908*	—	—	15/16	2-3/8
12	—	28	Plg	—	—	387835*	—	387909*	—	—	15/16	2-3/8
12	—	28	Bot	—	—	387836*	—	387910*	—	—	15/16	2-3/8

‡ H10 Taps are available to allow plating of threaded hole after forming.

Industrial Quality Roll Taps  
Vanadium High Speed Steel Taps



ROLL TAPS FOR STEELS

- Plug (3 to 5 threads chamfered)
- Bottoming (1 to 2 threads chamfered)
- USCTI dimensions
- For tapping ductile materials
- Taps have oxide surface treatment
- 7/16 to 1/2" taps have 4 lubrication grooves; 9/16 and larger have 6 grooves.

List 3520 Fractional sizes

Nominal Size	Threads per In ch		Style	Pitch Diameter Limit / EDP Numbers						Dimensions	
	NC UNC	NF UNF		H4	H5	H6	H7	H8	H10 ‡	Length of Thread	Length Overall
1/4	20	—	Plg	387837*	—	387911*	—	—	387978*	1	2-1/2
1/4	20	—	Bot	387838*	—	387912*	—	—	387979*	1	2-1/2
1/4	—	28	Plg	387839*	—	387913*	—	—	387980*	1	2-1/2
1/4	—	28	Bot	387840*	—	387914*	—	—	387981*	1	2-1/2
5/16	18	—	Plg	—	387872*	—	387930*	—	—	1-1/8	2-23/32
5/16	18	—	Bot	—	387873*	—	387931*	—	—	1-1/8	2-23/32
5/16	—	24	Plg	—	387874*	—	387932*	—	—	1-1/8	2-23/32
5/16	—	24	Bot	—	387875*	—	387933*	—	—	1-1/8	2-23/32
3/8	16	—	Plg	—	387876*	—	387934*	—	—	1-1/4	2-15/16
3/8	16	—	Bot	—	387877*	—	387935*	—	—	1-1/4	2-15/16
3/8	—	24	Plg	—	387878*	—	387936*	—	—	1-1/4	2-15/16
3/8	—	24	Bot	—	387879*	—	387937*	—	—	1-1/4	2-15/16
7/16	14	—	Plg	—	387880*	—	—	387960*	—	1-7/16	3-5/32
7/16	14	—	Bot	—	387881*	—	—	387961*	—	1-7/16	3-5/32
7/16	—	20	Plg	—	387882*	—	—	387962*	—	1-7/16	3-5/32
7/16	—	20	Bot	—	387883*	—	—	387963*	—	1-7/16	3-5/32
1/2	13	—	Plg	—	387884*	—	—	387964*	—	1-21/32	3-3/8
1/2	13	—	Bot	—	387885*	—	—	387965*	—	1-21/32	3-3/8
1/2	—	20	Plg	—	387886*	—	—	387966*	—	1-21/32	3-3/8
1/2	—	20	Bot	—	387887*	—	—	387967*	—	1-21/32	3-3/8
9/16	12	—	Plg	—	—	—	387946*	—	387990*	1-21/32	3-19/32
9/16	12	—	Bot	—	—	—	387947*	—	387991*	1-21/32	3-19/32
9/16	—	18	Plg	—	—	—	387948*	—	387992*	1-21/32	3-19/32
9/16	—	18	Bot	—	—	—	387949*	—	387993*	1-21/32	3-19/32
5/8	11	—	Plg	—	—	—	387950*	—	387994*	1-13/16	3-13/16
5/8	11	—	Bot	—	—	—	387951*	—	387995*	1-13/16	3-13/16
5/8	—	18	Plg	—	—	—	387952*	—	387996*	1-13/16	3-13/16
5/8	—	18	Bot	—	—	—	387953*	—	387997*	1-13/16	3-13/16
3/4	10	—	Plg	—	—	—	387954*	—	387998*	2	4-1/4
3/4	10	—	Bot	—	—	—	387955*	—	387999*	2	4-1/4
3/4	—	16	Plg	—	—	—	387956*	—	388000*	2	4-1/4
3/4	—	16	Bot	—	—	—	387957*	—	388001*	2	4-1/4

‡ H10 taps are available to allow plating of threaded hole after forming.



Industrial Quality Pipe Taps

TAPER PIPE TAPS—GENERAL PURPOSE

NPT



NPT Taper Pipe Taps. These general purpose taper pipe taps are ideal for threading a wide variety of materials, such as steels and irons, and can also be used for nonferrous and nonmetallic materials.

Ground thread taper pipe taps are standard in American Standard Pipe Form (NPT).

Vanadium High Speed Steel Taps

The nominal size of a pipe tap is that of the pipe fitting to be tapped, not the actual size of the tap. The thread tapers 3/4 of an inch per foot.

Taps have oxide surface treatment  
 All pipe taps have a chamfer of 2-1/2 to 3 1/2 threads  
 \*Available in Bright. Add "B" to the end of the EDP no.

List	3430	NPT ANPT	Regular EDP Numbers NPT or ANPT	Dimensions			
				No. of Flutes	Length of Thread	Length Overall	
	1/16	27	4	383100	—	11/16	2-1/8
	1/8 (Lg. Shank)	27	4	383101	5	3/4	2-1/8
	1/8 (Sm. Shank)	27	4	383102	5	3/4	2-1/8
	1/4	18	4	383103	5	1-1/16	2-7/16
	3/8	18	4	383104	5	1-1/16	2-9/16
	1/2	14	4	383105	5	1-3/8	3-1/8
	3/4	14	5	383106	5	1-3/8	3-1/4
	1	11-1/2	5	383107	5	1-3/4	
	1-1/4	11-1/2	5	383108	5	1-3/4	4
	1-1/2	11-1/2	7	383109	7	1-3/4	
	2	11-1/2	7	383110	7	1-3/4	4-1/2

Troubleshooting

Problem	Causes	Solutions
Chipping	Excessive Tapping Speed Misalignment Hole Size is Too Small Poor Tapping Fluid	Increase Tapping Speed to 15-18 SFM Adjust or Use Radial Float Tapping Head Check Hole Size Use a Heavy Duty Lubricant
Poor Finish (Chatter Mark)	Excessive Tapping Speed Excessive Hook Angle Poor Tapping Fluid	Reduce Tapping Speed to 10-15 SFM Adjust Hook Angle During Re grind Use Cutting Oil or Tapping Lubricant
Stop Mark	Excessive Tapping Speed Poor Tapping Head Poor Setup	Reduce Tapping Speed to 10-15 SFM Use Floating Tapping Head Use special Design Taps or Threadmill

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**Interrupted Pipe Taps for  
NPT Threads** For American Taper



**NPT** ‡ Interrupted



**TAPER PIPE TAPS—GENERAL PURPOSE**

Interrupted NPT Pipe Taps have full threads in the tap chamfer and for the first few threads. The balance of the threads are interrupted to reduce drag while threading. These pipe taps are standard having an odd number of flutes, 5 or 7.

Ground thread taper pipe taps are standard in American Standard Pipe Form (NPT).

The nominal size of a pipe tap is that of the pipe fitting to be tapped, not the actual size of the tap. The thread tapers 3/4 of an inch per foot.

Taps have oxide surface treatment  
All pipe taps have a chamfer of 2-1/2 to 3 1/2 threads

Available in Right. Add "B" to the end of the EDP no.

List 3435 Interrupted NPT

Nominal Size	Threads per Inch	No. of Flutes	EDP Numbers		Dimensions	
			NPT or ANPT		Length of Thread	Length Overall
1/16	27	—	—	—	11/16	2-1/8
1/8 (Lg. Shank)	27	5	383151		3/4	2-1/8
1/8 (Sm. Shank)	27	5	383152		3/4	2-1/8
1/4	18	5	383153		1-1/16	2-7/16
3/8	18	5	383154		1-1/16	2-9/16
1/2	14	5	383155		1-3/8	3-1/8
3/4	14	5	383156		1-3/8	3-1/4
1	11-1/2	5	383157		1-3/4	3-3/4
1-1/4	11-1/2	5	383158		1-3/4	4
1-1/2	11-1/2	7	383159		1-3/4	4-1/4
2	11-1/2	7	383160		1-3/4	4-1/2



Industrial Quality Hand Taps for Cast Irons

For Unified and Metric threads

These taps have a geometry suited for tapping gray irons and irons that produce broken chips. This design is also appropriate for some non-metallics such as Bakelite and Cast Brass.

IQ HT - CI NPT



Vanadium High Speed Steel Taps  
For Cast Irons

Straight flute  
(2-1/2 to 3-1/2 threads chamfered)

Taps have a surface toughening tap treatment

List 3437 NPT

Nominal Size	Threads per Inch	No. of Flutes	EDP Numbers		Dimensions	
			NPS	NPSF	Length of Thread	Length Overall
1/8 (Lg. Shank)	27	4	383201	383226	3/4	2-1/8
1/8 (Sm. Shank)	27	4	383202	383227	3/4	2-1/8
1/4	18	4	383203	383228	1-1/16	2-7/16
3/8	18	4	383204	383229	1-1/16	2-9/16
1/2	14	4	383205	383230	1-3/8	3-1/8
3/4	14	5	383206	383231	1-3/8	3-1/4
1	11-1/2	5	383207	383232	1-3/4	3-3/4
1-1/4	11-1/2	5	383208	383233	1-3/4	4
1-1/2	11-1/2	7	383209	383234	1-3/4	4-1/4
2	11-1/2	7	383210	383235	1-3/4	4-1/2



Pipe Taps for Mold Steels, for NPT Threads

For American Taper Pipe Threads



# ZELX MOLD PIPE

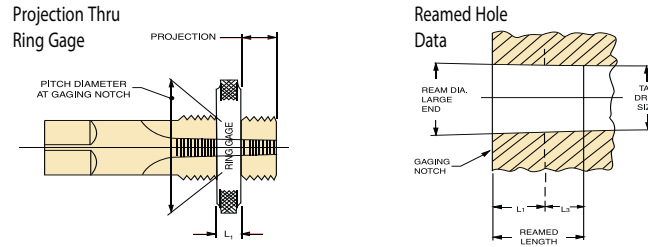


First Choice For Tapping Mold Steels  
 Ideal for tapping mold steels, tool steels and gray cast irons. (35 to 45 HRC)  
 YMW offers this series of ZELX Mold Taps made of Cobalt High Speed Steel.

List 3434 NPT Straight Flute Style  
 Pipe Taps are standard with 2-1/2 to 3-1/2 threads chamfered

Nominal Size	Threads per Inch	No. of Flutes	EDP Numbers	Dimensions	
			NPT	Length of Thread	Length Overall
1/8 (Lg. Shank)	27	4	389641	3/4	2-1/8
1/4	18	4	389643	1-1/16	2-7/16
3/8	18	4	389644	1-1/16	2-9/16
1/2	14	4	389645	1-3/8	3-1/8
3/4	14	5	389646	1-3/8	3-1/4

Titanium Nitride coating (TiN) is available upon request.  
 TiN coating approaches the hardness of carbide.  
 TiN's smooth, hard finish increases tool life and helps to improve product thread flank finish.



**NPT/NPTF THREAD LIMITS**

Nominal Size (inch)	Threads per Inch NPT	* Gage Measurement (inch)		Taper per Foot (inch)	
		Projection	Tolerance (+/-)	Min.	Max.
1/16	27	0.312	1/16	23/32	25/32
1/8	*27	0.312	1/16	23/32	25/32
1/4	18	0.459	1/16	23/32	25/32
3/8	18	0.454	1/16	23/32	25/32
1/2	14	0.579	1/16	23/32	25/32
3/4	14	0.565	1/16	23/32	25/32
1	11-1/2	0.678	3/32	23/32	25/32
1 1/4	11-1/2	0.686	3/32	23/32	25/32
1 1/2	11-1/2	0.699	3/32	23/32	25/32
2	11-1/2	0.667	3/32	23/32	25/32
2 1/2	8	0.925	3/32	47/64	25/32
3	8	0.925	3/32	47/64	25/32
3 1/2	8	0.938	1/8	47/64	25/32
4	8	0.950	1/8	47/64	25/32

\*The d distance small end of tap projects through an L1 American Standard Taper Pipe Thread Ring Gage

**Measurement of Taper Pipe Taps, Reaming Data and Tap Drill Sizes**

Size	Projection				Ream Dia. Large End	Gage Width L1	Reamed Length L1 + L3	Tap Drill for Use w/ Reaming	Tap Drill for Use w/o Reaming
	NPT & NTF		SAE-SHORT						
	Min.	Max.	Min.	Max.					
1/16-27	0.250	0.375	0.222	0.259	0.2515	0.1600	0.2711	15/64	C
1/8-27	0.250	0.375	0.222	0.259	0.3340	0.1615	0.2726	21/64	Q
1/4-18	0.397	0.521	0.333	0.389	0.4472	0.2278	0.3945	27/64	7/16
3/8-18	0.392	0.516	0.333	0.389	0.5826	0.240	0.4067	9/16	9/16
1/2-14	0.517	0.641	0.429	0.500	0.7213	0.320	0.5343	11/16	45/64
3/4-14	0.503	0.627	0.429	0.500	0.9317	0.339	0.5533	57/64	29/32
1-11-1/2	0.584	0.772	-	-	1.1691	0.400	0.6609	1-1/8	1-9/64
1-1/4-11-1/2	0.592	0.780	-	-	1.1538	0.420	0.6809	1-15/32	1-31/64
1-1/2-11-1/2	0.606	0.792	-	-	1.7528	0.420	0.6809	1-45/64	1-23/32
2-11-1/2	0.574	0.760	-	-	2.2267	0.436	0.6969	2-3/16	2-3/16

## Pipe Taps for NPTF Dryseal Threads

For American Taper Pipe Threads



# NPTF



Modified Style  
(3 - 5 threads chamfered)  
Taps have oxide surface treatment

\*2 "BR" of code No. stands for Bright finish taps

\*6  $\ell_3$  : The distance, parallel to the axis, from the small end of thread portion of tap to the gauge plane.

\* Taps have oxide surface treatment  
All pipe taps have a chamfer of 2-1/2 to 3 1/2 threads

Available in Bright. Add "B" to the end of the EDP no.

List 3440 NPTF

Nominal Size	Threads per Inch	No. of Flutes	EDP Numbers		Dimensions	
			NPTF	No. of Flutes	Length of Thread	Length Overall
1/16	27	4	383125*	—	11/16	2-1/8
1/8 (Lg. Shank)	27	4	383126*	5	3/4	2-1/8
1/8 (Sm. Shank)	27	4	383127*	5	3/4	2-1/8
1/4	18	4	383128	5	1-1/16	2-7/16
3/8	18	4	383129*	5	1-1/16	2-9/16
1/2	14	4	383130*	5	1-3/8	3-1/8
3/4	14	5	383131*	5	1-3/8	3-1/4
1	11-1/2	5	383132*	5	1-3/4	3-3/4
1-1/4	11-1/2	5	383133*	5	1-3/4	4
1-1/2	11-1/2	7	383134*	7	1-3/4	4-1/4
2	11-1/2	7	383135*	7	1-3/4	4-1/2

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Taps have oxide surface treatment

All pipe taps have a chamfer of 2-1/2 to 3 1/2 threads

## Pipe Taps for NPS Threads

For American Straight Pipe Threads

# NPS



2 "BR" of code No. stands for Bright finish taps

Modified Style

(3 - 5 threads chamfered)

Taps have oxide surface treatment

\*Available in Bright. Add "B" to end of the EDP no.

LIST 3450

EDP Numbers

Dimensions

Nom inal Size	Threads per Inch	No. of Flutes	NPS	Length of Thread	Length Overall
1/8 (Lg. Shank)	27	4	383301	3/4	2-1/8
1/8 (Sm. Shank)	27	4	383302	3/4	2-1/8
1/4	18	4	383303	1-1/16	2-7/16
3/8	18	4	383304	1-1/16	2-9/16
1/2	14	4	383305	1-3/8	3-1/8
3/4	14	5	383306	1-3/8	3-1/4
1	11-1/2	5	383307	1-3/4	3-3/4

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## Pipe Taps for NPSF Dryseal Threads

For American Straight Pipe Threads



# NPSF



Taps have oxide surface treatment  
All pipe taps have a chamfer of 2-1/2 to 3 1/2 threads

\*1 See blank type on page 97.  
\*2 "BR" of code No. stands for Bright finish taps

Modified Style  
(3 - 5 threads chamfered)  
Taps have oxide surface treatment  
Available in Bright. Add "B" to end of the EDP no.

LIST 3460 NPSF Dryseal

Nominal Size	Threads per Inch	EDP Numbers		Dimensions	
		No. of Flutes	NPSF	Length of Thread	Length Overall
1/8 (Lg. Shank)	27	4	383326	3/4	2-1/8
1/8 (Sm. Shank)	27	4	383327	3/4	2-1/8
1/4	18	4	383328	1-1/16	2-7/16
3/8	18	4	383329	1-1/16	2-9/16
1/2	14	4	383330	1-3/8	3-1/8
3/4	14	5	383331	1-3/8	3-1/4
1	11-1/2	5	383332	1-3/4	3-3/4

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# ZELX NI STI Taps

Cobalt, Vanadium Premium Steel Taps

For Nickel Base Alloys, Other Exotic Alloys, Mold and Stainless Steels > 30 Rc

ZELX NI Taps have been designed for extended for extended tap life in Cobalt, Nickel and Iron base exotic materials such as: Inconel, Hastelloy, Waspalloy and very hard Stainless Steels, Mold and Tool Steels.

STI taps are oversize to the extent that the internal thread which they produce will accomodate a helical coil wire screw thread insert, which at final assembly will accept a screw thread of the nominal size and pitch.

## STI SPIRAL POINTED TAPS

List 3619 Machine Screw sizes  
3629 Fractional sizes

Plug Style  
(3 to 5 threads chamfered)  
Taps have an oxide and nitride surface toughening treatment

Nominal Size	Threads per inch		No. of Flutes	Pitch Diameter Limit / EDP Numbers				Dimensions		
	NC UNC	NF UNF		H1	H2	H3	H4	Length of Thread	Length of Neck	Length Overall
2	56	—	2	—	387200	—	—	.335	.227	1-7/8
4	40	—	3	387203	387204	—	—	.413	.274	2
6	32	—	3	—	387208	387224	—	.531	.344	2-3/8
6	—	40	3	—	387209	—	—	.453	.297	2-1/8
8	32	—	3	—	387210	387226	—	.571	.366	2-3/8
10	24 <sup>387265</sup>	—	3	—	387212	387228	—	.591	.409	2-1/2
10	—	32	3	—	387213	387229	—	.591	.409	2-1/2
1/4	20	—	3	—	387248	387258	—	.669	.456	2-23/32
1/4	—	28	3	—	387249	387259	—	.669	.456	2-23/32
5/16	18	—	3	—	—	387260	387272	.748	.502	2-15/16
5/16	—	24	3	—	387251	387261	—	.748	.502	2-15/16
3/8	16	—	3	—	—	387262	387270	.984	—	3-3/8
3/8	—	24	3	—	387253	387263	—	.866	—	3-5/32
7/16	14	—	3	—	—	387264	—	.984	—	3-19/32
7/16	—	20	3	—	—	—	387275	.984	—	3-3/8
1/2	13	—	3	—	—	387266	—	1.083	—	3-13/16
1/2	—	20	3	—	—	387267	—	.984	—	3-19/32

### Recommended Minor Diameters and Tap Drills for Inch Size STI

Nominal Size STI	Threads per Inch		Aluminum Recommended Drill		Plastic - Steel - Magnesium Recommended Drill	
	UNC	UNF	Nominal Size	Dec. Equiv.	Nominal Size	Dec. Equiv.
2	56	—	3/32	.0938	41	.0960
4	40	—	31	.1200	31	.1200
6	32	—	26	.1470	25	.1495
8	32	—	17	.1730	16	.1770
10	24	—	13/64	.2031	5	.2055
10	—	32	7	.2010	13/64	.2031
1/4	20	—	H	.2660	H	.2660
1/4	—	28	G	.2610	6,7mm	.2638
5/16	18	—	Q	.3320	Q	.3320
5/16	—	24	21/64	.3281	21/64	.3281
3/8	16	—	X	.3970	X	.3970
3/8	—	24	25/64	.3906	25/64	.3906
7/16	14	—	29/64	.4531	29/64	.4531
7/16	—	20	29/64	.4531	29/64	.4531
1/2	13	—	33/64	.5156	17/32	.5312
1/2	—	20	33/64	.5156	17/32	.5312

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STI Spiral Fluted Taps for Nickel Base Alloys

For Unified and Metric threads

ZELX NI STI



List 3617  
3627



Cobalt, Vanadium Premium Steel Taps  
For Nickel Base Alloys, Other Exotic Alloys, Mold and Stainless Steels > 30 HRC.  
STI taps are special taps used to prepare holes for the installation of helical coil wire thread inserts.

**Modified Bottoming Style**

(3 to 4 threads chamfered)

Taps have an oxide and nitride surface toughening treatment

Nominal Size	Threads per inch		No. of Flutes	Pitch Diameter Limit / EDP Numbers				Dimensions		
	NC UNC	NF UNF		H1	H2	H3	H4	Length of Thread	Length of Neck	Length Overall
2	56	—	3	—	387400	—	—	.236	.326	1-7/8
4	40	—	3	387403	387404	387420	—	.276	.411	2
6	32	—	3	—	387408	387424	—	.354	.521	2-3/8
6	—	40	3	—	387409	—	—	.276	.474	2-1/8
8	32	—	3	—	387410	387426	—	.354	.583	2-3/8
10	24	—	3	—	387412	387428	—	.433	.567	2-1/2
10	—	32	3	—	387413	387429	—	.354	.646	2-1/2
1/4	20	—	3	—	387448	387458	—	.472	.653	2-23/32
1/4	—	28	3	—	387449	387459	—	.394	.731	2-23/32
5/16	18	—	3	—	—	387460	387470	.551	.699	2-15/16
5/16	—	24	3	—	387451	387461	—	.394	.856	2-15/16
3/8	16	—	3	—	—	387462	387472	.630	1.417	3-3/8
3/8	—	24	3	—	387453	387463	—	.472	1.378	3-5/32
7/16	14	—	3	—	—	387464	—	.709	1.338	3-19/32
7/16	—	20	3	—	—	387465	387475	.472	1.575	3-3/8
1/2	13	—	3	—	—	387466	—	.748	1.456	3-13/16
1/2	—	20	3	—	—	387467	—	.512	1.535	3-19/32

STI Spiral Fluted Taps for Nickel Base Alloys

For Unified and Metric threads

ZELX NI STI



List 3617  
3627



Cobalt, Vanadium Premium Steel Taps  
For Nickel Base Alloys, Other Exotic Alloys, Mold and Stainless Steels > 30 HRC.  
STI taps are special taps used to prepare holes for the installation of helical coil wire thread inserts.

**Bottoming Style**

(1 to 2 threads chamfered)

Taps have an oxide and nitride surface toughening treatment

Nominal Size	Threads per inch		No. of Flutes	Pitch Diameter Limit / EDP Numbers				Dimensions		
	NC UNC	NF UNF		H1	H2	H3	H4	Length of Thread	Length of Neck	Length Overall
4	40	—	3	387004	387419	—	—	.276	.411	2
6	32	—	3	387008	387425	—	387042	.354	.521	2-3/8
8	32	—	3	381409	387026	—	387044	.354	.583	2-3/8
10	24	—	3	387012	387028	—	387445	.433	.567	2-1/2
10	32	—	3	—	387029	—	387057	.354	.646	2-1/2
1/4	20	—	3	—	387058	—	387090	.472	.653	2-23/32
1/4	—	28	3	—	387059	—	387091	.394	.731	2-23/32
5/16	18	—	3	—	387060	—	387092	.551	.699	2-15/16
5/16	—	24	3	—	387061	—	387093	.394	.856	2-15/16
3/8	16	—	3	—	387062	—	387084	.630	1.417	3-3/8
3/8	—	24	3	—	387063	—	387085	.472	1.378	3-5/32
7/16	14	—	3	—	387064	—	387086	.709	1.338	3-19/32
7/16	—	20	3	—	387065	—	387087	.472	1.575	3-3/8
1/2	13	—	3	—	387066	—	387088	.748	1.456	3-13/16
1/2	—	20	3	—	387067	—	387089	.512	1.535	3-19/32



Industrial Quality STI Spiral Pointed Taps

For Unified and Metric threads

**IQPO STI**



"available while supplies last"  
 Vanadium High Speed Steel Taps  
 Ideal for steels, irons, brass and plastics in through hole applications.  
 STI taps are special taps used to prepare holes for the installation of helical coil wire thread inserts.

Plug (3 to 5 threads chamfered)  
 All taps have a Bright finish‡

List 3219 Machine Screw sizes  
 3229 Fractional sizes

Nominal Size	Threads per inch		No. of Flutes	Pitch Diameter Limit / EDP Numbers			Dimensions		
	NC UNC	NF UNF		H1	H2	H3	Length of Thread	Length Overall	Shank Diameter
2	56	—	2	—	382716	—	9/16	1-7/8	.141
4	40	—	2	382704	382720	—	11/16	2	.141
6	32	—	2	—	382724	382740	7/8	2-3/8	.194
8	32	—	2	—	382726	382742	15/16	2-3/8	.220
10	24	—	2	—	382728	—	1	2-1/2	.255
10	—	32	2	—	382729	—	1	2-1/2	.255
1/4	20	—	2	—	382758	382768	1-1/8	2-23/32	.318
1/4	—	28	2	—	382759	382769	1-1/8	2-23/32	.318
5/16	—	24	2	—	382761	—	1-1/4	2-15/16	.381

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Recommended Minor Diameters and Tap Drills for Inch Size STI

Nominal Size STI	Threads per Inch		Aluminum Recommended Drill		Plastic - Steel - Magnesium Recommended Drill	
	UNC	UNF	Nominal Size	Dec. Equiv.	Nominal Size	Dec. Equiv.
2	56	—	3/32	.0938	41	.0960
4	40	—	31	.1200	31	.1200
6	32	—	26	.1470	25	.1495
8	32	—	17	.1730	16	.1770
10	24	—	13/64	.2031	5	.2055
10	—	32	7	.2010	13/64	.2031
1/4	20	—	H	.2660	H	.2660
1/4	—	28	G	.2610	6,7mm	.2638
5/16	18	—	Q	.3320	Q	.3320
5/16	—	24	21/64	.3281	21/64	.3281
3/8	16	—	X	.3970	X	.3970
3/8	—	24	25/64	.3906	25/64	.3906
7/16	14	—	29/64	.4531	29/64	.4531
7/16	—	20	29/64	.4531	29/64	.4531
1/2	13	—	33/64	.5156	17/32	.5312
1/2	—	20	33/64	.5156	17/32	.5312

## Industrial Quality STI Spiral Fluted Taps

For Unified and Metric threads



### IQSP STI



"available while supplies last"  
 Vanadium High Speed Steel Taps  
 Ideal for blind hole tapping ferrous materials that produce stringy chips.  
 STI taps are special taps used to prepare holes for the installation of helical coil wire thread inserts.

LIST 3319 Machine Screw sizes  
 3329 Fractional sizes

Bottoming (1 to 2 threads chamfered)  
 All taps have a Bright finish‡

Nominal Size	Threads per inch		No. of Flutes	Pitch Diameter Limit / EDP Numbers			Dimensions		
	NC UNC	NF UNF		H1	H2	H3	Length of Thread	Length Overall	Shank Diameter
2	56	—	2	—	382716	—	9/16	1-7/8	.141
4	40	—	2	382704	382720	—	11/16	2	.141
6	32	—	2	—	382724	382740	7/8	2-3/8	.194
8	32	—	2	—	382726	382742	15/16	2-3/8	.220
10	24	—	2	—	382728	—	1	2-1/2	.255
10	—	32	2	—	382729	—	1	2-1/2	.255
1/4	20	—	2	—	382758	382768	1-1/8	2-23/32	.318
1/4	—	28	2	—	382759	382769	1-1/8	2-23/32	.318
5/16	—	24	2	—	382761	—	1-1/4	2-15/16	.381

‡ Supplemental surface treatments available upon request: oxide surface treatment and Titanium Nitride (TiN). See page For Recommended Minor Diameter and Tap Drills for STI Taps.

For tapping hardened steels or exotic alloys, use ZELX-NI STI Taps.

### Recommended Minor Diameters and Tap Drills for STI

Nominal Size STI	Threads per Inch		Aluminum Recommended Drill		Plastic - Steel - Magnesium Recommended Drill	
	NC UNC	NF UNF	Nominal Size	Dec. Equivalent	Nominal Size	Dec. Equivalent
2	56	—	3/32	.0938	41	.0960
4	40	—	31	.1200	31	.1200
6	32	—	26	.1470	25	.1495
8	32	—	17	.1730	16	.1770
10	24	—	13/64	.2031	5	.2055
10	—	32	7	.2010	13/64	.2031
1/4	20	—	H	.2660	H	.2660
1/4	—	28	G	.2610	6.7MM	.2638
5/16	18	—	Q	.3320	Q	.3320
5/16	—	24	21/64	.3281	21/64	.3281
3/8	16	—	X	.3970	X	.3970
3/8	—	24	25/64	.3906	25/64	.3906
7/16	14	—	29/64	.4531	29/64	.4531
7/16	—	20	29/64	.4531	29/64	.4531
1/2	13	—	33/64	.5156	17/32	.5312
1/2	—	20	33/64	.5156	17/32	.5312

# AR - D HSS

Industrial Quality HSS Adjustable Round Dies



For Unified threads



### Vanadium High Speed Steel Dies

YMW round adjustable dies are manufactured on state of the art machining centers for the highest quality dies possible.

- List 3710
- 3720

Nominal Size	Threads per inch		EDP Numbers			
	NC UNC	NF UNF	13/16" O.D. 1/4" thickness	1" O.D. 3/8" thickness	1-1/2" O.D. 1/2" thickness	2" O.D. 5/8" thickness
5	40	—	360365	—	—	—
5	—	44	360366	—	—	—
6	32	—	360367	360368	—	—
6	—	40	360370	—	—	—
8	32	—	360372	360373	—	—
8	—	36	360374	—	—	—
10	24	—	360376	360377	—	—
10	—	32	360379	360380	—	—
12	24	—	360381	360382	—	—
12	—	28	360383	—	—	—
1/4	20	—	360333	360334	360335	—
1/4	—	28	360336	360337	360338	—
5/16	18	—	360339	360340	360341	—
5/16	—	24	360342	360343	360344	—
3/8	16	—	—	360345	360346	—
3/8	—	24	—	360347	360348	—
7/16	14	—	—	360349	360350	—
7/16	—	20	—	360351	360352	—
1/2	13	—	—	—	360353	—
1/2	—	20	—	—	360354	—
9/16	12	—	—	—	360355	—
9/16	—	18	—	—	360356	—
5/8	11	—	—	—	360357	360358
5/8	—	18	—	—	360359	360360
3/4	10	—	—	—	—	360361
3/4	—	16	—	—	—	360362
7/8	9	—	—	—	—	360363
7/8	—	14	—	—	—	360364

ZELX ° SS Drills & Countersinks

Custom Blended Vanadium High Speed Steel Combined Drill & Countersinks  
For Stainless Steels, Alloy Steels, Aluminums and Ductile Irons

YMW combined drills and countersinks with a 60° included angle are ideal for CNC and general machining applications. They are designed and manufactured for high efficiency and good wear life. TiN coating is available upon request.



PERFORMANCE COMBINED DRILL AND COUNTERSINK

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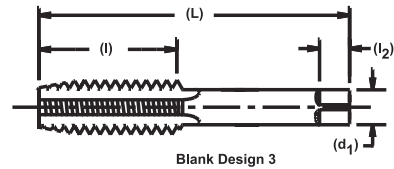
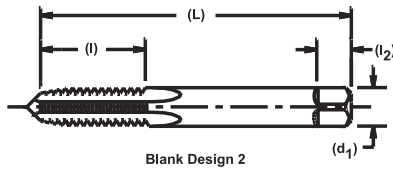
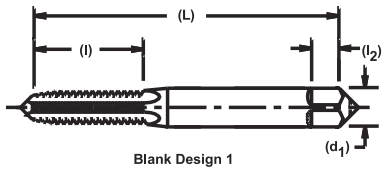
**List 3800 Plain Type** TiN & TiCN available

Size	EDP Numbers	Dimensions		
		Body Diameter	Drill Diameter	Overall Length
00	350000	1/8	.025	1-7/32
0	350001	1/8	1/32	1-7/32
1	350010	1/8	3/64	1-1/4
2	350020	3/16	5/64	1-7/8
3	350030	1/4	7/64	2
4	350040	5/16	1/8	2-1/8
5	350050	7/16	3/16	2-3/4
6	350060	1/2	7/32	3
7	350070	5/8	1/4	3-1/4
8	350080	3/4	5/16	3-1/2

**List 3801 Long Type** TiN & TiCN available

Size	EDP Numbers for Overall Length				Dimensions	
	3"	4"	5"	6"	Body Diam.	Drill Diam.
1	350310	350410	350510	350610	1/8	3/64
2	—	350420	350520	350620	3/16	5/64
3	—	350430	350530	350630	1/4	7/64
4	—	350440	350540	350640	5/16	1/8
4-1/2	—	350445	350545	350645	3/8	9/64
5	—	350450	350550	350650	7/16	3/16
6	—	—	350560	350660	1/2	7/32
7	—	—	350570	350670	5/8	1/4
8	—	—	—	350680	3/4	5/16

General Dimensions . Dimensions Table 302 (\*USCTI)



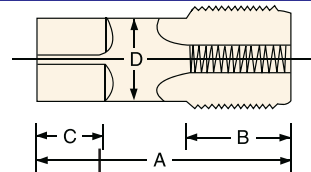
General Dimensions

Nominal Diameter Range Inches Over To (Incl)	Machine Screw Size No.	Nominal Fractional Diameter Inches	Nominal Metric Diameter Millimeters	Style Per Illustration Above	Overall Length L	Tap Dimensions — Inches			
						Thread Length l <sub>1</sub>	Square Length l <sub>2</sub>	Shank Diameter d <sub>1</sub>	Size of Square a
.052 .065	0 (.0600)		M 1.6 (.0630)	1	1.63	.31	.19	.1410	.110
.065 .078	1 (.0730)		M1.8 (.0709)	1	1.69	.38	.19	.1410	.110
.078 .091	2 (.0860)		M2 (0787), M2.2 (.0866)	1	1.75	.44	.19	.1410	.110
.091 .104	3 (.0990)		M2.5 (.0984)	1	1.81	.50	.19	.1410	.110
.104 .117	4 (.1120)			1	1.88	.56	.19	.1410	.110
.117 .130	5 (.1250)		M3 (.1181)	1	1.94	.63	.19	.1410	.110
.130 .145	6 (.1380)		M3.5 (.1378)	1	2.00	.69	.19	.1410	.110
.145 .171	8 (.1640)		M4 (.1575)	1	2.13	.75	.25	.1680	.131
.171 .197	10 (.1900)		M4.5 (.1772), M5 (.1969)	1	2.38	.88	.25	.1940	.152
.197 .223	12 (.2160)			1	2.38	.94	.28	.2200	.165
.223 .260		1/4 (.2500)	M6 (.2362)	2	2.50	1.00	.31	.2550	.191
.260 .323		5/16 (.3125)	M7 (.2756), M8 (.3150)	2	2.72	1.13	.38	.3180	.238
.323 .395		3/8 (.3750)	M10 (.3937)	2	2.94	1.25	.44	.3810	.286
.395 .448		7/16 (.4375)		3	3.16	1.44	.41	.3230	.242
.448 .510		1/2 (.5000)	M12 (.4724)	3	3.38	1.66	.44	.3670	.275
.510 .573		9/16 (.5625)	M14 (.5512)	3	3.59	1.66	.50	.4290	.322
.573 .635		5/8 (.6250)	M16 (.6299)	3	3.81	1.81	.56	.4800	.360
.635 .709		11/16 (.6875)	M18 (.7087)	3	4.03	1.81	.63	.5420	.406
.709 .760		3/4 (.7500)		3	4.25	2.00	.69	.5900	.442
.760 .823		13/16 (.8125)	M20 (.7874)	3	4.47	2.00	.69	.6520	.489
.823 .885		7/8 (.8750)	M22 (.8661)	3	4.69	2.22	.75	.6970	.523
.885 .948		15/16 (.9375)	M24 (.9449)	3	4.91	2.22	.75	.7600	.570
.948 1.010		1 (1.0000)	M25 (.9843)	3	5.13	2.50	.81	.8000	.600
1.010 1.073		1-1/16 (1.0625)	M27 (1.0630)	3	5.13	2.50	.88	.8960	.672
1.073 1.135		1-1/8 (1.1250)		3	5.44	2.56	.88	.8960	.672
1.135 1.198		1-3/16 (1.1875)	M30 (1.1811)	3	5.44	2.56	1.00	1.0210	.766
1.198 1.260		1-1/4 (1.2500)		3	5.75	2.56	1.00	1.0210	.766
1.260 1.323		1-5/16 (1.3125)	M33 (1.2992)	3	5.75	2.56	1.06	1.1080	.831
1.323 1.385		1-3/8 (1.3750)		3	6.06	3.00	1.06	1.1080	.831
1.358 1.448		1-7/16 (1.4375)	M36 (1.4173)	3	6.06	3.00	1.13	1.2330	.925
1.448 1.510		1-1/2 (1.5000)		3	6.38	3.00	1.13	1.2330	.925
1.510 1.635		1-5/8 (1.6250)	M39 (1.5354)	3	6.69	3.19	1.13	1.3050	.979
1.635 1.760		1-3/4 (1.7500)	M42 (1.6535)	3	7.00	3.19	1.25	1.4300	1.072
1.760 1.885		1-7/8 (1.8750)		3	7.31	3.56	1.25	1.5190	1.139
1.885 2.010		2 (2.0000)	M48 (1.8898)	3	7.63	3.56	1.38	1.6440	1.233
2.010 2.135		2 1/8 (2.1250)		3	8.00	3.56	1.38	1.7690	1.327
2.135 2.260		2 1/4 (2.2500)	M56 (2.2047)	3	8.25	3.56	1.44	1.8940	1.420
2.260 2.385		2 3/8 (2.3750)		3	8.50	4.00	1.44	2.0190	1.514
2.385 2.510		2 1/2 (2.5000)		3	8.75	4.00	1.50	2.1000	1.575
2.510 2.635		2 5/8 (2.6250)	M64 (2.5197)	3	8.75	4.00	1.50	2.2250	1.669
2.635 2.760		2 3/4 (2.7500)		3	9.25	4.00	1.56	2.3500	1.762
2.760 2.885		2 7/8 (2.8750)	M72 (2.8346)	3	9.25	4.00	1.56	2.4750	1.856
2.885 3.010		3 (3.0000)		3	9.75	4.56	1.63	2.5430	1.907
3.010 3.135		3 1/8 (3.1250)		3	9.75	4.56	1.63	2.6680	2.001
3.135 3.260		3 1/4 (3.2500)	M80 (3.1496)	3	10.00	4.56	1.75	2.7930	2.095
3.260 3.385		3 3/8 (3.3750)		3	10.00	4.56	1.75	2.8830	2.162
3.385 3.510		3 1/2 (3.5000)		3	10.25	4.94	2.00	3.0080	2.256
3.510 3.635		3 5/8 (3.6250)	M90 (3.5433)	3	10.25	4.94	2.00	3.1330	2.350
3.635 3.760		3 3/4 (3.7500)		3	10.50	5.31	2.13	3.2170	2.413
3.760 3.885		3 7/8 (3.8750)		3	10.50	5.31	2.13	3.3420	2.506
3.885 4.010		4 (4.0000)	M100 (3.9370)	3	10.75	5.31	2.25	3.4670	2.600

\*United States Cutting Tool Institute (USCTI) governs tap dimensions for the United States



Dimensions



USCTI Table 302 Tap Tolerance

Element	Nominal Diameter Range – Inches		Direction	Tolerance (Inches)
	Over	To (Inc.)		
Length Overall - L	.0520	1.0100	Plus or Minus	.031
	1.0100	4.0100	Plus or Minus	.063
Length of Thread - l	.0520	.2230	Plus or Minus	.047
	.2230	.5100	Plus or Minus	.063
	.5100	1.5100	Plus or Minus	.094
	1.5100	4.0100	Plus or Minus	.125
Length of square - l <sub>2</sub>	.0520	1.0100	Plus or Minus	.031
	1.0100	4.0100	Plus or Minus	.063
Diameter of shank - d <sub>1</sub>	.0520	.2230	Minus	.0015
	.2230	.6350	Minus	.0015
	.6350	1.0100	Minus	.0020
	1.0100	1.5100	Minus	.0020
	1.5100	2.0100	Minus	.0030
	2.0100	4.0100	Minus	.0030
Size of square - a	.0520	.5100	Minus	.004
	.5100	1.0100	Minus	.006
	1.0100	2.0100	Minus	.008
	2.0100	4.0100	Minus	.010

Special Fine Pitch Taps — Short Series, Ground Thread

C I 303

Unless otherwise specified, special taps 1.010" to 1.510" diameter inclusive having 14 or more threads per inch or 1.75 millimeter pitch and finer, and sizes over 1.510"

diameter with 10 or more threads per inch, or 2.5 millimeter pitch and finer, will be made to the general dimensions shown below:

Nominal Diameter Range Inches	Nominal Fractional Diameter Inches	Nominal Metric Diameter Millimeters	General Tap Dimensions - Inches					
			Overall Length L	Thread Length l	Square Length l <sub>2</sub>	Shank Diameter d <sub>1</sub>	Size of Square a	
1.010	1.073	1-1/16	M27	4.00	1.50	.88	.8960	.672
1.073	1.135	1- 1/8		4.00	1.50	.88	.8960	.672
1.135	1.198	1-3/16	M30	4.00	1.50	1.00	1.0210	.766
1.198	1.260	1-1/4		4.00	1.50	1.00	1.0210	.766
1.260	1.323	1-5/16	M33	4.00	1.50	1.00	1.1080	.831
1.323	1.385	1-3/8		4.00	1.50	1.00	1.1080	.831
1.385	1.448	1-7/16	M36	4.00	1.50	1.00	1.2330	.925
1.448	1.510	1-1/2		4.00	1.50	1.00	1.2330	.925
1.510	1.635	1-5/8	M39	5.00	2.00	1.13	1.3050	.979
1.635	1.760	1-3/4	M42	5.00	2.00	1.25	1.4300	1.072
1.760	1.885	1-7/8		5.00	2.00	1.25	1.5190	1.139
1.885	2.010	2	M48	5.00	2.00	1.38	1.6440	1.233
2.010	2.135	2-1/8		5.25	2.00	1.38	1.7690	1.327
2.135	2.260	2-1/4	M56	5.25	2.00	1.44	1.8940	1.420
2.260	2.385	2-3/8		5.25	2.00	1.44	2.0190	1.514
2.385	2.510	2-1/2		5.25	2.00	1.50	2.1000	1.575
2.510	2.635	2-5/8	M64	5.50	2.00	1.50	2.1000	1.575
2.635	2.760	2-3/4		5.50	2.00	1.50	2.1000	1.575
2.760	2.885	2-7/8	M72	5.50	2.00	1.50	2.1000	1.575
2.885	3.010	3		5.50	2.00	1.50	2.1000	1.575
3.010	3.135	3-1/8		5.75	2.00	1.50	2.1000	1.575
3.135	3.260	3-1/4	M80	5.75	2.00	1.50	2.1000	1.575
3.260	3.385	3-3/8		5.75	2.00	1.50	2.1000	1.575
3.385	3.510	3-1/2		5.75	2.00	1.50	2.1000	1.575
3.510	3.635	3-5/8	M90	6.00	2.00	1.75	2.1000	1.575
3.635	3.760	3-3/8		6.00	2.00	1.75	2.1000	1.575
3.760	3.885	3-7/8		6.00	2.00	1.75	2.1000	1.575
3.885	4.010	4	M100	6.00	2.00	1.75	2.1000	1.575

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TAP TOLERANCES

Technical Information

Dimensions

JIS Spiral Pointed and Spiral Fluted STANDARD DIMENSIONS

JIS TAP DIMENSIONS

Diameter	Pitch	General Dimensions - Metric					Ground Thread Limits Class	Pitch Diameter Limit		
		Overall Length A	Length of Thread B	Length of Square C	Shank Diam. D	Size of Square E		Basic	Minimum	Maximum
M2	0.4	40	15	5	3	2.5	2	1.740	1.750	1.770
M2.3	0.4	42	15	5	3	2.5	2	2.040	2.050	2.070
M2.6	0.45	44	16	5	3	2.5	2	2.308	2.318	2.333
M3	0.5	46	18	6	4	3.2	2	2.675	2.685	2.700
M3.5	0.6	48	18	6	4	3.2	2	3.110	3.120	3.135
M4	0.7	52	20	7	5	4	2	3.545	3.555	3.575
M4.5	0.75	55	20	7	5	4	2	4.013	4.023	4.043
M5	0.8	60	22	7	5.5	4.5	2	4.480	4.490	4.510
M6	0.75	62	20	7	6	4.5	2	5.513	5.523	5.543
M6	1	62	24	7	6	4.5	2	5.350	5.360	5.380
M7	1	65	6	8	6.2	5	2	6.350	6.360	6.380
M7	0.75	62	20	8	6.2	5	2	7.513	7.525	7.550
M8	1	70	30	8	6.2	5	2	7.350	7.360	7.380
M8	1.25	70	30	8	6.2	5	2	7.188	7.198	7.223
M9	1.25	72	30	8	7	5.5	2	8.188	8.198	8.223
M9	1	70	30	8	7	5.5	2	9.350	9.362	9.387
M10	1.25	75	32	8	7	5.5	2	9.188	9.198	9.223
M10	1.5	75	32	8	7	5.5	2	9.026	9.041	9.066
M11	1.5	80	38	9	8	6	2	10.026	10.041	10.066
M11	1	70	30	9	8.5	6.5	2	11.350	11.365	11.395
M12	1.25	80	38	9	8.5	6.5	2	11.188	11.203	11.233
M12	1.5	82	38	9	8.5	6.5	2	11.026	11.041	11.071
M12	1.75	82	38	9	8.5	6.5	2	10.863	10.878	10.908
M12	1.25	80	38	11	10.5	8	2	13.188	13.203	13.233
M14	1.5	88	42	11	10.5	8	2	13.026	13.041	13.071
M14	2	88	42	11	10.5	8	2	12.701	12.716	12.746
M14	1	75	30	13	12.5	10	2	15.350	15.365	15.395
M16	1.5	95	45	13	12.5	10	2	15.026	15.041	15.071
M16	2	95	45	13	12.5	10	2	14.701	14.716	14.746
M16	1.5	95	45	14	14	11	2	17.026	17.041	17.071
M18	2	95	45	14	14	11	2	16.701	16.716	16.751
M18	2.5	100	48	14	14	11	2	16.376	16.396	16.431
M20	1.5	95	45	15	15	12	2	19.026	19.041	19.076
M20	2.5	100	48	15	15	12	2	18.376	19.396	18.431
M22	1.5	95	45	16	17	13	2	21.026	21.041	21.076
M22	2.5	115	55	16	17	13	2	20.376	20.396	20.431
M24	1.5	95	45	18	19	15	2	23.026	23.041	23.076
M24	3	120	58	18	19	15	2	22.051	22.071	22.111
M26	1.5	95	45	18	20	15	2	25.026	25.041	25.076
M26	3	130	62	18	20	15	2	24.051	24.071	24.076
M28	1.5	105	45	8	21	17	2	27.026	27.041	27.076
M30	1.5	105	45	20	23	17	2	29.026	29.041	29.076
M30	3.5	135	65	20	23	17	2	27.727	27.747	27.787
M32	1.5	105	45	22	24	19	2	31.026	31.041	31.076
M33	1.5	110	45	22	25	19	2	32.026	32.041	32.076
M34	1.5	110	45	24	26	21	2	33.026	33.041	33.076
M36	1.5	110	45	24	28	21	2	35.026	35.041	35.076

Technical Information

**NPT/NPTF THREAD LIMITS**

Nominal Size (inch)	Threads per Inch NPT	*Gage Measurement (inch)		Taper per Foot (inch)	
		Projection	Tolerance (+/-)	Min.	Max.
1/16	27	0.312	1/16	23/32	25/32
1/8	*27	0.312	1/16	23/32	25/32
1/4	18	0.459	1/16	23/32	25/32
3/8	18	0.454	1/16	23/32	25/32
1/2	14	0.579	1/16	23/32	25/32
3/4	14	0.565	1/16	23/32	25/32
1	11-1/2	0.678	3/32	23/32	25/32
1 1/4	11-1/2	0.686	3/32	23/32	25/32
1 1/2	11-1/2	0.699	3/32	23/32	25/32
2	11-1/2	0.667	3/32	23/32	25/32
2 1/2	8	0.925	3/32	47/64	25/32
3	8	0.925	3/32	47/64	25/32
3 1/2	8	0.938	1/8	47/64	25/32
4	8	0.950	1/8	47/64	25/32

\*The distance small end of tap projects through an L1 American Standard Taper Pipe Thread Ring Gage.

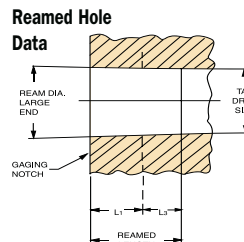
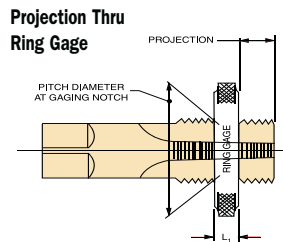
**WIDTH OF FLATS—TAPS**

Threads Per Inch	Element	Width of Flats at Tap Crest and Roots			
		NPT		NPTF	
		Min.	Max.	Min.	Max.
27	Major Dia.	0.0014	.0041	0.0040	.0055
	Minor Dia.				
18	Major Dia.	0.0021	.0057	0.0050	.0065
	Minor Dia.				
14	Major Dia.	0.0027	.0064	0.0050	.0065
	Minor Dia.				
11 1/2	Major Dia.	0.0033	.0073	0.0060	.0083
	Minor Dia.				
8	Major Dia.	0.0048	.0090	0.0080	.0103
	Minor Dia.				

Minimum minor diameter flats are not specified. May be as sharp as practicable. Ground Thread Taps marked NPT may be used for NPT and ANPT applications.

**Measurement of Taper Pipe Taps, Reaming Data and Tap Drill Sizes**

Size	Projection				Ream Dia. Large End	Gage Width L1	Reamed Length L1 + L3	Tap Drill for Use w/ Reaming	Tap Drill for Use w/o Reaming
	NPT & NTF		SAE-SHORT						
	Min.	Max.	Min.	Max.					
1/16-27	0.250	0.375	0.222	0.259	0.2515	0.1600	0.2711	15/64	C
1/8-27	0.250	0.375	0.222	0.259	0.3340	0.1615	0.2726	21/64	Q
1/4-18	0.397	0.521	0.333	0.389	0.4472	0.2278	0.3945	27/64	7/16
3/8-18	0.392	0.516	0.333	0.389	0.5826	0.240	0.4067	9/16	9/16
1/2-14	0.517	0.641	0.429	0.500	0.7213	0.320	0.5343	11/16	45/64
3/4-14	0.503	0.627	0.429	0.500	0.9317	0.339	0.5533	57/64	29/32
1-11-1/2	0.584	0.772	-	-	1.1691	0.400	0.6609	1-1/8	1-9/64
1-1/4-11-1/2	0.592	0.780	-	-	1.1538	0.420	0.6809	1-15/32	1-31/64
1-1/2-11-1/2	0.606	0.792	-	-	1.7528	0.420	0.6809	1-45/64	1-23/32
2-11-1/2	0.574	0.760	-	-	2.2267	0.436	0.6969	2-3/16	2-3/16



**Straight Pipe Taps — General Dimensions — Inches**

Nominal Pipe Size	L Overall Length		l Length of Thread		l <sub>2</sub> Length of Square		d <sub>1</sub> Shank Diameter			a Size of Square		Tap Drill Sizes
	Length	Tol	Length	Tol	Length	Tol.	Cut Dia.	Ground Thread Tol.	Thread Tol.	Size	Tol	
1/8	2-1/8	±1/32	3/4	±1/16	3/8	±1/32	.3125	-.007	-.0015	.234	-.004	11/32
1/8	2-1/8	±1/32	3/4	±1/16	3/8	±1/32	.4375	-.007	-.0015	.328	-.004	11/32
1/4	2-7/16	±1/32	1-1/16	±1/16	7/16	±1/32	.5625	-.007	-.0020	.421	-.006	7/16
3/8	2-9/16	±1/32	1-1/16	±1/16	1/2	±1/32	.7000	-.007	-.0020	.531	-.006	37/64
1/2	3-1/8	±1/32	1-3/8	±1/16	5/8	±1/32	.6875	-.007	-.0020	.515	-.006	23/32
3/4	3-1/4	±1/32	1-3/8	±1/16	11/16	±1/32	.9063	-.009	-.0020	.679	-.006	59/64
1	3-3/4	±1/16	1-3/4	±3/32	13/16	±1/16	1.1250	-.009	-.0020	.843	-.008	1-5/32

**Straight Pipe Taps — Standard Sizes and Limits — H.S. Steel Ground Threads**

Nominal Pipe Size	Threads Per Inch		No. of Flutes	American Standard Pipe Form (NPS, NPSC and NPSM)				American Standard Dryseal Pipe Form (NPSF)				*Minor Dia. Of Flat Max.
	NPS	NPSF		Major Diameter Min	Major Diameter Max	Pitch Diameter Min	Pitch Diameter Max	Major Diameter Min	Major Diameter Max	Pitch Diameter Min	Pitch Diameter Max	
1/8	27	27	4	.4022	.4032	.3746	.3751	.3932	.3942	.3696	.3701	.004
1/4	18	18	4	.5347	.5357	.4933	.4938	.5239	.5249	.4859	.4864	.005
3/8	18	18	4	.6701	.6711	.6287	.6292	.6593	.6603	.6213	.6218	.005
1/2	14	14	4	.8347	.8357	.7806	.7811	.8230	.8240	.7712	.7717	.005
3/4	14	14	5	1.0447	1.0457	.9906	.9916	1.0335	1.0345	.9817	.9822	.005
1	11-1/2	11-1/2	5	1.3062	1.3077	1.2402	1.2412	1.2933	1.2943	1.2295	1.2305	.006

**TAP RECOMMENDATIONS FOR CLASSES 2, 3, 2B & 3B**

**UNIFIED AND AMERICAN NATIONAL SCREW THREADS**

SIZE	THREADS PER INCH		RECOMMENDED TAP LIMITS				INTERNAL THREAD PITCH DIAMETER LIMITS				
	NC UNC	NF UNF	CLASS 2	CLASS 3	CLASS 2B	CLASS 3B	MIN/ALL CLASSES (BASIC)	MAX CLASS 2	MAX CLASS 3	MAX CLASS 2B	MAX CLASS 3B
0		80	G H1	G H1	G H2	G H1	.0519	.0536	.0532	.0542	.0536
1	64		G H1	G H1	G H2	G H1	.0629	.0648	.0643	.0655	.0648
1		72	G H1	G H1	G H2	G H1	.0640	.0658	.0653	.0665	.0659
2	56		G H1	G H1	G H2	G H1	.0744	.0764	.0759	.0772	.0765
2		64	G H1	G H1	G H2	G H1	.0759	.0778	.0773	.0786	.0779
3	48		G H1	G H1	G H2	G H1	.0855	.0877	.0871	.0885	.0877
3		56	G H1	G H1	G H2	G H1	.0874	.0894	.0889	.0902	.0895
4	40		G H2	G H1	G H2	G H2	.0958	.0982	.0975	.0991	.0982
4		48	G H1	G H1	G H2	G H1	.0985	.1007	.1001	.1016	.1008
5	40		G H2	G H1	G H2	G H2	.1088	.1112	.1105	.1121	.1113
5		44	G H1	G H1	G H2	G H1	.1102	.1125	.1118	.1134	.1126
6	32		G H2	G H1	G H3	G H2	.1177	.1204	.1196	.1214	.1204
6		40	G H2	G H1	G H2	G H2	.1218	.1242	.1235	.1252	.1243
8	32		G H2	G H1	G H3	G H2	.1437	.1464	.1456	.1475	.1465
8		36	G H2	G H1	G H2	G H2	.1460	.1485	.1478	.1496	.1487
10	24		G H3	G H1	G H3	G H3	.1629	.1662	.1653	.1672	.1661
10		32	G H2	G H1	G H3	G H2	.1697	.1724	.1716	.1736	.1726
12	24		G H3	G H1	G H3	G H3	.1889	.1922	.1913	.1933	.1922
12		28	G H3	G H1	G H3	G H3	.1928	.1959	.1950	.1970	.1959
1/4	20		G H3	G H2	G H5	G H3	.2175	.2211	.2201	.2223	.2211
1/4		28	G H3	G H1	G H4	G H3	.2268	.2299	.2290	.2311	.2300
5/16	18		G H3	G H2	G H5	G H3	.2764	.2805	.2794	.2817	.2803
5/16		24	G H3	G H1	G H4	G H3	.2854	.2887	.2878	.2902	.2890
3/8	16		G H3	G H2	G H5	G H3	.3344	.3389	.3376	.3401	.3387
3/8		24	G H3	G H1	G H4	G H3	.3479	.3512	.3503	.3528	.3516
7/16	14		G H5	G H3	G H5	G H3	.3911	.3960	.3947	.3972	.3957
7/16		20	G H3	G H1	G H5	G H3	.4050	.4086	.4076	.4104	.4091
1/2	13		G H5	G H3	G H5	G H3	.4500	.4552	.4537	.4565	.4548
1/2		20	G H3	G H1	G H5	G H3	.4675	.4711	.4701	.4731	.4717
9/16	12		G H5	G H3	G H5	G H3	.5084	.5140	.5124	.5152	.5135
9/16		18	G H3	G H2	G H5	G H3	.5264	.5305	.5294	.5323	.5308
5/8	11		G H5	G H3	G H5	G H3	.5660	.5719	.5702	.5732	.5714
5/8		18	G H3	G H2	G H5	G H3	.5889	.5930	.5919	.5949	.5934
3/4	10		G H5	G H3	G H5	G H5	.6850	.6914	.6895	.6927	.6907
3/4		16	G H3	G H2	G H5	G H3	.7094	.7139	.7126	.7159	.7143
7/8	9		G H6	G H4	G H6	G H4	.8028	.8098	.8077	.8110	.8089
7/8		14	G H4	G H2	G H6	G H4	.8286	.8335	.8322	.8356	.8339
1	8		G H6	G H4	G H6	G H4	.9188	.9264	.9242	.9276	.9254
1		12	G H4	G H2	G H6	G H4	.9459	.9515	.9499	.9535	.9516
1		14 NS	G H4	G H2	G H6	G H4	.9536	.9585	.9572	.9609	.9590
1-1/8	7		G H8	G H4	G H8	G H4	1.0322	1.0407	1.0381	1.0416	1.0393
1-1/8		12	G H4	G H4	G H6	G H4	1.0709	1.0765	1.0749	1.0787	1.0768
1-1/4	7		G H8	G H4	G H8	G H4	1.1572	1.1657	1.1631	1.1668	1.1644
1-1/4		12	G H4	G H4	G H6	G H4	1.1959	1.2015	1.1999	1.2039	1.2019
1-3/8	6		G H8	G H4	G H8	G H4	1.2667	1.2768	1.2738	1.2771	1.2745
1-3/8		12	G H4	G H4	G H6	G H4	1.3209	1.3265	1.3249	1.3291	1.3270
1-1/2	6		G H8	G H4	G H8	G H4	1.3917	1.4018	1.3988	1.4022	1.3996
1-1/2		12	G H4	G H4	G H6	G H4	1.4459	1.4515	1.4499	1.4542	1.4522

The above recommended taps normally produce the class of thread indicated in 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.

\*\*Sizes through 1" diameter:  
 H1 = Basic PD to Basic PD + 0.0005"  
 H2 = Basic PD + 0.0005" to Basic PD + 0.0010"  
 H3 = Basic PD + 0.0010" to Basic PD + 0.0015"  
 H4 = Basic PD + 0.0015" to Basic PD + 0.0020"  
 H5 = Basic PD + 0.0020" to Basic PD + 0.0025"  
 H6 = Basic PD + 0.0025" to Basic PD + 0.0030"  
 Sizes larger than 1" diameter through 1-1/2"  
 H4 = Basic PD + 0.0010" to Basic PD + 0.0020"

TAP "H" LIMIT Recommendations

Technical Information

# Ground Thread Tap Limits

In addition to the nominal size and pitch of a tap, there is another important dimensional factor to be considered when selecting a ground thread tap for a given job. This factor is the pitch diameter tap limit, "H" and "L." "H" represents (high) above basic pitch diameter; "L" (low) is below basic pitch diameter. Tap limits have been established to provide a choice in the selection of the tap size best suited to produce the class of thread desired.

**Figure 1** illustrates the numbering system and the .0005" diameter increment separation between successive limits. Because the starting point is basic pitch diameter, dividing the limit number by two establishes, in thousandths of an inch, the amount the maximum tap pitch diameter is above basic in the "H" series and the amount the minimum tap pitch diameter is under basic in the "L" series.

**Figure 2** illustrates the positioning of the tap limits in relation to the various classes of threads for a 1/4-20 size.

Figure 1

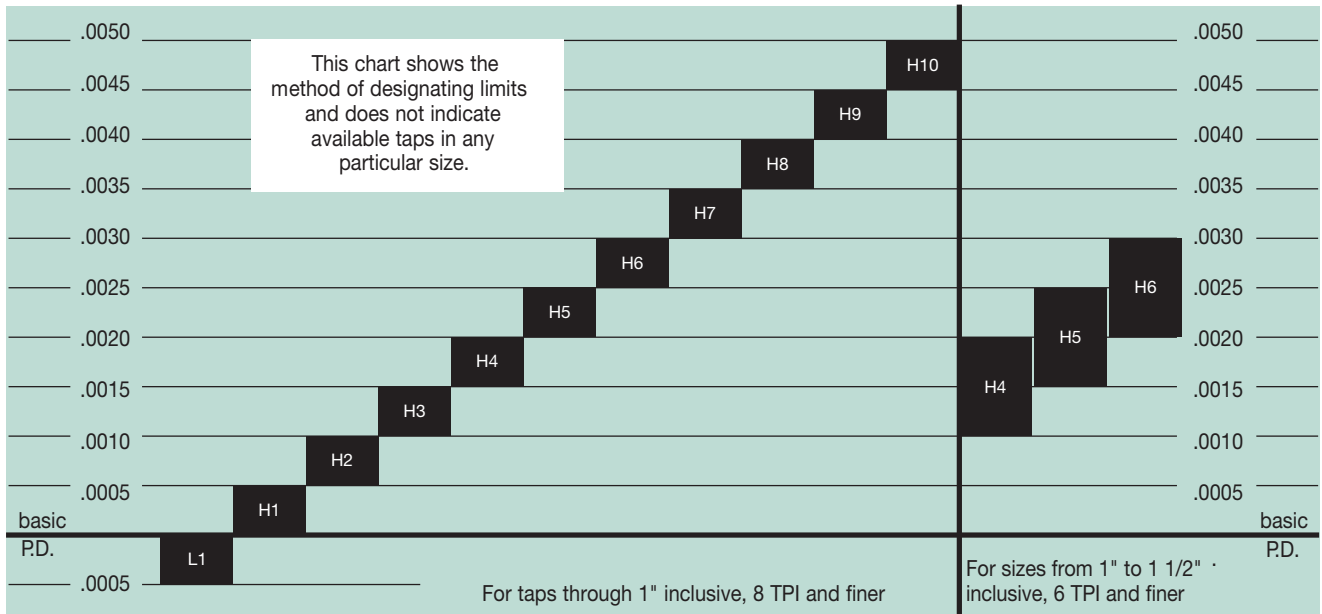


Figure 2

Class of Thread – 1/4 -20 UNC and NC



# Tap Drill Size Selection

## Recommended Percentage of Full Thread in Tapped Holes

To reduce tapping problems and improve tool life use the largest drill possible for the minor diameter. Select the percentage of thread height from the chart below to find the appropriate drill size for each size thread.

A minor diameter that provides a 55% to 65% thread is sufficient for good strength in most applications. In some cases it may be necessary to produce a thread with a higher percentage of thread height to meet minor diameter limits of the thread class specified or for added strength.

Material		>2D to L Tapping	Average Commercial Work	Thin Sheet Stock or Stamping
Free machining	Aluminum, Brass, Bronze, Cast Iron, Copper, Mild Steel, Tool Steel	60% - 70%	65% - 70%	75% - 85%
Harder materials or tougher machining	Cast Steel, Drop Forging, Monel Metal, Nickel Steel, Stainless Steel	55% - 65%	60% - 70%	

Tap Size	Threads Per Inch		Minor Diameter		Tap Drill Diameter				
	UNC	UNF	Min. 2B	Max. 2B	80% Thread	75% Thread	70% Thread	65% Thread	60% Thread
0	-	80	0.0465	0.0514	0.0470	0.0478	0.0486	0.0494	0.0503
1	64	-	0.0561	0.0623	0.0568	0.0578	0.0588	0.0598	0.0608
	-	72	0.0580	0.0635	0.0586	0.0595	0.0604	0.0613	0.0622
2	56	-	0.0667	0.0737	0.0674	0.0686	0.0698	0.0709	0.0721
	-	64	0.0691	0.0752	0.0698	0.0708	0.0718	0.0728	0.0738
3	48	-	0.0764	0.0845	0.0774	0.0787	0.0801	0.0814	0.0828
	-	56	0.0797	0.0865	0.0804	0.0816	0.0828	0.0839	0.0851
4	40	-	0.0849	0.0939	0.0860	0.0876	0.0893	0.0909	0.0925
	-	48	0.0894	0.0968	0.0904	0.0917	0.0931	0.0944	0.0958
5	40	-	0.0979	0.1062	0.0990	0.1006	0.1023	0.1039	0.1055
	-	44	0.1004	0.1079	0.1014	0.1029	0.1043	0.1058	0.1073
6	32	-	0.1040	0.1140	0.1055	0.1076	0.1096	0.1116	0.1136
	-	40	0.1110	0.1190	0.1120	0.1136	0.1153	0.1169	0.1185
8	32	-	0.1300	0.1390	0.1315	0.1336	0.1356	0.1376	0.1396
	-	36	0.1340	0.1420	0.1351	0.1369	0.1387	0.1405	0.1424
10	24	-	0.1450	0.1560	0.1467	0.1494	0.1521	0.1548	0.1575
	-	32	0.1560	0.1640	0.1575	0.1596	0.1616	0.1636	0.1656
12	24	-	0.1710	0.1810	0.1727	0.1754	0.1781	0.1808	0.1835
	-	28	0.1770	0.1860	0.1789	0.1812	0.1835	0.1858	0.1882
1/4	20	-	0.1960	0.2070	0.1980	0.2013	0.2045	0.2078	0.2110
	-	28	0.2110	0.2200	0.2129	0.2152	0.2175	0.2198	0.2222
5/16	18	-	0.2520	0.2650	0.2548	0.2584	0.2620	0.2656	0.2692
	-	24	0.2670	0.2770	0.2692	0.2719	0.2746	0.2773	0.2800
3/8	16	-	0.3070	0.3210	0.3101	0.3141	0.3182	0.3222	0.3263
	-	24	0.3300	0.3400	0.3317	0.3344	0.3371	0.3398	0.3425
7/16	14	-	0.3600	0.3760	0.3633	0.3679	0.3726	0.3772	0.3818
	-	20	0.3830	0.3950	0.3855	0.3888	0.3920	0.3953	0.3985
1/2	13	-	0.4170	0.4340	0.4201	0.4251	0.4301	0.4351	0.4400
	-	20	0.4460	0.4570	0.4480	0.4513	0.4545	0.4578	0.4610
9/16	12	-	0.4720	0.4900	0.4759	0.4813	0.4867	0.4921	0.4976
	-	18	0.5020	0.5150	0.5048	0.5084	0.5120	0.5156	0.5192
5/8	11	-	0.5270	0.5460	0.5305	0.5364	0.5423	0.5482	0.5541
	-	18	0.5650	0.5780	0.5673	0.5709	0.5745	0.5781	0.5817
3/4	10	-	0.6420	0.6630	0.6461	0.6526	0.6591	0.6656	0.6721
	-	16	0.6820	0.6960	0.6851	0.6891	0.6932	0.6972	0.7013
7/8	9	-	0.7550	0.7780	0.7595	0.7668	0.7740	0.7812	0.7884
	-	14	0.7980	0.8140	0.8008	0.8054	0.8101	0.8147	0.8193
1	8	-	0.8650	0.8900	0.8701	0.8782	0.8863	0.8945	0.9026
	-	12	0.9100	0.9280	0.9134	0.9188	0.9242	0.9296	0.9351
1-1/8	7	-	0.9700	0.9980	0.9765	0.9858	0.9951	1.0044	1.0137
	-	12	1.0350	1.0530	1.0384	1.0438	1.0492	1.0546	1.0601
1-1/4	7	-	1.0950	1.1230	1.1015	1.1108	1.1201	1.1294	1.1387
	-	12	1.1600	1.1780	1.1634	1.1688	1.1742	1.1796	1.1851
1-3/8	6	-	1.1950	1.2250	1.2018	1.2126	1.2235	1.2343	1.2451
	-	12	1.2850	1.3030	1.2884	1.2938	1.2992	1.3046	1.3101
1-1/2	6	-	1.3200	1.3500	1.3268	1.3376	1.3485	1.3593	1.3701
	-	12	1.4100	1.4280	1.4134	1.4188	1.4242	1.4296	1.4351
1-3/4	5	-	1.5330	1.5670	1.5422	1.5551	1.5681	1.5811	1.5941
	2	4-1/2	-	1.7590	1.7950	1.7691	1.7835	1.7979	1.8124

### TAP DRILL SIZE FORMULAR

$$\text{Drill Size} = \text{Tap Major Dia} - \frac{0.01299 \times \% \text{ of Full Thread}}{\# \text{ of Threads Per Inch}}$$

Example: To determine Drill Size for 3/4" - 10 Tap, 70% Full Thread. Basic Major Diameter of Tap = .750"  
 $0.01299 \times 70 = 0.9093 \div 10 = 0.09093$   
 Drill Size = .6591"

### PERCENTAGE OF FULL THREAD FORMULAR <sup>Tap</sup>

$$\% \text{ of Full Thread} = \frac{\text{Threads Per Inch} \times \text{Major Dia} - \text{Drill}}{0.01299}$$

Example: To determine the % of Full Thread for 3/4" - 10 Tap, using .6656" Drill.  
 $\frac{\text{Threads Per Inch} \times \text{Major Dia} - \text{Drill}}{0.01299} = \frac{10 \times .750 - .6656}{0.01299} = \frac{0.8344}{0.01299} = 64.97$   
 Percentage of Full Threads = 65%

: cfa Tap Drill Sizes 7\ Ufh

To reduce tapping problems and improve tool life use the largest drill possible for the minor diameter. Select the percentage of thread height from the chart below to find the appropriate drill size for each size thread.

A minor diameter that provides a 55% to 65% thread is sufficient for good strength in most applications. In some cases it may be necessary to produce a thread with a higher percentage of thread height to meet minor diameter limits of the thread class specified or for added strength.

Suggested Percentage of Full Thread in Tapped Holes

Material		* Deep Hole Tapping	Average Commercial Work	Thin Sheet Stock or Stamping
Free Cutting	Aluminum, Brass, Bronze, Cast Iron, Copper, Mild Steel, Tool Steel	60% - 70%	65% - 70%	75% - 85%
Hard or Tough Cutting	Cast Steel, Drop Forging, Monel Metal, Nickel Steel, Stainless Steel	55% - 65%	60% - 70%	

Tap Size	Threads Per Inch			Minor Diameter		Tap Drill Diameter - Form Taps				
	UNC	UNF	8-Pitch	Min. 2B	Max. 2B	75% Thread	70% Thread	65% Thread	60% Thread	55% Thread
						(in)	(in)	(in)	(in)	(in)
0	-	80	-	0.0465	0.0514	0.0536	0.0540	0.0545	0.0549	0.0554
1	64	-	-	0.0561	0.0623	0.0650	0.0655	0.0661	0.0666	0.0672
2	56	-	-	0.0667	0.0737	0.0769	0.0774	0.0781	0.0787	0.0794
3	48	-	-	0.0691	0.0752	0.0780	0.0785	0.0791	0.0796	0.0802
4	40	-	-	0.0764	0.0845	0.0884	0.0890	0.0898	0.0905	0.0913
5	40	-	-	0.0797	0.0865	0.0899	0.0904	0.0911	0.0917	0.0924
6	40	-	-	0.0849	0.0939	0.0993	0.1000	0.1010	0.1018	0.1028
8	32	-	-	0.0894	0.0968	0.1014	0.1020	0.1028	0.1035	0.1043
10	32	-	-	0.0979	0.1062	0.1123	0.1130	0.1140	0.1148	0.1158
12	32	-	-	0.1004	0.1079	0.1134	0.1141	0.1150	0.1157	0.1166
1/4	24	-	-	0.1040	0.1140	0.1221	0.1230	0.1243	0.1252	0.1264
5/16	24	-	-	0.1110	0.1190	0.1253	0.1260	0.1270	0.1278	0.1288
3/8	24	-	-	0.1300	0.1390	0.1481	0.1490	0.1503	0.1512	0.1524
7/16	24	-	-	0.1340	0.1420	0.1498	0.1507	0.1518	0.1526	0.1537
1/2	24	-	-	0.1450	0.1560	0.1688	0.1700	0.1716	0.1729	0.1746
9/16	24	-	-	0.1560	0.1640	0.1741	0.1750	0.1762	0.1772	0.1784
5/8	24	-	-	0.1710	0.1810	0.1948	0.1960	0.1976	0.1989	0.2006
3/4	24	-	-	0.1770	0.1860	0.1978	0.1990	0.2002	0.2014	0.2028
7/8	20	-	-	0.1960	0.2070	0.2245	0.2260	0.2279	0.2295	0.2315
1	20	-	-	0.2110	0.2200	0.2318	0.2329	0.2342	0.2354	0.2389
1 1/8	18	-	-	0.2520	0.2650	0.2842	0.2861	0.2879	0.2898	0.2917
1 1/4	18	-	-	0.2670	0.2770	0.2912	0.2927	0.2941	0.2955	0.2969
1 1/2	16	-	-	0.3070	0.3210	0.3431	0.3452	0.3474	0.3495	0.3516
1 3/4	16	-	-	0.3300	0.3400	0.3537	0.3552	0.3566	0.3580	0.3594
2	14	-	-	0.3600	0.3760	0.4011	0.4035	0.4059	0.4084	0.4108
2 1/4	14	-	-	0.3830	0.3950	0.4120	0.4137	0.4154	0.4171	0.4188
2 1/2	13	-	-	0.4170	0.4340	0.4608	0.4634	0.4660	0.4686	0.4712
2 3/4	13	-	-	0.4460	0.4570	0.4745	0.4762	0.4779	0.4796	0.4813
3	12	-	-	0.4720	0.4900	0.5200	0.5229	0.5257	0.5285	0.5313
3 1/4	12	-	-	0.5020	0.5150	0.5342	0.5361	0.5379	0.5398	0.5417
3 1/2	11	-	-	0.5270	0.5460	0.5787	0.5817	0.5848	0.5879	0.5910
3 3/4	11	-	-	0.5650	0.5780	0.5967	0.5986	0.6004	0.6023	0.6042
4	10	-	-	0.6420	0.6630	0.6990	0.7024	0.7058	0.7092	0.7126
4 1/4	10	-	-	0.6820	0.6960	0.7181	0.7202	0.7224	0.7245	0.7266
4 1/2	9	-	-	0.7550	0.7780	0.8183	0.8221	0.8259	0.8297	0.8334
4 3/4	9	-	-	0.7980	0.8140	0.8386	0.8410	0.8434	0.8459	0.8483
5	8	-	-	0.8650	0.8900	0.9363	0.9405	0.9448	0.9490	0.9533
5 1/4	8	-	-	0.9100	0.9280	0.9575	0.9603	0.9632	0.9660	0.9866

: CFA H5D8F @G40 : CFAI @F

Drill Size = Tap Major Dia -  $\frac{0.0068 \times \% \text{ of Full Thread} \times}{\# \text{ of Threads Per Inch}}$   
 Example: Determine Drill Size for ' # " - 1\$ Tap, 70% Full Thread.  
 Basic Major Diameter of Tap = .+)\$ \$"  
 $0.0068 \times 70 = 0.4760 \div 1\$ = 0.0( + * " 1 " + ) \$$   
 Drill Size = .+)\$ \$"

PERCENTAGE OF FULL THREAD : CFAI @F

% of Full Thread = Threads Per Inch x  $\frac{\text{Tap Major Dia} - \text{Drill Dia}}{0.0\$^*}$   
 Example: Determine the % of Full Thread for ' # " - 1\$ Tap, using .+)\$ , " Drill.  
 Threads Per Inch = 1\$  
 $.+)$ $ - .+)$ $ , = 0.0( ( \& \div 0.0\$^* , = * . ) \text{ Percentage of Full Threads} = * ) \%$





## TAPPING FORMULAS BY YMW-USA

### BASIC THREAD PITCH =

1" / NUMBER OF THREADS PER INCH

EXAMPLE 1/4"- 28UN THREAD = 1/28 = .0357 PITCH

### BASIC THREAD HEIGHT PER SIDE =

.6495105 X THREAD PITCH

EXAMPLE 1/4"- 28UN THREAD = .6495105 X .03578 = .0232 THREAD HEIGHT

### BASIC PITCH DIAMETER =

BASIC THREAD HEIGHT - BASIC MAJOR DIAMETER

EXAMPLE 1/4"- 28UN THREAD = .03578 - .250 = .2142 BASIC PITCH DIAMETER

### SIMPLE TAP/DRILL SELECTION

MAJOR DIAMETER - PITCH = 75% THREAD

EXAMPLE 1/4"- 28 UN THREAD = .250 - .0357 = .2143 TAP DRILL SIZE

SELECT NEAREST STANDARD DRILL SIZE TO .2143

### PERCENTAGE OF FULL THREAD BY DRILL SIZE

NUMBER OF THREADS PER INCH X (BASIC MAJOR DIAMETER - DRILLED HOLE)  
0.013

EXAMPLE 1/4"- 28UN THREAD = 28 X (.250 - .2130) = 79%

### SELECTING "H" LIMITS 40% RULE

MAXIMUM P. D. - BASIC P. D. = X

"X" TIMES 40% = POSITION OF DESIRED "H" LIMIT

TOP OF "H" LIMIT/.0005 = DESIRED "H" LIMIT

1/2"- 20UNC 2B

EXAMPLE MAX. P.D. .4731

BASIC P.D. .4675

TOTAL TOLERANCE = .0056 = 40% RULE .0056 X .40 = .0022/.005 = H5 TAP

### FORMING TAPS

DRILLED HOLE SIZE =

BASIC MAJOR DIAMETER OF THREAD X  $\left( \frac{.0068 \times \% \text{ OF FULL THREAD}}{\text{NUMBER OF THREADS PER INCH}} \right)$

EXAMPLE 1/4"- 28UN THREAD  
.250 X  $\left( \frac{.0068 \times 75}{28} \right)$  = .2317 SELECT NEAREST STANDARD DRILL SIZE TO .2317 DIAMETER

### STI THREADS =

2 X .64952 X P (ADDED TO ALL BASIC DIMENSIONS OF NOMINAL UN THREAD)

EXAMPLE 1/4"-28 STI THREAD

2 X .64952 X .0357 = .0714 (ADD TO ALL BASIC DIMENSIONS OF NOMINAL THREAD)

## METRIC THREADS CUT TAPS

### SIMPLE MM TAP/DRILL SELECTION

MAJOR DIAMETER - PITCH = 75% THREAD

EXAMPLE M6 X 1 = 6mm - 1.00mm = 5.00 DRILL SIZE

### PERCENTAGE OF MM THREAD BY DRILL SIZE =

THREAD PITCH - SELECTED DRILL SIZE  
0.01299

EXAMPLE M6 X 1.0 THREAD =  $\frac{1 - 5.05}{0.01299}$  = 73%

### MM DRILLED HOLE SIZE IN INCHES =

BASIC MAJOR DIAMETER OF THREAD -  $\left( \frac{.0068 \times \text{PERCENTAGE OF FULL THREAD}}{\text{THREAD PITCH}} \right)$

EXAMPLE 6mm X 1 THREAD  
6 -  $\left( \frac{.0068 \times 75}{1} \right)$  = 5.49mm SELECT NEAREST DRILL SIZE TO 5.49 DIAMETER

### MM FORMING TAPS

#### MAXIMUM DRILLED HOLE SIZE IN MM =

BASIC MAJOR DIAMETER - 0.375P

EXAMPLE 6mm X 1 THREAD = 6 - (.375 X 1) = 5.625mm SELECT NEAREST DRILL SIZE TO 5.625 DIAMETER

## Surface Treatment

Surface treatments are selected and applied to each tap depending on the material being tapped. An explanation of each type of surface treatment is shown in the following pages.

### Nitriding

In Nitriding, Nitrogen and Carbon are allowed to soak into the surface of HSS tools, which reacts with the chemical composition of the HSS material to produce a hard nitride surface. There are 3 methods in the treatment, a composition gas method, a salt bath nitride method and an ion nitride method.

Salt bath nitride treatment has been changed into a gas nitride treatment method because of cyanic environmental pollution.

The Nitriding temperature of treatment is 500 to 550 degree. Hardness and depth of the treatment can be controlled by active nitrogen concentration and the reaction time.

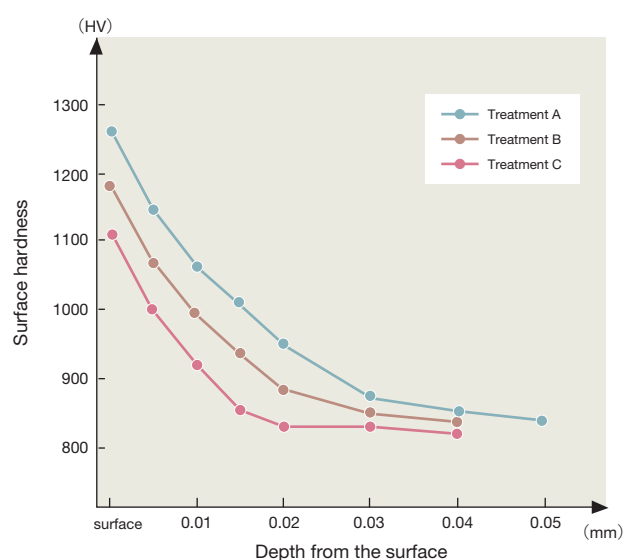
The high hardness of the tool surface minimize the chemical attraction to the tap material and results in less welding and it lowers the resulting friction resistance. A major improvement can be expected in tool's performance.

Yamawa have found the best combinations of hardness and toughness through its treatment technology.

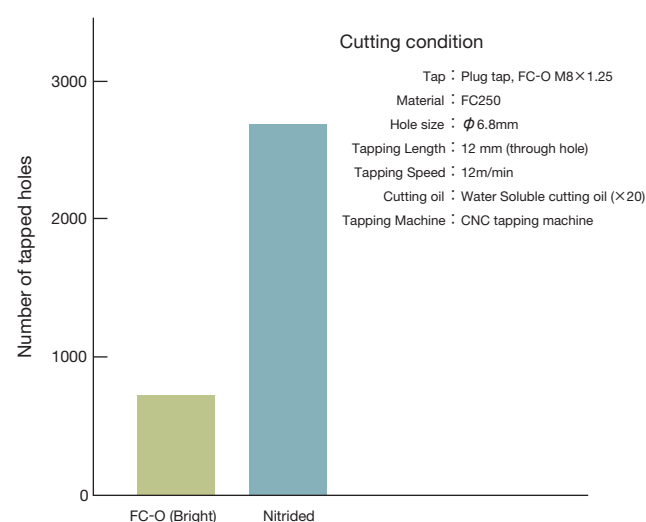
The nitriding treatment is widely applicable to workpiece materials like gray cast irons, special cast irons, aluminum diecastings with higher silicone content, copper alloys, and resinoids (plastics). These materials produce small segmental chips and are very abrasive.

Yamawa recommends nitrogen and oxidizing for comparatively sticky material such as high carbon steel and refined alloy steel. This double treatment improves the chipping resistance and has is a proven benefit in machining ferrous materials.

### Depth and hardness of Nitride Surface Treatment



### Efficiency of Nitride Treatment



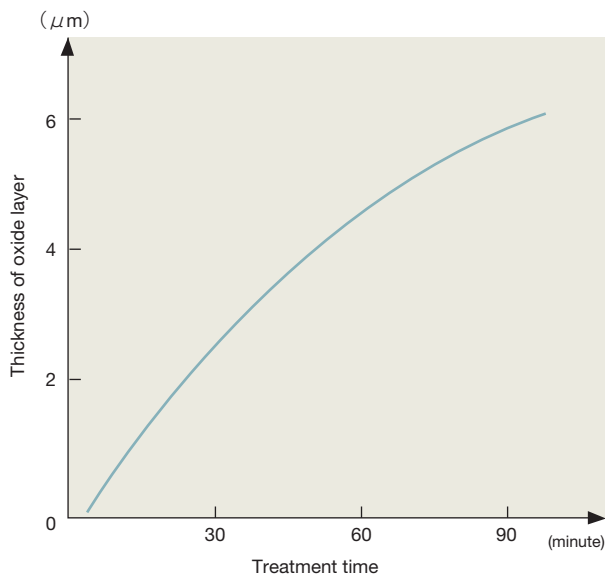
Each tap has the best surface treatment applied depending on the tapping purpose. Characteristics and effectiveness of surface treatment are introduced in next section.

## Oxidizing

The first offering of this treatment was created using a HOMO furnace of LEED AND NORTHUP Company in the USA around 1938. It is called HOMO treatment. This treatment is also called vapor treatment and steam treatment. Through this treatment, a Fe3O4 layer of blue black color is produced over the tool surface.

The oxidization treatment produces a porous layer on the tool's surface. This porous layer works as a series of oil pocket to hold the oil on the tap surface. The oxidization helps to reduce friction, to avoid welding and to improve the surface roughness of internal screw. Moreover, longer tool life is experienced because the treatment reduces the remaining stress of HSS tools.

### Thickness of oxide layer and the time of treatment

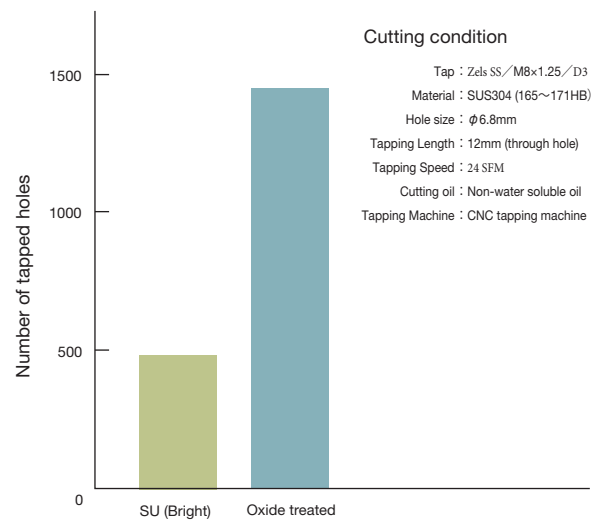


The oxidization treatment does not increase the hardness on tool surface. Using the furnace of YAMAWA original design and choosing the proper treatment surface Treatment time, we have been very good result of oxidizing for YAMAWA HSS tools.

Stainless steel and low carbon steel are materials that easily weld the chip to the tap. Yamawa applies this treatment to the special purpose taps as well for better tool life in these materials. Because of the reduction of frictional resistance, this treatment has a wide range of application in steel and stainless steel material for better tool life.

Yamawa combines oxidizing with nitriding for taps designed for steels, alloyed steel, tool steels and stainless steels. This double treatment improves tool life in all types of ferrous materials.

### Efficiency of oxide treatment



## Surface Treatment

Each tap has the best surface treatment applied, depending on the tapping purpose. Characteristics and effectiveness of surface treatment are introduced in next section.

High speed cutting and hard-to-machine cutting are more popular in recent technology. To meet this tendency, a hard layer coating applied by vapor deposition over tool's surface has proven to increase tool life. There are two coating methods, CVD and PVD. The lower heat PVD process is mainly used for tap.

### Physical Vapor Deposition

A vacuum chamber container of low heat and vapor deposition material are used to deposit the thin film coating by electric discharge on the surface of each tap.

Due to its low reaction temperature (lower than 500° C), PVD makes little change of shape and hardness of HSS tools.

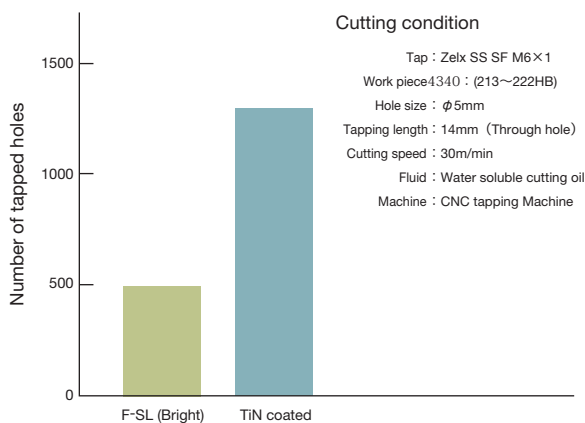
Yamawa has adopted an iron plating method, which coats a thin layer (1-4um) over our HSS and carbide tools. This layer processed by this method is very high in its adherence and its wear resistance.

### The features and classification of coating

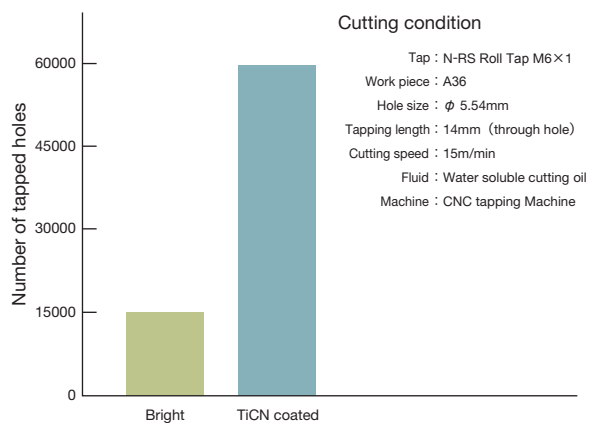
Classification	Titanium nitride (TiN)	Titanium carbonitride (TiCN)	Titanium nitride aluminum (TiAlN)	Hard chromium plating (CrN)
Features				
Vickers Hardness	2000~2400	3000~3500	2300~2700	1800~2200
Wear resistance	Good	Excellent	Excellent	Normal
Welding resistance	Good	Good	Good	Excellent
Heat resistance	Good	Normal	Excellent	Excellent
Acid resistance	Good	Normal	Excellent	Good
Slippery	Good	Excellent	Good	Excellent
Color	Gold	Blue Dray Violet	Violet	Silver
Workpiece materials	Carbon Steels Aluminum forging	Carbon Steels Hard Steels Stainless Steels Aluminum forging Cast Irons Brass · Bronze	Stainless Steels Cast Irons	Copper

Note: Evaluation (tri-level) of characteristic features is just comparative of these four coatings, TiN, TiCN, TiAlN, and CrN, in the table. These coatings have great advantages of wear resistance, welding resistance, and reduced friction resistance. The values of vickers hardness are also higher than the heat treatment or nitriding of HSS cutting tools from the table.

### The efficiency of TiN coating



### The efficiency of TiCN coating



# How to determine which tap holder to use each machines type.

About combination use of machines, holders, and taps

## The function and aspect of machine feed system

### Fully synchronous feed (Rigid) system

Spindle revolution and feed are synchronized, a perfect thread lead and feed per revolution are expected.

### Master lead screw feed system

A better-feed condition is expected because the tap is fed by a master lead screw shaft that is the same pitch as this tap.

### Gear feed system

The tap is fed at the same pitch by a combinations of gears. This is creates better-feed condition.

### Asynchronous feed system by approximation

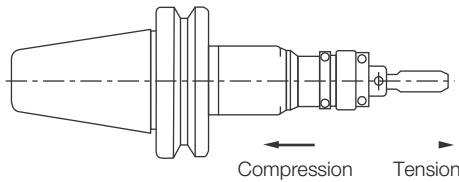
Use when the values of spindle rotation and the feed are set independently. Especially, if the machine feed value cannot be accurately predicted to be that of the tap lead.

Feed is controlled by a pressure regulation system which normally results in an inaccurate feed per revolution compared to the tap.

Feed is controlled by worker which is difficult to keep a stable amount of feed per revolution.

Technical Information

## HOLDERS aspects

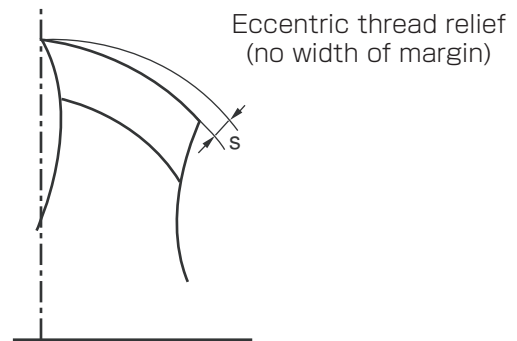


### Spring direction

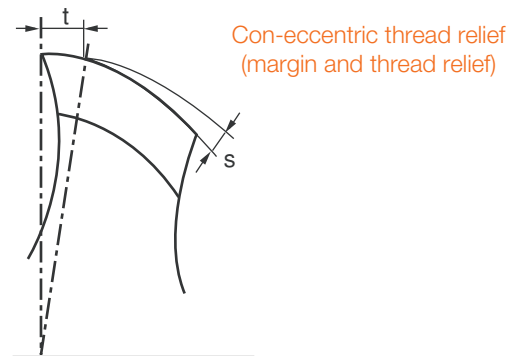
#### Completely fixed holder type

The tap is completely mounted with no axial or radial adjustment in the collet and holder.

## Characteristics of self-guidance behavior in tapping



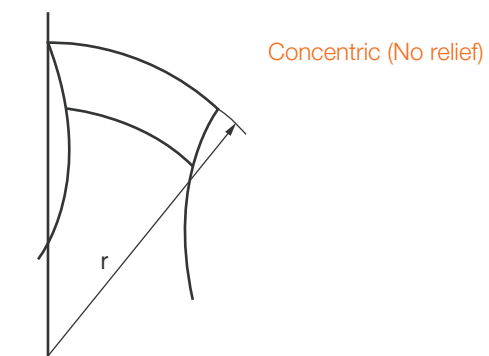
Cutting and machining performance are very high for this type of holder; however, a fully synchronous machining system with fixing holder is needed.  
**Example: "High speed tapping" and "fully synchronous tapping."**



The combination of radial margin, thread relief and chamfer relief helps to make the correct tap guidance.

#### Adjustable spring floating holder (Tension & Compression)

Machine feed and tap's pitch errors are corrected by two types of spring system, Vertical tap's tensional direction and Vertical tap's compressional direction.)



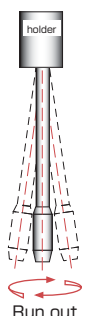
There is no radial relief at cutting edge creating an easy self-guidance of the tap while tapping under less synchronous feed condition.



# Common reasons for over size-cutting of internal thread and its mechanism


1. Run out, misalignment, inclined hole/cutting at inclined hole → **Over-cutting at radial direction**

**Run out during tapping**



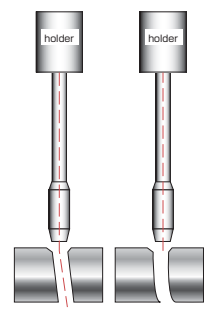
Chuck needs to be adjusted. Tapping with run out can be observed and checked by idle running.

**Misalignment during tapping**



Axis of tapping process and bored hole should be lined up correctly. **Solutions**  
The use of adjustable holder with floating features will reduce this problem.

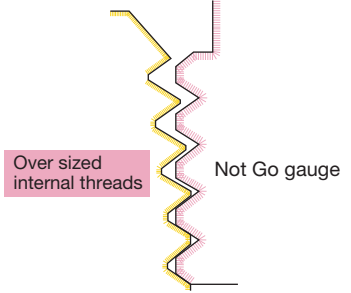
**Inclined hole/Cutting at inclined hole**



Verifacation of prepared hole condition.

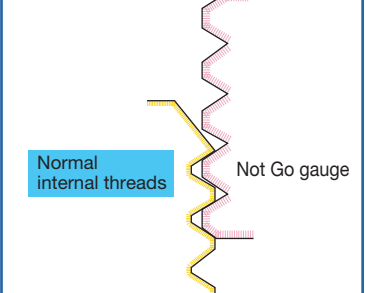
Over-cutting is caused by extra cutting of workpiece at rotational direction. This process is followed along bored hole, which small amount of over-cutting would be observed at bored hole bottom, and over-cutting would be observed at bored hole entrance.

**Over-cutting at radial direction**

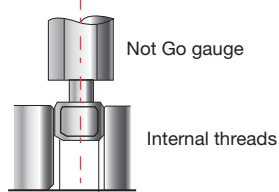


Over sized internal threads

**Normal internal threads**



Normal internal threads



2. Using a tap not suitable for the operation or a tap with a dull cutting edge may cause galling and over-cutting. **Over-cutting caused by galling and excess cutting**

Tapping process with incorrect tap for workpiece

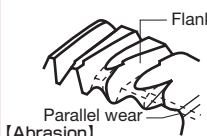
Tap

- Straight fluted tap
- Spiral fluted tap
- Spiral pointed tap
- Roll tap

Selection of correct taps are strongly recommended.

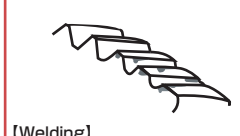
Tapping process with dull edge

Abrasion




[Abrasion]

Welding



[Welding]

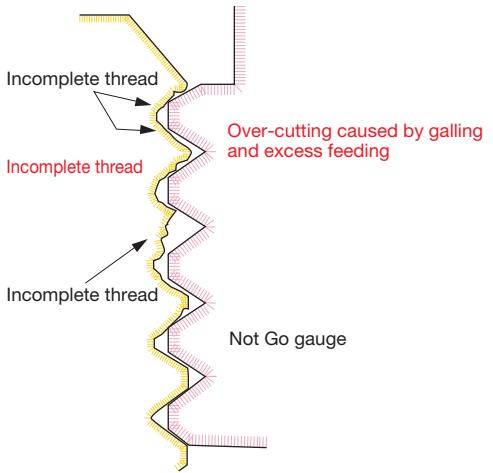
Chipping



[Breakage of Chamfer/chipping]

Proper use of cutting oil, confirmed value to establish tool life constant

A torn thread is observed at the surface of internal thread. When this situation is continued, over-cutting of internal thread, deformed threads, interrupted threads, and finally it leads to over-cutting of internal thread.

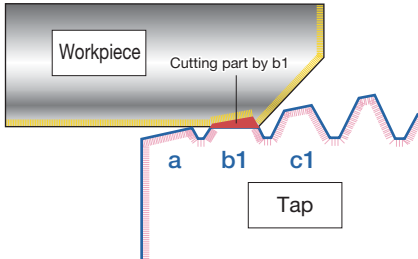


The reasons for over-cutting of internal thread lead and its mechanism

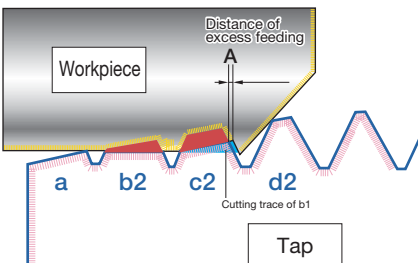
3. Tapping with improper feed condition → over-cutting at axial direction

The mechanism producing an incorrect thread;

① At cutting edge b1, cutting chamfer

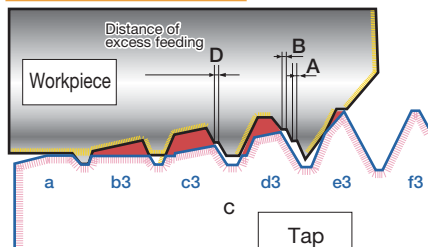


② Position after the tap rotates 1 turn. Cutting trace(b1) and thread phase of cutting face(c2) are misaligned creating the distance of excessive feeding A.



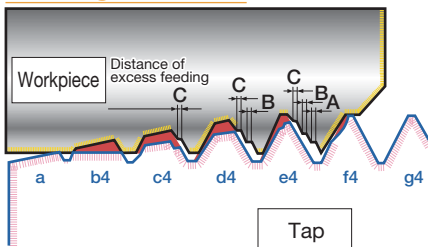
③ Position after the tap rotates 2 turns. Cutting chamfer(c3) is misaligned until the distance of excess feeding B and cutting chamfer (d3) is misaligned until the distance of over feeding A+B.

Cutting situation



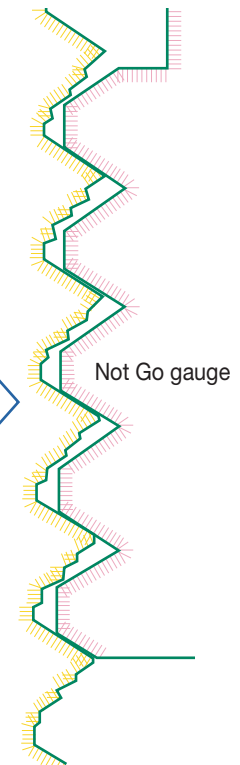
④ Position of thread after 3 rotations of tap. The thread continues to misalign until the distance of the thread lead is in error from excessive feeding C.

Cutting situation

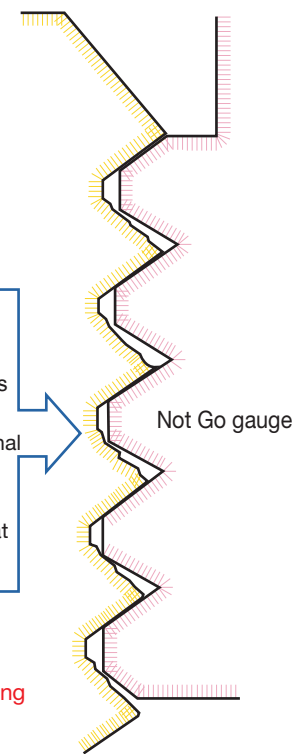


- Feed adjustment is strongly recommended.**
- \* (Use of fully synchronous feed system and fixing holder)
  - Cutting machine that do not have the functions listed, such as drilling machine.
  - \* The correct balance of main spindle adjustment is strongly recommended.
  - \* Use an axial/radial floating holder for its adjustment.

**over-cutting of the thread by excessive feeding.**  
A clearance gap is created at the back frank of thread. An additional amount of material is cut at front frank, creating an incomplete threads



**over-cutting thread by too slow feeding;**  
This mechanism creates a the opposite of excess feeding or over-cutting internal thread. A clearance gap is created at teh front frank and extra material is cut at back frank.



Reasons for over-cutting during tapping process (overview)

- ① The tap mounting condition in the holder.
- ② The condition of bored hole.
- ③ The cutting oil selection.
- ④ Incorrect adjustment of feed balance.
- ⑤ Selecting the correct tap from the tap selection section.

The reasons for over-cutting of internal thread and its mechanism

Technical Information

## Trouble Shooting

Troubles		Breakage			Excessive wear	
Check point		Prevent excessive cutting torque	Prevent clogging of chips	Tap	Workpiece	Tap
Segments						
Workpiece	Hardness	● Use workpiece which has even structure and hardness.			○ Use workpiece which has even structure and hardness.	
	Shape	● Pay attention for tapping position and material thickness.			● Pay attention for tapping position and material thickness.	
	Bored hole	◎ Provide bigger bored holes. ● Prevent work hardening.			○ Provide bigger bored holes. ● Provide countersinking on hole entrance. ○ Prevent work hardening.	
		◎ Provide deeper tapping hole. ● Prevent slanting of hole.				
Machine		● Avoid inconsistent feed. ● Adjust feed stroke.				
Jigs, Holders		● Use tap holder of floating type. ◎ Use tap holder with torque limiter.				
Cutting condition		○ Reduce cutting speed.			○ Reduce cutting speed.	
Lubricant		● Use the other cutting oil which prevents cold welding. ● Use non soluble type cutting oil.			● Provide proper timing for changing or filling-up of cutting oil. ● Prevent mixing of other oil into cutting oil. ● Use other cutting oil which prevents cold welding. ● Use cutting oil of non soluble type. ● Adjust flow of cutting oil and method of lubrication.	
On process			● Remove unnecessary chips during tapping. ● Provide bigger space for chips disposal.			
Tap	Selection			● Use PO tap(through hole). ● Use SP tap(blind hole). ● Use Roll tap.		
	Design		● Provide bigger chiproom.	● Change material of taps. ● Provide proper hardness on taps.		● Use set tap. ● Change material of taps. ● Provide proper hardness on taps.
		● Reconsider length of cutting chamfer. ● Use set tap.				● Reconsider length of cutting chamfer. ● Provide nitride on taps.
Re-grind	● Be careful about burning during re-sharpening. ● Provide proper land.				● Be careful about burning during re-sharpening. ● Increase re-sharpening frequency.	

Undersize cutting of internal thread			Bad surface, surface damaged		
Improve cutting performance	Selection and design of tap	Work material	Improve cutting performance	Prevent welding	Check cutting condition
		●Check workmaterial.			●Provide proper hardness on workpiece material.
		●Pay attention for tapping position and material thickness.			●Pay attention for tapping position and material thickness.
●Adopt bigger tapping hole. ●Prevent work hardening of material.					
			●Prevent work hardening of material.	●Adopt bigger tapping hole.	○Prevent slanting of hole.
					○Feed according to pitch.
					●Use the tap holder of floating type. ●Prevent vibrating of axis of tap ●Prevent centering -off with work piece.
			●Reduce cutting speed.		
			●Provide proper timing for changing or filling-up of cutting oil. ●Prevent mixing of other oil into cutting oil. ●Use other cutting oil which prevents cold welding. ●Use cutting oil with non soluble type. ●Adjust flow of cutting oil and method of lubrication.		
				●Remove unnecessary chips around tapping.	
●Provide Nitride on taps.	○Use oversize taps.		●Use spiral pointed taps (for through hole).	○Provide oxide coating on taps.	○Use oil hole taps.
○Provide larger cutting angle.	●Adjust relief angle on cutting chamfer.		○Provide larger cutting angle.	●Change of no. of flutes on taps.	●Reconsider length of cutting chamfer.
	○Provide thread relief.		●Adjust relief angle on cutting chamfer. ○Provide more narrow margin.		
●Increase re-sharpening frequency.			●Increase re-sharpening frequency.	●Provide better surface finishing on flutes.	
			●Provide precise re-sharpening. ●Be careful about burning during re-sharpening.		

## Trouble Shooting

Troubles		Over-cutting of internal thread				
Check point		Prevent uneven in feed of tap	Prevent over cutting on thread	Prevent welding	Check cutting condition	Prevent unbalance on entering
Segments						
Workpiece	Hardness	●Use workpiece which has even structure and hardness.				
	Shape					
	Bored hole			●Provide bigger hole.	●Prevent slanting of hole.	●Provide countersinking on the hole entrance.
Machine		●Adjust a feed. ◎Feed according to pitch.				
Jigs, Holders					○Use tap holder of floating type.	◎Prevent vibrating of axis of tap. ○Prevent centering-off with work piece. ●Use tap holder of floating type.
Cutting condition				●Reduce cutting speed.		
Lubricant				●Use other cutting lubricant which prevents cold welding. ●Check the viscosity.		
On process						
Tap	Selection			◎Provide oxide surface treatment. ○Use tap with oil hole.		
	Design		○Provide small cutting angle. ●Adjust chamfer relief angle. ◎Check the width of thread margin.	●Provide short thread length.	●Reconsider number of flutes of tap.	●Reconsider number of flutes of tap.
	Re-grind		●Remove burrs on teeth after re-grinding. ●Provide proper land.		●Provide precise re-sharpening.	◎Care for vibration.

◎ : Most suitable solution

○ : Second most suitable solution

Chipping				Tapping operation	
Prevent clogging of chips	Prevent excessive cutting torque	Improve tapping method	Tap	Prevent clogging of chips	Tap
	● Use workpiece material which has even structure and hardness.				
		○ Pay attention for tapping position and material thickness.		● If possible, use finer pitch tap or shorter tapping length.	
Provide deeper tapping hole(Blind hole).	○ Provide bigger tapping hole. ● Prevent work hardening.	● Prevent slanting of holes.		○ Reduce cutting speed. ○ Provide deeper tapping hole(Blind hole).	
● Provide countersinking on hole the entrance.					
	● Avoid inconsistent feed.				
	○ Use tapping holder with torque limiter.	● Prevent centering-off with workpiece. ● Prevent vibration of axis of tap. ● Use the tap holder of floating type.			● Use the tap holder of floating type. ● Prevent vibrating of axis of tap. ● Prevent centering -off with workpiece.
● Reduce cutting speed.				● Reduce cutting speed.	
	● Use the other cutting oil which prevent cold welding.			● Check the viscosity.	
● Remove unnecessary chips during tapping. ● Provide bigger space for chip disposal.				● Remove unnecessary chips during tapping. ● Provide bigger space for chip disposal.	
			● Use PO taps (Through hole). ● Use SP taps (Blind hole). ● Use Roll tap.		● Use PO taps (Through hole). ● Use SP taps (Blind hole). ● Use Roll tap.
● Provide bigger chip room.			● Change material of tap. ● Provide smaller cutting angle. ● Provide proper hardness.	● Provide bigger chip room. ● Reconsider length of cutting chamfer.	
● Reduce cutting speed. ● Reduce cutting speed. ● Adjust relief angle on cutting chamfer.				○ Use oil hole tap. ● Provide shorter thread length to tap.	
● Be careful about burning during re-sharpening.					

# Thread Series

Thread Series

■ Unified Threads

Unit : mm

Size		Nominal Dia.		Threads per inch												
Column 1	Column 2	inch	mm	Coarse	Fine	Extra Fine	Constant pitch series									
				UNC	UNF	UNEF	4UN	6UN	8UN	12UN	16UN	20UN	28UN	32UN		
No. 0	No. 1	0.0600	1.524		80											
No. 2		0.0730	1.854	64	72											
		0.0860	2.184	56	64											
No. 4	No. 3	0.0990	2.515	48	56											
No. 5		0.1120	2.845	40	48											
		0.1250	3.175	40	44											
No. 6		0.1380	3.505	32	40											UNC
No. 8		0.1640	4.166	32	36											UNC
No.10		0.1900	4.826	24	32											UNF
	No.12	0.2160	5.486	24	28	32										UNEF
1/4			0.2500	6.350	20	28	32									
5/16		0.3125	7.938	18	24	32							UNC	20	28	UNEF
3/8		0.3750	9.525	16	24	32							UNC	20	28	UNEF
7/16		0.4375	11.112	14	20	28							16	UNF	UNEF	32
1/2		0.5000	12.700	13	20	28							16	UNF	UNEF	32
9/16		0.5625	14.288	12	18	24				UNC			16	20	28	32
5/8		0.6250	15.875	11	18	24				12			16	20	28	32
3/4	11/16	0.6875	17.462			24				12			16	20	28	32
		0.7500	19.050	10	16	20				12			UNF	UNEF	28	32
	13/16	0.8125	20.638			20				12			16	UNEF	28	32
7/8		0.8750	22.225	9	14	20				12	16		UNEF	UNEF	28	32
	15/16	0.9375	23.812			20				12	16		UNEF	UNEF	28	32
1			1.0000	25.400	8	12	20				12	16		UNEF	UNEF	28
	1 1/16	1.0625	26.988			18				UNC	8		12	16	20	28
1 1/8		1.1250	28.575	7	12	18				8	UNF		16	20	28	
	1 3/16	1.1875	30.162			18				8	12		16	20	28	
1 1/4		1.2500	31.750	7	12	18				8	UNF		16	20	28	
	1 5/16	1.3125	33.338			18				8	12		16	20	28	
1 3/8			1.3750	34.925	6	12	18				UNC	8		UNF	16	20
	1 7/16	1.4375	36.512			18				6	8		12	16	20	28
1 1/2		1.5000	38.100	6	12	18				UNC	8		UNF	16	20	28
	1 9/16	1.5625	39.688			18				6	8		12	16	20	
1 5/8		1.6250	41.275			18				6	8		12	16	20	
	1 11/16	1.6875	42.862			18				6	8		12	16	20	
1 3/4			1.7500	44.450	5						6	8		12	16	20
	1 13/16	1.8125	46.038							6	8		12	16	20	
1 7/8		1.8750	47.625							6	8		12	16	20	
	1 15/16	1.9375	49.212							6	8		12	16	20	
2		2.0000	50.800	4 1/2						6	8		12	16	20	
2 1/4	2 1/8	2.1250	53.975							6	8		12	16	20	
		2.2500	57.150	4 1/2						6	8		12	16	20	
2 1/2	2 3/8	2.3750	60.325							6	8		12	16	20	
		2.5000	63.500	4						UNC	6		8	12	16	20
2 3/4	2 5/8	2.6250	66.675							4	6		8	12	16	20
3		2.7500	69.850	4						UNC	6		8	12	16	20
	2 7/8	2.8750	73.025							4	6		8	12	16	20
		3.0000	76.200	4						UNC	6		8	12	16	20
3 1/4	3 1/8	3.1250	79.375							4	6		8	12	16	
		3.2500	82.550	4						UNC	6		8	12	16	
	3 3/8	3.3750	85.725							4	6		8	12	16	
3 1/2		3.5000	88.900	4						UNC	6		8	12	16	
	3 5/8	3.6250	92.075							4	6		8	12	16	
3 3/4			3.7500	95.250	4						UNC	6		8	12	16
	3 7/8	3.8750	98.425							4	6		8	12	16	
4		4.0000	101.600	4						UNC	6		8	12	16	
	4 1/8	4.1250	104.775							4	6		8	12	16	
4 1/4		4.2500	107.950							4	6		8	12	16	
	4 3/8	4.3750	111.125							4	6		8	12	16	
4 1/2			4.5000	114.300							4	6		8	12	16
	4 5/8	4.6250	117.475							4	6		8	12	16	
4 3/4		4.7500	120.650							4	6		8	12	16	
	4 7/8	4.8750	123.825							4	6		8	12	16	
5		5.0000	127.000							4	6		8	12	16	
	5 1/8	5.1250	130.175							4	6		8	12	16	
5 1/4			5.2500	133.350							4	6		8	12	16
	5 3/8	5.3750	136.525							4	6		8	12	16	
5 1/2		5.5000	139.700							4	6		8	12	16	
	5 5/8	5.6250	142.875							4	6		8	12	16	
5 3/4			5.7500	146.050							4	6		8	12	16
	5 7/8	5.8750	149.225							4	6		8	12	16	
6			6.0000	152.400							4	6		8	12	16

\*: Please select the first column by priority. And select second column and third column if necessary.

■ Conversion Table

Threads per inch	Pitch
100	0.2540
80	0.3175
72	0.3528
64	0.3969
60	0.4233
56	0.4536
48	0.5292
44	0.5773
40	0.6350
36	0.7056
32	0.7938
28	0.9071
27	0.9407
24	1.0583
20	1.2700
19	1.3368
18	1.4111
16	1.5875
14	1.8143
13	1.9538
12	2.1167
11 1/2	2.2087
11	2.3091
10	2.5400
9	2.8222
8	3.1750
7	3.6286
6	4.2333
5	5.0800
4 1/2	5.6444
4	6.3500

Technical Information



# Dimension table for Metric threads

Dimension table for Metric threads

Unit:mm

nominal size	pitch	0.2	0.25	0.3	0.35	0.4	0.45	0.5	0.6	0.7	0.75	0.8	1	1.25	1.5	1.75	2	2.5	3	3.5	4	4.5	5	
1		0.2	0.25																					
1.1		0.2	0.25																					
1.2		0.2	0.25																					
1.4		0.2		0.3																				
1.6		0.2			0.35																			
1.7		0.2			0.35																			
1.8		0.2			0.35																			
2			0.25			0.4																		
2.2			0.25				0.45																	
2.3			0.25			0.4																		
2.5					0.35		0.45																	
2.6					0.35		0.45																	
3					0.35			0.5	0.6															
3.5					0.35				0.6															
4								0.5		0.7	0.75													
4.5								0.5			0.75													
5								0.5			0.75	0.8												
5.5								0.5			0.75		1											
6								0.5			0.75		1											
7								0.5			0.75		1											
8								0.5			0.75		1	1.25										
9								0.5			0.75		1	1.25	1.5									
10								0.5			0.75		1	1.25	1.5									
11								0.5			0.75		1	1.25	1.5									
12								0.5			0.75		1	1.25	1.5	1.75								
13								0.5			0.75		1	1.25	1.5	1.75								
14								0.5			0.75		1	1.25	1.5	1.75	2							
15								0.5			0.75		1	1.25	1.5		2							
16								0.5			0.75		1	1.25	1.5		2							
17								0.5			0.75		1	1.25	1.5		2							
18								0.5			0.75		1	1.25	1.5		2	2.5						
19								0.5			0.75		1	1.25	1.5		2	2.5						
20								0.5			0.75		1	1.25	1.5		2	2.5						
22								0.5			0.75		1	1.25	1.5		2	2.5						
24								0.5			0.75		1	1.25	1.5		2		3					
25												1		1.5			2		3					
26												1		1.5			2		3					
27												1		1.5			2		3					
28												1		1.5			2		3					
30												1		1.5			2		3	3.5				
32												1		1.5			2		3	3.5				
33												1		1.5			2		3	3.5				
34												1		1.5			2		3					
35												1		1.5			2		3					
36												1		1.5			2		3		4			
37													1	1.5										
38												1		1.5			2		3					
39													1	1.5			2		3		4			
40													1	1.5			2		3		4			
42														1.5			2		3		4	4.5		
44														1.5			2		3		4			
45														1.5			2		3		4	4.5		
46														1.5			2		3		4			
48														1.5			2		3		4			5

※Letters in red mean Coarse screw threads.

※Please refer to PRAD system page 2 when you'd like to use PRAD system.

※Please contact our sales staff if you require the thread shown in above table, but its thread is not listed in this catalog.

# Screw Thread Terms and Definitions

**Major Diameter** — The largest diameter of a straight thread.

**Minor Diameter** — The smallest diameter of a straight thread

**Angle of Thread** — The angle included between the flanks of the thread measured in an axial plane.

**Half Angle of Thread** — The angle included between a flank of thread and the normal (90°) to the axis, measured in an axial plane.

**Pitch** — The distance from a point on a screw to a corresponding point on the next thread measured parallel to the axis.

**Metric** — The pitch in inches =  $\frac{\text{Pitch in Millimeters}}{25.4}$

**Inches** — The pitch in inches =  $\frac{1}{\text{Number of threads per inch}}$

**Lead of Thread** — The distance a screw thread advances axially in one turn. On a single-thread screw the lead and pitch are identical. On a double-thread, the lead is 2 x the pitch. On a triple-thread the lead is 3 x pitch, etc.

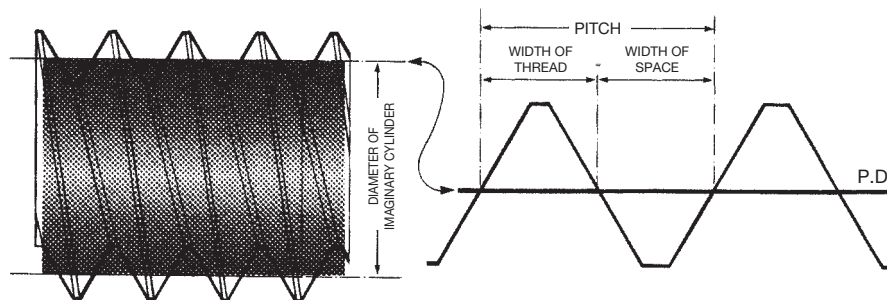
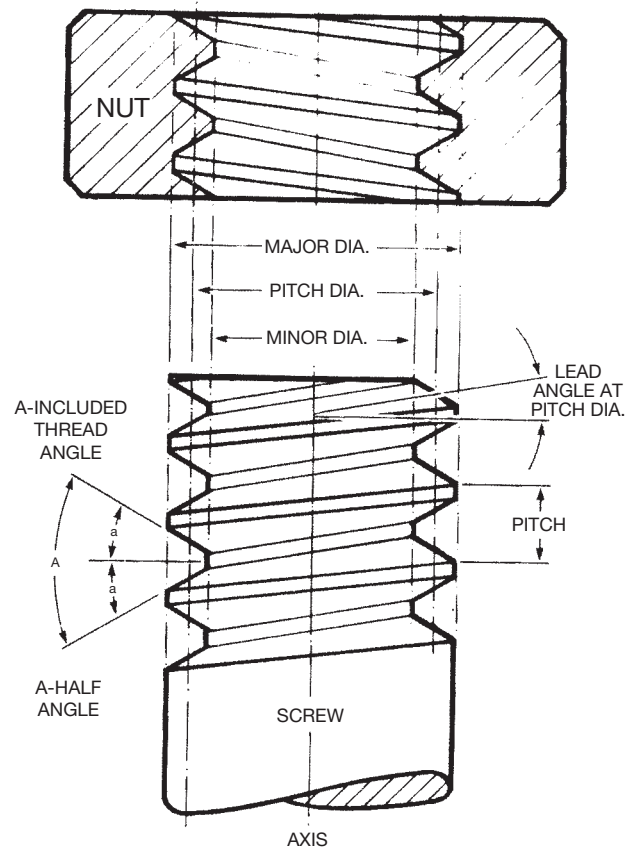
**Lead Angle** — The angle made by the helix of a thread at the pitch diameter with a line perpendicular to the axis.

**Tolerance** — The total amount of variation permitted from a specified dimension. Tolerance may be expressed plus, minus or both.

**Allowance** — The intentional minimum clearance between mating threads.

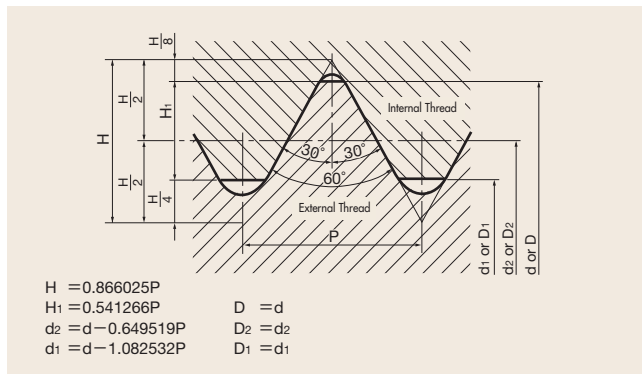
**Length of Engagement** — The length that is engaged measured parallel to the axis, when mating parts are fully assembled.

**Pitch Diameter** — On a straight screw thread, the diameter of an imaginary cylinder, the surface of which would pass through the threads at such points as to make equal the width of the threads and the width of the spaces cut by the surface of the cylinder.

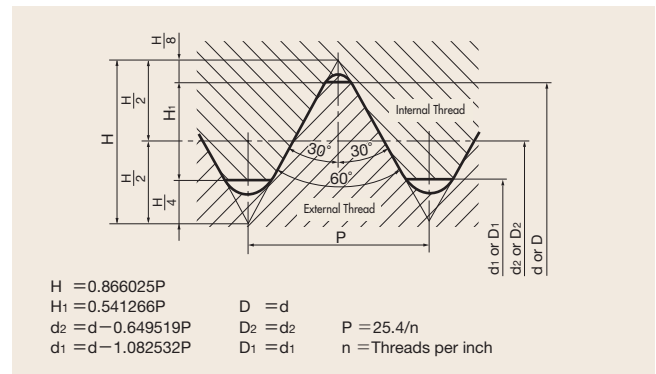


# Basic profile of threads

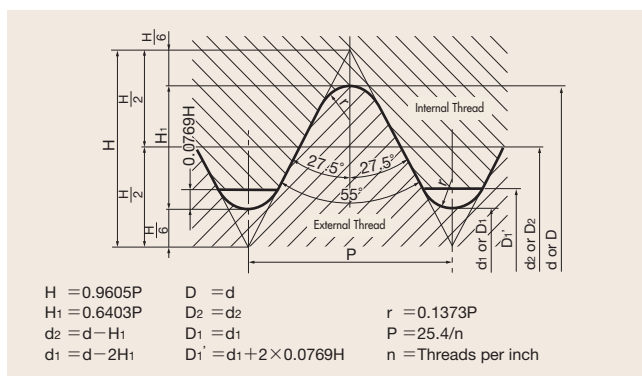
## Metric Screw Threads (M)



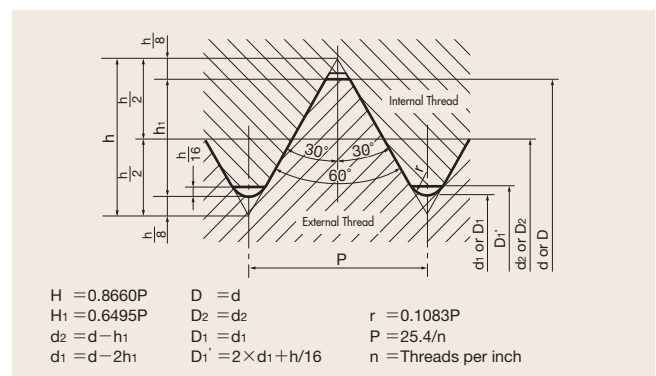
## Unified Screw Threads (UNC, UNF, etc.)



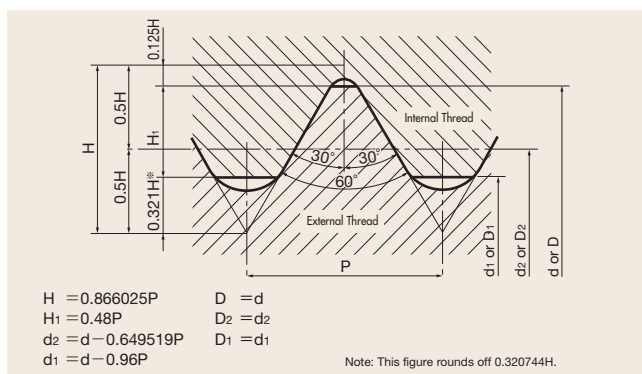
## Whitworth Screw Threads (W)



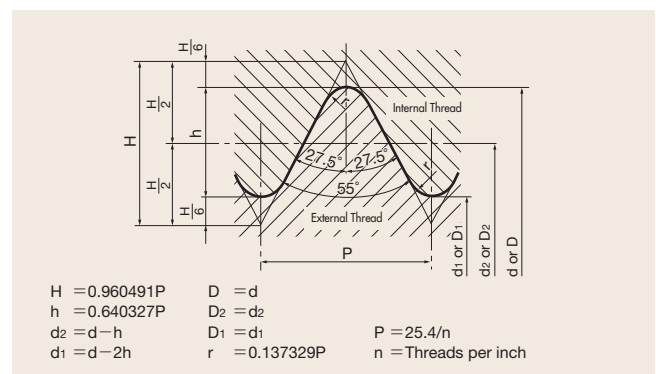
## Screw Threads for Sewing Machine (SM)



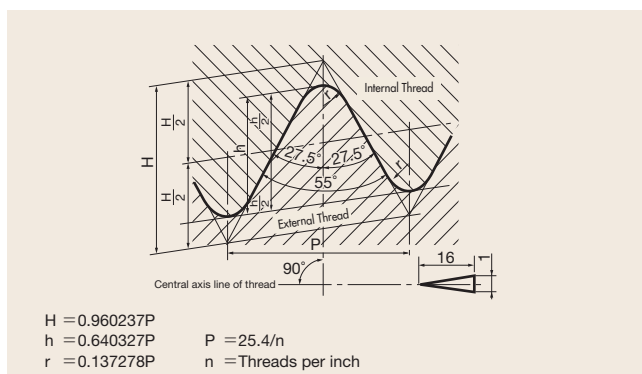
## Miniature Screw Threads (S)



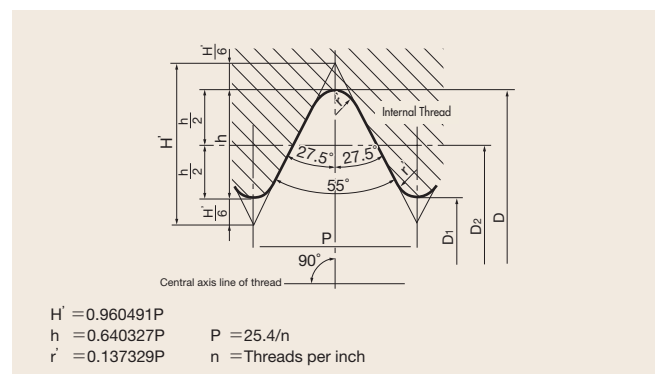
## Parallel Pipe Threads (G, PF)



## Taper Pipe Threads (R, Rc, PT)

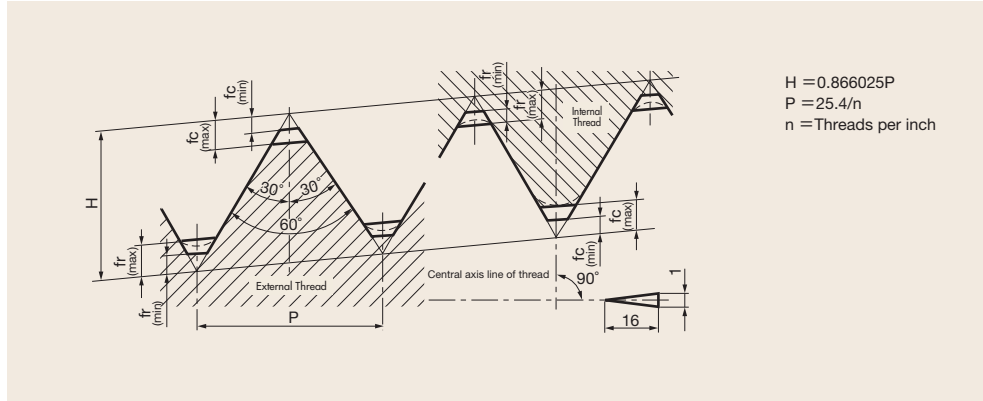


## Taper Pipe Threads (Parallel) (Rp, PS)



## Basic profile of threads

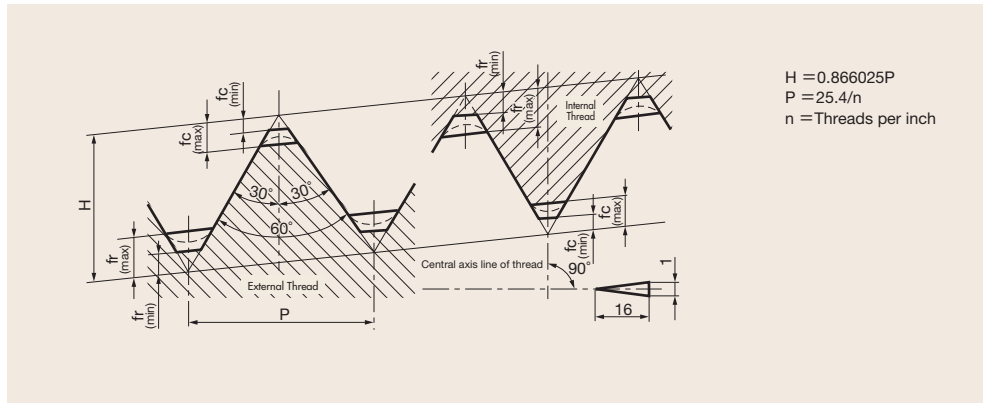
### American Standard Taper Pipe Threads (NPT)



Truncation Unit : mm

Threads per inch	Section	fc = fr
27	Max.	0.096P
	Min.	0.033P
18	Max.	0.088P
	Min.	0.033P
14	Max.	0.078P
	Min.	0.033P
11.5	Max.	0.073P
	Min.	0.033P
8	Max.	0.062P
	Min.	0.033P

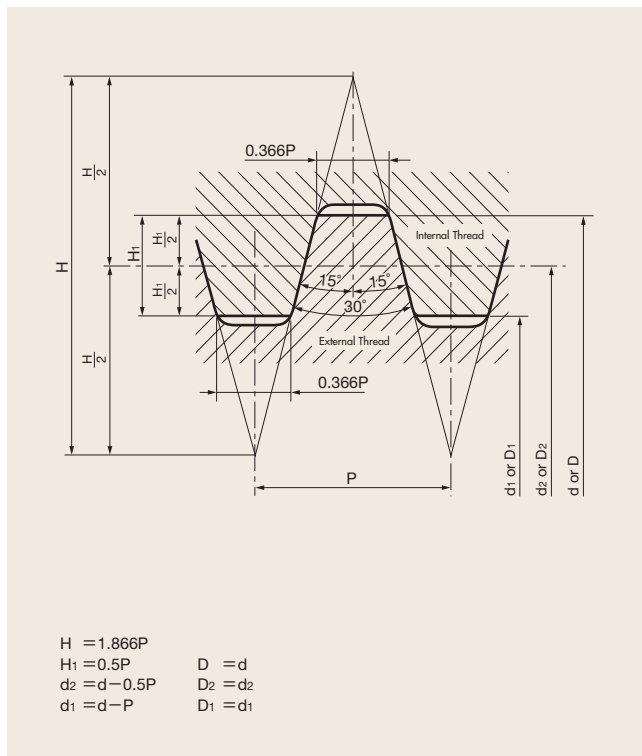
### Dryseal American Standard Taper Pipe Threads (NPTF)



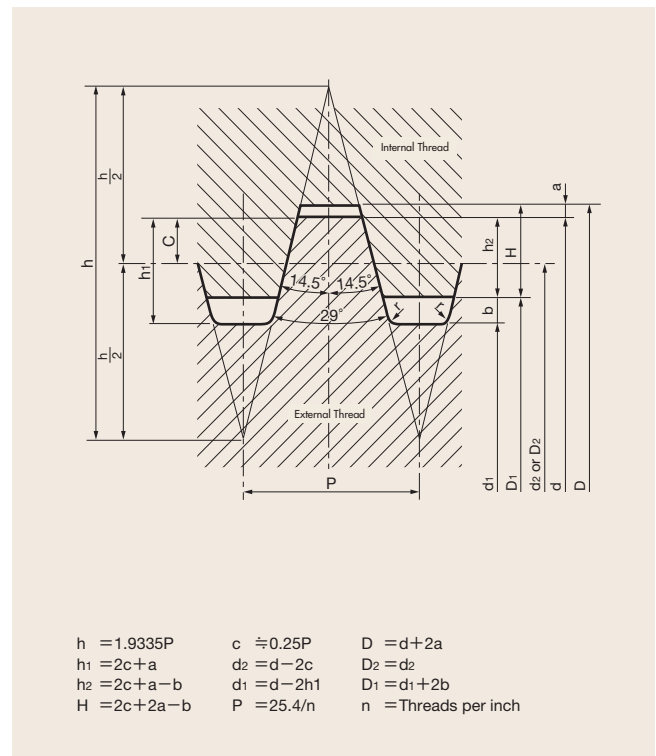
Truncation Unit : mm

Threads per inch	Section	fc	fr
27	Max.	0.094P	0.140P
	Min.	0.047P	0.094P
18	Max.	0.078P	0.109P
	Min.	0.047P	0.078P
14	Max.	0.060P	0.085P
	Min.	0.036P	0.060P
11.5	Max.	0.060P	0.090P
	Min.	0.040P	0.060P
8	Max.	0.055P	0.076P
	Min.	0.042P	0.055P

### Metric Trapezoidal Screw Threads (Tr)



### 29° Trapezoidal Screw Threads (Tw)



Basic profile of threads

Technical Information

**USCTI SPECIFICATION**

The following tables and formula are used in determining the limits and tolerances for ground thread taps having a thread lead angle not in excess of 5°, unless otherwise specified.

**LEAD TOLERANCE**

A maximum lead deviation of ±0.0005", within any two threads not farther apart than 1" is permitted.

**ANGLE TOLERANCE**

Threads Per Inch	Deviation in Half Angle
4 to 5-1/2 incl.	±20'
6 to 9 incl.	±25'
10 to 80 incl.	±30'

**FORMULA**

Max. Major Dia. = Basic + A  
 Min. Major Dia. = Basic + B  
 In the above formula:  
 A = Constant to add = 0.130P for all Pitches  
 B = Major Diameter Tolerance = 0.087P for 48 Through 80 TPI  
   = 0.076P for 36 Through 47 TPI  
   = 0.065P for 4 Through 35 TPI  
 C = Amount over basic for minimum pitch diameter  
 D = Pitch diameter tolerance

Note: When the tap major diameter must be determined from a specified tap pitch diameter, the maximum major diameter equals the minimum specified pitch diameter minus Constant C, plus 0.64952P, plus Constant A.

Threads Per Inch	A	B	C			D			
			To 5/8" Incl.	Over 5/8" to 2 1/2" Incl.	Over 2 1/2"	To 1" Incl.	Over 1" to 1 1/2" Incl.	Over 1 1/2" to 2 1/2" Incl.	Over 2 1/2"
80	0.0016	0.0011	0.0005	0.0010	0.0015	0.0005	0.0010	0.0010	0.0015
72	0.0018	0.0012	0.0005	0.0010	0.0015	0.0005	0.0010	0.0010	0.0015
64	0.0020	0.0014	0.0005	0.0010	0.0015	0.0005	0.0010	0.0010	0.0015
56	0.0023	0.0016	0.0005	0.0010	0.0015	0.0005	0.0010	0.0010	0.0015
48	0.0027	0.0018	0.0005	0.0010	0.0015	0.0005	0.0010	0.0010	0.0015
44	0.0030	0.0017	0.0005	0.0010	0.0015	0.0005	0.0010	0.0010	0.0015
40	0.0032	0.0019	0.0005	0.0010	0.0015	0.0005	0.0010	0.0010	0.0015
36	0.0036	0.0021	0.0005	0.0010	0.0015	0.0005	0.0010	0.0010	0.0015
32	0.0041	0.0020	0.0010	0.0010	0.0015	0.0005	0.0010	0.0010	0.0015
28	0.0046	0.0023	0.0010	0.0010	0.0015	0.0005	0.0010	0.0010	0.0015
24	0.0054	0.0027	0.0010	0.0010	0.0015	0.0005	0.0010	0.0015	0.0015
20	0.0065	0.0032	0.0010	0.0010	0.0015	0.0005	0.0010	0.0015	0.0015
18	0.0072	0.0036	0.0010	0.0010	0.0015	0.0005	0.0010	0.0015	0.0015
16	0.0081	0.0041	0.0010	0.0010	0.0015	0.0005	0.0010	0.0015	0.0020
14	0.0093	0.0046	0.0010	0.0015	0.0015	0.0005	0.0010	0.0015	0.0020
13	0.0100	0.0050	0.0010	0.0015	0.0015	0.0005	0.0010	0.0015	0.0020
12	0.0108	0.0054	0.0010	0.0015	0.0015	0.0005	0.0010	0.0015	0.0020
11	0.0118	0.0059	0.0010	0.0015	0.0020	0.0005	0.0010	0.0015	0.0020
10	0.0130	0.0065	-	0.0015	0.0020	0.0005	0.0010	0.0015	0.0020
9	0.0144	0.0072	-	0.0015	0.0020	0.0005	0.0010	0.0015	0.0020
8	0.0162	0.0081	-	0.0015	0.0020	0.0005	0.0010	0.0015	0.0020
7	0.0186	0.0093	-	0.0015	0.0020	0.0010	0.0010	0.0020	0.0025
6	0.0217	0.0108	-	0.0015	0.0020	0.0010	0.0010	0.0020	0.0025
5 1/2	0.0236	0.0118	-	0.0015	0.0020	0.0010	0.0015	0.0020	0.0025
5	0.0260	0.0130	-	0.0015	0.0020	0.0010	0.0015	0.0020	0.0025
4 1/2	0.0289	0.0144	-	0.0015	0.0020	0.0010	0.0015	0.0020	0.0025
4	0.0325	0.0162	-	0.0015	0.0020	0.0010	0.0015	0.0020	0.0025

For intermediate pitches, use values for next coarser pitch for C and D, but use formulas for A and B.

# Symbols for Standard Threads

## USA

Thread symbols	Kinds of threads	Related Standards
UN	Unified inch screw threads	ANSI B 1.1
UNC/UNRC	Unified coarse thread series	ANSI B 1.1
UNF/UNRF	Unified fine thread series	ANSI B 1.1
UNEF/UNREF	Unified extra-fine thread series	ANSI B 1.1
4UN/4UNR	Unified constant-pitch series with 4-threads	ANSI B 1.1
6UN/6UNR	Unified constant-pitch series with 6-threads	ANSI B 1.1
8UN/8UNR	Unified constant-pitch series with 8-threads	ANSI B 1.1
12UN/12UNR	Unified constant-pitch series with 12-threads	ANSI B 1.1
16UN/16UNR	Unified constant-pitch series with 16-threads	ANSI B 1.1
20UN/20UNR	Unified constant-pitch series with 20-threads	ANSI B 1.1
28UN/28UNR	Unified constant-pitch series with 28-threads	ANSI B 1.1
32UN/32UNR	Unified constant-pitch series with 32-threads	ANSI B 1.1
UN/UNRS	Unified threads of special diameters, pitches and lengths of engagement	ANSI B 1.1
NR	American National thread with a0.108p to 0.144p controlled root radius	MIL-B-7838
Acme	Acme screw threads	ANSI B 1.5
Stub-Acme	Stub Acme screw threads	ANSI B 1.8
Butt	Buttress inch screw threads	ANSI B 1.9
UNM	Unified miniature thread series	ANSI B 1.10
NC5	Class 5 interference-fit thread	ANSI B 1.12
NPT	American Standard taper pipe threads for general use	ANSI/ASME B 1.20.1
NPTR	American Standard taper pipe threads for railing joints	ANSI/ASME B 1.20.1
NPSC	American Standard straight pipe thread in pipe couplings	ANSI/ASME B 1.20.1
NPSL	American standard straight pipe threads for loose-fitting mechanical joints with locknuts	ANSI/ASME B 1.20.1
NPSM	American Standard straight pipe threads for free-fitting mechanical joints for fixture	ANSI/ASME B 1.20.1
NPSH	American Standard straight pipe threads for loose-fitting mechanical joints for hose couplings	ANSI/ASME B 1.20.1
NPTF	Dryseal American Standard taper pipe threads	ANSI B 1.20.3, 1.20.4
F-PTF	Dryseal fine taper pipe thread series	ANSI B 1.20.3, 1.20.4
PTF-SAE SHORT	Dryseal SAE short taper pipe threads	ANSI B 1.20.3, 1.20.4
PTF-SPL SHORT	Dryseal special short taper pipe threads	ANSI B 1.20.3, 1.20.4
PTF-SPL EXTRA SHORT	Dryseal special extra short taper pipe threads	ANSI B 1.20.3, 1.20.4
SPL-PTF	Dryseal special taper pipe threads	ANSI B 1.20.3, 1.20.4
NPSI	Dryseal American Standard intermediate internal straight pipe threads	ANSI B 1.20.3, 1.20.4
NPSF	Dryseal American Standard fuel internal straight pipe threads	ANSI B 1.20.3, 1.20.4
ANPT	Aeronautical National Form taper pipe threads	MIL-P-7150
NGO	National gas outlet threads	ANSI B 57.1
NGS	National gas straight threads	ANSI B 57.1
NGT	National gas taper threads	ANSI B 57.1
SGT	Special gas taper threads	ANSI B 57.1
NH	Hose coupling and firehose coupling threads	USAS B 2.4
NHR	Hose coupling and firehose coupling threads	USAS B 2.4
NPSH	Hose coupling and firehose coupling threads	USAS B 2.4
AMO	American standard microscope objective threads	ANSI B 1.11

Symbols for Standard Threads

■ Japan

Thread symbols	Kinds of threads	Related Standards
M	Metric screw threads, Coarse series	JIS B 0205-1~0205-4
M	Metric screw threads, Fine series	JIS B 0205-1~0205-4
S	Miniature screw threads	JIS B 0201
UNC	Unified threads, Coarse series	JIS B 0206
UNF	Unified threads, Fine series	JIS B 0208
Tr	Metric Trapezoidal screw threads	JIS B 0216
R	Taper external pipe threads	JIS B 0203(JIS main book)
Rc	Taper internal pipe threads	JIS B 0203(JIS main book)
Rp	Parallel internal pipe threads	JIS B 0203(JIS main book)
G	Parallel pipe threads	JIS B 0202(JIS main book)
PF	Parallel pipe threads	JIS B 0202(JIS Appendix)
PT	Taper pipe threads	JIS B 0203(JIS Appendix)
PS	Taper pipe threads (Parallel)	JIS B 0203(JIS Appendix)
CTC	Screw threads for rigid metal thin-walled conduit and fitting	JIS C 8305
CTG	Screw threads for rigid metal thick-walled conduit and fitting	JIS C 8305
BC	Cycle threads	JIS B 0225
SM	Screw threads for sewing machine	JIS B 0226(2001.2.20repeal)
E	Electric socket and lamp-base threads	JIS C 7709
V	Tyre valve threads of automobile	JIS D 4207
CTV	Tyre valve threads of cycle	JIS D 9422

■ ISO

Thread symbols	Kinds of threads	Related Standards
M	ISO Metric threads	ISO 261
S	ISO Miniature screw threads	ISO R 1501
Tr	ISO Metric trapezoidal screw threads	ISO 2902
UNC	ISO Unified threads, coarse series	ISO 263
UNF	ISO Unified threads, fine series	ISO 263
UNEF	ISO Unified threads, extra fine series	ISO 263
UN	ISO Unified threads, constant pitch series	ISO 263
UNJC	Unified threads (MIL Standard) coarse	ISO 3161
UNJF	Unified threads (MIL Standard) fine	ISO 3161
UNJEF	Unified threads (MIL Standard) extra fine	ISO 3161
UNJ	Unified threads (MIL Standard) constant pitch series	ISO 3161
MJ	Metric threads, MIL Standard	ISO 5855
R	Taper external pipe threads	ISO 7/1
Rc	Taper internal pipe threads	ISO 7/1
Rp	Parallel internal pipe threads	ISO 7/1
G	Parallel pipe threads	ISO 228/1
GL	Glass container threads	ISO R 1115
V	Tyre valve threads	ISO 4570/1~3



### British<sup>※</sup>

Thread symbols	Kinds of threads	Related Standards
UNS	Unified special series	BS 1580
B.S.W.	British Standard Whitworth coarse threads	BS 84
B.S.F.	British Standard fine threads	BS 84
BSP	British Standard pipe thread (corresponding to R, Rc, Rp and G of ISO standard)	BS 21,2779
B.A.	B.A.-Screw threads	BS 93
Acme	General purpose, Acme screw threads	BS 1104
Buttress	Buttress threads	BS 1657
BSC	Cycle threads	BS 811
BSMO	Microscope objective threads	BS 3569
E	Edison screw threads	BS 5042
R.S.M	Rolled sheet metal screw threads and threads for molded plastics and die-cast materials	BS 2038

※ : We left out the symbols after ISO standard was adopted.

### German<sup>※</sup>

Thread symbols	Kinds of threads	Related Standards
GL	Glass containers thread.	DIN 168
S	Buttress thread.	DIN 513,2781,20401
Rd	Knuckle thread.	DIN 405,262,264,3182,7273,15403,20400
W	Whitworth-gewinde.	DIN 168,477,6630,4668,49301
KS,KT	Screw siles for packages made of Plastics.	DIN 6063
E	Edison screw thread.	DIN 40400
Pg	Steel conduit thread.	DIN 40430
Glasg	Thread for cover glasses, porcelain and cast iron caps.	DIN 40450
Vg	Automobile tyre valve thread.	DIN 7756
Gf	Thread for freezing pipes.	DIN 4930
Gg	Threads for drill pipe.	DIN 4941,20314
HA	Thread for bone screws and nuts.	DIN 58810
RMS	Thread connexion for microscope objectives.	DIN 58888
FG	Bicycle threads.	DIN 79012

※ : We left out the symbols after ISO standard was adopted.

# Cross chart of thread cutting tool standard

Tap and Dies names	JIS	TAS	ISO	ANSI	BS	DIN
General specification		4051				
Measuring method		4053				
Technical requirement			8830			2197
Thread limit (Metric)		4052	2857			
Thread limit (Pipe)			5969			
Hand taps (Metric coarse)	B4430	4105	529	B94.9	949	352
Hand taps (Metric fine)	B4430	4106	529	B94.9	949	2181
Hand taps (Unified coarse)	B4432	4107	529	B94.9	949	
Hand taps (Unified fine)	B4438		529	B94.9	949	
Hand taps (Parallel pipe thread)	B4445		2284	B94.9	949	
Hand taps (Taper pipe thread)	B4446		2284	B94.9	949	
Hand taps (American parallel pipe thread)		4113		B94.9		
Hand taps (American taper pipe thread)		4114		B94.9		
Hand taps (American dryseal parallel pipe thread)		4115		B94.9		
Hand taps (American dryseal taper pipe thread)		4116		B94.9		
Nut taps (Metric coarse)	B4433	4109			357	
Nut taps (Metric fine)		4110				
Nut taps (Unified coarse)		4111		B94.9		
Nut taps (Unified fine)		4112				
Machine taps (Metric coarse)						371,376
Machine taps (Metric fine)						374
Bent shank taps (Metric coarse)		4101				
Bent shank taps (Metric fine)		4102				
Bent shank taps (Unified coarse)		4103				
Bent shank taps (Unified fine)		4104				
Long shank machine taps (Metric thread)		4153	2283			
Long shank machine taps (Inch thread)		4153	2283			
Spiral pointed taps		4155		B94.9		
Spiral fluted taps		4154		B94.9		
Shell taps (Metric thread)		4117				
Pulley taps				B94.9		
Thread Forming taps				B94.9		
Blanks for carbide taps				B94.1		
Thread cutting round dies (Metric coarse, Adjustable)	B4451					223
Thread cutting round dies (Metric fine, Adjustable)	B4451					223
Thread cutting round dies (Metric, Solid)	B4451		2568		1127	223
Thread cutting round dies (Unified coarse adjustable)	B4451					
Thread cutting round dies (Unified fine adjustable)	B4451					
Thread cutting round dies (Unified thread)	B4451		2568		1127	
Thread cutting round dies (Parallel pipe thread)	B4455		4231		1127	5158
Thread cutting round dies (Taper pipe thread)	B4456		4230			5159
Hexagon dies			7226		1127	382

※ : We left out the symbols after ISO standard was adopted.

**Symbols: Organization names**

- ISO: International Organization for Standardization
- JIS: Japanese Industrial Standards Committee
- TAS: The Japan Small Tool Makers' Association
- ANSI: American National Standards Institute
- BS: British Standards Institution, UK
- DIN: Deutsches Institut für Normung

# Hardness conversion table

■ Conversion table from Rockwell C hardness of steel.\*1 (Approximate)

Rockwell C Scale Hardness	Vickers Hardness	Brinell Hardness		Rockwell Hardness*3			Rockwell Superficial Hardness			Shore Hardness	MPa*2 Tensile Strength	Rockwell C Scale Hardness*3
		Standard ball	Tungsten Carbide ball	A scale	B scale	D scale	15-N scale	30-N scale	45-N scale			
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	—	(654)	81.2	—	70.7	90.2	77.5	66.7	81	—	60
59	674	—	(634)	80.7	—	69.9	89.8	76.6	65.5	80	—	59
58	653	—	615	80.1	—	69.2	89.3	75.7	64.3	78	—	58
57	633	—	595	79.6	—	68.5	88.9	74.8	63.2	76	—	57
56	613	—	577	79.0	—	67.7	88.3	73.9	62.0	75	—	56
55	595	—	560	78.5	—	66.9	87.9	73.0	60.9	74	2075	55
54	577	—	543	78.0	—	66.1	87.4	72.0	59.8	72	2015	54
53	560	—	525	77.4	—	65.4	86.9	71.2	58.6	71	1950	53
52	544	(500)	512	76.8	—	64.6	86.4	70.2	57.4	69	1880	52
51	528	(487)	496	76.3	—	63.8	85.9	69.4	56.1	68	1820	51
50	513	(475)	481	75.9	—	63.1	85.5	68.5	55.0	67	1760	50
49	498	(464)	469	75.2	—	62.1	85.0	67.6	53.8	66	1695	49
48	484	451	455	74.7	—	61.4	84.5	66.7	52.5	64	1635	48
47	471	442	443	74.1	—	60.8	83.9	65.8	51.4	63	1580	47
46	458	432	432	73.6	—	60.0	83.5	64.8	50.3	62	1530	46
45	446	421	421	73.1	—	59.2	83.0	64.0	49.0	60	1480	45
44	434	409	409	72.5	—	58.5	82.5	63.1	47.8	58	1435	44
43	423	400	400	72.0	—	57.7	82.0	62.2	46.7	57	1385	43
42	412	390	390	71.5	—	56.9	81.5	61.3	45.5	56	1340	42
41	402	381	381	70.9	—	56.2	80.9	60.4	44.3	55	1295	41
40	392	371	371	70.4	—	55.4	80.4	59.5	43.1	54	1250	40
39	382	362	362	69.9	—	54.6	79.9	58.6	41.9	52	1215	39
38	372	353	353	69.4	—	53.8	79.4	57.7	40.8	51	1180	38
37	363	344	344	68.9	—	53.1	78.8	56.8	39.6	50	1160	37
36	354	336	336	68.4	(109.0)	52.3	78.3	55.9	38.4	49	1115	36
35	345	327	327	67.9	(108.5)	51.5	77.7	55.0	37.2	48	1080	35
34	336	319	319	67.4	(108.0)	50.8	77.2	54.2	36.1	47	1055	34
33	327	311	311	66.8	(107.5)	50.0	76.6	53.3	34.9	46	1025	33
32	318	301	301	66.3	(107.0)	49.2	76.1	52.1	33.7	44	1000	32
31	310	294	294	65.8	(106.0)	48.4	75.6	51.3	32.5	43	980	31
30	302	286	286	65.3	(105.5)	47.7	75.0	50.4	31.3	42	950	30
29	294	279	279	64.7	(104.5)	47.0	74.5	49.5	30.1	41	930	29
28	286	271	271	64.3	(104.0)	46.1	73.9	48.6	28.9	41	910	28
27	279	264	264	63.8	(103.0)	45.2	73.3	47.7	27.8	40	880	27
26	272	258	258	63.3	(102.5)	44.6	72.8	46.8	26.7	38	860	26
25	266	253	253	62.8	(101.5)	43.8	72.2	45.9	25.5	38	840	25
24	260	247	247	62.4	(101.0)	43.1	71.6	45.0	24.3	37	825	24
23	254	243	243	62.0	100.0	42.1	71.0	44.0	23.1	36	805	23
22	248	237	237	61.5	99.0	41.6	70.5	43.2	22.0	35	785	22
21	243	231	231	61.0	98.5	40.9	69.9	42.3	20.7	35	770	21
20	238	226	226	60.5	97.8	40.1	69.4	41.5	19.6	34	760	20
(18)	230	219	219	—	96.7	—	—	—	—	33	730	(18)
(16)	222	212	212	—	95.5	—	—	—	—	32	705	(16)
(14)	213	203	203	—	93.9	—	—	—	—	31	675	(14)
(12)	204	194	194	—	92.3	—	—	—	—	29	650	(12)
(10)	196	187	187	—	90.7	—	—	—	—	28	620	(10)
( 8)	188	179	179	—	89.5	—	—	—	—	27	600	( 8)
( 6)	180	171	171	—	87.1	—	—	—	—	26	580	( 6)
( 4)	173	165	165	—	85.5	—	—	—	—	25	550	( 4)
( 2)	166	158	158	—	83.5	—	—	—	—	24	530	( 2)
( 0)	160	152	152	—	81.7	—	—	—	—	24	515	( 0)

\*1 : Bold-faced numbers are based on the table of ASTM E 140

\*2 : 1 Mpa=1N/mm<sup>2</sup>

\*3 : In above table, numbers in parenthesis are only for reference.

This table is abstracted from SAE J 417.

## YAMAWA STYLES OF TAPS

STYLES OF TAPS OFFERED BY YAMAWA

### Straight Fluted Hand Taps



These are general purpose taps used for a wide variety of hand and machine tapping applications. They are available, in most cases, in taper, plug and bottoming chamfers and in various numbers of flutes.

### Spiral Pointed Taps



These taps have a special angular grind at the point which shears chips and drives them ahead of the tap. Advantages are reduced tapping torque and increased speed in through hole tapping.

### Spiral Fluted Taps



These taps are manufactured with spiral flutes for increased chip clearing efficiency in soft materials in which stringy chips are generated. Especially useful in tapping deep or blind holes, and in bridging keyways, these taps are available with regular or high helix flutes.

### Forming Taps



Roll forming taps generate threads by displacing rather than cutting metal, thereby eliminating or greatly reducing chips. They are especially useful for applications in which chips cannot be tolerated. YMW-USA Roll taps are designed to allow tapping harder and tougher materials than have been successfully tapped with other forming taps.

### Extra Length Taps



YMW-USA produces, as standard and special, two different types of taps with extra long shanks that permit tapping in deep or obstructed areas. They are extension taps are offered in spiral point and spiral flute.

### Pipe Taps



Taps for internal threading of pipe, pipe fittings, or holes in which threaded pipe is to be assembled are pipe taps. The types of pipe taps manufactured by YAMAWA for YMW-USA as standard include: Zelx SS Taper Pipe Taps, NPT Taper Pipe Taps in regular or interrupted thread; Zelx Mold NPT Taper Pipe Taps for hardened steels, Hand Tap design NPT Taper Pipe Taps, and Straight Pipe Taps. Interrupted thread pipe taps are manufactured with alternate teeth removed on adjacent lands (with the exception of the first few threads at the point). Designed for tapping certain tough metals or those which tend to tear or load the cutting teeth, these taps are to be used only when regular full thread taps fail.

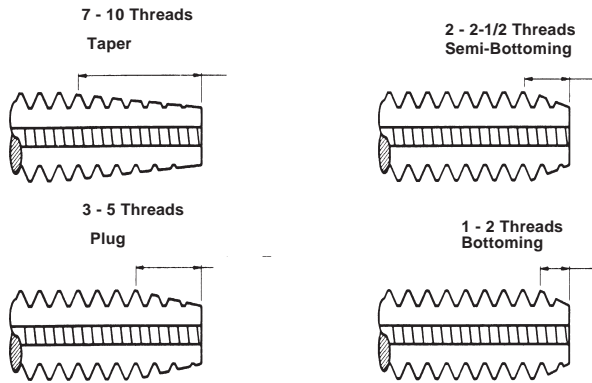
Technical Information

**Taper taps** have 7 to 10 threads chamfered and are designed for threading through holes.

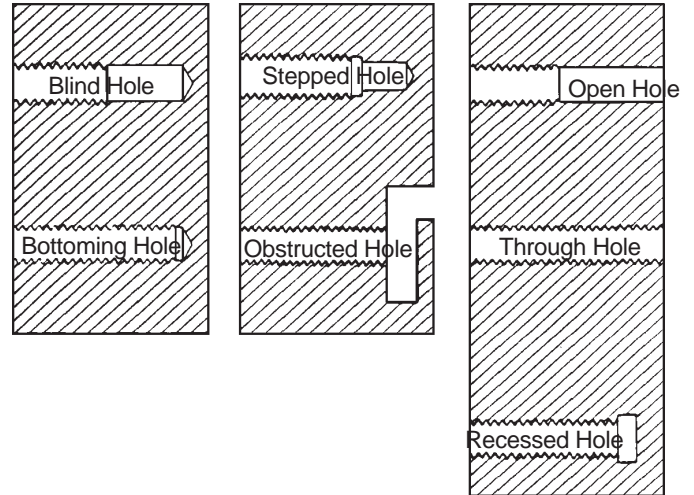
**Plug taps** have 3 to 5 threads chamfered and are most widely used in through holes and in blind holes that do not have to be threaded all the way to the bottom. Although most hand taps are available in taper, plug, and bottoming styles, some taps, such as pipe taps, are available only in the plug chamfer.

**Semi-bottoming taps** have 2 to 2-1/2 threads chamfered and are designed for both through and blind hole tapping.

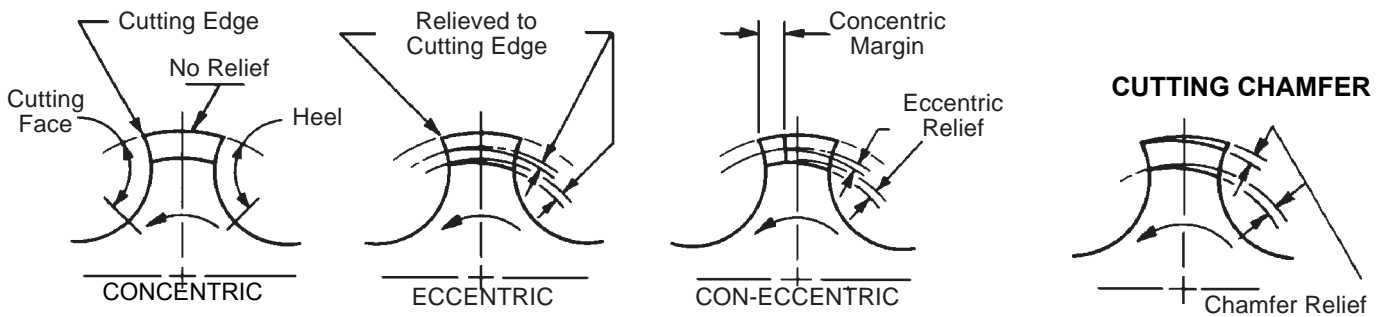
**Bottoming taps** have 1 to 2 threads chamfered, and are de-signed to thread blind holes close to the bottom.



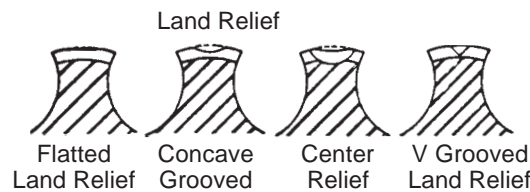
## Types of Tapped Holes

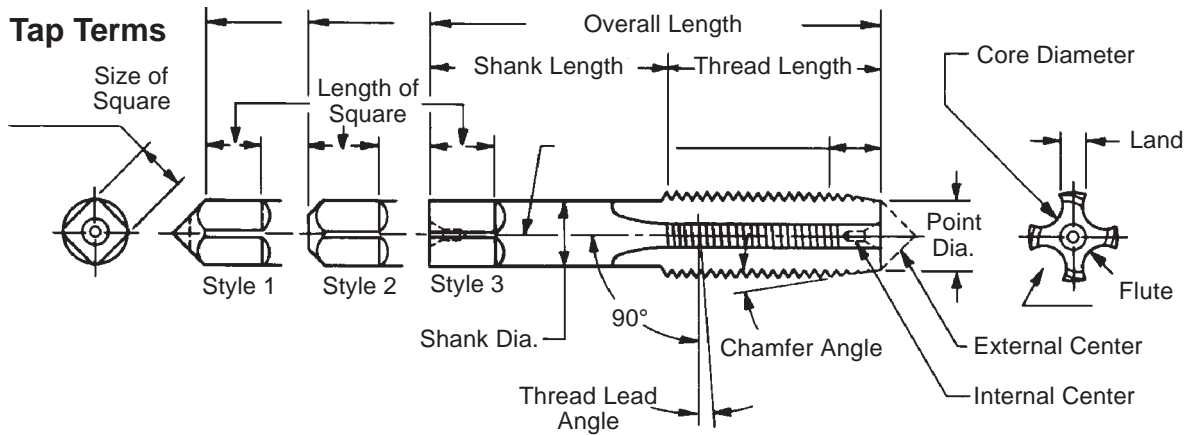


## Clearance Relief Styles



## ADDED RELIEF FOR DIFFICULT MATERIALS





**ALLOWANCE.** An allowance is an intentional difference in correlated dimensions of mating parts. It is the minimum clearance (positive allowance) or maximum interference (negative allowance) between such parts.

**ANGLE OF THREAD.** The angle included between the flanks of the thread, measured in an axial plane.

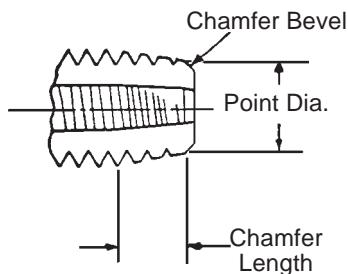
**AXIS.** The longitudinal central line through the screw or tap.

**BACK TAPER.** A slight axial relief on the thread of the tap which makes the pitch diameter of the thread near the shank somewhat smaller than that at the chamfered end. (See RELIEF)

**BASIC.** The theoretical or nominal standard size from which all variations are made. (See SIZE)

**CHAMFER.** The tapering of the end of the thread on a tap by cutting away and relieving the crest of the first few teeth to distribute the cutting action over several teeth. It also acts as a guide in starting the tap. When this tapering amounts to 8 to 10 threads, the tap is called a *taper* tap; when 3 to 5 threads, a *plug* tap; and with 1 to 2 threads chamfer, a *bottoming* tap.

**Chamfer Dimensions**



**CORE DIAMETER.** The diameter of an imaginary cylinder tangent to the deepest part of the flute.

**CREST.** The top surface joining the two flanks of a thread. The crest of an external thread is at its major diameter, while the crest of an internal thread is at its minor diameter.

**CREST CLEARANCE.** The space between the crest of a thread and the root of its component.

**CUTTING EDGE.** The leading side of the land in the direction of rotation for cutting and which does the actual cutting.

**DEPTH OF THREAD.** The distance between the crest and the base of the thread, measured normal to the axis.

**DRYSEAL.** A fuel connection for both external and internal application designed for use where the assembled product must withstand high fluid or gas pressures without the use of a sealing compound or where a sealer is functionally objectionable.

**FLANK.** The surface of the thread, sometimes referred to as side of thread, which connects the crest with the root.

**FLUTES.** The longitudinal channels formed in a tap to create cutting edges on the thread profile and to provide chip spaces and cutting-fluid passages.

**FLUTE LEAD.** The axial advance of a helical or spiral cutting edge in one turn around the tool axis.

**HEEL.** The face of the tap land trailing the cutting edge during forward rotation.

**HEIGHT OF THREAD.** The distance between the crest and the base of thread measured normal to the axis.

**HELIX ANGLE—FLUTE.** Flutes of taps are sometimes cut helically instead of straight. This helix angle is the angle made by the flute with the axis of the tap. (Helical flutes are sometimes called spiral flutes.)

**HELIX ANGLE—THREAD.** The angle made by the helix of a thread at the pitch diameter with a plane perpendicular to the axis.

**HOOK.** The concave cutting face of a tap land between the crest and the root of thread.

**INTERRUPTED THREAD.** A tap having an odd number of lands, with every other tooth along the thread helix removed.

**LAND.** One of the threaded sections between the flutes on a tap.

**LEAD.** The distance a screw thread advances axially in one complete turn. On a single-thread screw or tap, the lead and pitch are identical. On a double-thread, the lead is twice the pitch; on a triple-thread, the lead is three times the pitch, etc.

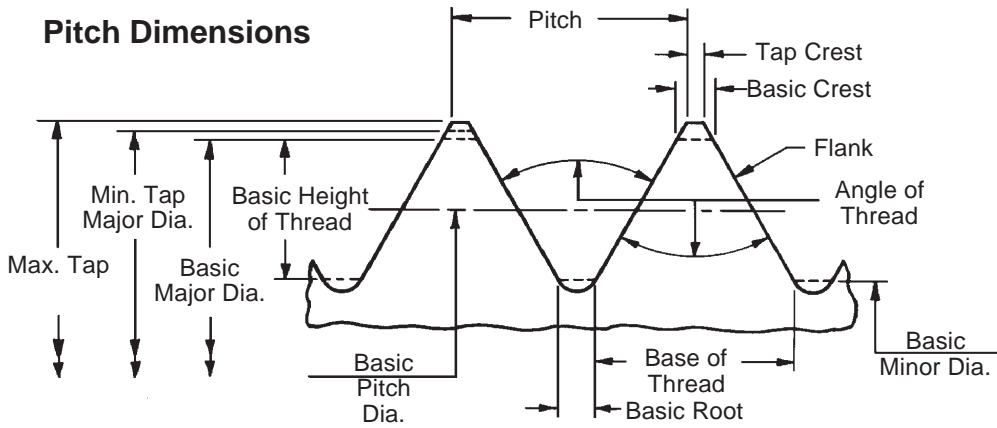
**LEAD ERROR.** The amount the actual lead of the screw thread differs from the specified lead.

**LEAD—DRUNKEN.** Irregular advance of the thread helix or lead. Usually called "drunken thread."

**LENGTH OF ENGAGEMENT.** The length of contact between two mating threaded parts measured axially.

**LIMITS.** The maximum and minimum sizes permissible for a specific dimension. (See ALLOWANCE AND TOLERANCE)





**MAJOR DIAMETER.** The largest diameter of a straight thread. On a taper thread, the largest diameter at any given plane normal to the axis. The term “major diameter” replaces the term “outside diameter” as applied to the thread of a screw or tap and also the term “full diameter” as applied to the thread of a nut or die.

**MINOR DIAMETER.** The smallest diameter of a straight thread. On a taper thread, the smallest diameter at any given plane normal to the axis. The term “minor diameter” replaces the terms “root diameter” and “core diameter” as applied to the thread of a screw or tap and also the term “inside diameter” as applied to the thread of a nut or die.

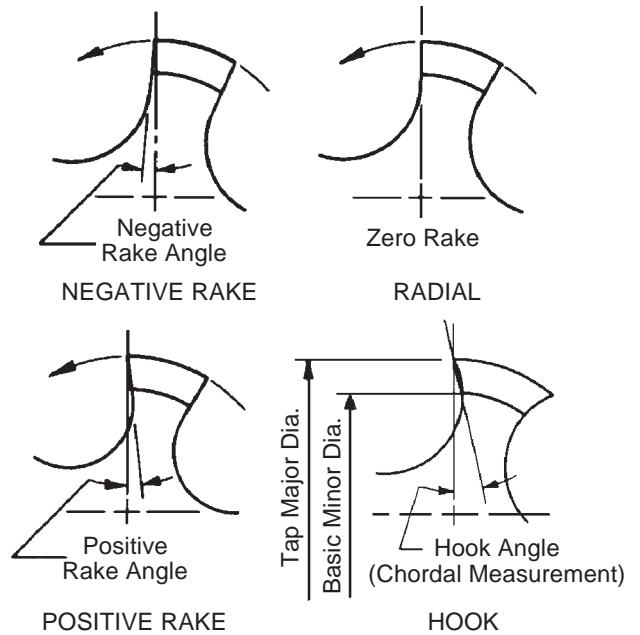
**PERCENT OF THREAD.** One-half the difference between the basic major diameter and the actual minor diameter of an internal thread, divided by the basic thread height, expressed as percentage.

**PITCH.** The distance from a point on a screw thread to a corresponding point on the next thread, measured parallel to the axis and on the same side of the axis. The pitch equals one divided by the number of threads per inch.

**PITCH DIAMETER.** On a straight screw thread, the diameter of an imaginary cylinder, the surface of which would pass through the threads at such points as to make equal the width of the threads and the width of the spaces cut by a given distance from a reference plane perpendicular to the axis of an imaginary cone, the surface of which would pass through the threads at such points as to make equal the width of the threads and the width of the spaces cut by the surface of the cone.

**PITCH LINE.** A generator of the imaginary cylinder or cone specified in the definition of PITCH DIAMETER.

**Rake Angles**



**RAKE.** On a tap, any deviation of a straight cutting face of the tooth from a radial line. Positive rake means that the crest of the cutting face is angularly advanced ahead of the balance of the face of the tooth. Negative rake means that the same point is angularly behind the balance of the cutting face of the tooth. Zero rake means that the cutting face is directly on the center line.

**RELIEF—RADIAL.** The clearance produced by removal of metal from behind the cutting edge. Taps should have the chamfer relieved and should have back taper, but may or may not have relief in the angle and on the major diameter of the threads. When the thread angle is relieved from heel to cutting edge, the tap is said to have “eccentric” relief. If relieved from heel for only a portion of land width (usually 2/3) the tap is said to have “con-eccentric” relief. (See BACK TAPER)



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## Metalcutting Safety (read this before using YMW products)

Modern metalcutting operations involve high energy, high spindle or cutter speeds, and high temperatures and cutting forces. Hot, flying chips may be projected from the workpiece during metalcutting. Although advanced cutting tool materials are designed and manufactured to withstand the high cutting forces and temperatures that normally occur in these operations, they are susceptible to fragmenting in service, particularly if they are subjected to overstress, severe impact or otherwise abused. Therefore, precautions should be taken to adequately protect workers, observers and equipment against hot, flying chips, fragmented cutting tools, broken workpieces or other similar projectiles. Machines should be fully guarded and personal protective equipment should be used at all times.

When grinding advanced cutting tool materials, a suitable means for collection and disposal of dust, mist or sludge should be provided. Overexposure to dust or mist containing metallic particles can be hazardous to health particularly if exposure continues over an extended period of time and may cause eye, skin and mucous membrane irritation and temporary or permanent respiratory disease. Certain existing pulmonary and skin conditions may be aggravated by exposure to dust or mist. Adequate ventilation, respiratory protection and eye protection should be provided when grinding and workers should avoid breathing of and prolonged skin contact

with dust or mist. General Industry Safety and Health Regulations, Part 1910. U.S. Department of Labor, published in Title 29 of the Code of Federal Regulations should be consulted. Obtain from YMW and read the applicable Material Safety Data Sheet before grinding.

Cutting tools are only one part of the worker-machine- tool system. Many variables exist in machining operations, including the metal removal rate; the workpiece size, shape, strength and rigidity; the chucking and fixturing; the load carrying capability of centers; the cutter and spindle speed and torque limitations; the holder and boring bar overhang; the available power; and the condition of the tooling and the machine. A safe metalcutting operation must take all of these variables, and others, into consideration.

YMW has no control over the end use of its products or the environment into which those products are placed. YMW urges that its customers adhere to the recommended standards of use of their metalcutting machines and tools, and that they follow procedures that ensure safe metalcutting operations. The information included throughout this catalog under the heading "Technical Data" and other recommendations on machining practices referred to herein are only advisory in nature and do not constitute representations or warranties and are not necessarily appropriate for any particular work environment or application.

# SPECIAL TAP REQUEST FORM

Please fill in the blanks and send it to us by e-mail or FAX

**e-mail: [jeff@ymwtaps.com](mailto:jeff@ymwtaps.com) FAX: 714-437-1712**

<b>●</b> Company name			
<b>●</b> Department		<b>●</b> Name	
<b>●</b> TEL		<b>●</b> FAX	
<b>●</b> e-mail address			

### Customer's request

<b>●</b> Thread type	·Metric ·Unified ·Whitworth ·Special( )		
<b>●</b> Size and pitch	( ) X ( )	<b>●</b> Rotative direction	·Right hand ·Left hand
<b>●</b> Tap Type	· Bottoming · Spiral Point · <b>Hand Tap</b> · ROLL · Other item( )		
<b>●</b> Overall length	· YMW standard ( ) or special length ( )		
<b>●</b> Tap material	· HSS-E (M42) · HSS-E (M7 +7% V. HSS) · HSS-P (T15)		
<b>●</b> Tolerance	CLASS ·GH ( ) ISO · Request class ( )		
<b>●</b> Thread length	· YMW standard ( ) · Request length ( )	<b>●</b> Shank dia.	· YMW standard · Request dia. ( )
<b>●</b> Chamfer length	· YMW standard · Taper · Plug · Bottoming · 4P(P) · 2P(B) · Request chamfer ( )		
<b>●</b> Surface treatment	·Oxide ·Nitride ·Nitride-Oxide ·TiN ·TiCN ·CrN ·Bright finished		

### Condition of Work-piece material

<b>●</b> Tapping part	( ) ·Unclear	<b>●</b> Hardness	( ) HB ( ) HC Rc · Unclear
<b>●</b> Work material	·FC( ) ·SS( ) ·SPC( ) ·SUS( ) ·ADC( ) ·AC ( ) ·BSBM ( ) ·BC( ) ·S ( )C ·SCM( ) ·Synthetic resin ( ) ·Else ( ) ·Unclear ( )		
<b>●</b> Parts shape			<b>●</b> Direction ·Vertical ·Horizontal
<b>●</b> How to make hole	·Drill ·Press ·Reamer ·Molding ·Other ( ) ·Unclear		
<b>●</b> Gauge	·GP ( ) ·NP (WP) ( ) ·No check ·Unclear		

### Machine, cutting condition

<b>●</b> Tapping machine	·Drill press ·Automatic lathe ·Special machine ·Tapping machine ·Machining Center ·Else		
<b>●</b> Holder	·Drilled chuck type ·Tapping folder (with spring) type ·Complete fixed holder type ·Else		
<b>●</b> Feed	·Manual feed ·Gear feed system ·Master lead screw feed system ·Asynchronous feed system by approximation ·Fully synchronous feed system ·Else		
<b>●</b> Cutting speed	( )SFM or Revolution ( ) rpm ·Unclear		
<b>●</b> Cutting oil	·Oil ·Water soluble oil ·Paste ·Else( ) ·Unclear		

<Comment>

**FAX: 714-437-1712**



**Spiral Pointed Taps**



**Spiral Fluted Taps  
(For through hole)**



**Spiral Fluted Taps  
(For blind hole)**

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