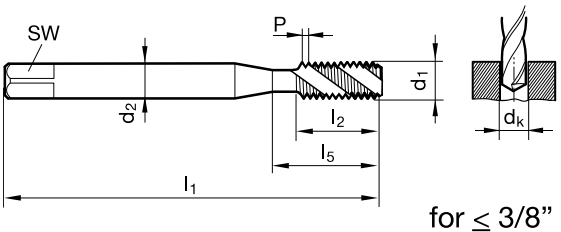
Spiral flute taps for UNF threads

Series no. **4653**

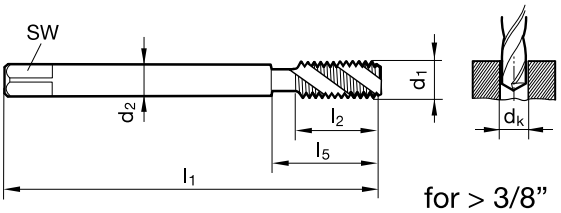
Material	Material examples	Suitability
P	Steel	●
M	Stainless steel	●
K	Cast iron	○
N	Aluminum	○
S	Ni / Ti alloys	○
H	Hardened steel	

●=Optimal ○=Secondary

Tool material	**HSS-E**
Tolerance on Ø	2BX
Coating	Slidur
Flute type	VA R45
Chamfer form	C (2-3)
Internal cooling	N/A



for ≤ 3/8”



for > 3/8”

DIN length,
ANSI shank

d1 - P	H	dk in	No. of	d2	SW	l1	l5	Code no.	EDP Number
	limits	range	flutes	in	in	in	in		
2-64	H3/H4	0.069 - 0.075	3	0.141	0.110	1.969	0.631	2.184	**9046530021840**
3-56	H3/H4	0.080 - 0.086	3	0.141	0.110	2.205	0.631	2.515	**9046530025150**
4-48	H3/H4	0.089 - 0.097	3	0.141	0.110	2.205	0.709	2.845	**9046530028450**
5-44	H3/H4	0.100 - 0.108	3	0.141	0.110	2.205	0.709	3.175	**9046530031750**
6-40	H3/H4	0.111 - 0.119	3	0.141	0.110	2.205	0.709	3.505	**9046530035050**
8-36	H3/H4	0.134 - 0.142	3	0.168	0.131	2.480	0.827	4.166	**9046530041660**
10-32	H4/H5	0.156 - 0.164	3	0.194	0.152	2.756	0.945	4.826	**9046530048260**
12-28	H4/H5	0.177 - 0.186	3	0.220	0.165	3.150	1.024	5.486	**9046530054860**
1/4-28	H4/H5	0.211 - 0.220	3	0.255	0.191	3.150	1.181	6.350	**9046530063500**
5/16-24	H4/H5	0.267 - 0.277	3	0.318	0.238	3.543	1.377	7.938	**9046530079380**
3/8-24	H4/H5	0.330 - 0.340	4	0.381	0.286	3.543	1.456	9.525	**9046530095250**
7/16-20	H5/H6	0.383 - 0.395	4	0.323	0.242	3.937	N/A	11.113	**9046530111130**
1/2-20	H5/H6	0.446 - 0.457	4	0.367	0.275	3.937	N/A	12.700	**9046530127000**
9/16-18	H5/H6	0.502 - 0.515	4	0.429	0.322	3.937	N/A	14.288	**9046530142880**
5/8-18	H5/H6	0.565 - 0.578	4	0.480	0.360	3.937	N/A	15.875	**9046530158750**
3/4-16	H6/H7	0.682 - 0.696	4	0.590	0.442	4.331	N/A	19.050	**9046530190500**

Operating Parameters - **Cut Taps**

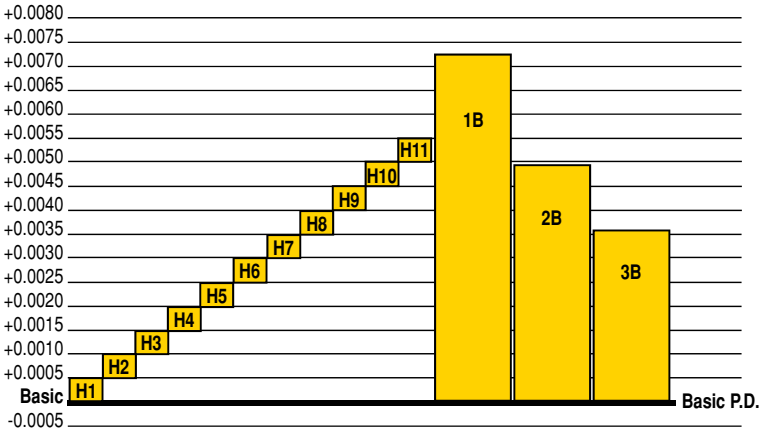
	Material Reference		Approx. Rc	Approx. HB	Recommended SFM HSS-E	Recommended SFM HSS-E-PM
P	Structural steels, free cutting steels			<180	50-70	70-85
P	Unalloyed case hardened steels		<22	<220	45-55	55-65
P	Unalloyed heat treatable steels		<30	<290	35-45	45-55
P	Structural steels, free cutting steels		<22	<220	45-55	55-65
P	Case hardended steels, heat treatable steels		<30	<290	35-45	45-55
P	Nitriding Steels, Spheroidal graphite iron		<38	<350	25-35	35-45
P	Alloyed case hardened steels		<22	<220	45-55	55-65
P	Alloyed heat treatable steels		<30	<290	35-45	45-55
P	Alloyed tool steels		<38	<350	25-35	35-45
P	High speed tool steels					
M	Stainless Steels	sulphured, austenitic, martensitic	<22	<220	35-45	45-55
M			<30	<290	25-35	35-45
M			<40	<375	15-20	20-25
K	Cast Iron			<180	-	-
K	Spheroidal graphite iron			<290	50-70	70-85
K	Malleable cast iron			<350	30-40	40-50
N	Aluminum and Al-alloys		Silcon content	Wrought Aluminum		
N		Al cast alloys	<6%	n/a	55-65	75-85
N			6-12%	n/a		
N		Al wrought alloys	n/a	30-80	25-35	35-45
N			n/a	75-150		
N	Magnesium alloys			<150	-	-
N	Copper and copper alloys		Long chipping		50-70	70-85
N			Short chipping			
N	Thermoplastics-Duroplastics		Long chipping		-	-
N			Short chipping		-	-
S	Titanium and Ti alloys			140-275	8-12	12-16
S				300-380		
S	Nickel and Ni alloys			200-300	4-8	8-12
S				>300		
H	Hardened steel		45-55		-	-
H			55-62		-	-

UNC/UNF Taps

Screw size and fractional threads are typically specified as one of three classes of fit. Class 1B – for low precision, or threads that are typically used in areas where dirt and grime are a constant factor; Class 2B for general threading applications (by far the most common); and Class 3B for precision threads generally found in medical, aerospace and applicable automotive applications.

• As seen in the chart – these classes of fit do overlap even though they are progressive in accuracy. To further break down the accuracy of these threads we have "H" limits in increments of 0.0005".

• Every size/pitch tap has a specific or given basic pitch diameter that is the basis for the "H" limits and the class of fit for that size.
• As you can see in the chart – the class of fit will give you minimum and maximum pitch diameter limits that need to be maintained during manufacturing (typically these are your thread gauge limits). By seeing the "H" limits illustrated you are better able to understand what area of the class of fit you are actually working within.



(This chart does not show a specific size tap – its purpose is to give a visual understanding of how the "H" limits work within the different classes of fit).

Metric Taps

With the aim of unifying threads on an international basis, the ISO thread was introduced. Today the ISO metric thread is the most common type. As you can see, our tap program demonstrates this fact in the clearest possible way.

Metric tolerance qualities (figure identification)
Tolerance qualities of external threads are defined by the table to the right, those of nut threads by the table on the lower right.

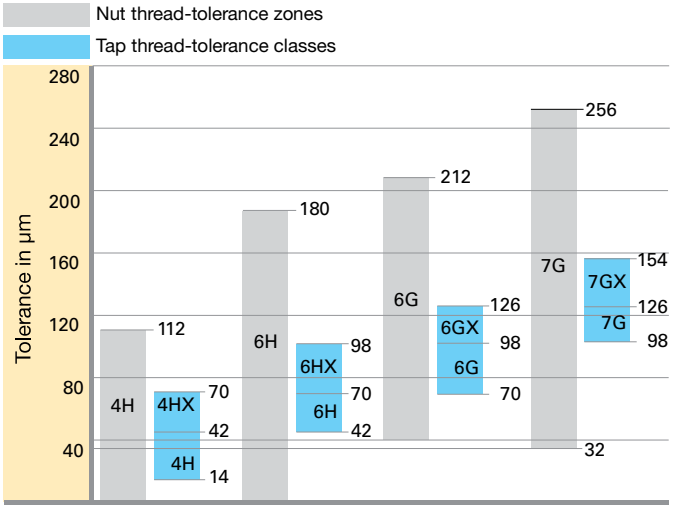
Tolerance positions (letter identification)
ISO metric internal threads are identified by capital letters A to H, ISO metric external threads by small letters a to h. Tolerance zones A to G have positive and a to g negative basic pitch deviations in contrast to the tolerance zones H and h which commence at zero. Generally, tolerance zones H and g are used. For threads destined for Coating treatment tolerance zones G and e are applied.

When manufacturing ISO-external threads the deviations that are determined for the major diameter with regard to the tolerance zones a to g have to be taken into account.

Tolerance zones (nut thread)/
Tolerance classes (tap thread)
Quality and position of tolerance determine the tolerance zone, which is identified by the appropriate figures and letters. The abbreviation for the tolerance class of tap corresponds to the tolerance zone of the internal thread for which the tap is used in most cases. Therefore, it is not identical with the tolerance zone of the cut nut thread in every application.

Taps with deviating tolerances according to DIN 802 part 1 will be given additional marking "X" (6 HX, 6 GX). We recommend the application of taps in accordance with the adjacent table:

Tolerance zone / tolerance class allocation

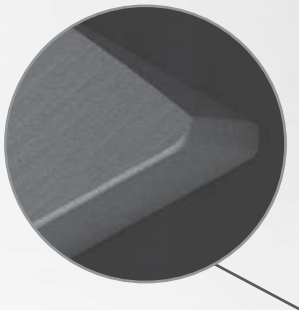


DIN EN 22857		Tolerance zone of internal thread to be cut					DIN 802 part 1 (withdrawn))
Application class of tap Designation*	Reference						Tolerance class of tap
Class 1	ISO 1	4H	5H				4H
Class 2	ISO 2			6H			6H
Class 3	ISO 3				6G		6G
–	–					7G	7G

* The tolerance of the 3 application classes is calculated in accordance to the following data dependent on one tolerance unit t the value of which corresponds to the value of the basic pitch diameter TD2 in tolerance class 5 of the nut thread (polished to a pitch of 0.2 mm):
$t = t_{D2}$ Tolerance class 5 of nut thread

Pionex

Consistent cutting edge allows for excellent **coating adhesion**.



Tapered thread **improves chip evacuation.**

The enhanced coating system applied to DIN spiral flute taps results in **reduced friction**, improved chip evacuation, and **increased tool life.**

The unique properties of the **Sirius** coating applied to spiral point DIN taps offers **high wear resistance** and **improved chip evacuation**.

Newly developed **Slidur** coating on ANSI cut taps adds a layer of **lubricity** on top of a TiAlN base for **excellent wear-resistance.**

Pionex*TAP*

- higher cutting rates
- longer tool life
- fewer tool changes

	Material group	Examples
P	Common structural steels	A283, A516, Gr50, 30, 35, 42, 45, 50, 55, 60, 65, 70, 75 , 80, 85, 90, 100, 110, 135, 140, 145, 150, 160
	Free-cutting steels	1151, 1215, L10, 10L10, 10L15, 10L17, 10L20, 10L23, 10L25, 10L30, 10L35, 10L40, 10L42, 10L45, 10L49, 10L50, 10L55, 11L15, 11L16, 11L17, 11L37, 11L38, 11L39, 11L41, 11L44, 11L46, 12L11, 12L12, 12L13, 12L14, 12L15, 41L25, 41L30, 41L35, 41L40, 41L42, 41L47, 41L50 51L15, 51L17, 51L20, 86L20, 86L40
	Unalloyed heat-treatable steels	1005, 1006, 1008, 1009, 1010, 1011, 1012, 1013, 1015, 1016, 1017, 1018, 1019, 1020, 1021, 1022, 1023, 1025, 1026, 1029, 1030, 1033, 1035, 1037, 1038, 1039, 1040, 1042, 1043, 1044, 1045, 1046, 1049, 1050, 1053, 1055, 1059, 1060, 1064, 1065, 1069, 1070, 1071, 1074, 1075, 1078, 1080, 1084, 1085, 1086, 1090, 1095
	Alloyed heat-treatable steels	1330, 1335, 1340, 1345, 2340, 3140, 3145, 3150, 3230, 3240, 3335, 3340, 3435, 3450, 4032, 4037, 4063, 4130, 4135, 4137, 4140, 4142, 4145, 4147, 4150, 4161, 4337, 4340, 4640, 5045, 5046, 5060, 5130, 5132, 5135, 5140, 5145, 5157, 5150, 5155, 5160, 6130, 6135, 6140, 6145, 6150, 7140, 6145, 6150, 7140, 8630, 8632, 8635, 8637, 8640, 8642, 8645, 8650, 8650, 8660, 8735, 8740, 8742, 9250, 9254, 9255, 9260, 9262, 9840, 9850
	Unalloyed case hardened steels	1005, 1006, 1008, 1009, 1010, 1011, 1012, 1013, 1015, 1016, 1017, 1018, 1019, 1020, 1021, 1022, 1023, 1025, 1026, 1029, 1030, 1033, 1035, 1037, 1038, 1039, 1040, 1042, 1043, 1044, 1045, 1046, 1049, 1050, 1053, 1055, 1059, 1060, 1064, 1065, 1069, 1070, 1071, 1074, 1075, 1078, 1080, 1084, 1085, 1086, 1090, 1095
	Alloyed case hardened steels	2317, 2512, 2515, 2517, 3115, 3120, 3215, 3220, 3312, 3316, 3325, 4012, 4023, 4024, 4027, 4028, 4118, 4119, 4125, 4317, 4320, 4419, 4422, 4427, 4608, 4615, 4617, 4620, 4621, 4626, 4718, 4720, 4815, 4817, 4820, 5015, 5115, 5117, 5120, 6115, 6118, 6120, 6125, 8115, 8615, 8617, 8620, 8622, 8625, 8627, 8720, 8822, 9310, 9315, 9317
	Nitriding steels	1132, 1137, 1138, 1139, 1140, 1141, 1144, 1145, 1146, 1151
	Tool steels	A2, A3, A4, A5, A6, A8, A9, A10, O1, O2, O6, O7, A7, D2, D3, D4, D5, D7, H10, H11, H12, H13, H14, H19, H20, H21, H22, H23, H24, H25, H26, H41, H42, H43, L1, L3, W1, W2, W5
	High speed steels	M1, M2, M3-1, M3-2, M4, M6, M7, M10, M30, M33, M34, M36, M41, M42, M43, M44, M46, M47, T1, T2, T4, T5, T6, T8, T15
	Spring steels	5150, 5155, 6145, 6150, 9255
H	Hardened steels >48-60 Rc	Heat Treated Steels
M	Stainless steels, sulphured	203 Ez, 303 Se, 303 Ma, 303 Pb, 303 PlusX, 430F Se, 416 Se, 416 PlusX, 420F, 420F Se, 440F, 440F Se
	austenitic	201, 202, 301, 302B, 303, 304, 304L, 305, 308, 309, 309S, 310, 310S, 314, 316, 316L, 317, 321, 330, 347, 348, 384, 385, Nitronic 32, Nitronic 33, Nitronic 40, Nitronic 50, Nitronic 60, 17-7PH
	martensitic	403, 405, 410, 414, 416, 420, 422, 430, 431, 440A, 440B, 440C, 446, 501, 502, 630, Greek Ascoloy
K	Cast iron	A48-20 B, A48-30 B, A48-40 B, A48-50B, A159G1800, A159G2500, A159G3000, A159G3500, A159G4000
	Spheroidal graphite iron and malleable cast iron	60-10-18, 60-40-18, 65-45-12, 80-55-06, 100-70-03, 120-90-02, 32510, 35018, 40010, 50005, 60004, 70003, 80002, 90001, A220-70003, A220-8002, A536
	Chilled cast iron	
S	Special alloys	Inconel, Hastelloy, Monel, Nimonic, MAR-M246, DS-Ni, Waspalloy, Rene41
	Ti and Ti-alloys	Ti6AL4V, 5390A, TiCu2
N	Aluminium and Al-alloys	EC 1060, 1100, 1145, 1175, 1235, 2011, 2014, 2017, 2018, 2021, 2024, 2025, 2117, 2218, 2219, 2618, 3003, 3004, 3005, 4032, 4032-T6, 5005, 5050, 5052, 5056, 5083, 5086, 5154, 5252, 5254, 5454, 5456, 5457, 5652, 5657, 6053, 6061, 6061-T6, 6063, 6066, 6070, 6101, 6151, 6253, 6262, 6463, 6951, 7001, 7004, 7005, 7039, 7049, 7050, 7075, 7075-T6, 7079, 7175, 7178
	Al wrought alloys	1100-0, 3003-H18, 5056-0, 2024-T4, 4043-H18
	Al cast alloys	295-T6, 319-F, 356-T6, 380-F, 384-F, 390-F, 443-F, 413-F, 518-F, 713-TS, 850-TS
	Magnesium alloys	AZ31B, AZ63A, AZ80A, AZ91C, EZ33A, HK31A, QE22A, ZK60A
	Copper, low-alloyed	C10100, C27000, C71500, C52400, C77000, C17200, C71500, C95500, C86500
	Brass, short-chipping	CUZn10, CUZn20