Think threads with YAMAWA

MH SERIES

Outstanding performances for medium hardness carbon steel and alloy steel

▪ MHSP - MHSL - MHRZ - MHCDS ▪

Z-PRO

Ultimate Machining Taps

MHSP

MHSL

MHRZ

MHCDS

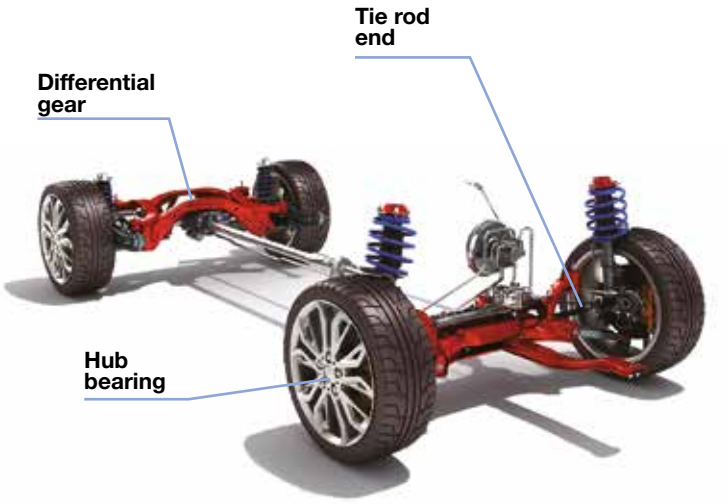
MH SERIES

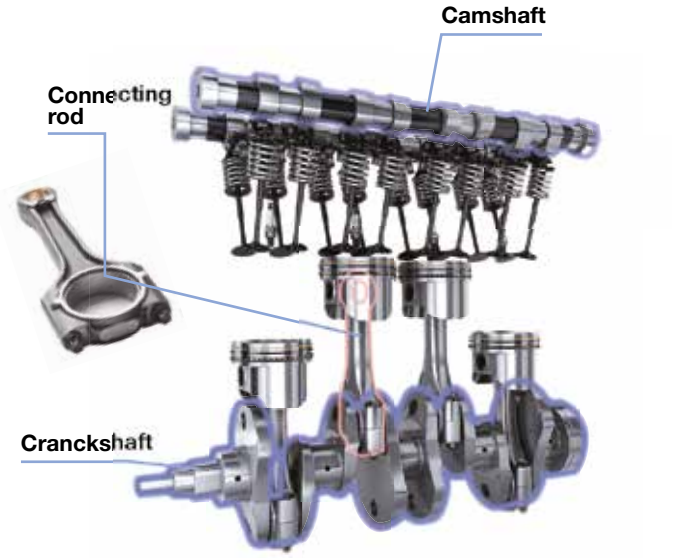
MH series delivers a high level of reliable machining and excellent performance which are essential for increasing productivity.

What are medium hardness carbon steels and alloy steels?

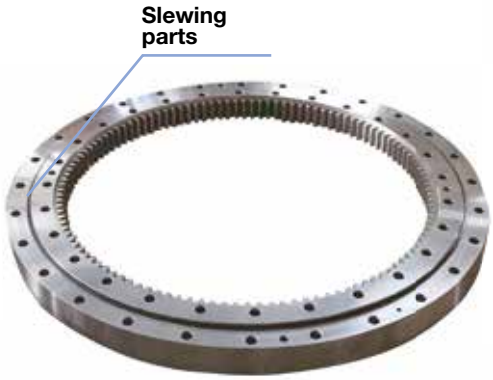
Yamawa defines “medium hardness (MH) carbon steels and alloy steels” steels used in the construction machinery industry.
For important safety components such as hub bearings and cranckshafts, medium-hardness (20 ÷ 35HRC) carbon steels and alloy steels with high rigidity and durability, are widely used.

Example of medium hardness alloy steel used in the construction machinery industry





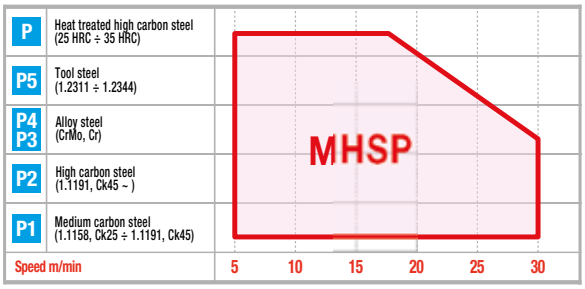
Tapping of expensive and large parts, requires high reliability and extreme accuracy.



MHSP

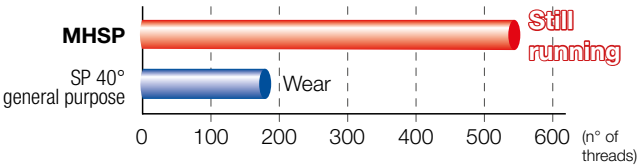
HSS-Co | COATING | SYNCHRO | 2.5P THCHT

- When tapping blind holes in heat-treated parts, cutting edge problems such as wear or damage caused by chip jamming, are very common. Safety and stable machining becomes very difficult with general-purpose taps.
- MHSP has been developed to ensure reliable and high performance under such condition.
- Optimal coating and substrate material with excellent wear resistance allow extraordinary long tool life.

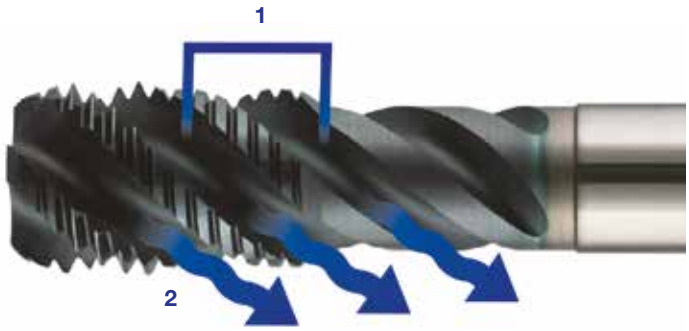


Process data

Size	M8 x 1.25	Tapping length	12 mm (Blind hole)
Workpiece material	1.7225, 42 CrMo 4 (35 HRC)	Machine	Vertical MC
Tapping speed	15 m/min	Tapping fluid	Water-soluble



Chip problems are drastically reduced



1. Thread clearance (BLF geometry) from the middle of the tap helps to prevent chipping problems

2. The unique flute design produces a finely curled chip

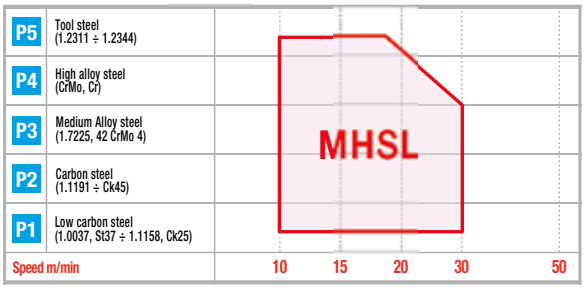
Tapping record

MHSP	Workpiece material	Tapping condition/tapping result							Notes
Size	Material symbol (Hardness)	Hole Size (mm)	Tapping length (mm)	Machine	Vc (m/min)	Feed	Tapping fluid	Tool life (No. of threads)	Conventional performance ***Workpiece name**
M8x1.25	1.1191, Ck45 (23 HRC)	6.8	16 (2D)	Horizontal M/C	30	Fully synchronous	Water-soluble	1.740	Replaced due to wear after 1200 holes. ***flange**
M8x1.25	1.0037, St37-2	6.8	16 (2D)	Vertical MC	30	Fully synchronous	Water-soluble	1.000	Replaced due to wear and chipping after 800 holes. ***Suspension part**
M8x1.25	1.1191, Ck45 (30 HRC)	6.9	24 (3D)	Vertical MC	6	Fully synchronous	Oil	300	Replaced due to wear after 90 holes. ***drum brake**
M10x1.5	1.1191, Ck45	8.5	20 (2D)	Vertical MC	25	Fully synchronous	Water-soluble	800	Replaced due to wear and chipping. ***suspension part**
M16x2	1.1191, Ck45 (28 HRC)	14	24 (1.5D)	Vertical MC	5	Non-synchronous	Water-soluble	530	Replaced due to poor surface finish. ***rod**
M16x2	1.7225, 42 CrMo 4 (35 HRC)	14	32 (2D)	Horizontal M/C	15	Fully synchronous	Water-soluble	720	Replaced due to wear after 600 holes. ***shaft**

MHSL

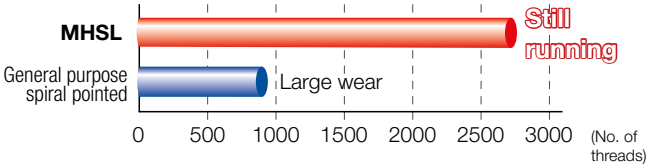
HSS-Co | COATING | SYNCHRO | 5P THCHT | 7P THCHT

- In through hole tapping of heat treated medium hardness carbon steel and alloy steel, high performance tools with suitable strength, rigidity, and durability are required.
- MHSL series has been developed to get reliable and long life avoiding very typical poroblems such as edge wear or chipping, poor chip ejection and bad surface finish of internal threads.
- Optimal coating and substrate material with excellent wear resistance allow extraordinary long tool life.



Process data

Size	M12 x 1.25	Tapping length	12 mm (Through hole)
Workpiece material	1.1210, Ck53 (25 HRC)	Machine	Vertical MC
Tapping speed	30 m/min	Tapping fluid	Water-soluble



Improved surface finish of internal threads

Ensure a stable tapping

- Chips are pushed forward, towards the exit of the through hole
- Left handed flutes with right hand cut push the chips forward
- Two-stepped taper shape flute

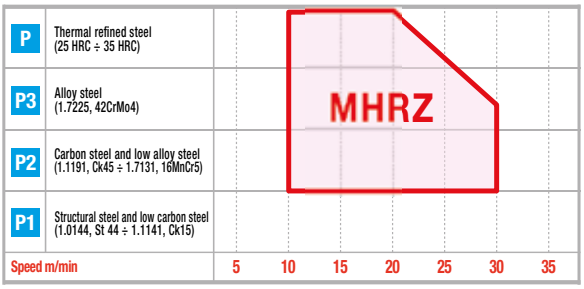
Tapping record

MHSL	Workpiece material	Tapping condition/tapping result							Notes
Size	Material symbol (Hardness)	Hole Size (mm)	Tapping length (mm)	Machine	Vc (m/min)	Feed	Tapping fluid	Tool life (No. of threads)	Conventional performance ***Workpiece name**
M6x1	1.1181, Ck35	5.1	12 (2D)	Horizontal M/C	7.5	Fully synchronous	Oil	10.000	Replaced due to poor surface finish. ***shaft**
M8x1.25	1.1191, Ck45	6.8	8 (1D)	Vertical MC	40	Fully synchronous	Water-soluble	9.120	Replaced due to wear after 5200 threads. ***shaft**
M8x1.25	1.1203, Ck55 (25 HRC)	6.85	12 (1.5D)	Vertical MC	30	Fully synchronous	Water-soluble	2.160	Replaced due to unstable tool life. ***clutch part**
M10x1.25	1.1191, Ck45 (23 HRC)	8.8	20 (2D)	Vertical MC	8	Fully synchronous	Water-soluble	2.450	Replaced due to wear after 1600 threads. ***automotive part**
M12x1.75	1.1203, Ck55 (27 HRC)	10.4	12 (1D)	Vertical MC	19	Fully synchronous	Water-soluble	2.840	Replaced due to unstable tool life. ***hub bearing**
M14x1.5	1.1210, Ck53 (25 HRC)	12.6	14 (1D)	Vertical MC	32	Fully synchronous	Water-soluble	4.430	Replaced due high torque after 3000 threads. ***hub bearing**
M14x1.5	1.1203, Ck55 (23 HRC)	12.6	14 (1D)	Vertical MC	22	Fully synchronous	Water-soluble	2.700	Replaced due to wear after 2000 holes. ***hub bearing**

MHRZ

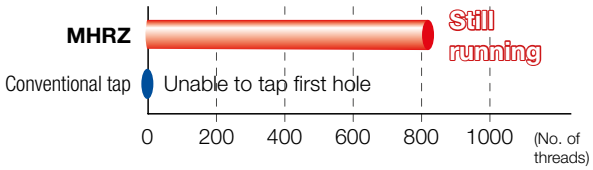
HSS-Co | COATING | 2P THCHT | 4P THCHT

- Stable and reliable life on forming process of heat treated materials with hardness of 25 HRC or more, is considered very difficult to achieve due to high tapping torque.
- For this kind of application, Yamawa has developed the MHRZ series that guarantees extraordinary performance.
- Optimal coating and substrate material with excellent wear resistance allow extraordinary long tool life.

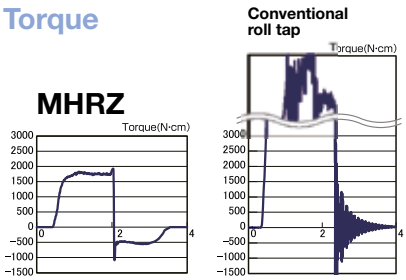


Process data

Size	M12 x 1.25	Tapping length	18 mm (Through hole)
Workpiece material	1.7225, 42 CrMo 4 (35 HRC)	Machine	Horizontal M/C
Tapping speed	20 m/min	Tapping fluid	Water-soluble
Hole Size	11.3 mm	Tool Life	800 threads



Torque



Consistent tapping process

- New lobs design and the specific coating with fine polishing treatment allow considerable torque reduction

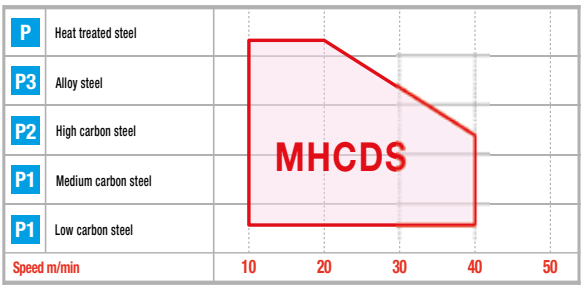
Tapping record

MHRZ	Workpiece material	Tapping condition/tapping result							Notes
Size	Material symbol (Hardness)	Hole Size (mm)	Tapping length (mm)	Machine	Vc (m/min)	Feed	Tapping fluid	Tool life (No. of threads)	Conventional performance ***Workpiece name**
M6x1	1.4401, AISI316	5.6	9 (1.5D)	CNC	28	Fully synchronous	Oil	10.000	Replaced due to wear after 1200 holes. ***flange**
M6x1	1.1203, Ck55 (23 HRC)	5.55	15 (2.5D)	MC	26	Fully synchronous	Water-soluble	6.000	Replaced due to wear and chipping after 800 holes. ***suspension part**
M6x1	1.7225, 42 CrMo 4	5.55	6 (1D)	MC	20	Fully synchronous	Water-soluble	2.000	Replaced due to wear after 90 holes. ***drum brake**
M6x1	1.7220, 34 CrMo 4 (30 HRC)	5.55	6 (1D)	MC	10	Fully synchronous	Oil	4.800	Replaced due to wear and chipping. ***suspension part**
M8x1.25	1.7220, 34 CrMo 4 (30 HRC)	7.5	16 (2D)	MC	30	Fully synchronous	Water-soluble	16.000	Replaced due to poor surface finish. ***rod**
M10x1.5	1.7027, 20Cr4 (30 HRC)	9.4	35 (3.5D)	MC	10	Fully synchronous	Oil	860	Replaced due to wear after 600 holes. ***shaft**

MHCDS

HSS-Co | COATING

- In the machining of cylindrical parts, the centering process accuracy is extremely important to produce high precision parts.
- As speed increases, the runout problems become more evident. MHCDS has been developed for high precision centering even at high speed.
- Optimal coating and substrate material with excellent wear resistance allow extraordinary long tool life.

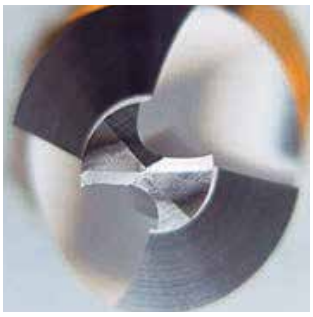


Process data

Machining data	3x60°x8	Feed=fn	015. mm/rpm
Workpiece material	1.1191, Ck45	Machine	NC lathe
Cutting speed	30 m/min	Lubricant	Water-soluble

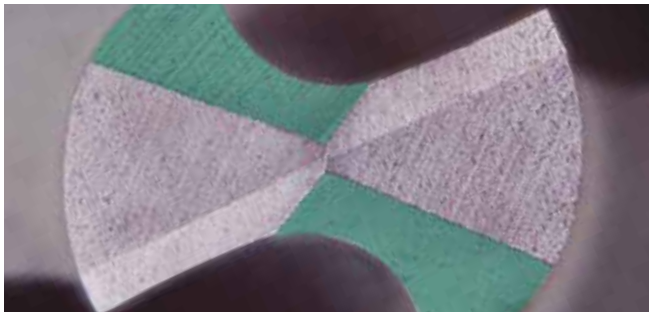
Pictures on the right show the different wear conditions of conventional product and MHCDS after 480 holes.

MHCDS



Conventional product

Ideal shape for high speed and feed



- Longer tool life, improved surface finish and roundness
- Highly accurate center holes can be machined with MHCDS thanks to its single-ended shape and special cutting edge design for minimizing the runout problems

Machining record

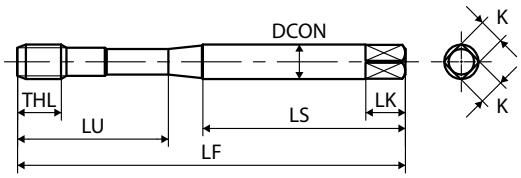
MHCDS	Workpiece material							Notes
Size	Material symbol (Hardness)	Hole length (mm)	Machine	n (rpm)	Feed (mm/rev)	Coolant	Tool life (No. of holes)	Conventional performance ***Workpiece name**
1x60°x4	1.1191, Ck45	1	NC lathe	2.000	0.03	Oil	900	Replaced due to breakage after 200 holes. ***automotive part**
2x60°x6	1.1203, Ck55	3.6	NC lathe	2.100	0.04	Water-soluble	5.400	Replaced due to high wear after 2400 holes. ***oil pump shaft**
2x60°x6	1.1191, Ck45 (35 HRC)	4	Milling Center	2.000	0.1	Water-soluble	700	Replaced due to breakage after few holes. ***automotive part**
3x60°x8	Inconel	5	Milling Center	500	0.03	Water-soluble	400	Replaced due to very poor surface finish.
2x60°x6	1.4845, AISI310S	6	NC lathe	500	0.03	Water-soluble	500	Replaced due to welding and chipping after few holes.
2x60°x6	1.3576, 15 CrNi 6 (43 HRC)	9	NC lathe	600	0.08	Water-soluble	10	Replaced due to breakage after 1 hole. ***camshaft**

Dimensions and sizes

MHSP

HSS-Co | COATING | SYNCHRO | 2.5P THCHT

TYPE: EU_025



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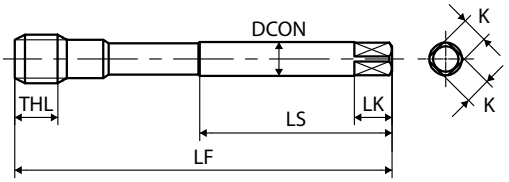


● stock standard, ○ check availability

M	TCTR (tolerance)	Ø (mm)	Hole Ø (mm)	Code	THCHT (chamfer)	LF (mm)	LT (mm)	THL (mm)	LU (mm)	LS (mm)	DCON (mm)	K (mm)	LK (mm)	NOF	Type	Stock
DIN 371																
M8X1.25	IS02X(6HX)	6.8	6.85	SD8.0NBOCLJ	2.5P	90	-	19	-	47	8	6.2	9	3	025	●
M10X1.5	IS02X(6HX)	8.5	8.6	SD010OBOCLJ	2.5P	100	-	23	-	52.5	10	8	11	3	025	●

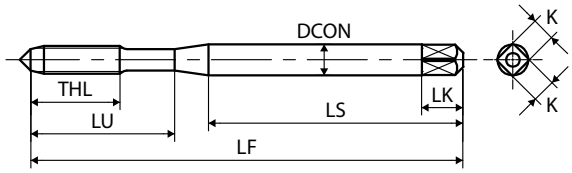
M	TCTR (tolerance)	Ø (mm)	Hole Ø (mm)	Code	THCHT (chamfer)	LF (mm)	LT (mm)	THL (mm)	LU (mm)	LS (mm)	DCON (mm)	K (mm)	LK (mm)	NOF	Type	Stock
DIN 376																
M12X1.75	IS02X(6HX)	10.3	10.36	SG012PBOCLJ	2.5P	110	-	26	-	56	9	7	10	4	023	●
M14X2	IS02X(6HX)	12	12.12	SG014QBOCLJ	2.5P	110	-	26	-	56	11	9	12	4	023	●
M16X2	IS02X(6HX)	14	14.12	SG016QBOCLJ	2.5P	110	-	26	-	56	12	9	12	4	023	●

MF	TCTR (tolerance)	Ø (mm)	Hole Ø (mm)	Code	THCHT (chamfer)	LF (mm)	LT (mm)	THL (mm)	LU (mm)	LS (mm)	DCON (mm)	K (mm)	LK (mm)	NOF	Type	Stock
DIN 374																
M10X1.25	IS02X(6HX)	8.8	8.85	SM010NBOCLJ	2.5P	100	-	23	-	51	7	5.5	8	3	023	●
M10X1	IS02X(6HX)	9	9.09	SM010MBOCLJ	2.5P	90	-	19	-	46	7	5.5	8	3	023	●
M12X1.5	IS02X(6HX)	10.5	10.6	SM012OBOCLJ	2.5P	100	-	21	-	51	9	7	10	4	023	●
M12X1.25	IS02X(6HX)	10.8	10.85	SM012NBOCLJ	2.5P	100	-	21	-	51	9	7	10	4	023	●
M14X1.5	IS02X(6HX)	12.5	12.6	SM014OBOCLJ	2.5P	100	-	21	-	51	11	9	12	4	023	●
M16X1.5	IS02X(6HX)	14.5	14.6	SM016OBOCLJ	2.5P	100	-	21	-	51	12	9	12	4	023	●

MHSL

HSS-Co | COATING | SYNCHRO | 5P THCHT | 7P THCHT

TYPE: EU_057



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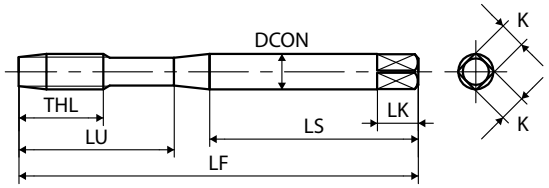

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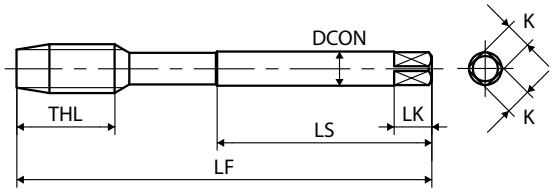


● stock standard, ○ check availability

M	TCTR (tolerance)	Ø (mm)	Hole Ø (mm)	Code	THCHT (chamfer)	LF (mm)	THL (mm)	LU (mm)	LS (mm)	DCON (mm)	K (mm)	LK (mm)	NOF	Type	Stock
DIN 371															
M6X1	ISO2X(6HX)	5	5.09	LD6.0MBFCL5	5P	80	15	30	45	6	4.9	8	3	057	●
M8X1.25	ISO2X(6HX)	6.8	6.85	LD8.0NBFCL5	5P	90	19	35	47	8	6.2	9	3	084	●
M10X1.5	ISO2X(6HX)	8.5	8.6	LD010OBFCL5	5P	100	23	39	52	10	8	11	3	084	●

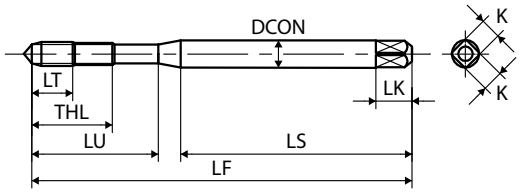
M	TCTR (tolerance)	Ø (mm)	Hole Ø (mm)	Code	THCHT (chamfer)	LF (mm)	THL (mm)	LU (mm)	LS (mm)	DCON (mm)	K (mm)	LK (mm)	NOF	Type	Stock
DIN 376															
M12X1.75	ISO2X(6HX)	10.3	10.36	LG012PBFCL5	5P	110	26	-	56	9	7	10	4	086	●

MF	TCTR (tolerance)	Ø (mm)	Hole Ø (mm)	Code	THCHT (chamfer)	LF (mm)	THL (mm)	LU (mm)	LS (mm)	DCON (mm)	K (mm)	LK (mm)	NOF	Type	Stock
DIN 374															
M10X1.25	ISO2X(6HX)	8.8	8.85	LM010NBFCL5	5P	100	23	-	51	7	5.5	8	3	086	●
M12X1.5	ISO2X(6HX)	10.5	10.6	LM012OBFCL5	5P	100	21	-	51	9	7	10	4	086	●
M12X1.25	ISO2X(6HX)	10.8	10.85	LM012NBFCL7	7P	100	21	-	51	9	7	10	4	086	●
M14X1.5	ISO2X(6HX)	12.5	12.6	LM014OBFCL7	7P	100	21	-	51	11	9	12	4	086	●
M16X1.5	ISO2X(6HX)	14.5	14.6	LM016OBFCL7	7P	100	21	-	51	12	9	12	4	086	●

MHRZ

HSS-Co | COATING | 2P THCHT | 4P THCHT

TYPE: EU_140



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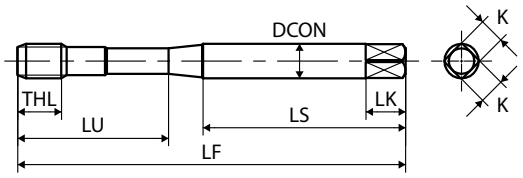

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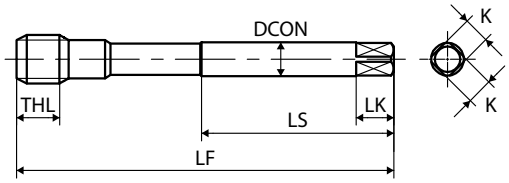


● stock standard, ○ check availability

M	TCTR (tolerance)	Bored Hole Ø (mm) Max	Bored Hole Ø (mm) Min	Code	THCHT (chamfer)	LF (mm)	THL (mm)	LU (mm)	LS (mm)	DCON (mm)	K (mm)	LK (mm)	NOF (Lobes)	Type	Stock
DIN 371															
M6X1	ISO2X(6HX)	5.61	5.5	RD6.0MBOCTP	4P	80	11	30	45	6	4.9	8	5(5)	140	●
	ISO2X(6HX)	5.61	5.5	RD6.0MBOCTB	2P	80	11	30	45	6	4.9	8	5(5)	025	●
M8X1.25	ISO2X(6HX)	7.52	7.38	RD8.0NBOCTP	4P	90	12	35	47	8	6.2	9	6(6)	025	●
	ISO2X(6HX)	7.52	7.38	RD8.0NBOCTB	2P	90	12	35	47	8	6.2	9	6(6)	025	●
M10X1.5	ISO2X(6HX)	9.41	9.26	RD0100BOCTP	4P	100	13	39	52	10	8	11	8(8)	025	●
	ISO2X(6HX)	9.41	9.26	RD0100BOCTB	2P	100	13	39	52	10	8	11	8(8)	025	●

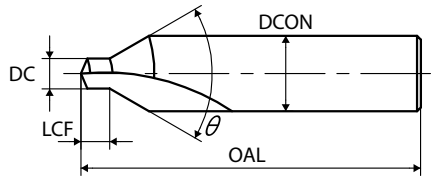
M	TCTR (tolerance)	Bored Hole Ø (mm) Max	Bored Hole Ø (mm) Min	Code	THCHT (chamfer)	LF (mm)	THL (mm)	LU (mm)	LS (mm)	DCON (mm)	K (mm)	LK (mm)	NOF (Lobes)	Type	Stock
DIN 376															
M12X1.75	ISO2X(6HX)	11.3	11.13	RG012PBOCTP	4P	110	15	-	56	9	7	10	8(8)	023	●
	ISO2X(6HX)	11.3	11.13	RG012PBOCTB	2P	110	15	-	56	9	7	10	8(8)	023	●

MF	TCTR (tolerance)	Bored Hole Ø (mm) Max	Bored Hole Ø (mm) Min	Code	THCHT (chamfer)	LF (mm)	THL (mm)	LU (mm)	LS (mm)	DCON (mm)	K (mm)	LK (mm)	NOF (Lobes)	Type	Stock
DIN 374															
M10X1.25	ISO2X(6HX)	9.51	9.38	RM010NBOCTP	4P	100	13	-	51	7	5.5	8	8(8)	023	●
	ISO2X(6HX)	9.51	9.38	RM010NBOCTB	2P	100	13	-	51	7	5.5	8	8(8)	023	●
M12X1.5	ISO2X(6HX)	11.39	11.24	RM0120BOCTP	4P	100	15	-	51	9	7	10	8(8)	023	●
	ISO2X(6HX)	11.39	11.24	RM0120BOCTB	2P	100	15	-	51	9	7	10	8(8)	023	●
M12X1.25	ISO2X(6HX)	11.51	11.38	RM012NBOCTP	4P	100	15	-	51	9	7	10	8(8)	023	●
	ISO2X(6HX)	11.51	11.38	RM012NBOCTB	2P	100	15	-	51	9	7	10	8(8)	023	●
M14X1.5	ISO2X(6HX)	13.39	13.24	RM0140BOCTP	4P	100	14	-	51	11	9	12	8(8)	023	●
	ISO2X(6HX)	13.39	13.24	RM0140BOCTB	2P	100	14	-	51	11	9	12	8(8)	023	●
M16X1.5	ISO2X(6HX)	15.38	15.23	RM0160BOCTP	4P	100	18	-	51	12	9	12	8(8)	023	○
	ISO2X(6HX)	15.38	15.23	RM0160BOCTB	2P	100	18	-	51	12	9	12	8(8)	023	●
M18X1.5	ISO2X(6HX)	17.38	17.23	RM0180BOCTP	4P	110	20	-	56	14	11	14	8(8)	023	○
	ISO2X(6HX)	17.38	17.23	RM0180BOCTB	2P	110	20	-	56	14	11	14	8(8)	023	●
M20X1.5	ISO2X(6HX)	19.37	19.22	RM0200BOCTP	4P	125	20	-	64	16	12	15	8(8)	023	○
	ISO2X(6HX)	19.37	19.22	RM0200BOCTB	2P	125	20	-	64	16	12	15	8(8)	023	●

MHCDS

HSS-Co | COATING

TYPE: CE_016

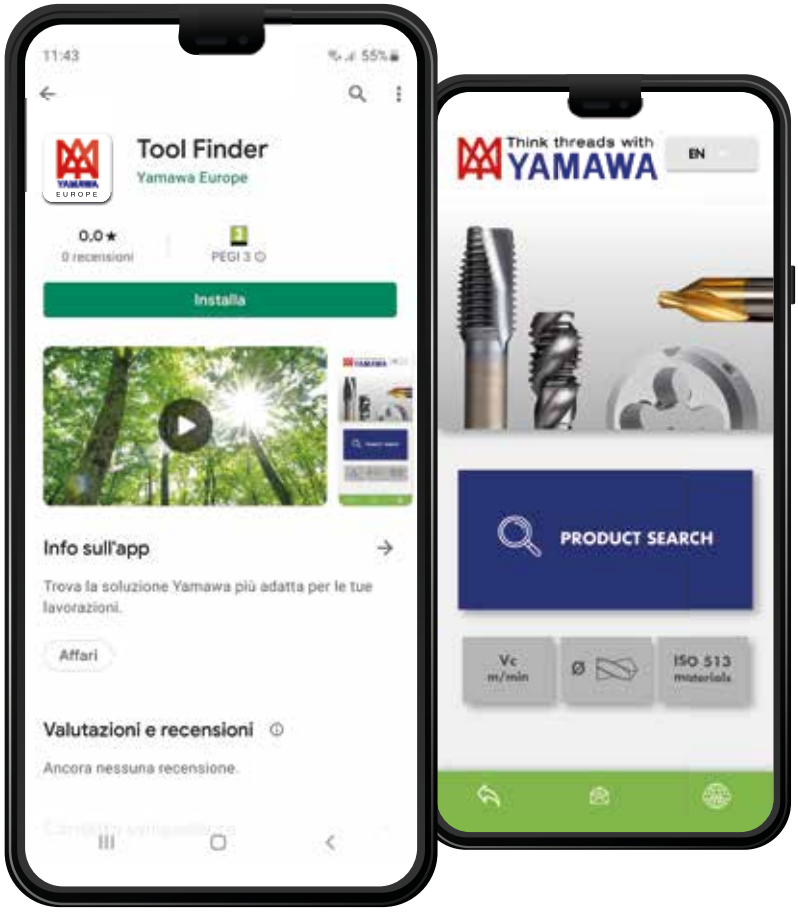


● stock standard, ○ check availability

DC x θ x DCON	Code	DC (mm)	DCON (mm)	OAL (mm)	LCF (mm)	Type	Stock
YMW							
1 x 60° x 4	**VMHCD1.0S**	1	4	30	1	016	●
1.5 x 60° x 5	**VMHCD1.5S**	1.5	5	30	1.5	016	●
2 x 60° x 6	**VMHCD2.0S**	2	6	30	1.9	016	●
2.5 x 60° x 8	**VMHCD2.5S**	2.5	8	40	2.4	016	●
3 x 60° x 8	**VMHCD3.0S**	3	8	40	2.8	016	●
4 x 60° x 10	**VMHCD4.0S**	4	10	45	3.8	016	●
5 x 60° x 12	**VMHCD5.0S**	5	12	55	4.6	016	●
6 x 60° x16	**VMHCD6.0S**	6	16	65	5.5	016	●

WARNING

- Tools may shatter. Wear cover or eye glass to avoid injury during tapping.
- Tools may shatter. Use tools under the proper tapping condition.
- Never wear gloves during turning operations as the gloves may get caught with the tools.
- Wear safety shoes to avoid injuring yourself by the falling tools.
- On attaching tools to the machine, fasten firmly to avoid shattering and run-out.
- Fasten the workpieces firmly so that they never move during operation. Never use worn tools or damaged tools with chipping.
- Take a special care to fire trouble. High temperature during machining may cause fire.



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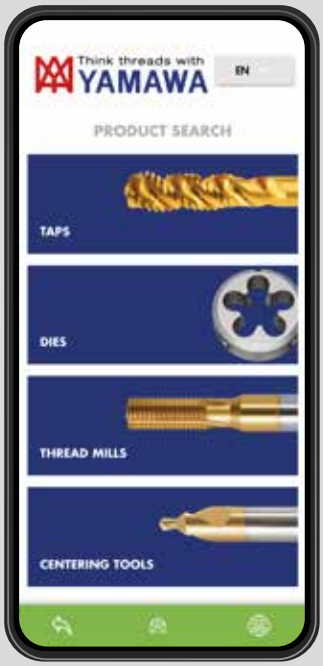
- Tool Finder is free of charge and does not require registration.
- The stock range is constantly updated.
- Data are available online, so database download on the device is not necessary.



Think threads with YAMAWA

$YMH

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