AEROSPACE TAPS

ZELX®SS
for Stainless steels

ZELX®NI
for Nickel base alloys

ZELX®TI
for Titanium alloys

June 2023 Edition

Think threads with
YAMAWA

YAMAWA High Performance Taps for Aerospace Industry

The demands for tapping into heat resistant alloys and stainless steels are increasing rapidly in the Aerospace Industry.
The most common heat resistant alloys are Nickel base alloys, such as A286, Inconel, Hastelloy, Waspalloy, and Titanium alloys.
There are considerable difficulties in tapping these materials due to their material features which can easily cause severe damage to taps.
YAMAWA has the best line of taps for such a severe tapping conditions.

ZELX® SS taps for Stainless steels

■ Features

- Custom blended vanadium high speed steel for high wear resistance
- Ideal cutting edge design to prevent welding
- Suitable surface treatment to prevent welding

ZELX® NI taps for Nickel base alloys, A286, Inconel, Hastelloy, Waspalloy

ZELX® TI taps for Titanium alloys

■ Features

- Premium PM high speed steel for high heat and wear resistance
- Ideal cutting edge design and thread relief for high heat resistance
- Optimum flute design to evacuate chips smoothly for each work material
- Suitable surface treatment to prevent welding and enhance wear resistance

Aerospace Taps Series

YAMAWA has assorted "ZELX series" taps for threading stainless steel, titanium alloys and nickel-based alloys that are used in many aircraft parts.

◇For through hole◇

Spiral Pointed Taps for Stainless Steels

ZELX® SS

Size Ranges
UNJC･･･No.4～1"
UNJF･･･No.4～1"

HSS | OX | 5 | II

Suitable work materials
303 STAINLESS STEEL
304 STAINLESS STEEL
410 STAINLESS STEEL
8740(SNCM240)

Spiral Pointed Taps for Nickel Base Alloys

ZELX® NI

Size Ranges
UNJC･･･No.4～3/4
UNJF･･･No.6～3/4

HSS-P | NX | 5 | II | Synchronized

Suitable work materials
INCONEL718, 750
Waspalloy
Hastelloy
A286
15-5PH
17-4PH(SUS630)
316 STAINLESS STEEL

Left Hand Spiral Fluted Taps for Titanium Alloys

ZELX® TI

Size Ranges
UNJC･･･No.4～1/2
UNJF･･･No.10～1/2

HSS-P | NI | L15° | 5 | II | Synchronized

Suitable work materials
Titanium alloys (Ti-6Al-4V)

◇For blind hole◇

Spiral Fluted Taps for Stainless Steels

ZELX® SS

Size Ranges
UNJC･･･No.4～1"
UNJF･･･No.4～1"

HSS | OX | 45° | 2.5 | V

Suitable work materials
303 STAINLESS STEEL
304 STAINLESS STEEL
410 STAINLESS STEEL
8740(SNCM240)

Spiral Fluted Taps for Nickel Base Alloys

ZELX® NI

Size Ranges
UNJC･･･No.4～3/4
UNJF･･･No.4～5/8

HSS-P | NX | 15° | 3 | V | Synchronized

Suitable work materials
INCONEL718, 750
Waspalloy
Hastelloy
A286
15-5PH
17-4PH(SUS630)
316 STAINLESS STEEL

Spiral Fluted Taps for Titanium Alloys

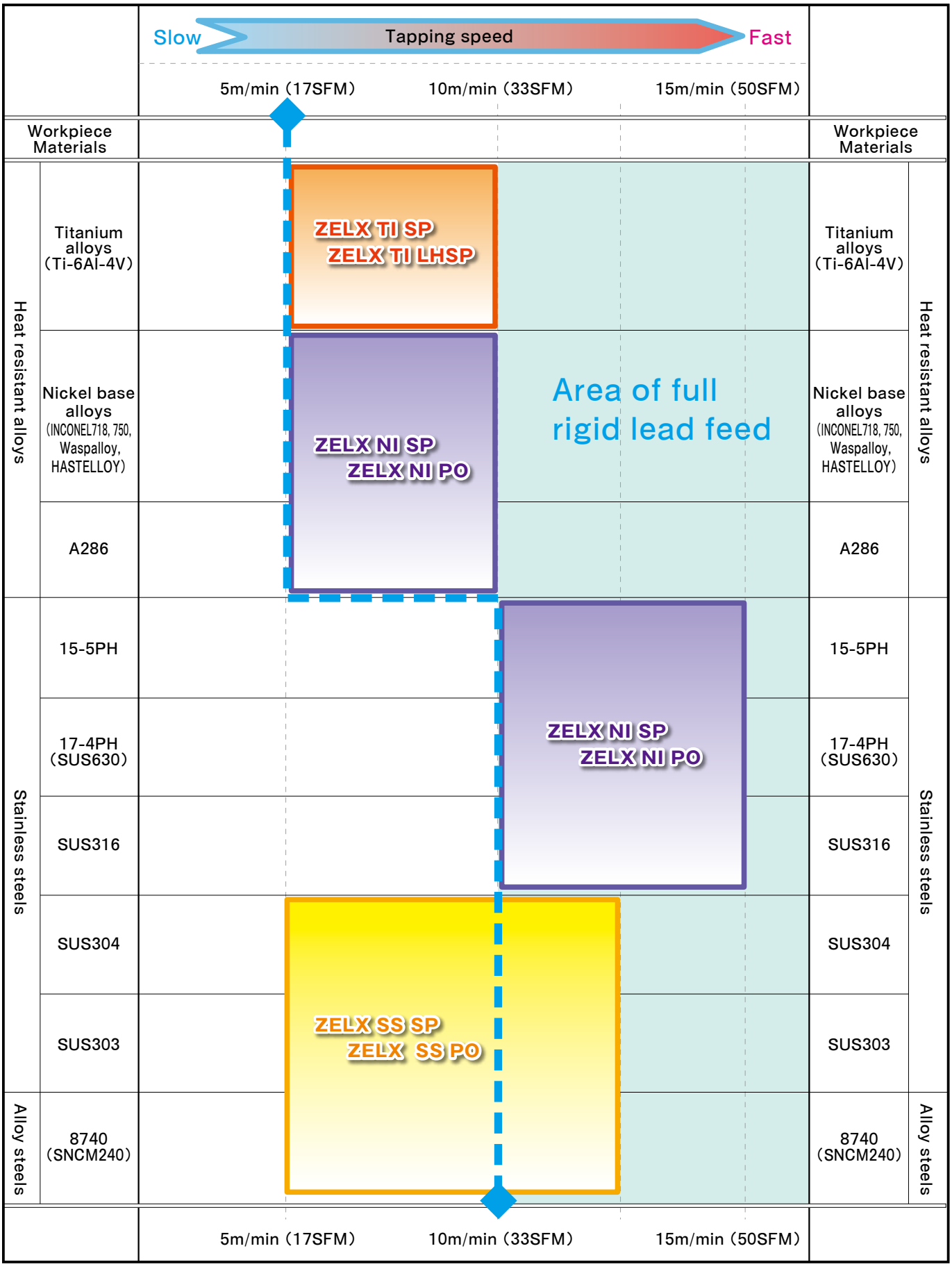
ZELX® TI

Size Ranges
UNJC･･･No.4～1/2
UNJF･･･No.10～1/2

HSS-P | NI | 15° | 3 | V | Synchronized

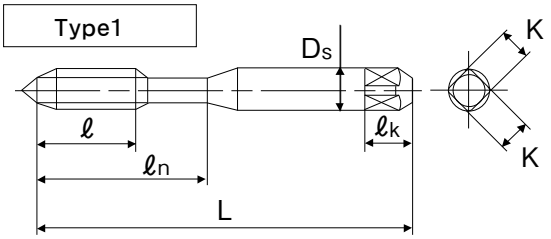
Suitable work materials
Titanium alloys (Ti-6Al-4V)

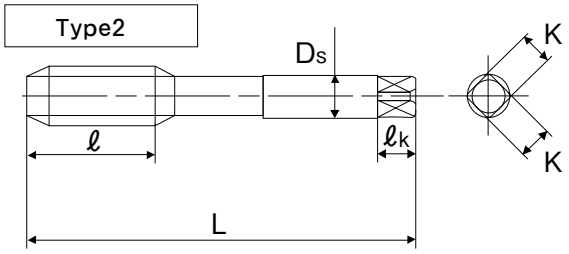
YAMAWA Products Chart for AEROSPACE INDUSTRY



An image telling possible applications

Taps Dimension





Unit : inch

Size	OAL (L)	Thread length (ℓ) ZELX SS PO ZELX NI PO ZELX TI LHSP	Thread length (ℓ) ZELX SS SP ZELX NI SP ZELX TI SP	Neck length (ℓn)	Shank dia (Ds)	Size of Square (K)	Square length (ℓk)	Type
No.2-56UNC	1.75	0.256	0.157	0.438	0.141	0.11	0.19	1
No.3-48UNC	1.81	0.295	0.197	0.5	0.141	0.11	0.19	1
No.4-40UNC	1.88	0.335	0.236	0.563	0.141	0.11	0.19	1
No.4-48UNF	1.88	0.335	0.236	0.563	0.141	0.11	0.19	1
No.5-40UNC	1.94	0.374	0.236	0.625	0.141	0.11	0.19	1
No.6-32UNC	2	0.413	0.276	0.688	0.141	0.11	0.19	1
No.6-40UNF	2	0.413	0.276	0.688	0.141	0.11	0.19	1
No.8-32UNC	2.13	0.453	0.276	0.75	0.168	0.131	0.25	1
No.8-36UNF	2.13	0.453	0.276	0.75	0.168	0.131	0.25	1
No.10-24UNC	2.38	0.531	0.354	0.875	0.194	0.152	0.25	1
No.10-32UNF	2.38	0.531	0.276	0.875	0.194	0.152	0.25	1
No.12-24UNC	2.38	0.571	0.354	0.938	0.22	0.165	0.28	1
No.12-28UNF	2.38	0.571	0.276	0.938	0.22	0.165	0.28	1
1/4-20UNC	2.5	0.591	0.433	1	0.255	0.191	0.31	1
1/4-28UNF	2.5	0.591	0.354	1	0.255	0.191	0.31	1
5/16-18UNC	2.72	0.669	0.472	1.125	0.318	0.238	0.38	1
5/16-24UNF	2.72	0.669	0.394	1.125	0.318	0.238	0.38	1
3/8-16UNC	2.94	0.748	0.551	1.25	0.381	0.286	0.44	1
3/8-24UNF	2.94	0.748	0.394	1.25	0.381	0.286	0.44	1
7/16-14UNC	3.16	0.866	0.591	-	0.323	0.242	0.41	2
7/16-20UNF	3.16	0.866	0.472	-	0.323	0.242	0.41	2
1/2-13UNC	3.38	0.984	0.63	-	0.367	0.275	0.44	2
1/2-20UNF	3.38	0.984	0.472	-	0.367	0.275	0.44	2
9/16-12UNC	3.59	0.984	0.709	-	0.429	0.322	0.5	2
9/16-18UNF	3.59	0.984	0.512	-	0.429	0.322	0.5	2
5/8-11UNC	3.81	1.083	0.748	-	0.48	0.36	0.56	2
5/8-18UNF	3.81	1.083	0.512	-	0.48	0.36	0.56	2
3/4-10UNC	4.25	1.201	0.827	-	0.59	0.442	0.69	2
3/4-16UNF	4.25	1.201	0.591	-	0.59	0.442	0.69	2
7/8-9UNC	4.69	1.339	0.827	-	0.697	0.523	0.75	2
7/8-14UNF	4.69	1.339	0.709	-	0.697	0.523	0.75	2
1-8UNC	5.13	1.496	0.984	-	0.8	0.6	0.81	2
1-12UNF	5.13	1.496	0.709	-	0.8	0.6	0.81	2
1"1/8-7UNC	5.44	1.535	1.181	-	0.896	0.672	0.88	2
1"1/8-12UNF	5.44	1.535	0.787	-	0.896	0.672	0.88	2
1"1/4-7UNC	5.75	1.535	1.181	-	1.021	0.766	1	2
1"1/4-12UNF	5.75	1.535	0.787	-	1.021	0.766	1	2
1"3/8-6UNC	6.06	1.811	1.575	-	1.108	0.831	1.06	2
1"3/8-12UNF	6.06	1.811	0.787	-	1.108	0.831	1.06	2
1"1/2-6UNC	6.38	1.811	1.575	-	1.233	0.925	1.13	2
1"1/2-12UNF	6.38	1.811	0.787	-	1.233	0.925	1.13	2
1"3/4-5UNC	7	1.929	1.772	-	1.43	1.072	1.25	2
2-4.5UNC	7.63	1.929	1.969	-	1.644	1.233	1.38	2

ZELX®SS Spiral Pointed Taps for Stainless Steels

For Unified threads

ZELX SS taps are suitable for UNJ Aerospace internal threading applications

Custom Blended Vanadium High Speed Steel
Plug Style
(3 to 5 threads chamfered)

TPI				Pitch Diameter Limit / EDP Numbers						Dimensions		
Nominal Size	UNJC UNC	UNJF UNF	No. of Flutes	H2	H3	H4	H5	H6	H7	Length of Thread	Length of Neck	Length Overall
2	56	—	2	Y82623	Y82624	—	—	—	—	.256	.181	1-3/4
3	48	—	2	Y82600	—	—	—	—	—	.295	.205	1-13/16
4	40	—	2	Y82601	Y82602	Y82612	Y82634	—	—	.335	.227	1-7/8
4	—	48	2	Y82683	—	—	—	—	—	.335	.227	1-7/8
5	40	—	3	Y82603	—	—	—	—	—	.374	.251	1-15/16
6	32	—	3	Y82604	Y82605	Y82608	Y82635	Y82659	Y82665	.413	.274	2
6	—	40	3	Y82684	—	—	—	—	—	.413	.274	2
8	32	—	3	Y82606	Y82607	Y82629	Y82637	Y82660	Y82667	.453	.297	2-1/8
8	—	36	3	Y82686	—	—	—	—	—	.453	.297	2-1/8
10	24	—	3	—	Y82609	—	Y82639	Y82690	Y82669	.531	.344	2-3/8
10	—	32	3	Y82611	Y82610	Y82630	Y82640	Y82661	Y82670	.531	.344	2-3/8
12	24	—	3	—	Y82688	—	—	—	—	.571	.366	2-3/8
12	—	28	3	—	Y82689	—	—	—	—	.571	.366	2-3/8
1/4	20	—	3	—	Y82613	—	Y82643	Y82590	Y82673	.591	.409	2-1/2
1/4	—	28	3	—	Y82614	Y82631	Y82644	Y82662	Y82674	.591	.409	2-1/2
5/16	18	—	3	—	Y82615	—	Y82645	—	Y82675	.669	.456	2-23/32
5/16	—	24	3	—	Y82616	Y82632	Y82646	Y82663	Y82676	.669	.456	2-23/32
3/8	16	—	3	—	Y82617	—	Y82647	—	Y82668	.748	.502	2-15/16
3/8	—	24	3	—	Y82618	Y82633	Y82648	Y82664	Y82678	.748	.502	2-15/16
7/16	14	—	3	—	Y82619	—	Y82649	—	—	.866	—	3-5/32
7/16	—	20	3	—	Y82620	—	Y82650	Y82691	Y82680	.866	—	3-5/32
1/2	13	—	3	—	Y82621	—	Y82651	—	Y82681	.984	—	3-3/8
1/2	—	20	3	—	Y82622	—	Y82652	Y82692	Y82682	.984	—	3-3/8
9/16	12	—	3	—	Y82653	—	—	—	—	.984	—	3-19/32
9/16	—	18	3	—	Y82654	—	—	—	—	.984	—	3-19/32
5/8	11	—	3	—	Y82625	—	Y82655	—	—	1.083	—	3-13/16
5/8	—	18	3	—	Y82626	Y82636	Y82656	Y82694	Y82591	1.083	—	3-13/16
3/4	10	—	3	—	Y82627	—	Y82657	—	—	1.201	—	4-1/4
3/4	—	16	3	—	Y82628	—	Y82658	—	Y82592	1.201	—	4-1/4
7/8	9	—	3	—	—	Y82695	—	—	—	1.339	—	4-11/16
7/8	—	14	3	—	—	Y82696	—	Y82699	—	1.339	—	4-11/16
1	8	—	3	—	—	Y82697	—	—	—	1.496	—	5-1/8
1	—	12	3	—	—	Y82679	—	—	—	1.496	—	5-1/8
1-1/8	7	—	4	—	—	—	—	Y82700	—	1.535	—	5-7/16
1-1/8	—	12	4	—	—	—	Y82701	—	—	1.535	—	5-7/16
1-1/4	7	—	4	—	—	—	—	Y82702	—	1.535	—	5-3/4
1-1/4	—	12	4	—	—	—	Y82703	—	—	1.535	—	5-3/4
1-3/8	6	—	4	—	—	—	—	Y82705	—	1.811	—	6-1/16
1-3/8	—	12	4	—	—	—	Y82706	—	—	1.811	—	6-1/16
1-1/2	6	—	4	—	—	—	—	Y82707	—	1.811	—	6-3/8
1-1/2	—	12	4	—	—	—	Y82708	—	—	1.811	—	6-3/8
1-3/4	5	—	4	—	—	—	—	—	Y82709	1.929	—	7
2	—	4-1/2	4	—	—	—	—	—	Y82710	1.929	—	7-5/8

ZELX®SS Spiral Fluted Taps for Stainless Steels

For Unified threads

HSS OX 45° 2.5 U

ZELX SS taps are suitable for UNJ Aerospace internal threading applications

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

Nominal Size	TPI UNJC UNC	TPI UNJF UNF	No. of Flutes	Pitch Diameter Limit / EDP Numbers H2	H3	H4	H5	H6	H7	Dimensions Length of Thread	Length of Neck	Length Overall
2	56	—	2	Y84623	—	—	—	—	—	.157	.280	1-3/4
3	48	—	2	Y84600	—	—	—	—	—	.197	.303	1-13/16
4	40	—	2	Y84601	Y84602	Y84629	Y84634	—	—	.236	.326	1-7/8
4	—	48	2	Y84683	—	—	—	—	—	.236	.326	1-7/8
5	40	—	3	Y84603	—	—	—	—	—	.236	.389	1-15/16
6	32	—	3	Y84604	Y84605	Y84636	Y84635	Y84659	Y84665	.276	.411	2
6	—	40	3	Y84684	Y84685	—	—	—	—	.276	.411	2
8	32	—	3	Y84606	Y84607	—	Y84637	Y84660	Y84667	.276	.474	2-1/8
8	—	36	3	—	Y84687	—	—	—	—	.276	.474	2-1/8
10	24	—	3	Y84624	Y84609	—	Y84639	Y84690	Y84669	.354	.521	2-3/8
10	—	32	3	Y84611	Y84610	Y84630	Y84640	Y84662	Y84670	.276	.599	2-3/8
12	24	—	3	—	Y84688	—	—	—	—	.354	.583	2-3/8
12	—	28	3	—	Y84689	—	—	—	—	.276	.661	2-3/8
1/4	20	—	3	—	Y84613	—	Y84643	—	Y84673	.433	.567	2-1/2
1/4	—	28	3	—	Y84614	Y84631	Y84644	Y84664	Y84674	.354	.646	2-1/2
5/16	18	—	3	—	Y84615	—	Y84645	—	Y84675	.472	.653	2-23/32
5/16	—	24	3	—	Y84616	Y84632	Y84646	—	Y84676	.394	.731	2-23/32
3/8	16	—	3	—	Y84617	—	Y84647	—	Y84677	.551	.699	2-15/16
3/8	—	24	3	—	Y84618	Y84633	Y84648	—	Y84678	.394	.856	2-15/16
7/16	14	—	3	—	Y84619	—	Y84649	—	Y84679	.591	—	3-5/32
7/16	—	20	3	—	Y84620	—	Y84650	Y84691	Y84680	.472	—	3-5/32
1/2	13	—	3	—	Y84621	—	Y84651	—	Y84681	.630	—	3-3/8
1/2	—	20	3	—	Y84622	—	Y84652	Y84692	Y84682	.472	—	3-3/8
9/16	12	—	3	—	Y84653	—	—	—	—	.709	—	3-19/32
9/16	—	18	3	—	Y84654	—	Y84698	—	—	.512	—	3-19/32
5/8	11	—	3	—	Y84625	—	Y84655	—	—	.748	—	3-13/16
5/8	—	18	3	—	Y84626	—	Y84656	—	Y84672	.512	—	3-13/16
3/4	10	—	4	—	Y84627	—	Y84657	—	—	.827	—	4-1/4
3/4	—	16	4	—	Y84628	—	Y84658	—	Y84686	.591	—	4-1/4
7/8	9	—	4	—	—	Y84695	—	—	—	.827	—	4-11/16
7/8	—	14	4	—	—	Y84696	—	—	—	.709	—	4-11/16
1	8	—	4	—	—	Y84697	—	—	—	.984	—	5-1/8
1	—	12	4	—	—	Y84668	—	—	—	.709	—	5-1/8
1-1/8	7	—	4	—	—	—	—	Y84701	—	1.181	—	5-7/16
1-1/8	—	12	4	—	—	—	Y84702	—	—	0.787	—	5-7/16
1-1/4	7	—	4	—	—	—	—	Y84703	—	1.181	—	5-3/4
1-1/4	—	12	4	—	—	—	Y84705	—	—	0.787	—	5-3/4
1-3/8	6	—	4	—	—	—	—	Y84706	—	1.575	—	6-1/16
1-3/8	—	12	4	—	—	—	Y84707	—	—	0.787	—	6-1/16
1-1/2	6	—	4	—	—	—	—	Y84709	—	1.575	—	6-3/8
1-1/2	—	12	4	—	—	—	Y84711	—	—	0.787	—	6-3/8
1-3/4	5	—	4	—	—	—	—	—	Y84714	1.772	—	7
2	4-1/2	—	4	—	—	—	—	—	Y84715	1.969	—	7-5/8

ZELX®NI Spiral Pointed Taps for Nickel Base Alloys

For Unified threads

ZELX NI taps are suitable for UNJ Aerospace internal threading applications

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

TPI				Pitch Diameter Limit / EDP Numbers						Dimensions		
Nominal Size	UNJC UNC	UNJF UNF	No. of Flutes	H2	H3	H4	H5	H6	H7	Length of Thread	Length of Neck	Length Overall
2	56	—	2	Y85523	—	—	—	—	—	.256	.181	1-3/4
4	40	—	2	Y85501	Y85502	Y85504	—	—	—	.335	.227	1-7/8
5	40	—	3	Y85503	—	—	—	—	—	.374	.251	1-5/16
6	32	—	3	—	Y85505	Y85524	Y85535	—	—	.413	.274	2
6	—	40	3	Y85512	—	—	—	—	—	.413	.274	2
8	32	—	3	—	Y85507	Y85529	Y85537	Y85560	Y85567	.453	.297	2-1/8
10	24	—	3	—	Y85509	—	Y85539	—	—	.531	.344	2-3/8
10	—	32	3	—	Y85510	Y85530	Y85540	Y85561	Y85570	.531	.344	2-3/8
1/4	20	—	3	—	Y85513	—	Y85543	—	—	.591	.409	2-1/2
1/4	—	28	3	—	Y85514	Y85531	Y85544	Y85562	Y85574	.591	.409	2-1/2
5/16	18	—	3	—	Y85515	—	Y85545	—	—	.669	.456	2-23/32
5/16	—	24	3	—	Y85516	Y85532	Y85546	Y85563	Y85576	.669	.456	2-23/32
3/8	16	—	3	—	Y85517	—	Y85547	—	Y85553	.748	.502	2-15/16
3/8	—	24	3	—	Y85518	Y85533	Y85548	Y85564	Y85578	.748	.502	2-15/16
7/16	14	—	3	—	Y85519	—	Y85549	—	—	.866	—	3-5/32
7/16	—	20	3	—	Y85520	—	Y85550	—	—	.866	—	3-5/32
1/2	13	—	3	—	Y85521	—	Y85551	—	Y85581	.984	—	3-3/8
1/2	—	20	3	—	Y85522	—	Y85552	—	Y85582	.984	—	3-3/8
5/8	11	—	3	—	Y85525	—	Y85555	—	Y85585	1.083	—	3-13/16
5/8	—	18	3	—	Y85526	—	Y85556	—	Y85586	1.083	—	3-13/16
3/4	10	—	3	—	Y85527	—	Y85557	—	—	1.201	—	4-1/4
3/4	—	16	3	—	Y85528	—	Y85558	—	—	1.201	—	4-1/4

ZELX®NI Spiral Fluted Taps for Nickel Base Alloys

For Unified threads

HSS-P NX 15° 3 U Synchronized

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.

TPI				Pitch Diameter Limit / EDP Numbers						Dimensions		
Nominal Size	UNJC UNC	UNJF UNF	No. of Flutes	H2	H3	H4	H5	H6	H7	Length of Thread	Length of Neck	Length Overall
2	56	—	3	Y87523	—	—	—	—	—	.157	.280	1-3/4
4	40	—	3	Y87501	Y87502	Y87512	—	—	—	.236	.326	1-7/8
5	40	—	3	Y87504	—	—	—	—	—	.236	.389	1-15/16
6	32	—	3	—	Y87505	—	Y87535	—	—	.276	.411	2
8	32	—	3	—	Y87507	Y87529	Y87537	—	—	.276	.474	2-1/8
10	24	—	3	—	Y87509	—	Y87539	—	—	.354	.521	2-3/8
10	—	32	3	—	Y87510	Y87530	Y87540	Y87561	Y87570	.276	.599	2-3/8
1/4	20	—	3	—	Y87513	—	Y87543	—	—	.433	.567	2-1/2
1/4	—	28	3	—	Y87514	Y87531	Y87544	Y87562	Y87574	.354	.646	2-1/2
5/16	18	—	3	—	Y87515	—	Y87545	—	—	.472	.653	2-23/32
5/16	—	24	3	—	Y87516	Y87532	Y87546	Y87563	—	.394	.731	2-23/32
3/8	16	—	3	—	Y87517	—	Y87547	—	—	.551	.699	2-15/16
3/8	—	24	3	—	Y87518	Y87533	Y87548	Y87564	Y87578	.394	.856	2-15/16
7/16	14	—	3	—	Y87519	—	Y87549	—	—	.591	—	3-5/32
7/16	—	20	3	—	Y87520	—	Y87050	—	—	.472	—	3-5/32
1/2	13	—	3	—	Y87521	—	Y87551	—	—	.630	—	3-3/8
1/2	—	20	3	—	Y87522	—	—	—	Y87582	.472	—	3-3/8
5/8	11	—	4	—	Y87525	—	Y87555	—	Y87585	.748	—	3-13/16
5/8	—	18	4	—	Y87526	—	Y87556	—	—	.512	—	3-13/16
3/4	10	—	4	—	Y87527	—	Y87557	—	—	.827	—	4-1/4
3/4	—	16	4	—	Y87528	—	Y87558	—	—	.591	—	4-1/4

ZELX®TI

Left Hand Spiral Fluted Taps for Titanium Alloys

For Unified threads

ZELX TI taps are suitable for UNJ Aerospace internal threading applications

Plug Style
(4.5 to 6 threads chamfered)
Taps have a nitride surface toughening treatment.

TPI				Pitch Diameter Limit / EDP Numbers						Dimensions		
Nominal Size	UNJC UNC	UNJF UNF	No. of Flutes	H2	H3	H4	H5	H6	H7	Length of Thread	Length of Neck	Length Overall
2	56	—	3	Y85623	—	—	—	—	—	.256	.181	1-3/4
4	40	—	3	Y85601	—	—	—	—	—	.335	.227	1-7/8
5	40	—	3	Y85603	—	—	—	—	—	.374	.251	1-15/16
6	32	—	3	—	Y85605	—	Y85635	—	—	.413	.274	2
8	32	—	3	—	Y85607	Y85629	Y85637	—	—	.453	.297	2-1/8
10	24	—	3	—	Y85609	—	Y85639	—	—	.531	.344	2-3/8
10	—	32	3	—	Y85610	Y85630	Y85640	—	Y85670	.531	.344	2-3/8
1/4	20	—	3	—	Y85613	—	Y85643	—	—	.591	.409	2-1/2
1/4	—	28	3	—	Y85614	Y85631	Y85644	Y85662	—	.591	.409	2-1/2
5/16	18	—	3	—	Y85615	—	Y85645	—	—	.669	.456	2-23/32
5/16	—	24	3	—	Y85616	—	—	—	—	.669	.456	2-23/32
3/8	16	—	3	—	Y85617	—	—	—	—	.748	.502	2-15/16
3/8	—	24	3	—	Y85618	Y85633	—	—	—	.748	.502	2-15/16
7/16	14	—	3	—	Y85619	—	—	—	—	.866	—	3-5/32
7/16	—	20	3	—	Y85620	—	Y85650	—	—	.866	—	3-5/32
1/2	13	—	3	—	Y85621	—	Y85651	—	—	.984	—	3-3/8
1/2	—	20	3	—	Y85622	—	Y85652	—	—	.984	—	3-3/8

ZELX®TI Spiral Fluted Taps for Titanium Alloys

For Unified threads

HSS-P | NI | 15° | 3 | U | Synchronized

ZELX TI taps are suitable for UNJ Aerospace internal threading applications

Taps have a nitride surface toughening treatment

Modified Bottoming Style
(3 to 4 threads chamfered)

TPI				Pitch Diameter Limit / EDP Numbers						Dimensions		
Nominal Size	UNJC UNC	UNJF UNF	No. of Flutes	H2	H3	H4	H5	H6	H7	Length of Thread	Length of Neck	Length Overall
2	56	—	3	Y87623	—	—	—	—	—	.157	.280	1-3/4
4	40	—	3	Y87601	—	Y87612	—	—	—	.236	.326	1-7/8
6	32	—	3	—	Y87605	—	Y87635	—	—	.276	.411	2
8	32	—	3	—	Y87607	—	Y87637	Y87660	—	.276	.474	2-1/8
10	24	—	3	—	Y87609	—	—	—	—	.354	.521	2-3/8
10	—	32	3	—	Y87610	Y87630	Y87640	—	—	.276	.599	2-3/8
1/4	20	—	3	—	Y87613	—	—	—	—	.433	.567	2-1/2
1/4	—	28	3	—	Y87614	Y87631	Y87644	—	—	.354	.646	2-1/2
5/16	18	—	3	—	Y87615	—	—	—	—	.472	.653	2-23/32
5/16	—	24	3	—	Y87616	—	—	—	—	.394	.731	2-23/32
3/8	16	—	3	—	Y87617	—	—	—	—	.551	.699	2-15/16
3/8	—	24	3	—	Y87618	Y87633	Y87648	—	—	.394	.856	2-15/16
7/16	14	—	3	—	Y87619	—	—	—	—	.591	—	3-5/32
7/16	—	20	3	—	Y87620	—	Y87650	—	—	.472	—	3-5/32
1/2	13	—	3	—	Y87621	—	Y87626	—	—	.630	—	3-3/8
1/2	—	20	3	—	Y87622	—	Y87652	—	—	.472	—	3-3/8

Ground Thread Tap Limits

In addition to the nominal size and pitch of a tap, there is another important dimensional factor to be considered in selecting a ground thread tap for a given job. This factor is the "H" and "L'' pitch diameter tap limits. "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. Since 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

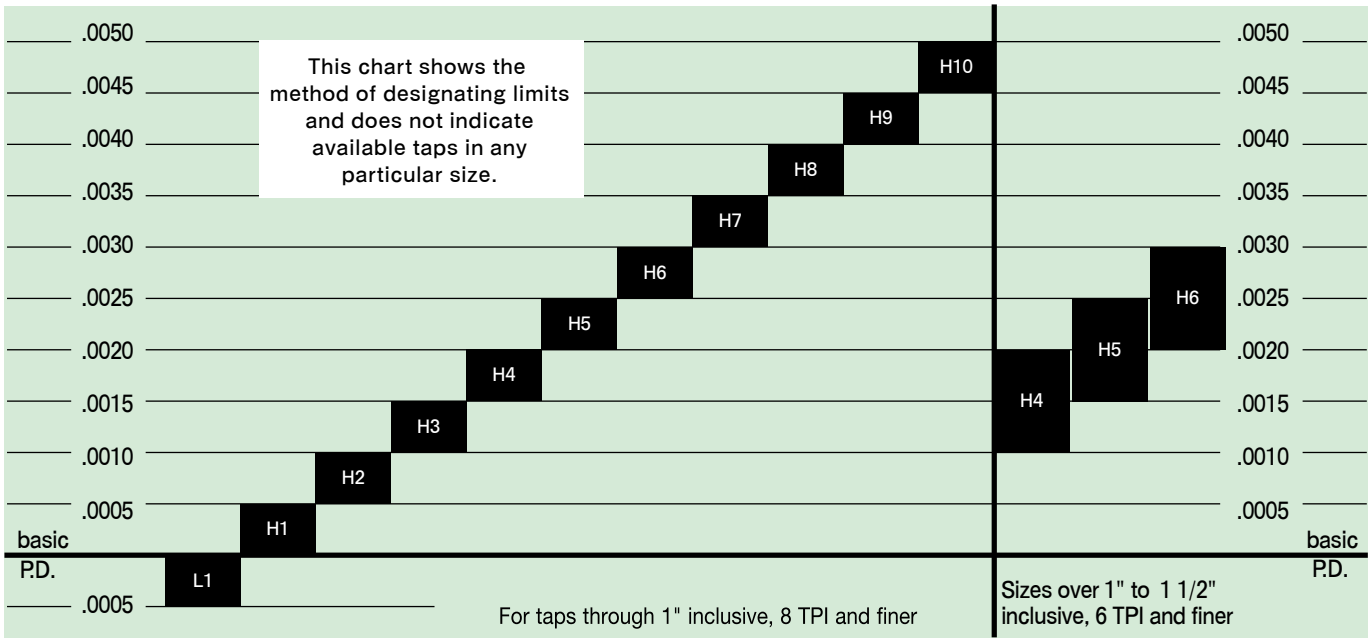
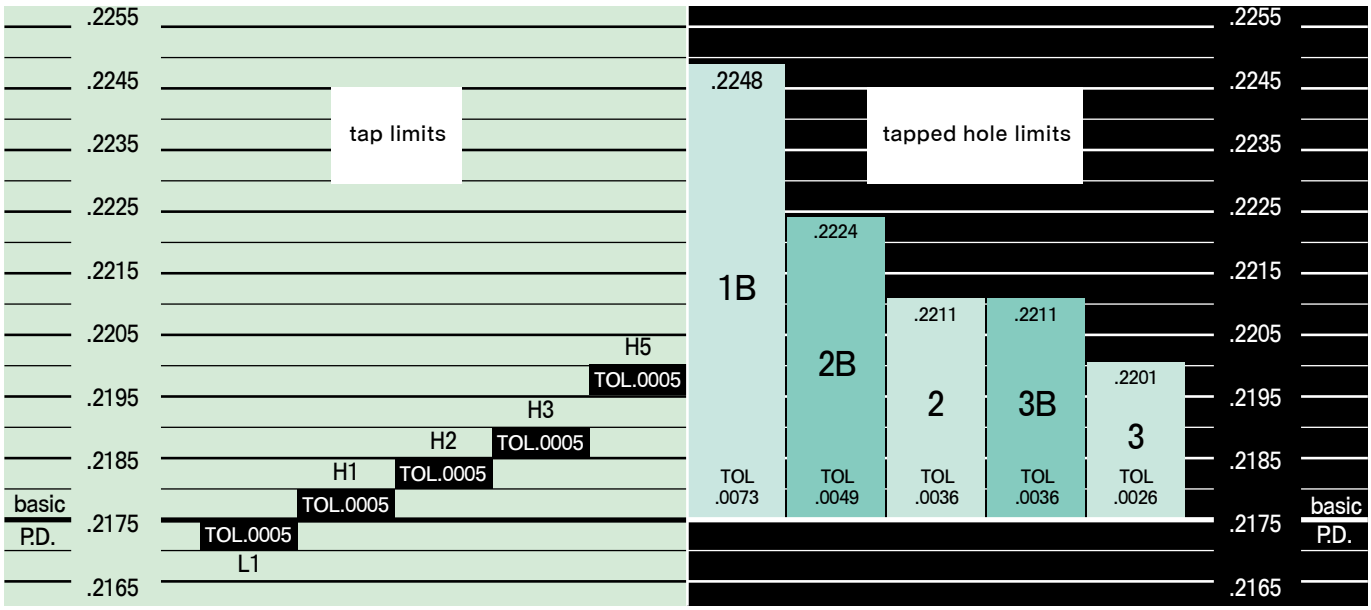


Figure 2

Class of Thread - 1/4 -20 UNC and NC



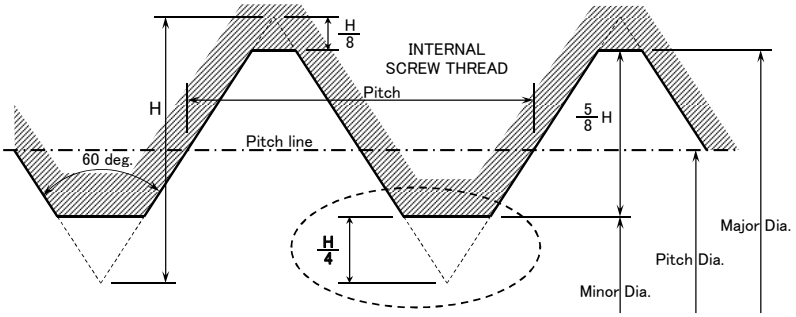
Differences between UN and UNJ threads

The minor diameter of both the external and internal screw threads of a UNJ are larger than that of a UN thread. This design is to enhance the bending and shearing strength of an external thread as per the diagrams below.

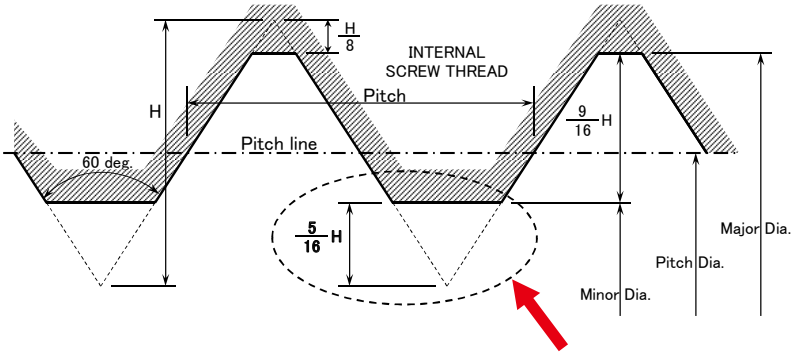
The standards for a UNJ screw thread (MIL-S-8879, AS 8879 and ISO 3161) are one of the Unified screw threads and were established for fastening parts of commercial and military aircrafts with threaded components called "Air-fastener". UNJ threads have only one combination of 3A class external threads and 3B class internal threads per size and both are the smallest tolerance for Unified threads to insure that air-fasteners are securely fastened for excessive loads.

The external screw threads of a UNJ have rounded root radii to specific tolerances for added strength. Yamawa (YMW) taps manufactured for UN threads can be used to produce internal UNJ threads per MIL-S-8879, AS 8879 and ISO 3161.

Basic profile of UNC, UNF Internal screw thread



Basic profile of UNJC, UNJF Internal screw thread



Please Note: We need to show external minor as a radii

Internal threads require producing a larger minor diameter bore than those recommended for UN threads. This larger minor diameter prevents interference of external and internal threads within the tolerance for UNJ standards.

Tapping conditions must be highly accurate to produce an internal screw thread within a 3B class of thread. Thread results can be effected by tapping conditions such as feed mechanism of tapping machine, etc.

Tapping machines with synchronized tapping attachments are strongly recommended.

(1) Feature of UNJ threads:

Larger minor diameter (larger core diameter) and rounded root radii make the external screw threads of a UNJ stronger than a UN thread. Internal UNJ threads require producing a larger minor diameter bore than those recommended for UN threads while staying within the tolerance of the minor diameter for UNJ standards.

(2) Example:

Limit size for minor diameter of Unified internal threads
1/4-20UNC (2B) Min: 0.1960" (or 4.979mm) - Max: 0.2070" (or 5.257mm)
1/4-20UNJC (3B) Min: 0.2013" (or 5.114mm) - Max: 0.2121" (or 5.387mm)

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

For more than 90 years, YAMAWA has continued to develop superior technical expertise as a pioneer in the taps and dies industry.

The Yamawa employees' technological know-how throughout its history 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, machine tap squares, OD grind, and machines to measure all of the tap's 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 specific 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.

ISO9001

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 ISO9001. The Fukushima Plant and Aizu Plant were ISO9001 certified in 2000 . The Tsutsumi plant were certified with ISO9001 in 2011. The headquarters were certified with ISO9001 in 2012.

ISO14001

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 friendly 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 friendly enterprise.

Yonezawa Plant
(ISO9001: 1996)(ISO14001: 2003)

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 pointed, 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
(ISO9001: 2000)(ISO14001: 2002)

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 fluted taps, dies and combined drills/countersinks as well as production machinery.

Aizu Plant
(ISO9001: 2000)(ISO14001: 2002)

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
(ISO9001: 2011)(ISO14001: 2011)

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
(ISO9001: 2012)(ISO14001: 2003)

Head office and export department.
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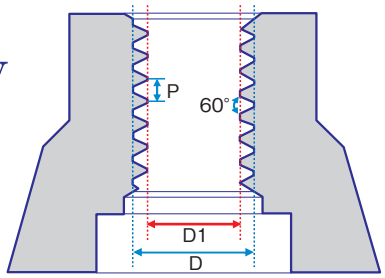
Quality, Consistency, Performance and Product Development. All of the 800 Yamawa employees are committed to these principles and these are reflected in each tool we produce.

Threads for the aerospace industry

Recommended Drill Sizes for Tapping Internal UNJ Threads



UNJC Unified coarse thread SAE AS8879D

Nominal size (inch) D		P [T.P.I.]	Minor dia. of the internal thread D1		Recommended drill size	
			min [inch]	max [inch]	Drill size	Decimal inch
No.4	(0.112)	40	0.0877	0.0942	2.30mm	0.0906
No.5	(0.125)	40	0.1007	0.1072	2.60mm	0.1024
No.6	(0.138)	32	0.1076	0.1157	#33	0.1130
No.8	(0.164)	32	0.1336	0.1417	3.50mm	0.1378
No.10	(0.190)	24	0.1494	0.1600	3.90mm	0.1535
No.12	(0.216)	24	0.1754	0.1852	4.60mm	0.1811
1/4	(0.250)	20	0.2013	0.2121	5.30mm	0.2087
5/16	(0.313)	18	0.2584	0.2690	6.70mm	0.2638
3/8	(0.375)	16	0.3141	0.3250	8.10mm	0.3189
7/16	(0.438)	14	0.3680	0.3795	9.50mm	0.3740
1/2	(0.500)	13	0.4251	0.4368	10.90mm	0.4291
9/16	(0.563)	12	0.4814	0.4914	31/64"	0.4844
5/8	(0.625)	11	0.5365	0.5474	13.80mm	0.5433
3/4	(0.750)	10	0.6526	0.6646	16.75mm	0.6594
7/8	(0.875)	9	0.7668	0.7801	19.60mm	0.7717
1	(1.000)	8	0.8783	0.8933	22.50mm	0.8858

UNJF Unified fine thread SAE AS8879D

Nominal size (inch) D		P [T.P.I.]	Minor dia. of the internal thread D1		Recommended drill size	
			min [inch]	max [inch]	Drill size	Decimal inch
No.4	(0.112)	48	0.0917	0.0971	2.40mm	0.0945
No.5	(0.125)	44	0.1029	0.1088	2.70mm	0.1063
No.6	(0.138)	40	0.1137	0.1202	3.00mm	0.1181
No.8	(0.164)	36	0.1370	0.1442	#28	0.1405
No.10	(0.190)	32	0.1596	0.1675	4.20mm	0.1654
No.12	(0.216)	28	0.1812	0.1896	#13	0.1850
1/4	(0.250)	28	0.2152	0.2229	7/32"	0.2188
5/16	(0.313)	24	0.2719	0.2799	7.00mm	0.2756
3/8	(0.375)	24	0.3344	0.3417	8.60mm	0.3386
7/16	(0.438)	20	0.3888	0.3970	10.00mm	0.3937
1/2	(0.500)	20	0.4513	0.4591	11.60mm	0.4567
9/16	(0.563)	18	0.5084	0.5166	13.00mm	0.5118
5/8	(0.625)	18	0.5709	0.5788	14.60mm	0.5748
3/4	(0.750)	16	0.6892	0.6977	17.60mm	0.6929
7/8	(0.875)	14	0.8055	0.8152	13/16"	0.8125
1	(1.000)	12	0.9189	0.9289	59/64"	0.9219

PIONEER

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