Technical Guide

N.1

Understanding the Basics of Roll taps

2017 version

Think threads with YAMAWA

Understanding the Basics of Roll taps

- The difference between cutting taps and roll taps.
- Features of roll taps.
- Internal screw threads produced with roll taps.
- Bored hole diameters and thread engagement.
- Internal screw threads produced using different bored hole diameters.
- The basics of choosing Roll Taps
- The relationship between an internal thread, a tap and a gauge.
- Accuracy of YAMAWA's Roll taps.
- Workpiece materials being formed with roll taps.
- YAMAWA's offering of roll taps.
- Tapping performance of high performance roll taps.
- Introduction of the MHRZ high performance roll taps.
- Introduction of check pins for bored hole.

Think threads with YAMAWA

Tapping with cutting taps eject the chips out of the hole along tap's flute. Tapping with roll taps creates an internal screw threads by material deformation.

YAMAWA offers both cutting taps and roll taps to meet the market requirements.

In this presentation, we will explain roll taps from the basic concept in order that everyone can easily understand their function and the best method of application.

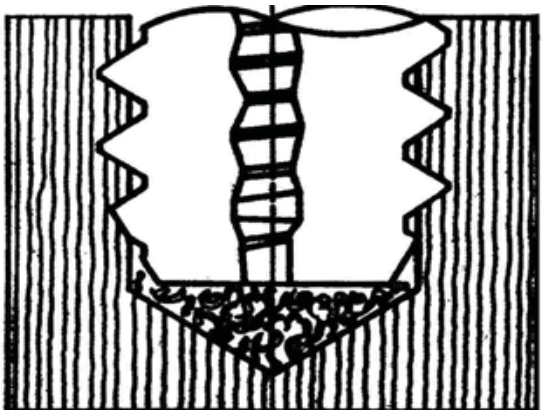
The difference between cutting taps and Roll taps

The main difference between cutting taps and roll taps is cutting taps eject the chips out of the hole and roll taps create a thread through material deformation and create no chips. The pictures below show the difference of these two taps styles.

Cutting Taps

Cutting taps create screw threads by cutting the material and generated chips. The chips need to be ejected out of the hole by the taps or in some way.

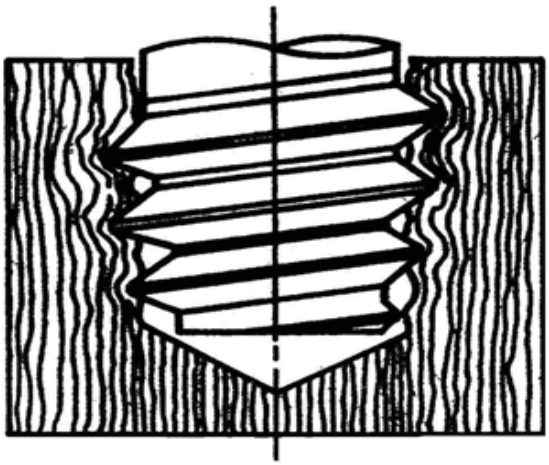
An image of processing a thread with a cutting tap.



Roll Taps

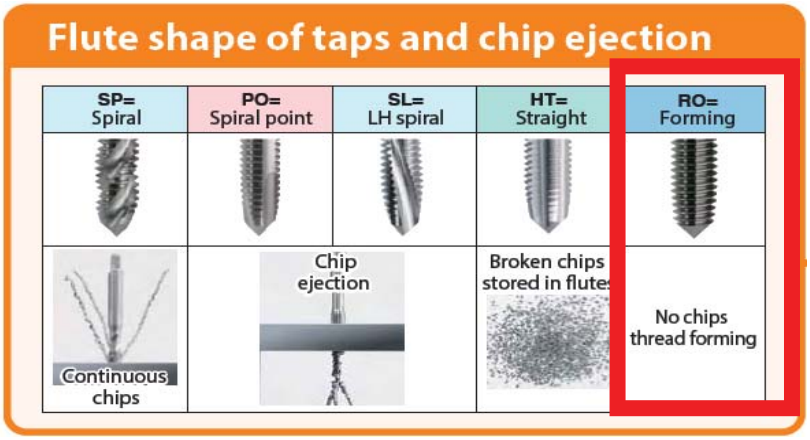
Roll taps create screw threads by material deformation and produce no chips.

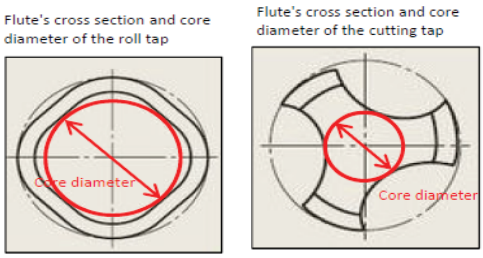
An image of processing a thread with a Roll tap.



Features of Roll taps

・No chips.
Roll taps do not produce chips.
Roll taps save chip disposal time.





・Roll taps are stronger than cutting taps due to their design.

The effect of a fluteless design produces a large core diameter cross section on the tap. There is no problems with chip jamming like with a cutting tap. This makes roll taps very good against tap breakage.

・Roll taps produce an excellent pitch diameter well within the class of fit of the pitch diameter tolerances. The material deformation process produces internal threads with good surface finish and a precise pitch diameter.

・High efficiency and longer tool life
The configuration of the lobes on the crests of the tap threads makes high speed tapping possible and extends tool life when compared to cutting taps. The addition of a supplemental tap surface treatment, such as OX, NI, TiN and TiCN can extend tool life 2 to 20 times over an uncoated (bright) taps performance.

・Threading with roll taps is only applicable to stringy materials.

・The control of the hole size before roll tapping must be held to a closer tolerance than that of cutting taps.

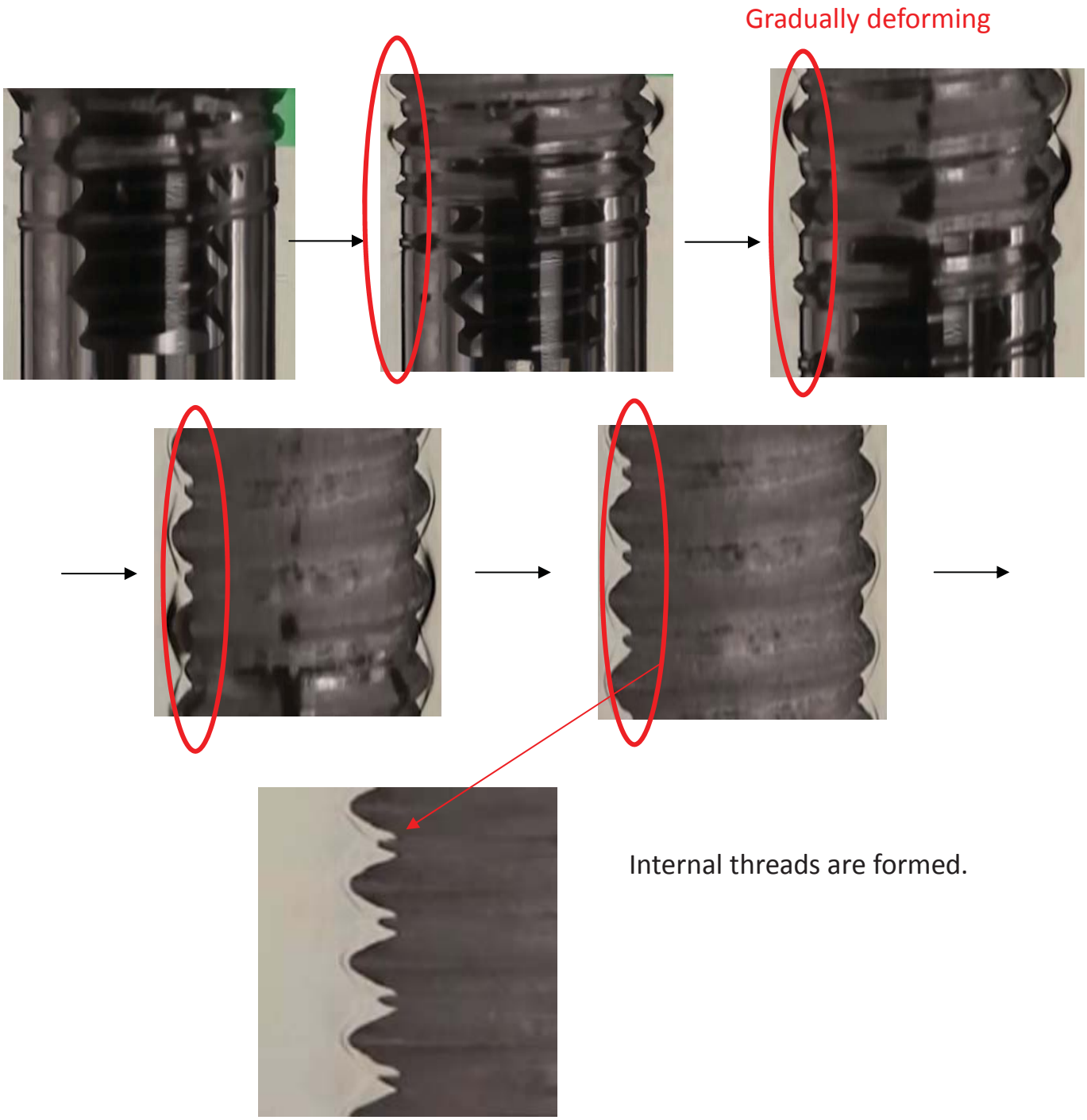
・The maximum deviation of the hole size before roll tapping should be less than 5% of the pitch.

・When using roll taps the tapping torque is 2 to 3 times larger than that of cutting taps.

Understanding the Basics of Roll taps

Internal screw threads produced with roll taps

These pictures are a cross section of tapping with Roll taps. You can see the effect that roll taps have on the workpiece material. As the pictures show, the workpiece materials are deformed gradually and an internal screw thread is formed.

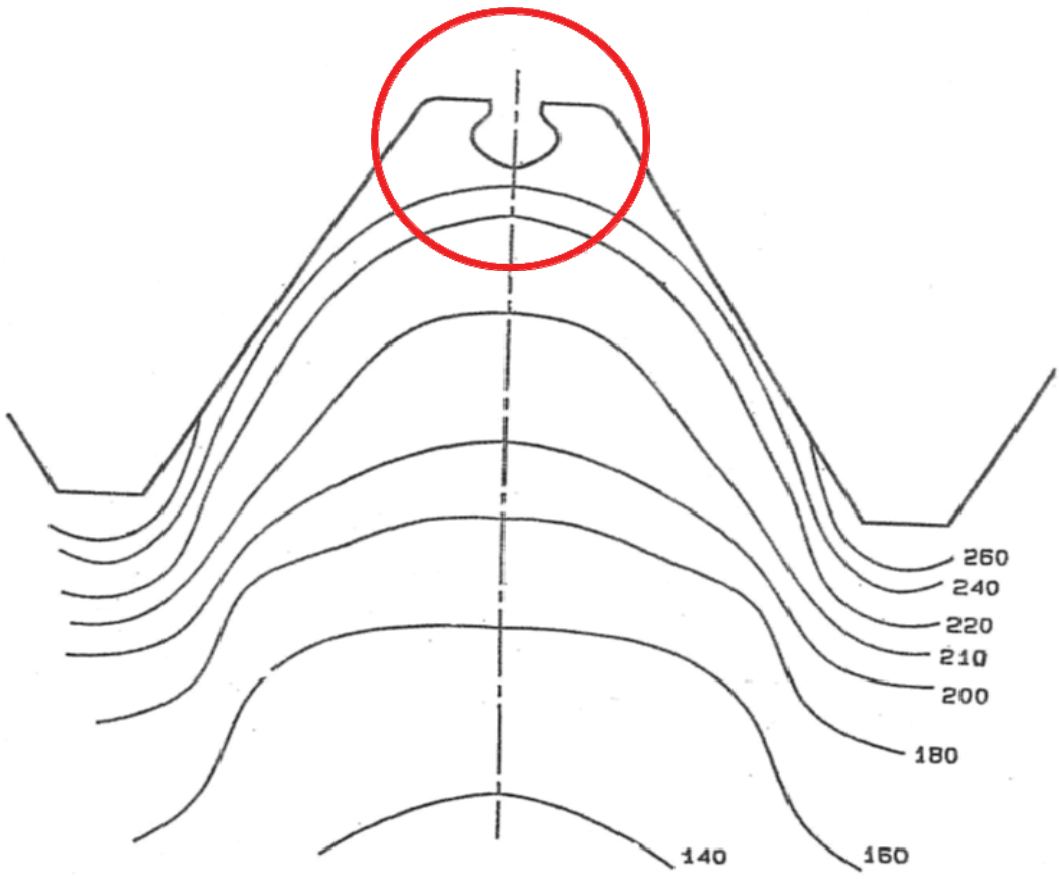


Understanding the Basics of Roll taps

This is an internal screw thread formed with roll taps.

On the minor diameter of the internal thread a U shape form can be seen at the crest of the thread. This is an original shape common to roll tapping and is never seen in tapping with cutting taps.

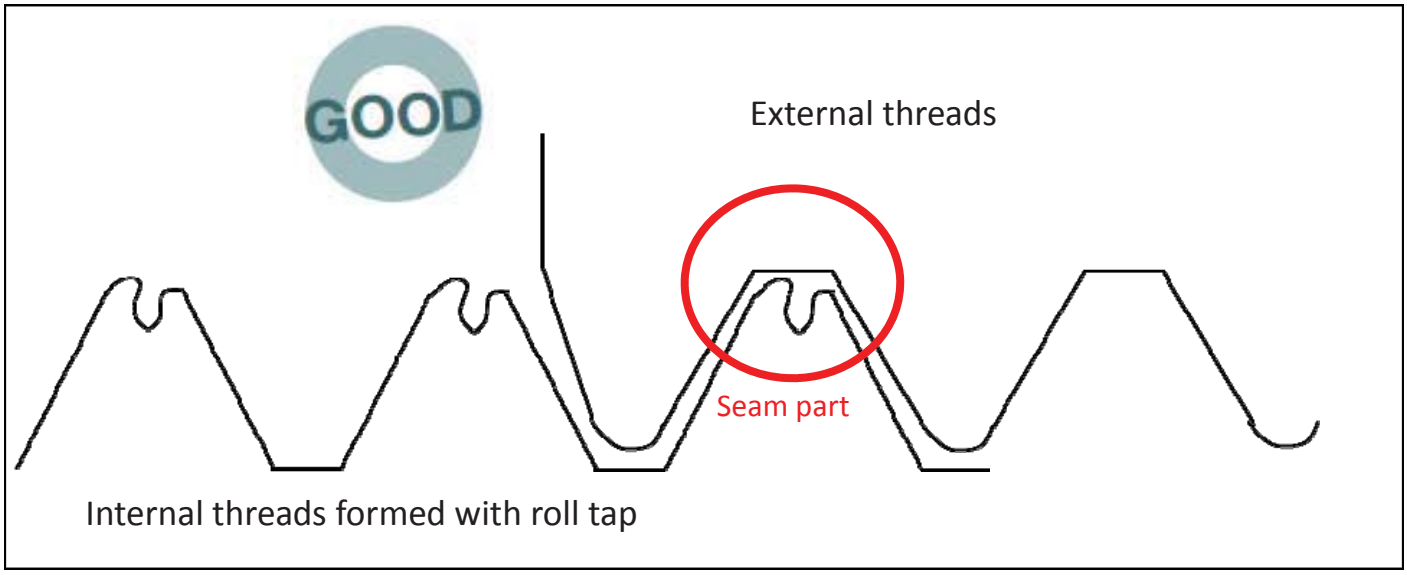
We call this shape “Seam Parts or a Tine”.

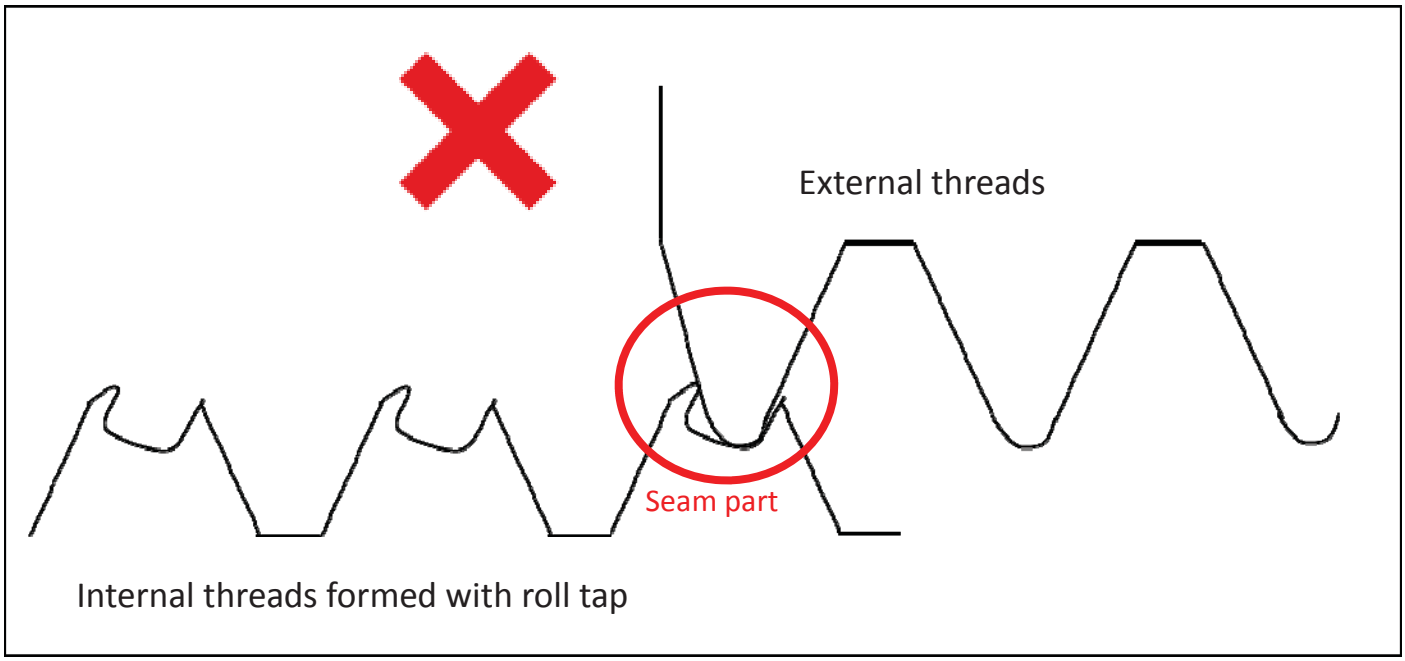


Hardness diagram of SS400 tapped with roll taps

Understanding the Basics of Roll taps

If a roll tap forms too large of a Seam parts or Tine, it can cause problems. The external threads may accidentally break into the seam parts or tine and cause damage or breakage of the internal threads or it can cause an incorrect fastening of the external and internal threads.
When tapping electrical parts, the problems at the seam parts or tine can cause a short circuit of electrical base plate.
In roll tapping, it is important to use an accurate and correct bored hole size and thread engagement. Yamawa will explain the need for a correct bored hole size and thread engagement on the next page.



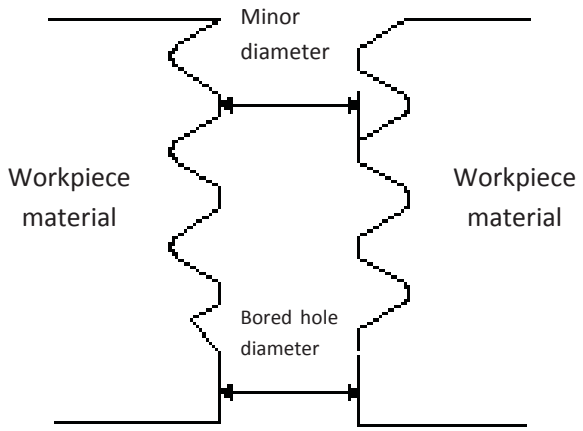


Bored hole diameters and thread engagement.

The minor diameter of an internal thread is the bored hole size when using a cutting tap. When roll tapping the diameter of the bored hole must be larger than the minor diameter of the internal thread because of the material deformation that occurs.

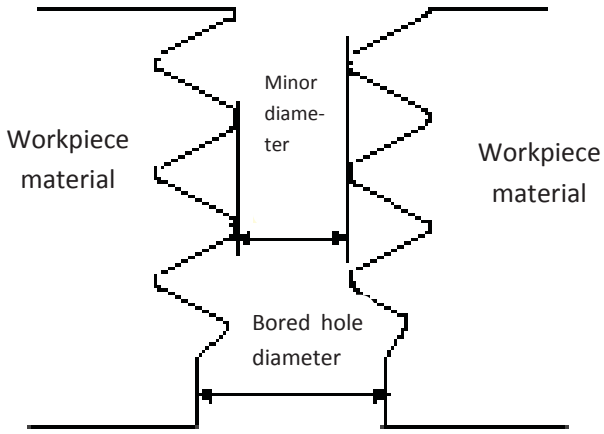
Cutting tap

The bored hole diameter is equal to the thread minor diameter.



Roll tap

The bored hole diameter is bigger than the thread minor diameter



Percentage of thread engagement.

The bored hole diameter for internal threads and the percentage of thread engage-ment ratio will change depending on several conditions. The tapping condition must be chosen carefully by selecting an acceptable percentage of thread engagement ratio. To get the best performance out of cutting and forming taps, the bored hole should be as large as possible while saying within the tolerance of the threads class of fit. The tap's

■Percentage of Thread Engagement & Relation between Percentage of Thread Height and Area Removed at a Thread Height

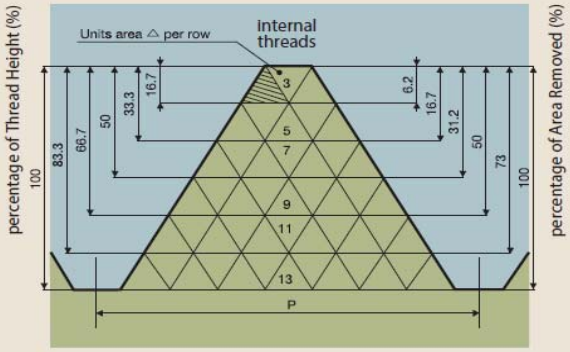
Percentage of Thread Engagement

$$\frac{\text{Basic Major Dia.} - \text{Hole Size Before Tapping}}{2\times(\text{Basic Thread Overlap})} \times 100$$

Basic Thread Overlap

Metric & Unified Thread	0.5413P
Whitworth Thread	0.5664P
Pipe Thread (Rc, Rp, G, PT, PS, PF)	0.6403P

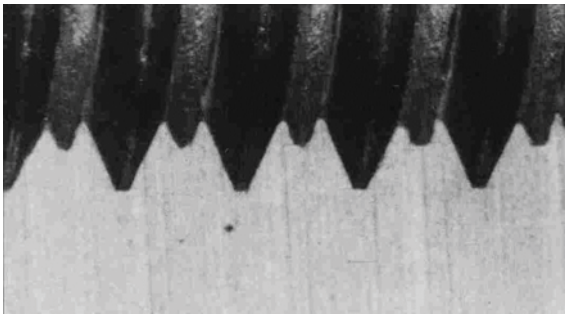
P=Pitch



Internal screw threads produced using different bored hole diameters.

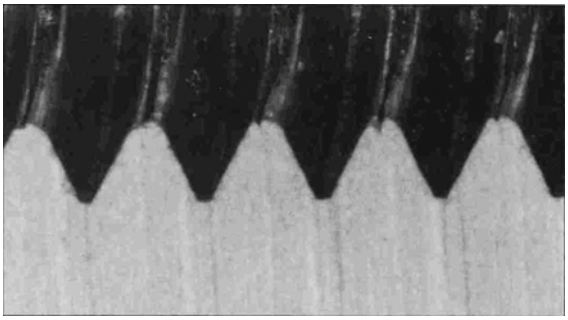
<Tapping condition>
Product： N-RS G7 M6X1 (B)
Workpiece material : AC2C-T6
Tapping speed : 20m/min
Lubrication : Non water soluble oil

NG



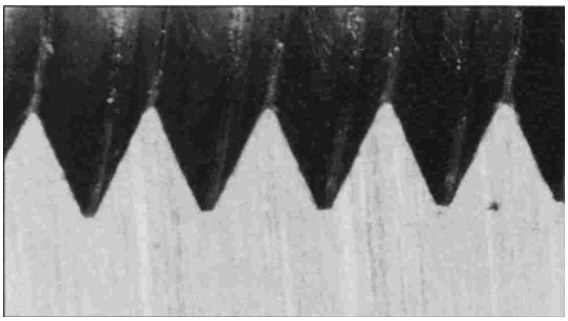
Bored hole diameter: 5.60mm
The percentage of thread engagement: 78%
Results: Not acceptable.
The bored hole diameter is bigger than the recommended size.
A short thread crest is produced.

OK



Bored hole diameter: 5.50mm
The percentage of thread engagement: 89%
Results: Good, the thread is OK for JIS 2nd.
We recommend making the bored hole even larger up to 5.55mm.

NG



Bored hole diameter: 5.40mm
The percentage of thread engagement: 125%
Results: Not Acceptable.
The bored hole diameter is too small.
A large thread crest is produced.

How can I get an appropriate internal screw thread ?

Think threads with YAMAWA

Understanding the Basics of Roll taps

The bored hole size before tapping for roll taps in the YAMAWA Product Catalog, shows we recommend a bored hole size according to the percentage of the thread engagement ratio. The deformation of the material may change depending on the characteristics of the workpiece material and the tapping condition.
Please refer to the YAMAWA recommended bored hole for roll tapping.

for Metric Threads

unit: mm

Size	Class	Recommended hole size (mm)		Thread engagement ratio (Estimation %)	Minor diameter of internal threads (5H/6H)	
		Max.	Min.		Max.	Min.
M1×0.25	ISO2X	0.92	0.89	80~100	0.785	0.729
	ISO3X	0.91	0.89	75~90		
M1.2×0.25	ISO2X	1.11	1.09	80~100	0.985	0.929
	ISO3X	1.11	1.09	75~90		
M1.4×0.3	ISO2X	1.30	1.26	80~100	1.142	1.075
	ISO3X	1.31	1.28	70~90		
M1.6×0.35	ISO2X	1.47	1.43	75~100	1.321	1.221
	ISO3X	1.51	1.46	70~95		
M2×0.4	ISO2X	1.85	1.80	75~100	1.679	1.567
	ISO3X	1.89	1.84	70~95		
M2.5×0.45	ISO2X	2.34	2.27	75~100	2.138	2.013
	ISO3X	2.36	2.31	75~95		
M3×0.5	ISO2X	2.83	2.76	75~100	2.599	2.459
	ISO3X	2.84	2.79	75~95		
M3.5×0.6	ISO2X	3.30	3.22	75~100	3.010	2.850
	ISO3X	3.32	3.25	75~95		
M4×0.7	ISO2X	3.73	3.66	80~100	3.422	3.242
	ISO3X	3.77	3.69	75~95		
M5×0.8	ISO2X	4.68	4.60	80~100	4.334	4.134
	ISO3X	4.73	4.64	75~95		
M6×1	ISO2X	5.60	5.50	80~100	5.153	4.917
	ISO3X	5.64	5.56	80~95		

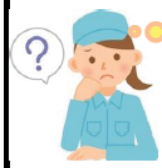
Size	Class	Recommended hole size (mm)		Thread engagement ratio (Estimation %)	Minor diameter of internal threads (5H/6H)	
		Max.	Min.		Max.	Min.
M8×1.25	ISO2X	7.52	7.39	80~100	6.912	6.647
	ISO3X	7.56	7.46	80~95		
M8×1	ISO2X	7.60	7.49	80~100	7.153	6.917
	ISO3X	7.64	7.56	80~95		
M10×1.5	ISO2X	9.38	9.26	85~100	8.676	8.376
	ISO3X	9.47	9.35	80~95		
M10×1.25	ISO2X	9.52	9.38	80~100	8.912	8.647
	ISO3X	9.55	9.45	80~95		
M12×1.75	ISO2X	11.27	11.13	85~100	10.441	10.106
	ISO3X	11.32	11.23	85~95		
M12×1.5	ISO2X	11.42	11.25	85~100	10.676	10.376
	ISO3X	11.45	11.33	80~95		
M12×1.25	ISO2X	11.51	11.37	80~100	10.912	10.647
	ISO3X	11.54	11.43	80~95		
M14×2	ISO2X	13.17	13.00	85~100	12.210	11.835
	ISO3X	13.2	13.1	85~95		
M14×1.5	ISO2X	13.36	13.23	85~100	12.676	12.376
	ISO3X	13.44	13.32	80~95		
M16×2	ISO2X	15.17	15.00	85~100	14.210	13.835
	ISO3X	15.2	15.09	85~95		
M16×1.5	ISO2X	15.35	15.23	85~100	14.676	14.376
	ISO3X	15.43	15.31	80~95		

Understanding the Basics of Roll taps

The basic way of choosing roll taps.

No.005 **Bag full of wisdom when you are in trouble** *Roll taps*

【Question】



I'm going to try roll taps for the first time.
Can you tell me the best way to use roll taps?
Further, I've heard it is not easy to control the bored hole diameter.

【Answer】

The proper application of roll taps is not difficult once you become familiar with the best way to select and use them.
Roll taps work better, if you follow a standard way to select and apply them.
I think there is a short cut that may help you reach really good results while using roll taps.

Once you gain the experience, you will find your own unique way to use roll taps.
Here I would like to introduce you to the basic way to use roll taps.

Basic way to choose Roll taps

Selection of material to be tapped

● At first, confirm if the material is suitable for tapping with roll taps. Tapping with roll taps is applicable to non-ferrous material like aluminum and soft steels, but not for cast irons and hard steels.

↓

Initial selection of the roll tap

● Yamawa's N+RS is for roll tapping of non-ferrous material like aluminum and the Yamawa N+RZ is for roll tapping of soft steels.
If you need longer tool life for production runs, I would recommend the Yamawa HP+RZ.
● I would recommend a Plug Chamfer for through hole tapping and a Bottoming Chamfer for blind hole tapping.
● I suggest you choose a standard thread class first for the thread class of fit.

↓

How to confirm the tap thread class adaptable to the thread class of fit for the internal thread

↓

On the first thread produced, prepare the bored hole diameter slightly bigger than recommended.

● For the first tap test, I sugget you choose a bored hole diameter a little larger than standard diameter recommended.
※If the initial bored hole diameter is too small, it can cause the problem of excessive material deformation and tap breakage.

↓

Tapping with the roll tap initially selected.

● Try tapping first with the roll tap initially selected.
① If the Go plug gauge measurers tight, there is a possibility that shrinkage in the internal thread was caused by elastic features of the material. Try tapping again with a roll tap of one thread class limit larger .
② If the NoGo plug gauge measures too loose, try tapping again with the roll tap of one thread class limit smaller.When you still have the above problems, reconsider the kind of the tap selected.

① When the Go plug gauge measures tight, try tapping again with a tap with a larger thread class.

② When the NoGo plug gauge measures too large of a thread size, try tapping again with a smaller thread class.

③ If the Go and NoGo gauges are OK, it means the selected thread class for the tap is appropriate.

③ If both the internal threads Go and NoGo are OK after tapping, it means the thread limit of the tap is appropriate.

The above explanation looks difficult to understand. But I feel I can use roll tap by proceeding with your step by step suggestions in order. Do you think I can?

Yes I do. Let's move on to the selection of a bored hole diameter on the next page.

Think threads with YAMAWA

Understanding the basics Roll taps

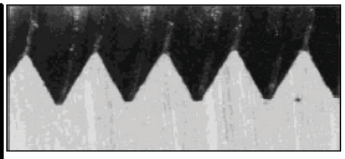
For setting the bored hole diameter, the basic procedure is minute adjusting while checking with the pin gauge for minor diameter.

In test tapping shown on the previous page, for safety reasons, the bored hole diameter is set a little bit larger. Through decreasing the diameter incrementally, then you can find the most appropriate bored hole diameter.

(Basic procedure to find the bored hole diameter)

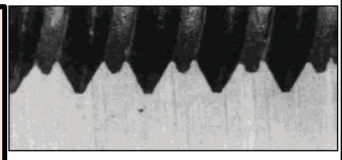
Measure the minor diameter of the internal threads that were accepted through both the GO and NOT-GO inspection guages ③ shown in previous page.

④
If the GO pin gauge for the minor diameter is NG, try tapping again by making the bored hole diameter larger.



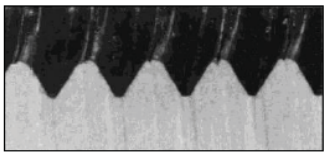
If bored hole diameter is smaller, material deformation becomes excessive.

⑤
If the NOT-GO pin gage for minor diameter is NG, try tapping again by making the bored hole diameter smaller.



If the bored hole diameter is larger, material deformation becomes too small.

⑥
If both the GO and NOT-GO pin gage inspection is OK, it means the bored hole diameter is appropriate. We have reached the goal.



If the bored hole diameter needs to be larger or smaller.
Then how much should we adjust ?

Let's assume the target of the minor diameter as A.
And let's assume the minor diameter after tapping is B.
Guideline of adjusting value C :
You can roughly get the value from formula (A-B)/2=C

＜Adjusting example of bored hole diameter＞
M6x1 Target minor diameter is set to be 5.0mm (rate of thread engagement 93%)

We assume when we set the bored hole diameter at 5.4mm, completed the minor diameter has become 4.8mm (rate of engagement 111%).
This looks like ④ shown in above picture.
In this case the formula is (5.0-4.8)/2=0.1. If you make the bored hole diameter 0.1mm larger than 5.4mm, then, completed minor diameter will become close to 5.0mm.

On the other hand, we assume when the minor diameter is set as 5.6mm, completed the minor diameter has become 5.2mm (rate of engagement 74%).
In this case formula is (5.0-5.2)/2=—0.1. If you make the bored hole diameter to 5.5mm, 0.1mm smaller than 5.6mm, then, completed minor diameter will become close to 5.0mm.

In the above picture ⑥、when the bored hole diameter is 5.5mm, the minor diameter is completed the most appropriate diameter, 5.0mm.

The actual situation may not be the same with this calculation, but the above calculation will give us a guideline for adjusting the bored hole diameter.

As a tool for checking minor diameter, use the CPC-S (Minor diameter checkpin for cutting tap) and you will find it useful.

Check Pins for Bored Hole： CPC-S

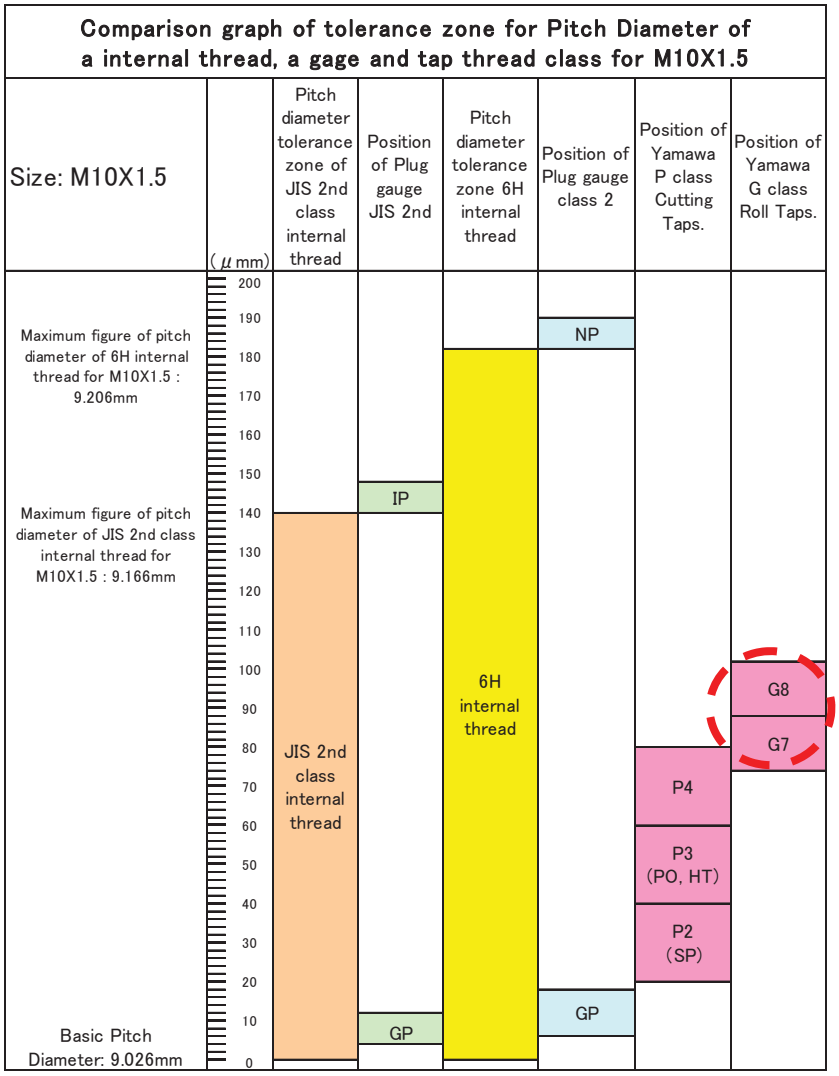
By using the CPC-S (minor diameter checkpin for a cutting tap), we can check the minor diameter in the range of engagement rate 100%-70% with 5% increments. By using CPC-S, we can check the minor diameter of internal threads completed by roll taps as well by 5% increments.

The relationship between an internal thread, a tap and a gauge.

The tap class of YAMAWA's roll taps are produced at the upper 2/3 of the pitch diameter tolerance of JIS 2nd class internal thread.
In the case of roll taps, the tap's pitch diameter tolerance reflects directly to produce the same pitch diameter on the internal threads. This occurs because the roll tap produces threads through material deformation.

Standard thread classes of each tap for M10X1.5 and the location of the pitch diameter.

- N-RZ G7 M10X1.5 G7=+76~+89μm
- SP P2 M10X1.5 P2=+20~+40μm
- PO P3 M10X1.5 P3=+40~+60μm
- HT P3 M10X1.5 P3=+40~+60μm



Accuracy of YAMAWA Roll taps

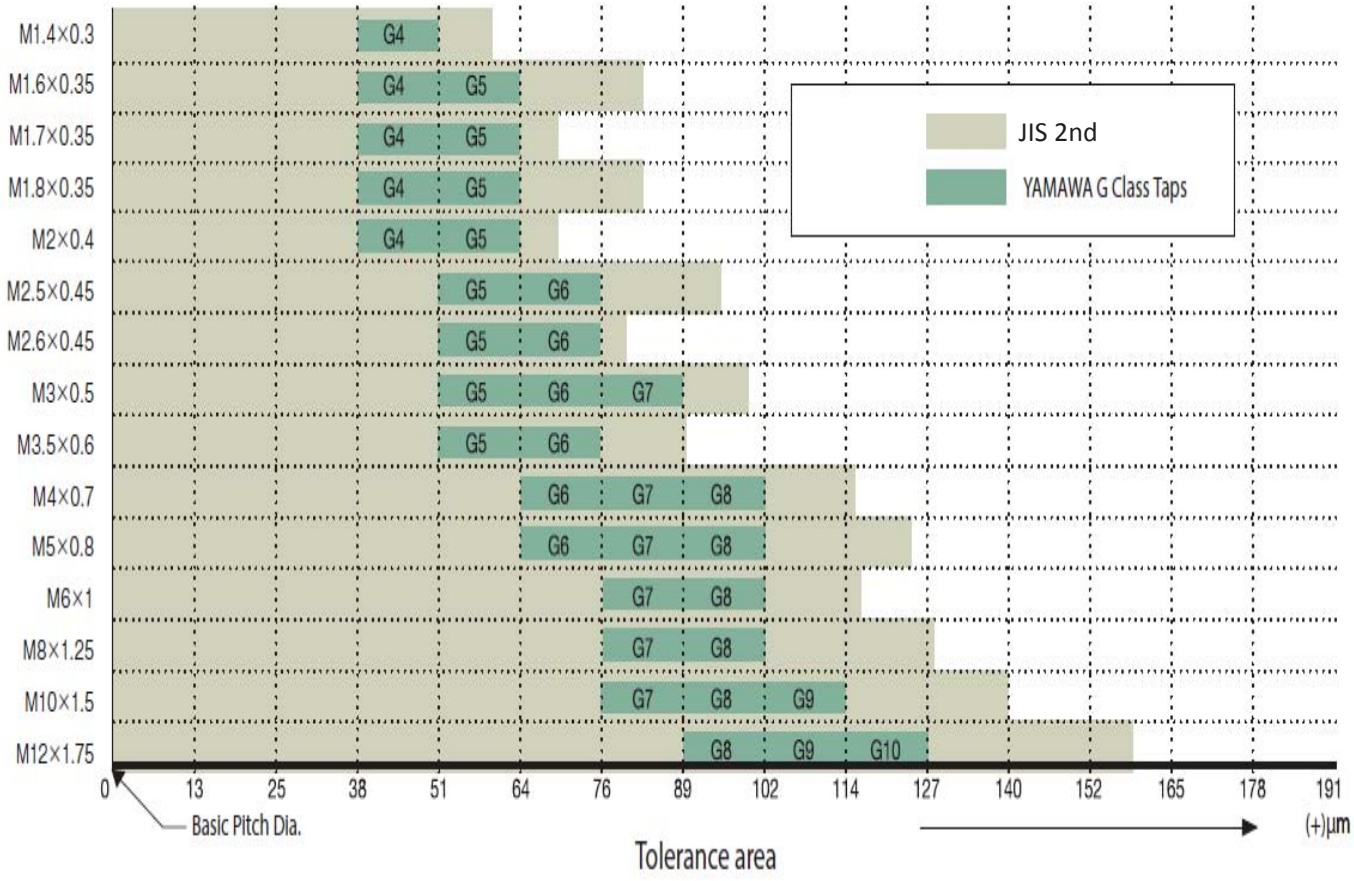
■YAMAWA's G class system for Thread Forming Taps.

YAMAWA's G class system is created by using the datum 0.0005 inch 12.7 µm in a step form in accordance with the ANSI standard GH class. The upper deviation of the G class is derived by rounding off the decimal point to a whole number with no decimal points. The lower deviation of G class is specified in the same upper tolerance of one lower step. The tolerances are either 12µm or 13µm.

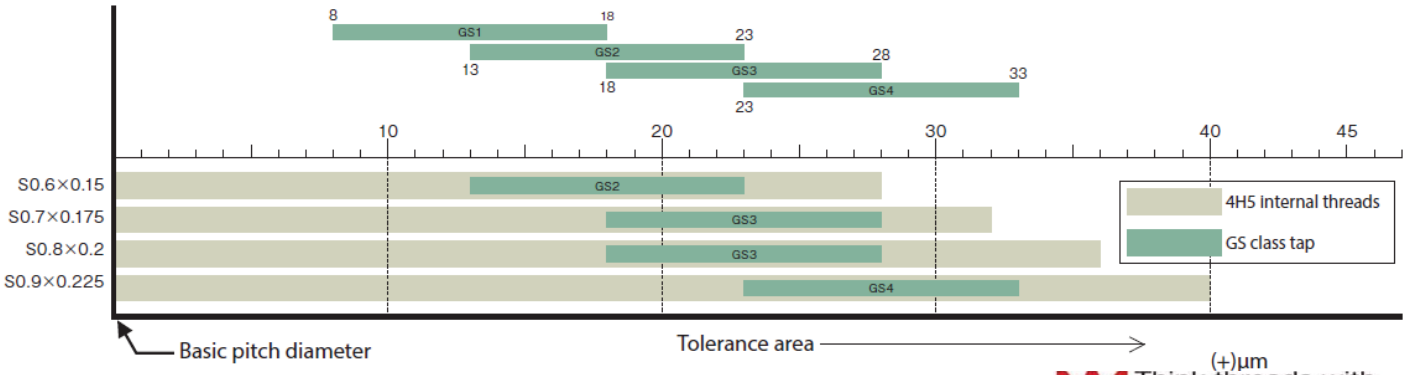
■Tolerance class

The differences in materials being Roll tapped and the hole size contribute to differences in thread forming. YAMAWA offers 2 to 3 oversized tap tolerance classes in order to achieve the most suitable internal thread pitch diameter size.

■Comparison of pitch tolerance zone between JIS 2nd internal threads and recommended Roll Taps G class.



■Comparison table of PD tolerance of GS class of roll taps for miniature threads and 4H5 internal threads.



Think threads with YAMAWA

Workpiece materials being formed with roll taps.

First we must confirm if the workpiece material is suitable for tapping with roll taps. The following are the materials suitable for roll tapping.

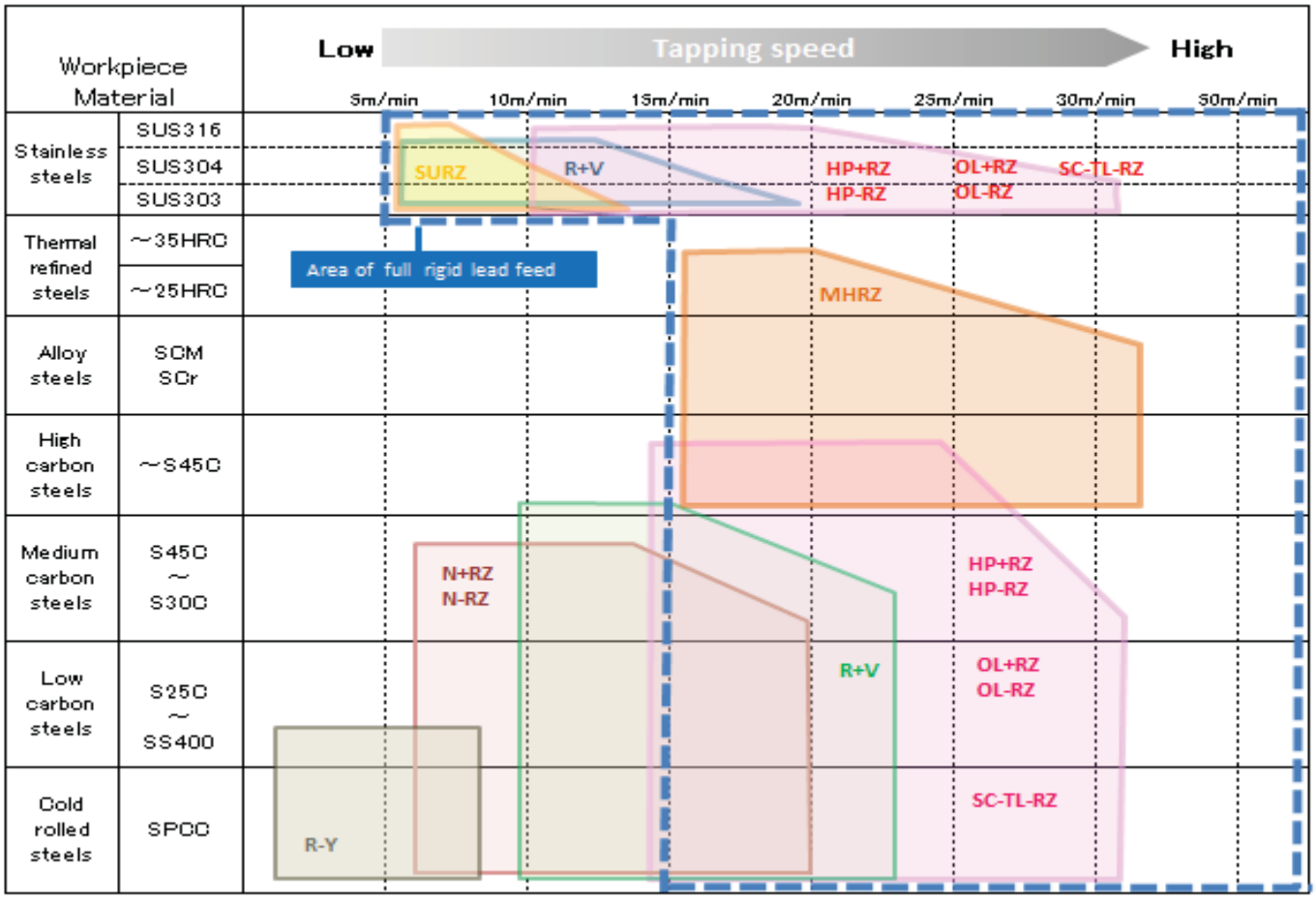
Type	Workpiece material (material symbol)
Non ferrous	Wrought Aluminum（AL)
	Aluminum (AC)
	Aluminum die casting（ADC)
	Zinc alloy（ZDC)
	Copper（Cu)
	Brass（Bs)
Ferrous	Soft steels
	Medium carbon steels (S25C～S45C)
	Stainless steels
	Free cutting steels

Note: Tapping hard materials that are not easily deformed like cast irons, ductile irons, and plastic are not suitable for roll tapping.

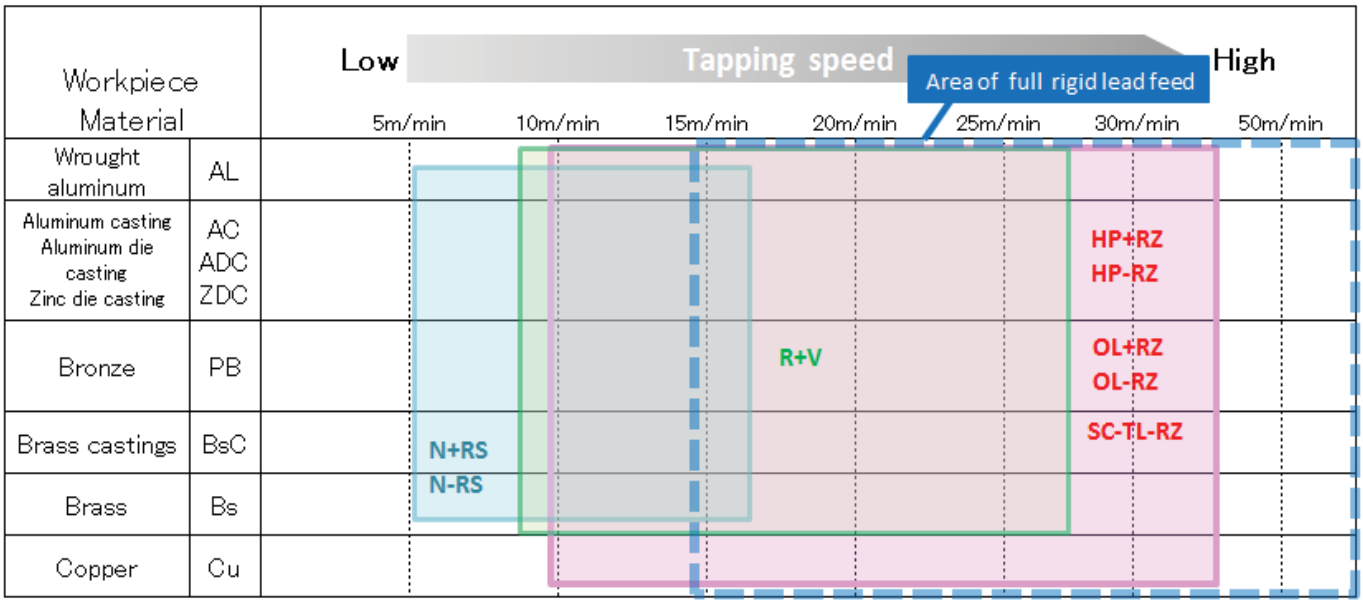
Understanding the Basics of Roll taps

YAMAWA offers the following product system chart based on the workpiece material and recommends tapping speed for each of the tap product.
Check in the product catalog and select a suitable tap product that fits your needs.

New System table of roll taps for steels



New System table of roll taps for non-ferrous materials



Think threads with YAMAWA

Understanding the Basics of Roll taps

YAMAWA's offering of Roll taps.

Product name and symbol	Features	Size range	• Number of chamfer threads • Tap Material • Surface treatment
Thread Forming Taps for Thin Structural Steel Sheets R-Y 	R-Y taps are suitable for tapping general fastener threads made from thin steel sheet like SPC and SPH. The R-Y taps are also suitable for soft steels like SS400 and S20C.	M1-M8	3P HSS Bright
Thread Forming Taps for Steels **N+RZ/N-RZ** 	N+RZ/N-RZ taps are forming taps suitable for ferrous materials such as low carbon steels, high carbon steels and alloy steels. Yamawa offers the "LS-N-RZ" as a longer shank length taps. The LS-N-RZ taps are applicable for use where the tapping length can not be reached with a standard length taps.	M1-M20 No. 0 - 1/4	Both 4P and 2P type HSS OX
Thread Forming Taps for Non-Ferrous Materials **N+RS/N-RS** 	N+RS/N-RS taps are forming taps suitable for non-ferrous materials such as aluminum castings, aluminum die-casting and brass. Yamawa offers the "LS-N-RS" as a longer shank length taps. The LS-N-RS taps are applicable for use where the tapping length can not be reached with a standard length taps.	M1-M20 No.0 - 1/4	Both 4P and 2P type HSS NI
Thread Forming Taps, Coated **R+V/R-V** 	R+V taps are coated forming taps for ferrous and non-ferrous materials. Optimum coating suitable to the tapping condition.	M1-M6	Both 4P and 2P type HSS Coating
Roll Taps for Miniature Threads **MS+RS** 	MS+RS taps utilize a new tap blank. These roll taps have improved rigidity, bending strength and run-out tolerance. The MS+RS has adopted a new thread limit (GS classes) to improve the thread accuracy of internal threads being machined.	S0.6-S0.9	2P HSS Bright

Understanding the Basic of Roll taps

Product name and symbol	Features	Size range	• Number of chamfer threads • Tap material • Surface treatment
Thread forming Taps for dry Tapping, Coated **OL+RZ/OL-RZ** 	OL+RZ/OL-RZ taps enabling dry roll tapping under following condition: Tap sizes of M6 and smaller for roll tapping thin steel sheets that normally have a problem with burrs and steel parts with a rather short length. The OL+RZ utilizes an optimum coating suitable for tapping in most conditions.	M1 - M6 No.2 - 1/4	4P HSS-P Coating ※No oil flutes
High Performance Thread Forming Taps, Coated **HP+RZ/HP-RZ** 	HP+RZ/HP-RZ taps are forming taps suitable for steels (lower than 35HRC) and light alloys. The HP+RZ roll taps are applicable to the high speed tapping. The HP+RZ utilizes an optimum coating suitable to for tapping most condition.	M1 - M20 No. 2 – 1/4	Both 4P and 2P type HSS-P Coating
High Performance Roll taps for Miniature Threads **HPsRZ** 	HPsRZ taps use a new tap blank. These roll taps have improved rigidity, bending strength and run-out tolerance. Using a new thread limit (GS classes) improves the thread accuracy of the internal threads being machined.	S0.6 -S0.9	2P HSS-P Coating

Understanding the Basics of Roll taps

Product name and symbol	Features	Size range	• Number of chamfer threads • Tap material • Surface treatment
Torqueless Thread Forming Taps with short chamfer **SC-TL-RZ**  〈Target parts〉  	Producing high quality internal threads with fewer burrs. Longer tool life with water soluble oil. Wider tapping application range with the ability for higher speed tapping.	M1 – M6	1P HSS-P Coating
Thread forming Taps for stainless steels **SURZ**  〈Target parts〉  	Using a special form on tap's thread root, the SURZ controls the minor diameter geometry of internal threads. A special lobe shape produces low tapping torque. High efficiency can be obtained in thread forming of stainless steels.	M1 - M6	2P HSS-P Coating
Roll Taps for Carbon Steels of Medium hardness **MHRZ**  〈Target pars〉   	YAMAWA has produced a proprietary design that decreases the tapping torque in roll tapping. With a combination of wear-resistant tool material and a special coating, the tool's durability has improved tremendously. Consistent tapping of Heat treated steels (～35HRC) is ensured. Tapping with water soluble tapping fluid is possible.	M6 - M14	Both 4P and 2P type HSS-P Coating

Think threads with YAMAWA

Tapping effectiveness in high performance roll taps

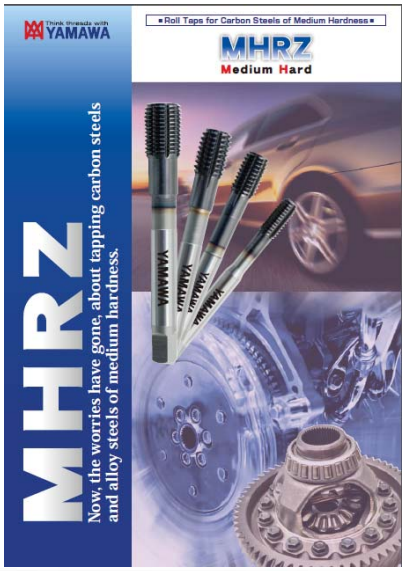
The graph below shows the tapping effectiveness of YAMAWA's high performance roll taps. The HP+RZ/HP-RZ has been received well from the manufacturing industry.

Type of tap and size	Tapping condition							Number of tapped hole (hole/pc)
	Workpiece material	Bored hole diameter (mm)	Threading length (mm)	Hole shape	Speed (m/min)	Machine	Tapping Fluid	
G4 M1X0.25 (B)	SUS420	0.87	1.5	Blind	0.9	Special-purpose machine	Soluble	1,400
G5 M1.4X0.3 (P)	SUS304	1.26	3	Through	8	Tapping machine	Paste	40,000
G4 M1.6X0.35 (B)	ADC12	1.44	3	Blind	3	Special-purpose machine	Water soluble	5,6000
G4 M1.7X0.35 (B)	SUS316	1.56	2.5	Blind	8	Special-purpose machine	Soluble	3,000
G5 M2X0.4 (P)	SUS304	1.77	4	Through	7	Special-purpose machine	Soluble	200,000
G5 M2X0.4 (P)	SPC	1.78	3	Through	6.3	Special-purpose machine	Soluble	100,000
G4 M2X0.4 (P)	SUS420	1.82	4	Blind	23	Special-purpose machine	Soluble	4,000
G6 M2.6X0.45 (P)	SS400	2.38	5	Blind	6.5	Special-purpose machine	Soluble	11,000
G6 M2.6X0.45 (P)	SPC	2.37	3	Through	12	Special-purpose machine	Soluble	11,000
G5 M3X0.5 (P)	SPC	2.75	6	Through	12	CNC	Dry	8,000
G5 M3X0.5 (P)	SUS303	2.77	5.5	Through	9.4	Special-purpose machine	Water soluble	20,000
G5 M3X0.5 (P)	SUS304	2.78	5	Through	8	Special-purpose machine	Soluble	100,000
G5 M3X0.5 (P)	SPC	2.77	3.5	Through	10.4	Special-purpose machine	Soluble	65,000
G5 M4X0.7 (B)	ADC12	3.65	10	Blind	50	CNC	Water soluble	85,000
G5 M4X0.7 (P)	SPC	3.65	3	Through	20	Special-purpose machine	Dry	6,000
G7 M6X1 (P)	Zinc plate	5.55	4	Through	15	Tapping machine	Dry	10,000
G6 M6X1 (P)	S45C	5.5	10	Blind	10	NC lathe	Water soluble	380
G7 M10X1.25 (B)	S48C	9.45	25	Blind	25	Special-purpose machine	Soluble	600
G9 M16X1.5 (B)	S45C	15.37	15	Blind	15	Special-purpose machine	Soluble	2,400

Understanding the Basics of Roll taps

Introduction of the MHRZ high performance roll taps.

MHRZ
Medium Hard



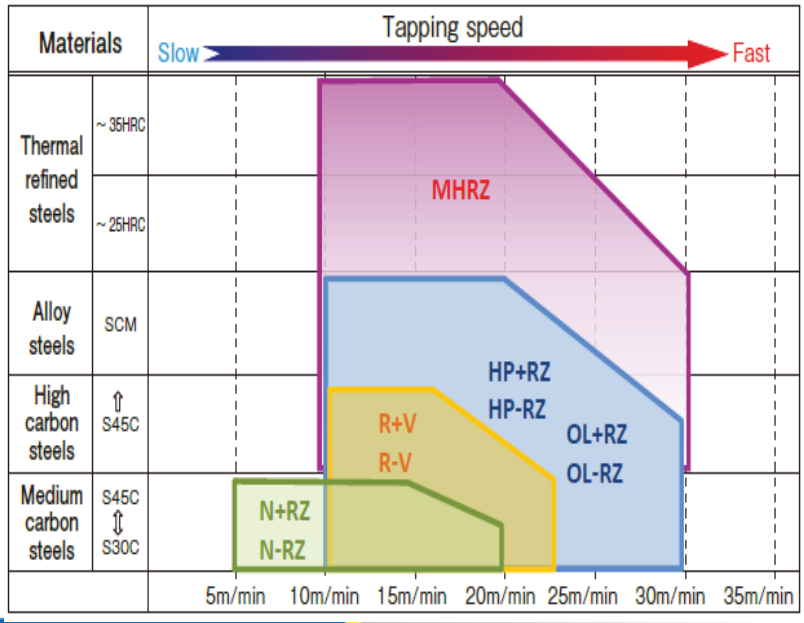
Product features

Roll Taps for Carbon Steels of Medium Hardness **MHRZ** M6～M14

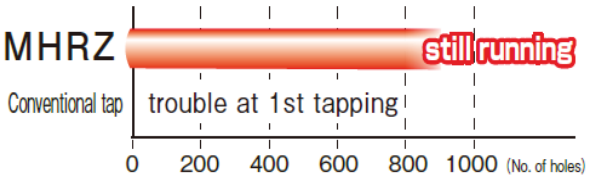
HSS-Co | Coating | 2 | 4

Features

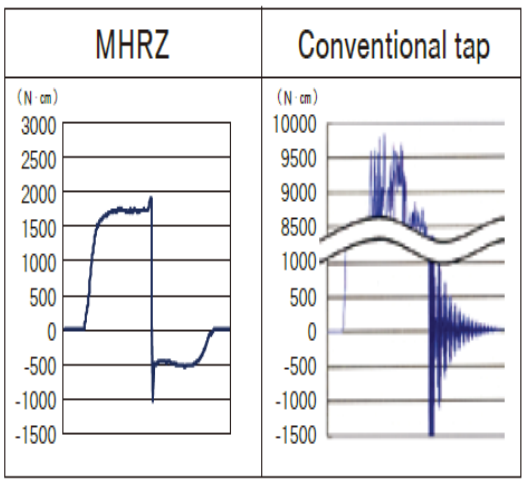
- Due to Yamawa's proprietary design, the tapping torque decreases.
- With a combination of wear-resistant tool material and a unique coating, the tool's durability improves tremendously.
- Consistent tapping of thermal refined materials (～35HRC) is ensured.
- Tapping with water soluble tapping fluid is possible.



Tapping Data / Comparison of tapping torque



Size	M12×1.5
Material	SCM440(thermal refined)／35HRC
Tapping speed	20m/min
Bored hole size	φ11.3㎜
Threading length	18㎜(Through hole)
Machine	MC(Synchronous feed)
Tapping fluid	Water soluble
No. of holes	800hole(still running)



Consistent tapping in SCM440(thermal refined) at 35HRC becomes possible. Before the MHRZ, this material was thought to be difficult for thread forming.

Think threads with YAMAWA

Understanding the Basics of Roll taps

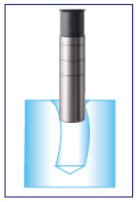
Introduction of Check Pins for bored hole.

YAMAWA offers the Check Pins Series for the measurement of bored hole sizes and their condition. By creating an accurate hole size and bored hole correctly, you can get longer tap life and stop many tapping problems.
Let's check the hole before tapping.

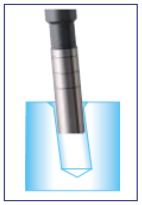
Pins for Roll taps	Features	Size range
Check pins for bored holes in thread roll tapping (straight type) CPR-S 	The CPR-S allows checking of several types of bored hole diameter and bore depths (for thread roll forming taps, straight type). CPR-S is made from wear resistant HSS material and works well with blind hole.	M2- M12 No.2 - 1/2
Check pins for bored holes in thread roll tapping (taper type) CPR-T 	Just one CPR-T allows simple checking of the bored hole diameter (for thread roll forming taps, taper type). CPR-T is made from a wear resistant HSS material works well in through hole and for blind hole having enough space in the bottom of the hole.	M2- M12 No.2 - 1/2
Check pins for bored holes in thread roll taping for R-Y taps CPR-Y 	Check pins for roll taps to check the bored hole diameter for R-Y roll taps.	M2-M8

■Check the hole condition before tapping.

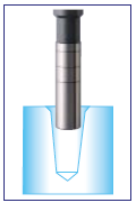
Case 1 — Bending —
Check-pin stops on the way.



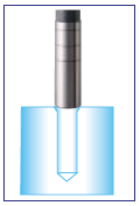
Case 2 — Slanting —
Hole isn't vertical against end face.



Case 3 —Oversize inlet of hole—
Inlet is too big.

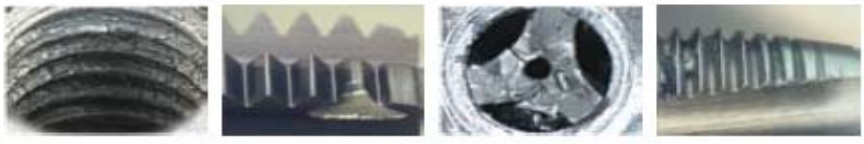


Case 4 —Undersize hole—
Hole is smaller than minimum size of the standard.



Problems caused by poor hole quality before tapping.

1)Bending hole
2)Slanting hole
3)Oversize inlet of hole
4)Undersize hole etc.



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