

GUIDE TO THREADING TOOLS

Section organization

- ① Classified according to external or internal applications.
 - ② Sub-classified according to product series.
- (Refer to the index on the next page.)

FIGURE SHOWING THE TOOLING APPLICATION uses illustrations and arrows to depict the available machining applications, such as external and internal threading.

TYPE OF TOOL HOLDER indicates the initial letters for the order number and cutting applications.

TITLE OF PRODUCT INDICATION OF EXTERNAL /INTERNAL APPLICATION

PRODUCT SECTION

PRODUCT FEATURES

THREADING

MMTE HOLDER (External threading)

Various insert types.
 * Precision class insert for precise thread forms.
 * Available with a pressed breaker for chip control.
 * Able to change lead angle by replacing the shim.

(Refer to page G014-G020 for use PDX, PDV)
 Right hand tool holder only.

Order Number	Insert Number	Dimensions (inch)												
		H	B	LF	LH	WF	WF	WF	WF	WF	WF			
MMTER-063SM	MMT16ER	.375	.375	1.474	.875	.375	.625	SETK91	SETS11	CR4	HFC03008	CTE3ZTP15	CHKV15P	SHV15P
MMTER-083SM	MMT16ER	.500	.500	1.474	.875	.500	.625	SETK91	SETS11	CR4	HFC03008	CTE3ZTP15	CHKV15P	SHV15P
MMTER-103	MMT16ER	.625	.625	1.400	1.000	.500	.625	SETK91	SETS11	CR4	HFC03008	CTE3ZTP15	CHKV15P	SHV15P
MMTER-123	MMT16ER	.750	.750	1.000	1.000	.750	1.000	SETK91	SETS11	CR4	HFC03008	CTE3ZTP15	CHKV15P	SHV15P
MMTER-163	MMT22ER	1.000	1.000	1.000	1.000	1.250	1.250	SETK91	SETS11	CR4	HFC03008	CTE3ZTP15	CHKV15P	SHV15P
MMTER-124	MMT22ER	.750	.750	1.000	1.250	1.000	1.000	SETK91	SETS11	CR5	HFC04010	CTE43TP15	CHKV15P	SHV15P
MMTER-164	MMT22ER	1.000	1.000	1.000	1.250	1.000	1.250	SETK91	SETS11	CR5	HFC04010	CTE43TP15	CHKV15P	SHV15P
MMTER-204	MMT22ER	1.250	1.250	1.000	1.250	1.500	1.500	SETK91	SETS11	CR5	HFC04010	CTE43TP15	CHKV15P	SHV15P

*1 Select and use an alternate shim from list below (sold separately), dependent on the lead angle.
 *2 Change Top/Left - SETS51-31, SETS61-44, HFC03008-13, HFC04010-16

SHIM

Last Angle (°)	Order Number	Stock	Indicated Angle (°)	Applicable Holder
-1.5°	CTE3ZTN15	●	-3°	MMTER
-0.5°	N05	●	-2°	MMTER
0.5°	P05	●	+1°	MMTER
1.5°	P15	●	0°	MMTER
2.5°	P25	●	+1°	MMTER
3.5°	P35	●	+2°	MMTER
4.5°	P45	●	+3°	MMTER

Standard shim delivered with the holder.
 * See page G016 and page G018 for shim selection guide lines.

IDENTIFICATION

Designation: **MMT E R 08 3 - SM**

Designation	Application	Hand of Tool	Tool Size (inch) (Height and Width)	Insert Size	Tool Type
MMT	E	R	08 3	3	SM Non other
			08 3	3	MMT16
			10 625 20	4	MMT22

RECOMMENDED CUTTING CONDITIONS

Work Material	Hardness	Grade	Cutting Speed (SFM)	Work Material	Hardness	Grade	Cutting Speed (SFM)
Mild Steel	≤180HB	VP15P	200-300	Cast Iron	≤200HB	VP15P	100-200
Carbon Steel	180-280HB	VP15P	100-200	Heat-Resistant Alloy	—	VP15P	100-200
Alloy Steel	—	VP15P	100-200	Titanium Alloy	—	VP15P	100-200
Stainless Steel	≤200HB	VP15P	100-200	Hardened Steel	45-58HRC	VP15P	100-200

G012 ● Inventory maintained.

How to select a shim > G025, G026

LEGEND FOR STOCK STATUS MARK is shown on the left hand page of each double-page spread.

PRODUCT STANDARDS indicates order numbers, stock status (per right/left hand), applicable inserts, holder dimensions, and spare parts.

STANDARDS FOR APPLICABLE INSERTS indicates stock status, dimensions, etc. for applicable inserts.

THREADING

MMT M-CLASS INSERTS WITH 3-D CHIP BREAKERS

EXTERNAL THREADING INSERTS

Type	Order Number	Coated	Pitch		Dimensions (mm)				Total depth of cut (mm)	Geometry
			mm	threadinch	IC	S	PDV	PDX		
Partial Profile ISO	MMT16ERA60-S	●	0.5-1.5	48-16	9.525	3.44	0.8	0.9	0.06	—
	MMT16ERG60-S	●	1.75-3.0	14-8	9.525	3.44	1.2	1.7	0.23	—
Partial Profile ISO	MMT16ERA55-S	●	—	48-16	9.525	3.44	0.8	0.9	0.07	—
	MMT16ERG55-S	●	—	14-8	9.525	3.44	1.2	1.7	0.23	—
ISO Metric	MMT16ER100ISO-S	●	1.0	—	9.525	3.44	0.7	0.7	0.13	0.61
	MMT16ER125ISO-S	●	1.25	—	9.525	3.44	0.8	0.9	0.16	0.77
	MMT16ER150ISO-S	●	1.5	—	9.525	3.44	0.8	1.0	0.20	0.92
	MMT16ER175ISO-S	●	1.75	—	9.525	3.44	0.8	1.2	0.22	1.07
	MMT16ER200ISO-S	●	2.0	—	9.525	3.44	1.0	1.3	0.26	1.23
ISO Metric	MMT16ER250ISO-S	●	2.5	—	9.525	3.44	1.1	1.5	0.33	1.53
	MMT16ER300ISO-S	●	3.0	—	9.525	3.44	1.2	1.6	0.40	1.84
American UN	MMT16ER160UN-S	●	—	16	9.525	3.44	0.9	1.1	0.23	0.97
	MMT16ER140UN-S	●	—	14	9.525	3.44	1.0	1.2	0.26	1.11
	MMT16ER120UN-S	●	—	12	9.525	3.44	1.1	1.4	0.30	1.30
American BSPP	MMT16ER190W-S	●	—	19	9.525	3.44	0.8	1.0	0.18	0.86
	MMT16ER140W-S	●	—	14	9.525	3.44	1.0	1.2	0.25	1.16
	MMT16ER110W-S	●	—	11	9.525	3.44	1.1	1.5	0.32	1.48
BSPP	MMT16ER190SPS-T	●	—	19	9.525	3.44	0.8	0.9	0.18	0.86
	MMT16ER140SPS-T	●	—	14	9.525	3.44	1.0	1.2	0.25	1.16
	MMT16ER110SPS-T	●	—	11	9.525	3.44	1.1	1.5	0.32	1.48

IDENTIFICATION

Designation: **MMT 16 E R 100 ISO - S**

Designation	Hand of Tool	Tool Size (inch)	Pitch	Threading Type
MMT	E	R	100	ISO - S
			100	60
			125	55
			150	50
			175	45
			200	40
			250	35
			300	30

Application: E External, I Internal

Hand of Tool: R Right, L Left

Pitch: A 0.5-1.5mm, G 1.75-3.0mm, UN 14-8 threadinch

Threading Type: S ISO Metric, W Whitworth for BSPP, BSP, BSPP (left), UN American UN

● Inventory maintained. * Inventory maintained in Japan.
 *S inserts in one case.

PAGE REFERENCE

- INSERTS
- SPARE PARTS
- TECHNICAL DATA

IDENTIFICATION FOR INSERTS

RECOMMENDED CUTTING CONDITIONS for each work material classification, indicates recommended cutting conditions according to the ISO categories for cutting grades, P, M, K, N, S and H.

To Order : For holder, please specify order number and hand of tool (right/left).
 For insert, please specify insert number and grade.

TURNING TOOLS

THREADING

CLASSIFICATION (EXTERNAL).....	G002
CLASSIFICATION (INTERNAL).....	G003
CROSS REFERENCE THREAD PITCH	
EXTERNAL	G004
INTERNAL	G006
STANDARD THREAD AND CORRESPONDING INSERT.....	G008
PIPE THREADS AND TOOL SELECTION.....	G009
FEATURES OF MMT SERIES.....	G010

STANDARD OF THREADING TOOLS

EXTERNAL THREADING

MMTE HOLDER	G012
MTVO HOLDER	G034

INTERNAL THREADING





MMTI TYPE BORING BARS	G013
STHN/O TYPE BORING BARS	G035
FSL5 TYPE BORING BARS	G036
SL5N TYPE BORING BARS	G037
MICRO-MINI TWIN(CT) BORING BARS	G039
THREADING METHODS	G022
STANDARD OF DEPTH OF CUT	G027
TROUBLE SHOOTING	G033

*Arranged by Alphabetical order



G039	CT
G036	FSL51
G036	FSL52
G038	MLG (INSERTS)
G038	MLT (INSERTS)
G014	MMT (INSERTS)
G012	MMTE
G013	MMTI
G034	MTVO
G037	S-SL5N
G035	S-STHN/O
G034	TNMC (INSERTS)

CLASSIFICATION



EXTERNAL CUTTING

Name of Tool Holder	Insert Shape	Features
<p>MMTE Holder</p>  <p>→ G012</p>		<ul style="list-style-type: none"> ● Various insert types. ● Precision class insert for precise thread forms. ● Available with a pressed breaker for chip control. ● Able to change lead angle by replacing the shim.
<p>MTVO Holder</p>  <p>→ G034</p>		<ul style="list-style-type: none"> ● Multi-clamp type. ● Precision class insert. ● Positive insert produces a good finished surface. ● Holder is capable of performing both grooving and threading. ● Economical due to the use of 3 cutting edges.

INTERNAL CUTTING

Name of Tool Holder	Insert Shape	Features
<p>MMTI</p>  <p>→ G013</p>		<ul style="list-style-type: none"> ● Minimum cutting diameter .500 inch. ● Various insert types. ● Precision class insert for precise thread forms. ● Available with a pressed breaker for chip control. ● Able to change lead angle by replacing the shim.
<p>STHN/O</p>  <p>→ G035</p>		<ul style="list-style-type: none"> ● Screw-on type. ● Precision class insert. ● Positive insert produces a good finished surface. ● Holder is capable of performing both grooving and threading. ● Economical due to the use of 3 cutting edges.
<p>FSL5 S-SL5</p>  <p>→ G036 → G037</p>		<ul style="list-style-type: none"> ● Screw-on type. ● Precision class insert. ● Holder is capable of performing both grooving and threading. ● Maximum groove depth .118inch.
<p>MICRO-MINI TWIN Boring Bars</p>  <p>→ G039</p>	<p>—</p>	<ul style="list-style-type: none"> ● Solid carbide type. ● Economical due to single holder with two cutting edges.
<p>MICRO-MINI Boring Bars</p>  <p>→ E031</p>	<p>—</p>	<ul style="list-style-type: none"> ● Solid carbide type. ● Insert can be ground to suit the application.

CROSS REFERENCE THREAD PITCH

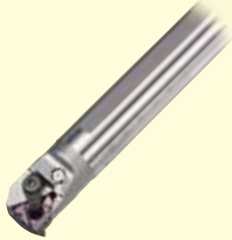


Application		General machining				Pipe fittings and couplings for gas and water	
Type	Symbol	Partial Profile 60°	Partial Profile 55°	ISO Metric	American UN	Parallel Pipe Thread Whitworth for BSW, BSP	American NPT
Holder	Pitch	mm (thread/inch)	thread/inch	mm	thread/inch	thread/inch	thread/inch
MMT Holder  → G012	Full form	—	—	0.5 2.5 0.75 3.0 1.0 3.5 1.25 4.0 1.5 4.5 1.75 5.0 2.0	32 12 28 11 24 10 20 9 18 8 16 7 14 6 13 5	28 11 26 10 20 9 19 8 18 7 16 6 14 5 12	27 18 14 11.5 8
	Partial form	0.5 -1.5(48-16) 1.75-3.0(14- 8) 0.5 -3.0(48- 8) 3.5 -5.0(07- 5)	48-16 14- 8 48- 8 7- 5	0.5 -1.5 1.75-3.0 0.5 -3.0 3.5 -5.0	48-16 14- 8 48- 8 7- 5	—	—
MTVO Holder  → G034	Partial form	0.5-3.0 0.5-4.5 0.5-6.0	—	0.5-3.0 0.5-4.5 0.5-6.0	48-8 48-6 48-4	—	—

THREADING

	Steam, gas and water pipes		Pipe couplings for food and fire fighting industries	Motion transmission		Aircraft and aerospace	Oil and gas	
	Taper Pipe Thread BSPT	American NPTF	Round DIN 405	ISO Trapezoidal 30°	American ACME	UNJ	API Buttress Casing	API Round Casing & Tubing
	BSPT R(PT) Rc(PS) Rp	NPTF	Rd	Tr (TM)	ACME (Tw)	UNJ	BCSG	CSG LCSG
	thread/inch	thread/inch	thread/inch	mm	thread/inch	thread/inch	thread/inch	thread/inch
	28 19 14 11	27 18 14 11.5 8	10 8 6 4	1.5 2.0 3.0 4.0 5.0	12 10 8 6 5	32 16 28 14 24 12 20 10 18 8	5	10 8
	→ G014, G018	→ G020	→ G018	→ G020	→ G020	→ G020	→ G020	→ G020
	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—

THREADING

CROSS REFERENCE THREAD PITCH

Application		General machining				Pipe fittings and couplings for gas and water	
Type	Partial Profile 60°	Partial Profile 55°	ISO Metric	American UN	Parallel Pipe Thread Whitworth for BSW, BSP	American NPT	
Symbol	M UNC UNF	W	M	UNC UNF	G(PF) W	NPT	
Holder	Pitch	mm (thread/inch)	thread/inch	mm	thread/inch	thread/inch	
MMT Boring Bars  → G013	Full form	—	—	0.5 2.5 0.75 3.0 1.0 3.5 1.25 4.0 1.5 4.5 1.75 5.0 2.0	32 12 28 11 24 10 20 9 18 8 16 7 14 6 13 5	28 11 26 10 20 9 19 8 18 7 16 6 14 5 12	27 18 14 11.5 8
	Partial form	0.5 -1.5(48-16) 1.75-3.0(14- 8) 0.5 -3.0(48- 8) 3.5 -5.0(07- 5)	48-16 14- 8 48- 8 7- 5	0.5 -1.5 1.75-3.0 0.5 -3.0 3.5 -5.0	48-16 14- 8 48- 8 7- 5	—	—
STHN/O Boring Bars  → G035	Partial form	0.5-3.0 0.5-4.5 0.5-6.0	—	0.5-3.0 0.5-4.5 0.5-6.0	48-8 48-6 48-4	—	—
	Partial form	1.5-2.0 1.5-2.5 1.5-3.5	—	1.5-2.0 1.5-2.5 1.5-3.5	48-13 48-11 48- 8	—	—
FSL5 SL5N Boring Bars  → G036 → G037	Partial form	0.5 -1.0 (36-24) 0.75-1.25(28-20) 0.75-1.5 (24-18) 0.75-1.75(24-16)	—	0.5 -1.0 0.75-1.25 0.75-1.5 0.75-1.75	36-24 28-20 24-18 24-16	—	—
	Partial form	→ G039	—	→ G039	→ G039	—	—

THREADING

	Steam, gas and water pipes		Pipe couplings for food and fire fighting industries	Motion transmission		Aircraft and aerospace	Oil and gas	
	Taper Pipe Thread BSPT	American NPTF	Round DIN 405	ISO Trapezoidal 30°	American ACME	UNJ	API Buttress Casing	API Round Casing & Tubing
	BSPT R(PT) Rc(PS) Rp	NPTF	Rd	Tr (TM)	ACME (Tw)	UNJ	BCSG	CSG LCSG
	thread/inch	thread/inch	thread/inch	mm	thread/inch	thread/inch	thread/inch	thread/inch
	19 14 11	14 11.5 8	10 8 6 4	1.5 2.0 3.0 4.0 5.0	12 10 8 6 5	*	5	10 8
	→ G015, G019	→ G021	→ G019	→ G021	→ G021	—	→ G021	→ G021
	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—

* When machining an internal UNJ thread, cut an internal hole with the appropriate diameter. Then machine with 60° American UN. In this case, a full form type insert cannot be used.

STANDARD THREAD AND CORRESPONDING INSERT

Thread Name	Standard Thread Type	Symbol	Thread Name	Standard Thread Type	Symbol
ISO Metric / American UN		M UNC UNF	BSPT		BSPT R (PT) Rc (PS) Rp
Parallel Pipe Thread Whitworth for BSW, BSP		W G (PF)	Round DIN405		Rd
American NPT		NPT	ISO Trapezoidal 30°		Tr (TM)
API Round Casing & Tubing	<p>taper = 3/4 in. per ft. (62.5mm per m) on diameter</p>	CSG LCSG	American ACME		ACME (Tw)
API Buttress Casing		BCSG			

PIPE THREADS AND TOOL SELECTION

● Parallel Pipe Threads G(PF)

Thread Type	Number of threads	Standard internal diameter
G1/16	28	.258"
G1/8		.337"
G1/4	19	.451"
G3/8		.589"
G1/2	14	.734"
G5/8		.811"
G3/4		.949"
G7/8		1.098"
G1	11	1.193"
G1-1/8		1.376"
G1-1/4		1.534"

Note) Same as PF.

● Taper Pipe Threads R(PT), Rc(PS)

Thread Type	Number of threads	Standard internal diameter
R1/16	28	.258"
R1/8		.337"
R1/4	19	.451"
R3/8		.589"
R1/2	14	.734"
-	-	-
R3/4	14	.949"
-	-	-
R1	11	1.193"
-	-	-
R1-1/4	11	1.534"

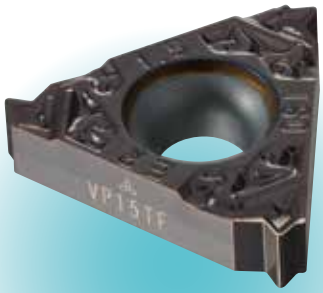
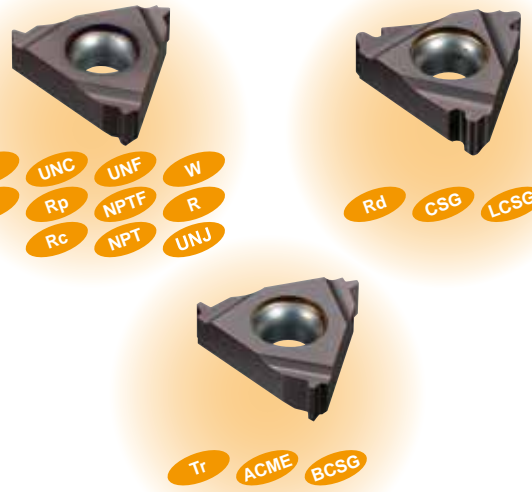
Note) Same as Rc and PT.

• The pitch is pre-determined for each nominal diameter. Note the minimum machining diameter especially when internal threading.

FEATURES OF MMT SERIES

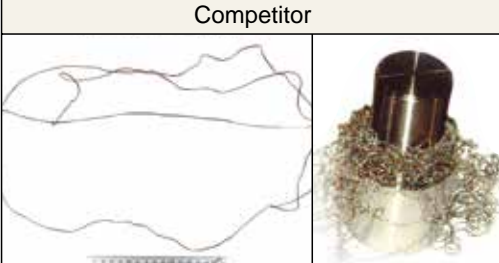

A WIDE VARIETY OF CHOICES

Mitsubishi Miracle Threading (MMT) series contains 297 inserts and 23 holders.

M-CLASS INSERTS WITH 3-D CHIP BREAKERS	G-CLASS GROUND INSERTS
 <p>M G UNC Rp UNF R W Rc</p>	 <p>M G UNC Rp UNF Rc W NPTF R UNJ Rd CSG LCSG Tr ACME BCSG</p>

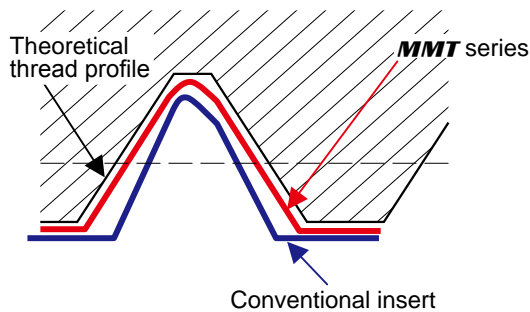
IDEAL CHIP CONTROL EVEN IN THE LATTER HALF OF PASSES WHEN CONTINUOUS CHIPS ARE USUALLY PRODUCED. (M-CLASS INSERTS WITH 3-D CHIP BREAKERS)

ISO metric external thread pitch 1.5mm Final pass (6th pass)

Competitor	MMT
	

<Cutting Conditions>
 Workpiece : AISI 4140
 Insert : MMT16ER150ISO-S
 Grade : VP15TF
 Cutting speed : 395SFM
 Cutting method : Radial Infeed
 Depth of cut : Fixed cut area
 Pass : 6 times
 Coolant : Wet

A HIGHER LEVEL OF PRECISION THAN CONVENTIONAL INSERTS (G-CLASS GROUND INSERTS)

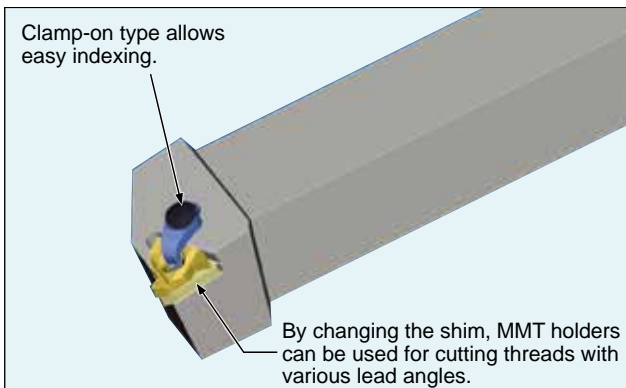


High precision threading can be achieved by using MMT inserts that feature a ground rake face and peripheral cutting edge.

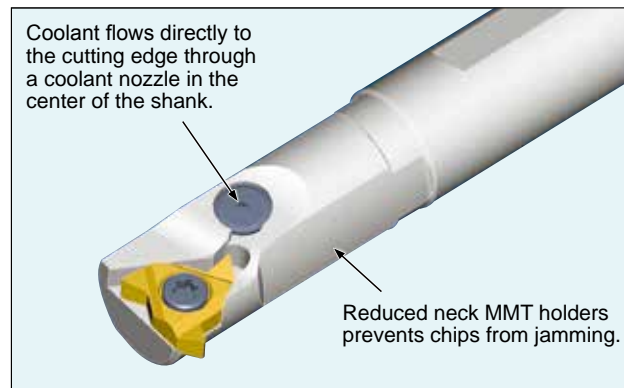
Thread Type	Threading Tolerance
ISO Metric	6g / 6H
American UN	2A / 2B
Whitworth for BSW, BSP	Medium Class A
BSPT	Standard BSPT
Round DIN 405	7h / 7H
ISO Trapezoidal 30°	7e / 7H
American ACME	3G
UNJ	3A
API Buttress Casing	Standard API
API Rounded Casing & Tubing	Standard API RD
American NPT	Standard NPT
American NPTF	Class2

HOLDER (With special surface treatment)

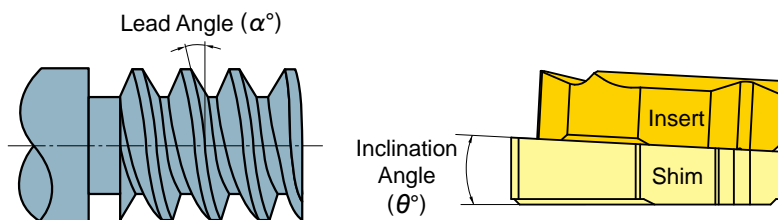
External



Internal



SUITABLE FOR THREADING WITH A LARGE LEAD ANGLE



By changing only the shim, MMT holders can be used for turning of threads with various lead angles as well as the turning of left hand threads. (Please refer to page G022, page G025 and page G026)

Lead Angle (α°)	Inclination Angle (θ°)
-1.5°	-3°
-0.5°	-2°
0.5°	-1°
1.5°	0°
2.5°	1°
3.5°	2°
4.5°	3°

Delivered with the holder.

VP10MF (G-class ground inserts only)

- Superior wear and plastic deformation resistance
- Suitable for continuous high precision machining with extensive tool life.

- High wear and plastic deformation resistance for threading when maintaining the thread form is important.
- Effective in combination with G-class inserts for high precision threading.

VP15TF (G-class ground inserts, M-class inserts with 3-D chip breakers)

- Wide versatility
- Able to withstand harsh conditions for long periods where conventional inserts would be liable to breakage.

- High fracture resistance during low rigidity applications such as bar feed machining.
- Effective combination of high cost performance M-class inserts with 3-D chip breakers.

VP20RT (M-class inserts with 3-D chip breakers)

- Excellent fracture resistance
- Suitable for stainless steel boring and unstable machining where inserts are vulnerable to fracturing.
- Effective combination of high cost performance M-class inserts with 3-D chip breakers.

CHOOSING M-CLASS INSERTS WITH 3-D CHIP BREAKERS OR G-CLASS INSERTS

Insert	Chip control	Precise Threads
M-class inserts with 3-D chip breakers	◎	○

Insert	Chip control	Precise Threads
G-class inserts	○	◎

◎ : 1st recommendation
○ : 2nd recommendation

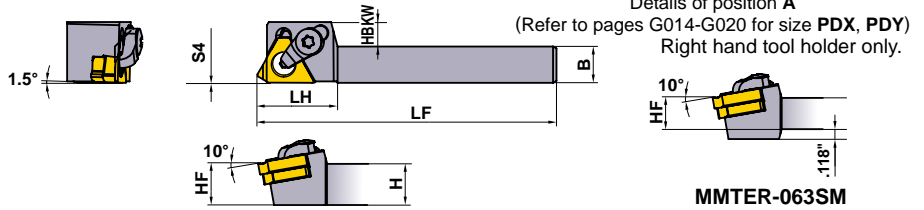
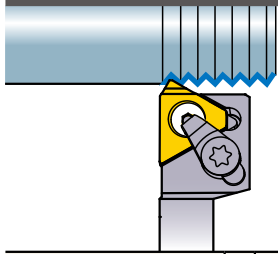
- For ideal chip control and a high cost performance ratio, M-class inserts with 3-D chip breakers are recommended.
- G-class inserts are recommended where highest precision is required.

MMTE HOLDER

- Various insert types.
- Precision class insert for precise thread forms.
- Available with a pressed breaker for chip control.
- Able to change lead angle by replacing the shim.

MMTE

(External threading)



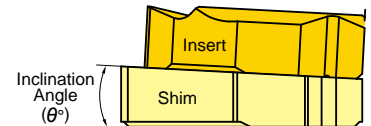
MMTER-063SM

Order Number	Stock R	Insert Number	Dimensions (inch)												
			H	B	LF	LH	HF	WF	Clamp Bridge	Clamp Screw	Stop Ring	Shim Screw	Shim *1	Wrench	
MMTER-063SM	●	MMT16ER ○○○○○	.375	.375	4.724	.875	.375	.625	SETK51	SETS51	CR4	HFC03008	CTE32TP15	①TKY15F ②HKY20R	
MMTER-083SM	●		.500	.500	4.724	.875	.500	.625	SETK51	SETS51	CR4	HFC03008	CTE32TP15	①TKY15F ②HKY20R	
MMTER-083	●		.500	.500	4.000	1.000	.500	.625	SETK51	SETS51	CR4	HFC03008	CTE32TP15	①TKY15F ②HKY20R	
MMTER-103	●		.625	.625	4.000	1.000	.625	.750	SETK51	SETS51	CR4	HFC03008	CTE32TP15	①TKY15F ②HKY20R	
MMTER-123	●		.750	.750	5.000	1.000	.750	1.000	SETK51	SETS51	CR4	HFC03008	CTE32TP15	①TKY15F ②HKY20R	
MMTER-163	●		1.000	1.000	6.000	1.000	1.000	1.250	SETK51	SETS51	CR4	HFC03008	CTE32TP15	①TKY15F ②HKY20R	
MMTER-124	●	MMT22ER ○○○○○	.750	.750	5.000	1.250	.750	1.000	SETK61	SETS61	CR5	HFC04010	CTE43TP15	①TKY20F ②HKY25R	
MMTER-164	●		1.000	1.000	6.000	1.250	1.000	1.250	SETK61	SETS61	CR5	HFC04010	CTE43TP15	①TKY20F ②HKY25R	
MMTER-204	●		1.250	1.250	6.000	1.250	1.250	1.500	SETK61	SETS61	CR5	HFC04010	CTE43TP15	①TKY20F ②HKY25R	

*1 Select and use an alternate shim from list below (sold separately), dependant on the lead angle.
 *2 Clamp Torque (lbf-in) : SETS51=31, SETS61=44, HFC03008=13, HFC04010=19

SHIM

Lead Angle (α°)	Order Number	Stock R	Inclination Angle (θ°)	Applicable Holder	Lead Angle (α°)	Order Number	Stock R	Inclination Angle (θ°)	Applicable Holder
-1.5°	CTE32TN15	●	-3°	MMTER -○○3	-1.5°	CTE43TN15	●	-3°	MMTER -○○4
-0.5°	CTE32TN05	●	-2°		-0.5°	CTE43TN05	●	-2°	
0.5°	CTE32TP05	●	-1°		0.5°	CTE43TP05	●	-1°	
1.5°	CTE32TP15	●	0°		1.5°	CTE43TP15	●	0°	
2.5°	CTE32TP25	●	1°		2.5°	CTE43TP25	●	1°	
3.5°	CTE32TP35	●	2°		3.5°	CTE43TP35	●	2°	
4.5°	CTE32TP45	●	3°	4.5°	CTE43TP45	●	3°		



Standard shim delivered with the holder.
 * See page G025 and page G026 for shim selection guide lines.

IDENTIFICATION

MMT		E		R		08		3		SM	
Designation	Application	Hand of Tool		Tool Size (inch) (Height and Width)				Insert Size	Tool Type		
	E External	R	Right	06	.375	12	.750	3	MMT16	SM Non-offset	
				08	.500	16	1.000	4	MMT22		
				10	.625	20	1.250				

RECOMMENDED CUTTING CONDITIONS

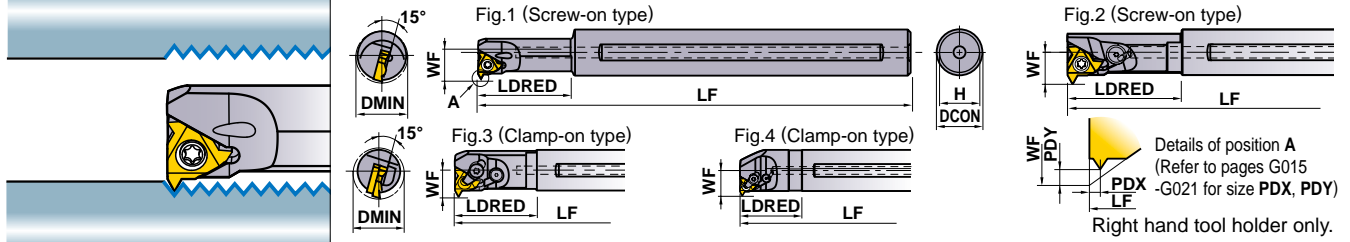
Work Material	Hardness	Grade	Cutting Speed (SFM)	Work Material	Hardness	Grade	Cutting Speed (SFM)
P Mild Steel	≤ 180HB	VP10MF	490 (230-755)	K Cast Iron	Tensile Strength ≤ 350MPa	VP10MF	460 (260-655)
		VP15TF	330 (195-460)			VP15TF	295 (195-395)
		VP20RT	260 (195-330)			VP10MF	150 (50-230)
		VP10MF	460 (260-655)			VP15TF	100 (65-130)
Carbon Steel Alloy Steel	180-280HB	VP15TF	330 (195-460)	S Heat-Resistant Alloy	-	VP10MF	195 (130-260)
		VP20RT	260 (195-330)			VP15TF	150 (80-210)
		VP10MF	425 (260-590)			VP10MF	165 (100-230)
M Stainless Steel	≤ 200HB	VP15TF	260 (130-395)	H Hardened Steel	45-55HRC	VP15TF	130 (65-195)
		VP20RT	195 (130-260)				

MMTI TYPE BORING BARS

- Minimum cutting diameter .500".
- Various insert types.
- Precision class insert for precise thread forms.
- Available with a pressed breaker for chip control.
- Able to change lead angle by replacing the shim.

MMTI

(Internal threading)

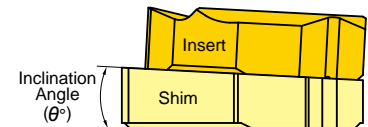


Order Number	Stock R	Insert Number	Lead Angle	Dimensions (inch)							Clamp Bridge	Clamp Screw *2	Stop Ring	Shim Screw	Shim *1	Wrench	Fig.
				DCON	LF	LDRED	WF	H	DMIN								
MMTIR102-0.50-1.5-C	●	MMT11IR	1.5°	.625	5.000	1.000	.340	.586	.500	-	TS25	-	-	-	-	⊙TKY08F	1
MMTIR102-0.50-2.5-C	●		2.5°	.625	5.000	1.000	.340	.586	.500	-	TS25	-	-	-	-	⊙TKY08F	1
MMTIR102-0.60-1.5-C	●	○○○○○	1.5°	.625	6.000	1.250	.380	.586	.600	-	TS25	-	-	-	-	⊙TKY08F	1
MMTIR102-0.60-2.5-C	●		2.5°	.625	6.000	1.250	.380	.586	.600	-	TS25	-	-	-	-	⊙TKY08F	1
MMTIR103-0.75-1.5-C	●	MMT16IR	1.5°	.625	6.000	1.500	.480	.586	.750	-	CS350860T	-	-	-	-	⊙TKY15F	2
MMTIR103-0.75-2.5-C	●		2.5°	.625	6.000	1.500	.480	.586	.750	-	CS350860T	-	-	-	-	⊙TKY15F	2
MMTIR123-0.90-1.5-C	●	○○○○○	1.5°	.750	7.000	1.500	.510	.711	.900	SETK51	SETS51	CR4	HFC03006	CTI32TP15	⊙TKY15F ⊙HKY20R	3	
MMTIR163-1.15-1.5-C	●		1.5°	1.000	10.000	2.500	.660	.937	1.150	SETK51	SETS51	CR4	HFC03006	CTI32TP15	⊙TKY15F ⊙HKY20R	3	
MMTIR203-1.45-1.5-C	●	○○○○○	1.5°	1.250	10.000	2.000	.810	1.187	1.450	SETK51	SETS51	CR4	HFC03006	CTI32TP15	⊙TKY15F ⊙HKY20R	4	
MMTIR124-0.95-1.5-C	●		1.5°	.750	7.000	2.000	.610	.711	.950	-	TS43	-	-	-	-	⊙TKY15F	2
MMTIR124-0.95-2.5-C	●	MMT22IR	2.5°	.750	7.000	2.000	.610	.711	.950	-	TS43	-	-	-	-	⊙TKY15F	2
MMTIR164-1.20-1.5-C	●		1.5°	1.000	8.000	1.500	.700	.937	1.200	SETK61	SETS61	CR5	HFC04008	CTI43TP15	⊙TKY20F ⊙HKY25R	4	
MMTIR204-1.50-1.5-C	●	○○○○○	1.5°	1.250	10.000	2.000	.860	1.187	1.500	SETK61	SETS61	CR5	HFC04008	CTI43TP15	⊙TKY20F ⊙HKY25R	4	
MMTIR244-1.75-1.5-C	●		1.5°	1.500	12.000	2.500	.980	1.437	1.750	SETK61	SETS61	CR5	HFC04008	CTI43TP15	⊙TKY20F ⊙HKY25R	4	

*1 Select and use an alternate shim from list below (sold separately), dependant on the lead angle.
 *2 Clamp Torque (lbf-in) : TS25=8.9, CS350860T=31, SETS51=31, TS43=31, SETS61=44, HFC03006=13, HFC04008=19
 Note 1) The screw-on type has no shim. The holder has an in-built lead angle. Please select a holder with the appropriate lead angle.
 Note 2) The minimum cutting diameter (DMIN) indicates the prepared hole diameter, not the nominal thread diameter.

SHIM

Lead Angle (α°)	Order Number	Stock R	Inclination Angle (θ°)	Applicable Holder
-1.5°	CTI32TN15	●	-3°	MMTIR ○○3-○○○ ○○-C
-0.5°	CTI32TN05	●	-2°	
0.5°	CTI32P05	●	-1°	
1.5°	CTI32P15	●	0°	
2.5°	CTI32P25	●	1°	
3.5°	CTI32P35	●	2°	
4.5°	CTI32P45	●	3°	



Standard shim delivered with the holder.
 * See page G025 and page G026 for shim selection guide lines.

IDENTIFICATION

Designation	Application	Shank Diameter (inch)	Insert Size	Min. Cutting Diameter (inch)	Lead Angle	Coolant
MMT I R 10 2 - 0.50 - 1.5 - C	I Internal	10 .625	2 MMT11	0.50 .500 1.15 1.150	1.5 1.5° 2.5 2.5°	C With
	Hand of Tool	12 .750	3 MMT16	0.60 .600 1.20 1.200		
R Right	R Right	16 1.000	4 MMT22	0.75 .750 1.45 1.450		
		20 1.250		0.90 .900 1.50 1.500		
		24 1.500		0.95 .950 1.75 1.750		

RECOMMENDED CUTTING CONDITIONS

Work Material	Hardness	Grade	Cutting Speed (SFM)
P Mild Steel	≤180HB	VP10MF	490 (230-755)
		VP15TF	330 (195-460)
		VP20RT	260 (195-330)
		VP10MF	460 (260-655)
Carbon Steel Alloy Steel	180-280HB	VP15TF	330 (195-460)
		VP20RT	260 (195-330)
		VP10MF	425 (260-590)
M Stainless Steel	≤200HB	VP15TF	260 (130-395)
		VP20RT	195 (130-260)

Work Material	Hardness	Grade	Cutting Speed (SFM)
K Cast Iron	Tensile Strength ≤350MPa	VP10MF	460 (260-655)
		VP15TF	295 (195-395)
S Heat-Resistant Alloy	-	VP10MF	150 (50-230)
		VP15TF	100 (65-130)
Titanium Alloy	-	VP10MF	195 (130-260)
		VP15TF	150 (80-210)
H Hardened Steel	45-55HRC	VP10MF	165 (100-230)
		VP15TF	130 (65-195)

THREADING

MMT M-CLASS INSERTS WITH 3-D CHIP BREAKERS

EXTERNAL THREADING INSERTS

Type	Order Number	Coated		Pitch		Dimensions (mm)					Total depth of cut (mm)	Geometry
		VP15TF	VP20RT			IC	S	PDY	PDX	RE		
				mm	thread/inch							
Partial Profile 60°	MMT16ERA60-S	●		0.5-1.5	48-16	9.525	3.44	0.8	0.9	0.06	—	
	MMT16ERG60-S	●		1.75-3.0	14-8	9.525	3.44	1.2	1.7	0.23	—	
Partial Profile 55°	MMT16ERA55-S	★			48-16	9.525	3.44	0.8	0.9	0.07	—	
	MMT16ERG55-S	★			14-8	9.525	3.44	1.2	1.7	0.23	—	
ISO Metric	MMT16ER100ISO-S	●	★	1.0		9.525	3.44	0.7	0.7	0.13	0.61	
	MMT16ER125ISO-S	●	★	1.25		9.525	3.44	0.8	0.9	0.16	0.77	
	MMT16ER150ISO-S	●	★	1.5		9.525	3.44	0.8	1.0	0.20	0.92	
	MMT16ER175ISO-S	●	★	1.75		9.525	3.44	0.9	1.2	0.22	1.07	
	MMT16ER200ISO-S	●	★	2.0		9.525	3.44	1.0	1.3	0.26	1.23	
	MMT16ER250ISO-S	●	★	2.5		9.525	3.44	1.1	1.5	0.33	1.53	
	MMT16ER300ISO-S	●	★	3.0		9.525	3.44	1.2	1.6	0.40	1.84	
American UN	MMT16ER160UN-S	●			16	9.525	3.44	0.9	1.1	0.23	0.97	
	MMT16ER140UN-S	●			14	9.525	3.44	1.0	1.2	0.26	1.11	
	MMT16ER120UN-S	●			12	9.525	3.44	1.1	1.4	0.30	1.30	
Whitworth for BSW, BSP	MMT16ER190W-S	★			19	9.525	3.44	0.8	1.0	0.18	0.86	
	MMT16ER140W-S	★			14	9.525	3.44	1.0	1.2	0.25	1.16	
	MMT16ER110W-S	★			11	9.525	3.44	1.1	1.5	0.32	1.48	
BSPT	MMT16ER190BSPT-S	★			19	9.525	3.44	0.8	0.9	0.18	0.86	
	MMT16ER140BSPT-S	★			14	9.525	3.44	1.0	1.2	0.25	1.16	
	MMT16ER110BSPT-S	★			11	9.525	3.44	1.1	1.5	0.32	1.48	

THREADING

IDENTIFICATION

MMT	16	E	R	100	ISO	-	S	M-class inserts with 3-D chip breakers	
Designation	Diameter of Inscribed Circle (mm)	Application	Hand of Tool	Pitch		Threading Type			
	11 6.35	E External	R Right	100 1.0mm	A 0.5-1.5mm or 48-16 thread/inch	60 Partial Profile 60°			
	16 9.525	I Internal		125 1.25mm		G 1.75-3.0mm or 14-8 thread/inch	55 Partial Profile 55°		
				150 1.5mm			ISO ISO Metric		
				175 1.75mm			W Whitworth for BSW, BSP		
				200 2.0mm			BSPT BSPT		
				250 2.5mm			UN American UN		
				300 3.0mm					

● : Inventory maintained. ★ : Inventory maintained in Japan.
 <5 inserts in one case>

INTERNAL THREADING INSERTS

Type	Order Number	Coated		Pitch		Dimensions (mm)					Total depth of cut (mm)	Geometry
		VP15TF	VP20RT	mm	thread/inch	IC	S	PDY	PDX	RE		
Partial Profile 60°	MMT11IRA60-S	★		0.5–1.5	48–16	6.35	3.04	0.8	0.9	0.03	—	
	MMT16IRA60-S	●		0.5–1.5	48–16	9.525	3.44	0.8	0.9	0.03	—	
	MMT16IRG60-S	●		1.75–3.0	14–8	9.525	3.44	1.2	1.7	0.11	—	
Partial Profile 55°	MMT11IRA55-S	★			48–16	6.35	3.04	0.8	0.9	0.07	—	
	MMT16IRA55-S	★			48–16	9.525	3.44	0.8	0.9	0.07	—	
	MMT16IRG55-S	★			14–8	9.525	3.44	1.2	1.7	0.21	—	
ISO Metric	MMT11IR100ISO-S	★		1.0		6.35	3.04	0.6	0.7	0.06	0.58	
	MMT11IR125ISO-S	★		1.25		6.35	3.04	0.8	0.9	0.08	0.72	
	MMT11IR150ISO-S	★		1.5		6.35	3.04	0.8	1.0	0.10	0.87	
	MMT16IR100ISO-S	●	★	1.0		9.525	3.44	0.6	0.7	0.06	0.58	
	MMT16IR125ISO-S	●	★	1.25		9.525	3.44	0.8	0.9	0.08	0.72	
	MMT16IR150ISO-S	●	★	1.5		9.525	3.44	0.8	1.0	0.10	0.87	
	MMT16IR175ISO-S	●	★	1.75		9.525	3.44	0.9	1.2	0.11	1.01	
	MMT16IR200ISO-S	●	★	2.0		9.525	3.44	1.0	1.3	0.13	1.15	
	MMT16IR250ISO-S	●	★	2.5		9.525	3.44	1.1	1.5	0.17	1.44	
MMT16IR300ISO-S	●	★	3.0		9.525	3.44	1.1	1.5	0.20	1.73		
American UN	MMT16IR160UN-S	●			16	9.525	3.44	0.9	1.1	0.11	0.92	
	MMT16IR140UN-S	●			14	9.525	3.44	0.9	1.2	0.12	1.05	
	MMT16IR120UN-S	●			12	9.525	3.44	1.1	1.4	0.14	1.22	
Whitworth for BSW, BSP	MMT16IR190W-S	★			19	9.525	3.44	0.8	1.0	0.18	0.86	
	MMT16IR140W-S	★			14	9.525	3.44	1.0	1.2	0.25	1.16	
	MMT16IR110W-S	★			11	9.525	3.44	1.1	1.5	0.32	1.48	
BSPT	MMT16IR190BSPT-S	★			19	9.525	3.44	0.8	0.9	0.18	0.86	
	MMT16IR140BSPT-S	★			14	9.525	3.44	1.0	1.2	0.25	1.16	
	MMT16IR110BSPT-S	★			11	9.525	3.44	1.1	1.5	0.32	1.48	

THREADING

MMT G-CLASS GROUND INSERTS

EXTERNAL THREADING INSERTS

Type	Thread Tolerance	Order Number	Coated		Pitch		Dimensions (mm)					Total depth of cut (mm)	Geometry
			VP10MF	VP15TF	mm	thread/inch	IC	S	PDY	PDX	RE		
Partial Profile 60°	-	MMT16ERA60	★	★	0.5-1.5	48-16	9.525	3.44	0.8	0.9	0.05		
		MMT16ERG60	★	★	1.75-3.0	14-8	9.525	3.44	1.2	1.7	0.27		
		MMT16ERAG60	★		0.5-3.0	48-8	9.525	3.44	1.2	1.7	0.08		
		MMT22ERN60	★		3.5-5.0	7-5	12.7	4.64	1.7	2.5	0.53		
Partial Profile 55°	-	MMT16ERA55	★	★		48-16	9.525	3.44	0.8	0.9	0.05		
		MMT16ERG55	★	★		14-8	9.525	3.44	1.2	1.7	0.21		
		MMT16ERAG55	★			48-8	9.525	3.44	1.2	1.7	0.07		
		MMT22ERN55	★			7-5	12.7	4.64	1.7	2.5	0.44		
ISO Metric	6g	MMT16ER050ISO	●		0.5		9.525	3.44	0.6	0.4	0.06		
		MMT16ER075ISO	●		0.75		9.525	3.44	0.6	0.6	0.10		
		MMT16ER100ISO	●	★	1.0		9.525	3.44	0.7	0.7	0.16		
		MMT16ER125ISO	●	★	1.25		9.525	3.44	0.8	0.9	0.19		
		MMT16ER150ISO	●	★	1.5		9.525	3.44	0.8	1.0	0.23		
		MMT16ER175ISO	●	★	1.75		9.525	3.44	0.9	1.2	0.21		
		MMT16ER200ISO	●	★	2.0		9.525	3.44	1.0	1.3	0.31		
		MMT16ER250ISO	●	★	2.5		9.525	3.44	1.1	1.5	0.32		
		MMT16ER300ISO	●	★	3.0		9.525	3.44	1.2	1.6	0.46		
		MMT22ER350ISO	★		3.5		12.7	4.64	1.6	2.3	0.45		
		MMT22ER400ISO	★		4.0		12.7	4.64	1.6	2.3	0.52		
		MMT22ER450ISO	★		4.5		12.7	4.64	1.7	2.4	0.58		
		MMT22ER500ISO	★		5.0		12.7	4.64	1.7	2.5	0.63		

THREADING

IDENTIFICATION

MMT	16	E	R	050	ISO
Designation	Diameter of Inscribed Circle (mm)	Application	Hand of Tool	Pitch	Threading Type
	11 6.35	E External	R Right	050 0.5mm	60 Partial Profile 60°
	16 9.525	I Internal		075 0.75mm	55 Partial Profile 55°
	22 12.7			100 1.0mm	ISO ISO Metric
				125 1.25mm	W Whitworth for BSW, BSP
				150 1.5mm	BSPT BSPT
				175 1.75mm	UN American UN
				200 2.0mm	RD Round DIN 405
				250 2.5mm	TR ISO Trapezoidal 30°
				300 3.0mm	ACME American ACME
				350 3.5mm	UNJ UNJ
				400 4.0mm	APBU API Buttress Casing
				450 4.5mm	APRD API Round Casing & Tubing
				500 5.0mm	NPT NPT
					NPTF NPTF

● : Inventory maintained. ★ : Inventory maintained in Japan.
 <5 inserts in one case>

INTERNAL THREADING INSERTS

Type	Thread Tolerance	Order Number	Coated		Pitch		Dimensions (mm)					Total depth of cut (mm)	Geometry
			VP10MF	VP15TF	mm	thread/inch	IC	S	PDY	PDX	RE		
Partial Profile 60°	-	MMT11IRA60	★	★	0.5-1.5	48-16	6.35	3.04	0.8	0.9	0.05		
		MMT16IRA60	★	★	0.5-1.5	48-16	9.525	3.44	0.8	0.9	0.05		
		MMT16IRG60	★	★	1.75-3.0	14-8	9.525	3.44	1.2	1.7	0.16		
		MMT16IRAG60	★		0.5-3.0	48-8	9.525	3.44	1.2	1.7	0.05		
		MMT22IRN60	★		3.5-5.0	7-5	12.7	4.64	1.7	2.5	0.30		
Partial Profile 55°	-	MMT11IRA55	★	★		48-16	6.35	3.04	0.8	0.9	0.05		
		MMT16IRA55	★	★		48-16	9.525	3.44	0.8	0.9	0.05		
		MMT16IRG55	★	★		14-8	9.525	3.44	1.2	1.7	0.21		
		MMT16IRAG55	★			48-8	9.525	3.44	1.2	1.7	0.07		
		MMT22IRN55	★			7-5	12.7	4.64	1.7	2.5	0.44		
ISO Metric	6H	MMT11IR050ISO	★		0.5		6.35	3.04	0.6	0.4	0.03		
		MMT11IR075ISO	★		0.75		6.35	3.04	0.6	0.6	0.04		
		MMT11IR100ISO	★	★	1.0		6.35	3.04	0.6	0.7	0.10		
		MMT11IR125ISO	★	★	1.25		6.35	3.04	0.8	0.9	0.12		
		MMT11IR150ISO	★	★	1.5		6.35	3.04	0.8	1.0	0.14		
		MMT11IR175ISO	★		1.75		6.35	3.04	0.9	1.1	0.10		
		MMT11IR200ISO	★		2.0		6.35	3.04	0.9	1.1	0.18		
		MMT16IR050ISO	★		0.5		9.525	3.44	0.6	0.4	0.03		
		MMT16IR075ISO	★		0.75		9.525	3.44	0.6	0.6	0.04		
		MMT16IR100ISO	●	★	1.0		9.525	3.44	0.6	0.7	0.10		
		MMT16IR125ISO	●	★	1.25		9.525	3.44	0.8	0.9	0.12		
		MMT16IR150ISO	●	★	1.5		9.525	3.44	0.8	1.0	0.14		
		MMT16IR175ISO	●	★	1.75		9.525	3.44	0.9	1.2	0.10		
		MMT16IR200ISO	●	★	2.0		9.525	3.44	1.0	1.3	0.18		
		MMT16IR250ISO	●	★	2.5		9.525	3.44	1.1	1.5	0.15		
		MMT16IR300ISO	●	★	3.0		9.525	3.44	1.1	1.5	0.26		
		MMT22IR350ISO	★		3.5		12.7	4.64	1.6	2.3	0.22		
		MMT22IR400ISO	★		4.0		12.7	4.64	1.6	2.3	0.25		
		MMT22IR450ISO	★		4.5		12.7	4.64	1.6	2.4	0.28		
		MMT22IR500ISO	★		5.0		12.7	4.64	1.6	2.3	0.32		

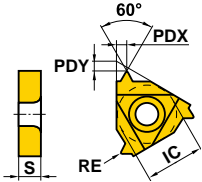
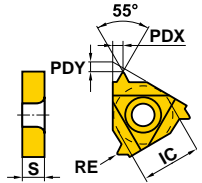
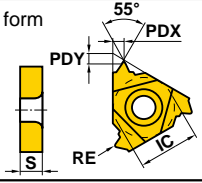
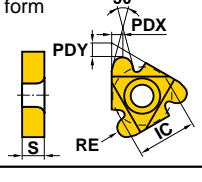
THREADING

IDENTIFICATION

MMT	16	E	R	050	ISO
Designation			Hand of Tool	Pitch	Threading Type
			R Right		
Diameter of Inscribed Circle (mm)	Application				
11 6.35	E External			050 0.5mm	60 Partial Profile 60°
16 9.525	I Internal			075 0.75mm	55 Partial Profile 55°
22 12.7				100 1.0mm	ISO ISO Metric
				125 1.25mm	W Whitworth for BSW, BSP
				150 1.5mm	BSPT BSPT
				175 1.75mm	UN American UN
				200 2.0mm	RD Round DIN 405
				250 2.5mm	TR ISO Trapezoidal 30°
				300 3.0mm	ACME American ACME
				350 3.5mm	UNJ UNJ
				400 4.0mm	APBU API Buttress Casing
				450 4.5mm	APRD API Round Casing & Tubing
				500 5.0mm	NPT NPT
					NPTF NPTF

MMT G-CLASS GROUND INSERTS

EXTERNAL THREADING INSERTS

Type	Thread Tolerance	Order Number	Coated		Pitch		Dimensions (mm)					Total depth of cut (mm)	Geometry
			VP10MF	VP15TF	mm	thread/inch	IC	S	PDY	PDX	RE		
American UN	2A	MMT16ER320UN	●			32	9.525	3.44	0.6	0.6	0.09	0.49	Full form 
		MMT16ER280UN	●			28	9.525	3.44	0.6	0.7	0.10	0.56	
		MMT16ER240UN	●			24	9.525	3.44	0.7	0.8	0.16	0.65	
		MMT16ER200UN	●			20	9.525	3.44	0.8	0.9	0.19	0.78	
		MMT16ER180UN	●			18	9.525	3.44	0.8	1.0	0.21	0.87	
		MMT16ER160UN	●	★		16	9.525	3.44	0.9	1.1	0.24	0.97	
		MMT16ER140UN	●	★		14	9.525	3.44	1.0	1.2	0.22	1.11	
		MMT16ER130UN	●			13	9.525	3.44	1.0	1.3	0.24	1.20	
		MMT16ER120UN	●	★		12	9.525	3.44	1.1	1.4	0.32	1.30	
		MMT16ER110UN	●			11	9.525	3.44	1.1	1.5	0.29	1.42	
		MMT16ER100UN	●			10	9.525	3.44	1.1	1.5	0.32	1.56	
		MMT16ER090UN	●			9	9.525	3.44	1.2	1.7	0.35	1.73	
		MMT16ER080UN	●			8	9.525	3.44	1.2	1.6	0.48	1.95	
		MMT22ER070UN	★			7	12.7	4.64	1.6	2.3	0.47	2.22	
		MMT22ER060UN	★			6	12.7	4.64	1.6	2.3	0.53	2.60	
MMT22ER050UN	★			5	12.7	4.64	1.7	2.5	0.64	3.12			
Whitworth for BSW, BSP	Medium Class A	MMT16ER280W	★			28	9.525	3.44	0.6	0.7	0.09	0.58	Full form 
		MMT16ER260W	★			26	9.525	3.44	0.7	0.8	0.10	0.63	
		MMT16ER200W	★			20	9.525	3.44	0.8	0.9	0.18	0.81	
		MMT16ER190W	★	★		19	9.525	3.44	0.8	1.0	0.19	0.86	
		MMT16ER180W	★			18	9.525	3.44	0.8	1.0	0.20	0.90	
		MMT16ER160W	★			16	9.525	3.44	0.9	1.1	0.23	1.02	
		MMT16ER140W	★	★		14	9.525	3.44	1.0	1.2	0.26	1.16	
		MMT16ER120W	★			12	9.525	3.44	1.1	1.4	0.30	1.36	
		MMT16ER110W	★	★		11	9.525	3.44	1.1	1.5	0.33	1.48	
		MMT16ER100W	★			10	9.525	3.44	1.1	1.5	0.37	1.63	
		MMT16ER090W	★			9	9.525	3.44	1.2	1.7	0.34	1.81	
		MMT16ER080W	★			8	9.525	3.44	1.2	1.5	0.39	2.03	
		MMT22ER070W	★			7	12.7	4.64	1.6	2.3	0.46	2.32	
		MMT22ER060W	★			6	12.7	4.64	1.6	2.3	0.53	2.71	
		MMT22ER050W	★			5	12.7	4.64	1.7	2.4	0.66	3.25	
BSPT	Standard BSPT	MMT16ER280BSPT	★			28	9.525	3.44	0.6	0.6	0.09	0.58	Full form 
		MMT16ER190BSPT	★	★		19	9.525	3.44	0.8	0.9	0.14	0.86	
		MMT16ER140BSPT	★	★		14	9.525	3.44	1.0	1.2	0.26	1.16	
		MMT16ER110BSPT	★	★		11	9.525	3.44	1.1	1.5	0.33	1.48	
Round DIN 405	7h	MMT16ER100RD	★			10	9.525	3.44	1.1	1.2	0.60	1.27	Full form 
		MMT16ER080RD	★			8	9.525	3.44	1.4	1.3	0.75	1.59	
		MMT16ER060RD	★			6	9.525	3.44	1.5	1.7	1.00	2.12	
		MMT22ER040RD	★			4	9.525	3.44	2.2	2.3	1.51	3.18	

THREADING

● : Inventory maintained. ★ : Inventory maintained in Japan.

<5 inserts in one case>

INTERNAL THREADING INSERTS

Type	Thread Tolerance	Order Number	Coated		Pitch		Dimensions (mm)					Total depth of cut (mm)	Geometry
			VP10MF	VP15TF	mm	thread/inch	IC	S	PDY	PDX	RE		
American UN	2B	MMT11R320UN	★			32	6.35	3.04	0.6	0.6	0.04	0.46	
		MMT11R280UN	★			28	6.35	3.04	0.6	0.7	0.05	0.52	
		MMT11R240UN	★			24	6.35	3.04	0.7	0.8	0.09	0.61	
		MMT11R200UN	★			20	6.35	3.04	0.8	0.9	0.11	0.73	
		MMT11R180UN	★			18	6.35	3.04	0.8	1.0	0.12	0.81	
		MMT11R160UN	★			16	6.35	3.04	0.9	1.1	0.14	0.92	
		MMT11R140UN	★			14	6.35	3.04	0.9	1.1	0.11	1.05	
		MMT16R320UN	●			32	9.525	3.44	0.6	0.6	0.04	0.46	
		MMT16R280UN	●			28	9.525	3.44	0.6	0.7	0.05	0.52	
		MMT16R240UN	●			24	9.525	3.44	0.7	0.8	0.09	0.61	
		MMT16R200UN	●			20	9.525	3.44	0.8	0.9	0.11	0.73	
		MMT16R180UN	●			18	9.525	3.44	0.8	1.0	0.12	0.81	
		MMT16R160UN	●★			16	9.525	3.44	0.9	1.1	0.14	0.92	
		MMT16R140UN	●★			14	9.525	3.44	0.9	1.2	0.11	1.05	
		MMT16R130UN	●			13	9.525	3.44	1.0	1.3	0.10	1.13	
		MMT16R120UN	●★			12	9.525	3.44	1.1	1.4	0.18	1.22	
		MMT16R110UN	●			11	9.525	3.44	1.1	1.5	0.13	1.33	
		MMT16R100UN	●			10	9.525	3.44	1.1	1.5	0.15	1.47	
		MMT16R090UN	●			9	9.525	3.44	1.2	1.7	0.17	1.63	
		MMT16R080UN	●			8	9.525	3.44	1.1	1.5	0.27	1.83	
MMT22R070UN	★			7	12.7	4.64	1.6	2.3	0.23	2.09			
MMT22R060UN	★			6	12.7	4.64	1.6	2.3	0.26	2.44			
MMT22R050UN	★			5	12.7	4.64	1.6	2.3	0.32	2.93			
Whitworth for BSW, BSP	Medium Class A	MMT11R190W	★			19	6.35	3.04	0.8	1.0	0.19	0.86	
		MMT11R140W	★			14	6.35	3.04	0.9	1.1	0.26	1.16	
		MMT16R280W	★			28	9.525	3.44	0.6	0.7	0.09	0.58	
		MMT16R260W	★			26	9.525	3.44	0.7	0.8	0.10	0.63	
		MMT16R200W	★			20	9.525	3.44	0.8	0.9	0.18	0.81	
		MMT16R190W	★★			19	9.525	3.44	0.8	1.0	0.19	0.86	
		MMT16R180W	★			18	9.525	3.44	0.8	1.0	0.20	0.90	
		MMT16R160W	★			16	9.525	3.44	0.9	1.1	0.23	1.02	
		MMT16R140W	★★			14	9.525	3.44	1.0	1.2	0.26	1.16	
		MMT16R120W	★			12	9.525	3.44	1.1	1.4	0.30	1.36	
		MMT16R110W	★★			11	9.525	3.44	1.1	1.5	0.33	1.48	
		MMT16R100W	★			10	9.525	3.44	1.1	1.5	0.37	1.63	
		MMT16R090W	★			9	9.525	3.44	1.2	1.7	0.34	1.81	
		MMT16R080W	★			8	9.525	3.44	1.2	1.5	0.39	2.03	
		MMT22R070W	★			7	12.7	4.64	1.6	2.3	0.46	2.32	
		MMT22R060W	★			6	12.7	4.64	1.6	2.3	0.53	2.71	
MMT22R050W	★			5	12.7	4.64	1.7	2.4	0.66	3.25			
BSPT	Standard BSPT	MMT11R190BSPT	★			19	6.35	3.04	0.8	0.9	0.14	0.86	
		MMT11R140BSPT	★			14	6.35	3.04	0.9	1.0	0.26	1.16	
		MMT16R190BSPT	★★			19	9.525	3.44	0.8	0.9	0.14	0.86	
		MMT16R140BSPT	★★			14	9.525	3.44	1.0	1.2	0.26	1.16	
		MMT16R110BSPT	★★			11	9.525	3.44	1.1	1.5	0.33	1.48	
Round DIN 405	7H	MMT16R100RD	★			10	9.525	3.44	1.1	1.2	0.55	1.27	
		MMT16R080RD	★			8	9.525	3.44	1.4	1.4	0.70	1.59	
		MMT16R060RD	★			6	9.525	3.44	1.4	1.5	0.93	2.12	
		MMT22R040RD	★			4	12.7	4.64	2.2	2.3	1.40	3.18	

THREADING

MMT G-CLASS GROUND INSERTS

EXTERNAL THREADING INSERTS

Type	Thread Tolerance	Order Number	Coated		Pitch		Dimensions (mm)					Total depth of cut (mm)	Geometry
			VP10MF		mm	thread/inch	IC	S	PDY	PDX	RE		
ISO Trapezoidal 30°	7e	MMT16ER150TR	★		1.5		9.525	3.44	1.0	1.1	0.08	0.90	Semi-full form
		MMT16ER200TR	★		2.0		9.525	3.44	1.1	1.3	0.15	1.25	
		MMT16ER300TR	★		3.0		9.525	3.44	1.3	1.5	0.15	1.75	
		MMT22ER400TR	★		4.0		12.7	4.64	1.7	1.9	0.15	2.25	
		MMT22ER500TR	★		5.0		12.7	4.64	2.1	2.5	0.15	2.75	
American ACME	3G	MMT16ER120ACME	●			12	9.525	3.44	1.1	1.2	0.08	1.19	Semi-full form
		MMT16ER100ACME	●			10	9.525	3.44	1.3	1.4	0.08	1.52	
		MMT16ER080ACME	●			8	9.525	3.44	1.4	1.5	0.10	1.84	
		MMT22ER060ACME	●			6	12.7	4.64	1.8	2.1	0.10	2.37	
		MMT22ER050ACME	●			5	12.7	4.64	2.0	2.3	0.10	2.79	
UNJ	3A	MMT16ER320UNJ	★			32	9.525	3.44	0.6	0.7	0.13	0.46	Full form
		MMT16ER280UNJ	★			28	9.525	3.44	0.7	0.7	0.14	0.52	
		MMT16ER240UNJ	★			24	9.525	3.44	0.7	0.8	0.17	0.61	
		MMT16ER200UNJ	★			20	9.525	3.44	0.8	0.9	0.20	0.73	
		MMT16ER180UNJ	★			18	9.525	3.44	0.8	1.0	0.22	0.81	
		MMT16ER160UNJ	★			16	9.525	3.44	0.9	1.1	0.25	0.92	
		MMT16ER140UNJ	★			14	9.525	3.44	1.0	1.2	0.29	1.05	
		MMT16ER120UNJ	★			12	9.525	3.44	1.1	1.3	0.33	1.22	
		MMT16ER100UNJ	★			10	9.525	3.44	1.2	1.5	0.40	1.47	
		MMT16ER080UNJ	★			8	9.525	3.44	1.2	1.6	0.51	1.83	
API Buttress Casing	Standard API	MMT22ER050APBU	★			5	12.7	4.64	3.1	1.9	0.18	1.55	Full form
API Round Casing & Tubing	Standard API RD	MMT16ER100APRD	●			10	9.525	3.44	1.2	1.4	0.34	1.41	Full form
		MMT16ER080APRD	●			8	9.525	3.44	1.3	1.5	0.41	1.81	
American NPT	Standard NPT	MMT16ER270NPT	●			27	9.525	3.44	0.7	0.8	0.04	0.66	Full form
		MMT16ER180NPT	●			18	9.525	3.44	0.8	1.0	0.08	1.01	
		MMT16ER140NPT	●			14	9.525	3.44	0.9	1.2	0.09	1.33	
		MMT16ER115NPT	●			11.5	9.525	3.44	1.1	1.5	0.11	1.64	
		MMT16ER080NPT	●			8	9.525	3.44	1.3	1.8	0.14	2.42	
American NPTF	Class 2	MMT16ER270NPTF	★			27	9.525	3.44	0.7	0.8	0.04	0.64	Full form
		MMT16ER180NPTF	★			18	9.525	3.44	0.8	1.0	0.04	1.00	
		MMT16ER140NPTF	★			14	9.525	3.44	0.9	1.2	0.04	1.35	
		MMT16ER115NPTF	★			11.5	9.525	3.44	1.1	1.5	0.04	1.63	
		MMT16ER080NPTF	★			8	9.525	3.44	1.3	1.8	0.04	2.38	

● : Inventory maintained. ★ : Inventory maintained in Japan.
 <5 inserts in one case>

INTERNAL THREADING INSERTS

Type	Thread Tolerance	Order Number	Coated		Pitch		Dimensions (mm)					Total depth of cut (mm)	Geometry
			VP-10MIF		mm	thread/inch	IC	S	PDY	PDX	RE		
ISO Trapezoidal 30°	7H	MMT16R150TR	★		1.5		9.525	3.44	1.0	1.1	0.08	0.90	Semi-full form
		MMT 16R200TR	★		2.0		9.525	3.44	1.1	1.3	0.15	1.25	
		MMT 16R300TR	★		3.0		9.525	3.44	1.3	1.5	0.15	1.75	
		MMT 22R400TR	★		4.0		12.7	4.64	1.7	1.9	0.15	2.25	
		MMT22R500TR	★		5.0		12.7	4.64	2.1	2.5	0.15	2.75	
American ACME	3G	MMT16R120ACME	●			12	9.525	3.44	1.2	1.3	0.05	1.19	Semi-full form
		MMT 16R100ACME	●			10	9.525	3.44	1.2	1.3	0.08	1.52	
		MMT 16R080ACME	●			8	9.525	3.44	1.4	1.5	0.10	1.84	
		MMT 22R060ACME	●			6	12.7	4.64	1.8	2.1	0.10	2.37	
		MMT 22R050ACME	●			5	12.7	4.64	2.0	2.3	0.10	2.79	
UNJ												When machining an internal UNJ thread, cut an internal hole with the appropriate diameter. Then machine with 60° American UN. In this case, a full form type insert cannot be used.	
API Buttress Casing	Standard API	MMT22R050APBU	★			5	12.7	4.64	2.8	1.9	0.18	1.55	Full form
API Round Casing & Tubing	Standard API RD	MMT16R100APRD	●			10	9.525	3.44	1.2	1.4	0.34	1.41	Full form
		MMT 16R080APRD	●			8	9.525	3.44	1.3	1.5	0.41	1.81	
American NPT	Standard NPT	MMT16R270NPT	●			27	9.525	3.44	0.7	0.8	0.04	0.66	Full form
		MMT 16R180NPT	●			18	9.525	3.44	0.8	1.0	0.08	1.01	
		MMT 16R140NPT	●			14	9.525	3.44	0.9	1.2	0.09	1.33	
		MMT 16R115NPT	●			11.5	9.525	3.44	1.1	1.5	0.11	1.64	
		MMT 16R080NPT	●			8	9.525	3.44	1.3	1.8	0.14	2.42	
American NPTF	Class 2	MMT16R140NPTF	★			14	9.525	3.44	0.9	1.2	0.04	1.35	Full form
		MMT 16R115NPTF	★			11.5	9.525	3.44	1.1	1.5	0.04	1.63	
		MMT 16R080NPTF	★			8	9.525	3.44	1.3	1.8	0.04	2.38	

THREADING METHODS

	Right Hand Thread	Left Hand Thread
EXTERNAL		
INTERNAL		

- Usually, threads are cut feeding the insert towards the chuck.
- When machining left hand threads, note that clamping rigidity is lowered due the application of back turning.
- When machining left hand threads, the lead angle is negative. Ensure an appropriate lead angle by changing the shim.

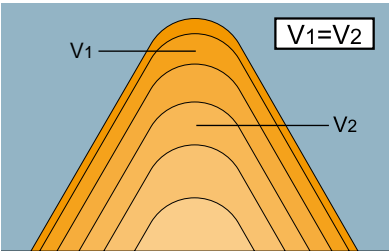
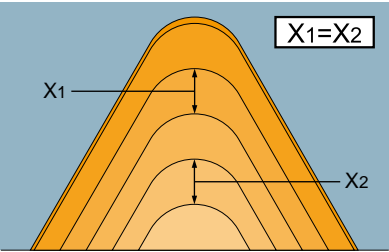
INSERT TYPES

Partial Form	Full Form	Semi Full Form (Trapezoidal threads only)
<ul style="list-style-type: none"> ● The same insert can be used for a range of pitches. ● Shorter tool life because the nose radius of the insert is smaller than that of a full form insert. ● Finishing with another operation may be necessary. 	<ul style="list-style-type: none"> ● No deburring needed after threading. ● Requires specific insert for each thread form and pitch. 	<ul style="list-style-type: none"> ● No de-burring needed after threading. ● Requires specific insert for each thread form and pitch. ● Finishing with another operation may be necessary.
<p>Crest Radius (Additional turning necessary to finish the thread crest.)</p>	<p>Crest Radius (Finished by insert form.)</p>	<p>Crest Radius (Additional turning necessary to finish the thread crest.)</p>

INFEEED METHODS

	Radial Infeed	Flank Infeed	Modified Flank Infeed	Incremental Infeed
Features	Advantages <ul style="list-style-type: none"> ● Easiest to use. (Standard program for threading) ● Wide application. (Cutting conditions easy to change.) ● Uniform wear of the right and left sides of the cutting edge. 	Advantages <ul style="list-style-type: none"> ● Relatively easy to use. (Semi-standard program for threading.) ● Reduced cutting force. ● Suitable for large pitch threads or materials that peel easily. ● Good chip discharge. 	Advantages <ul style="list-style-type: none"> ● Preventing flank wear on the right side of the cutting edge. ● Reduced cutting force. ● Good for large pitch or materials that peel easily. ● Good chip discharge. 	Advantages <ul style="list-style-type: none"> ● Uniform wear of the right and left sides of the cutting edge. ● Reduced cutting force. ● Good for large pitch or materials that peel easily.
	Disadvantages <ul style="list-style-type: none"> ● Difficult chip control. ● Subject to vibration in the later passes due to long cutting edge in contact with workpiece. ● Ineffective for large pitch threading. ● Heavy load on the nose radius. 	Disadvantages <ul style="list-style-type: none"> ● Large flank wear of the right side of a cutting edge. ● Relatively difficult to change cutting depth. (Re-programming necessary) 	Disadvantages <ul style="list-style-type: none"> ● Complex machining programming. ● Difficult to change cutting depth. (NC programming necessary) 	Disadvantages <ul style="list-style-type: none"> ● Complex machining programming. ● Difficult to change cutting depth. (Re-programming necessary) ● Chip control is difficult.

THREADING DEPTH

		Features	
		Advantages	Disadvantages
 <p>Fixed cut area</p>	<ul style="list-style-type: none"> • Easy to use. (Standard program for threading.) • Superior resistance to vibration. (Constant cutting force.) 	<ul style="list-style-type: none"> • Long chips generated during the final pass. • Complex calculation of cutting depth when changing the number of passes. 	
 <p>Fixed cutting depth</p>	<ul style="list-style-type: none"> • Reduced load on nose radius during the first half of the passes. • Easy chip control. (Optional setting of chip thickness) • Easy to calculate cutting depth when changing the number of passes. • Good chip control. 	<ul style="list-style-type: none"> • Subject to vibration in the later stages of cutting. (Increased cutting force) • In some cases, changing the NC program is necessary. 	

* It is recommended to set the depth of cut of the final pass to 0.05mm–0.025mm. Large cutting depths can cause vibration, leading to a poor surface finish.

Formulas

Formulas to calculate infeed for each pass in a reduced series.

$\Delta ap_n = \frac{ap}{\sqrt{n_{ap}-1}} \times \sqrt{b}$	<p>Example) External threading (ISO metric) Pitch : 1.0mm ap : 0.6mm n_{ap} : 5</p>
<p> Δap_n : Depth of cut n : Actual pass ap : Total depth of cut n_{ap} : Number of passes b : 1st pass 0.3 2nd pass 2-1=1 3rd pass 3-1=2 . . nth pass </p>	<p>1st pass $\Delta ap_1 = \frac{0.60}{\sqrt{5-1}} \times \sqrt{0.3} = 0.16 \rightarrow \mathbf{0.16} (\Delta ap_1)$</p> <p>2nd pass $\Delta ap_2 = \frac{0.60}{\sqrt{5-1}} \times \sqrt{2-1} = 0.3 \rightarrow \mathbf{0.14} (\Delta ap_2 - \Delta ap_1)$</p> <p>3rd pass $\Delta ap_3 = \frac{0.60}{\sqrt{5-1}} \times \sqrt{3-1} = 0.42 \rightarrow \mathbf{0.12} (\Delta ap_3 - \Delta ap_2)$</p> <p>4th pass $\Delta ap_4 = \frac{0.60}{\sqrt{5-1}} \times \sqrt{4-1} = 0.52 \rightarrow \mathbf{0.1} (\Delta ap_4 - \Delta ap_3)$</p> <p>5th pass $\Delta ap_5 = \frac{0.60}{\sqrt{5-1}} \times \sqrt{5-1} = 0.6 \rightarrow \mathbf{0.08} (\Delta ap_5 - \Delta ap_4)$</p>

NC Program for Modified Flank Infeed

Example:- M12×1.0 5 passes modified 1°-3° (mm)

External Threading	Internal Threading
G00 Z = 5.0 X = 14.0	G00 Z = 5.0 X = 10.0
G92 U-4.34 Z-13.0 F1.0	G92 U4.34 Z-13.0 F1.0
G00 W-0.07	G00 W-0.07
G92 U-4.64 Z-13.0 F1.0	G92 U4.64 Z-13.0 F1.0
G00 W-0.06	G00 W-0.05
G92 U-4.88 Z-13.0 F1.0	G92 U4.84 Z-13.0 F1.0
G00 W-0.05	G00 W-0.04
G92 U-5.08 Z-13.0 F1.0	G92 U5.02 Z-13.0 F1.0
G00 W-0.03	G00 W-0.03
G92 U-5.20 Z-13.0 F1.0	G92 U5.14 Z-13.0 F1.0
G00	G00

RECOMMENDED CUTTING METHODS AND CONDITIONS

Selecting Cutting Conditions

		Priority					Efficiency (Reduced passes)
		Tool life	Cutting force	Surface finish	Precision of thread	Chips discharge	
Threading methods	Radial	○		○	○		○
	Flank	(△ : Modified)	○	(△ : Modified)		○	
Cutting depth	Fixed cutting depth					○	
	Fixed cut area	○	○	○	○		○

Note) • Tool life and surface finish accuracy can be increased by changing the threading method from flank infeed to modified flank infeed.
 • Chip control can be improved by increasing the cutting depth in the later half of passes.

Cutting depth and the number of passes

Selection of the appropriate cutting depth and the right number of passes is vital for threading.

- For most threading, use a "threading cycle program," which has originally been installed on machines, and specify "total cutting depth" and "cutting depth in the first or final pass."
- Cutting depth and the number of passes are easy to change for the radial infeed method, thus making it easy to determine the appropriate cutting conditions.

Feature and benefits of Mitsubishi products

- Insert grades, specially produced for threading tools, ensure highly efficient cutting by enabling high-speed machining and a reduced number of passes.



Machining Cost Reduction

Advice on improved threading

Increasing tool life

- To prevent damage to the nose radius - Recommended method - Modified flank infeed.
- To have uniform flank wear on both sides of a cutting edge - Recommended method - Radial infeed
- To prevent crater wear - Recommended method - Flank infeed

Preventing chip problems

- Change to flank or modified infeed.
- During radial infeed cutting, use an inverted holder and change the coolant supply to a downward direction.
- When using the radial infeed method, set the minimum cutting depth at around .008 inch to make the chips thicker.
- Tangled chips during internal threading can damage the insert. In these cases, pause slightly away from the start point and clear the chips with coolant before every pass.
- Change to M-class inserts with a 3-D chip breaker.

To achieve highly efficient machining

- Increase cutting speed. (Dependant on the maximum revolution and rigidity of the machine.)
- Reduce the number of passes. (Reduce by 30-40%.)
- A reduced number of passes can improve chip discharge because of the thicker chips generated.

Preventing vibration

- Change to flank or modified infeed.
- When using radial infeed, reduce cutting depth in the later half of passes and lower the cutting speed.

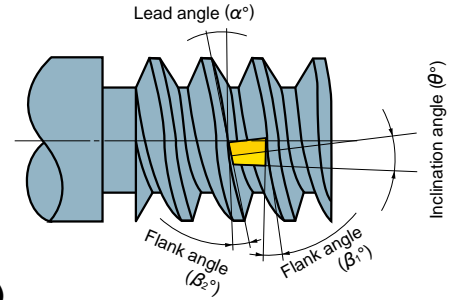
Increased surface finish accuracy

- A final pass should be performed at the same depth of cut as the last regular pass.
- When using the flank infeed method, change to radial infeed only during the final pass.

Selecting a Shim for the MMT Series

Flank angle and lead angle

Lead angle (α) depends on a combination of thread diameter and pitch. Select a shim so that the lead angle of the thread can coincide with the flank angles of the thread and insert (β_1, β_2). When threading with a small diameter or large pitch, change the shim depending on the lead angle, referring to the table and graph below. When threading left hand threads, change to a shim with a negative inclination angle.



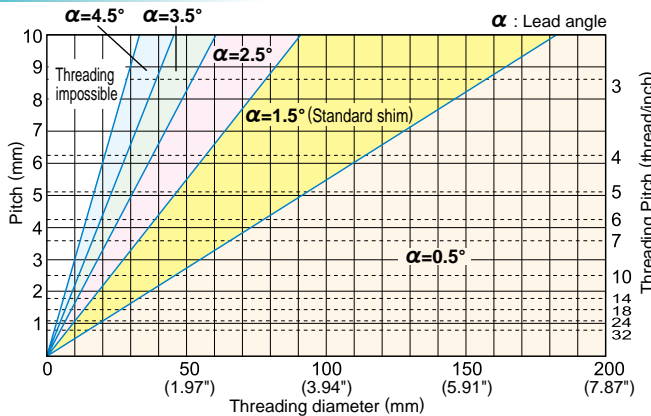
Shim reference table (Threading diameter—Thread angle 60° and 55°)

Lead Angle Pitch (mm)	Right Hand Thread (mm)						Left Hand Thread (mm)		
	Threading impossible	4.5°	3.5°	2.5°	1.5°	0.5°	Threading impossible	-1.5°	-0.5°
0.5	$\leq \phi 1.7$	$\phi 1.7 - \phi 2.3$	$\phi 2.3 - \phi 3.0$	$\phi 3.0 - \phi 4.6$	$\phi 4.6 - \phi 9.1$	$\geq \phi 9.1$	$\leq \phi 3.6$	$\phi 3.6 - \phi 9.1$	$\geq \phi 9.1$
0.75	$\leq \phi 2.5$	$\phi 2.5 - \phi 3.4$	$\phi 3.4 - \phi 4.6$	$\phi 4.6 - \phi 6.8$	$\phi 6.8 - \phi 13.7$	$\geq \phi 13.7$	$\leq \phi 5.5$	$\phi 5.5 - \phi 13.7$	$\geq \phi 13.7$
1	$\leq \phi 3.3$	$\phi 3.3 - \phi 4.6$	$\phi 4.6 - \phi 6.1$	$\phi 6.1 - \phi 9.1$	$\phi 9.1 - \phi 18.2$	$\geq \phi 18.2$	$\leq \phi 7.3$	$\phi 7.3 - \phi 18.2$	$\geq \phi 18.2$
1.25	$\leq \phi 4.1$	$\phi 4.1 - \phi 5.7$	$\phi 5.7 - \phi 7.6$	$\phi 7.6 - \phi 11.4$	$\phi 11.4 - \phi 22.8$	$\geq \phi 22.8$	$\leq \phi 9.1$	$\phi 9.1 - \phi 22.8$	$\geq \phi 22.8$
1.5	$\leq \phi 5.0$	$\phi 5.0 - \phi 6.8$	$\phi 6.8 - \phi 9.1$	$\phi 9.1 - \phi 13.7$	$\phi 13.7 - \phi 27.4$	$\geq \phi 27.4$	$\leq \phi 10.9$	$\phi 10.9 - \phi 27.4$	$\geq \phi 27.4$
1.75	$\leq \phi 5.8$	$\phi 5.8 - \phi 8.0$	$\phi 8.0 - \phi 10.6$	$\phi 10.6 - \phi 16.0$	$\phi 16.0 - \phi 31.9$	$\geq \phi 31.9$	$\leq \phi 12.8$	$\phi 12.8 - \phi 31.9$	$\geq \phi 31.9$
2	$\leq \phi 6.6$	$\phi 6.6 - \phi 9.1$	$\phi 9.1 - \phi 12.1$	$\phi 12.1 - \phi 18.2$	$\phi 18.2 - \phi 36.5$	$\geq \phi 36.5$	$\leq \phi 14.6$	$\phi 14.6 - \phi 36.5$	$\geq \phi 36.5$
2.5	$\leq \phi 8.3$	$\phi 8.3 - \phi 11.4$	$\phi 11.4 - \phi 15.2$	$\phi 15.2 - \phi 22.8$	$\phi 22.8 - \phi 45.6$	$\geq \phi 45.6$	$\leq \phi 18.2$	$\phi 18.2 - \phi 45.6$	$\geq \phi 45.6$
3	$\leq \phi 9.9$	$\phi 9.9 - \phi 13.7$	$\phi 13.7 - \phi 18.2$	$\phi 18.2 - \phi 27.3$	$\phi 27.3 - \phi 54.7$	$\geq \phi 54.7$	$\leq \phi 21.9$	$\phi 21.9 - \phi 54.7$	$\geq \phi 54.7$
3.5	$\leq \phi 11.6$	$\phi 11.6 - \phi 15.9$	$\phi 15.9 - \phi 21.3$	$\phi 21.3 - \phi 31.9$	$\phi 31.9 - \phi 63.8$	$\geq \phi 63.8$	$\leq \phi 25.5$	$\phi 25.5 - \phi 63.8$	$\geq \phi 63.8$
4	$\leq \phi 13.2$	$\phi 13.2 - \phi 18.2$	$\phi 18.2 - \phi 24.3$	$\phi 24.3 - \phi 36.5$	$\phi 36.5 - \phi 72.9$	$\geq \phi 72.9$	$\leq \phi 29.2$	$\phi 29.2 - \phi 72.9$	$\geq \phi 72.9$
4.5	$\leq \phi 14.9$	$\phi 14.9 - \phi 20.5$	$\phi 20.5 - \phi 27.3$	$\phi 27.3 - \phi 41.0$	$\phi 41.0 - \phi 82.1$	$\geq \phi 82.1$	$\leq \phi 32.8$	$\phi 32.8 - \phi 82.1$	$\geq \phi 82.1$
5	$\leq \phi 16.5$	$\phi 16.5 - \phi 22.8$	$\phi 22.8 - \phi 30.4$	$\phi 30.4 - \phi 45.6$	$\phi 45.6 - \phi 91.2$	$\geq \phi 91.2$	$\leq \phi 36.5$	$\phi 36.5 - \phi 91.2$	$\geq \phi 91.2$

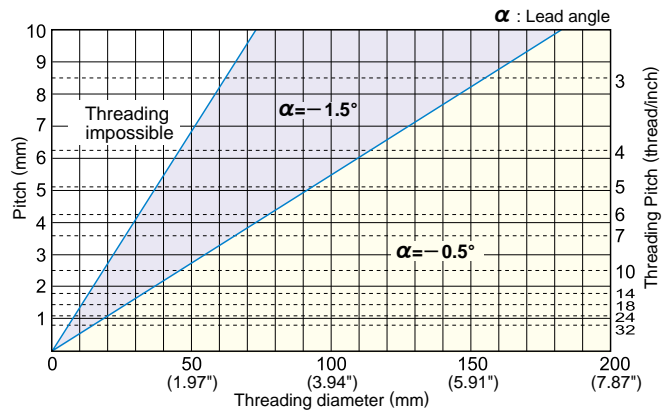
(Note) Back turning in the case of left hand threads.

Shim reference graph(Thread angle 60° and 55°)

Right Hand Thread



Left Hand Thread



Note) When a thread lead angle \leq the tool flank angle, change the shim to prevent side interference with the insert. (Refer to the table below for the calculation of thread lead angle and tool flank angle.)

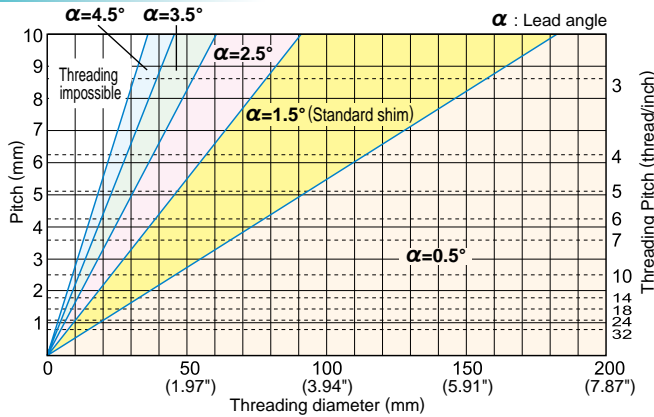
Shim reference table (Threading diameter—Thread angle 30° and 29°)

Lead Angle Pitch (mm)	Right Hand Thread (mm)						Left Hand Thread (mm)		
	Threading impossible	4.5°	3.5°	2.5°	1.5°	0.5°	Threading impossible	-1.5°	-0.5°
0.5	$\leq \phi 1.8$	$\phi 1.8 - \phi 2.3$	$\phi 2.3 - \phi 3.0$	$\phi 3.0 - \phi 4.6$	$\phi 4.6 - \phi 9.1$	$\geq \phi 9.1$	$\leq \phi 4.6$	$\phi 4.6 - \phi 9.1$	$\geq \phi 9.1$
0.75	$\leq \phi 2.7$	$\phi 2.7 - \phi 3.4$	$\phi 3.4 - \phi 4.6$	$\phi 4.6 - \phi 6.8$	$\phi 6.8 - \phi 13.7$	$\geq \phi 13.7$	$\leq \phi 6.8$	$\phi 6.8 - \phi 13.7$	$\geq \phi 13.7$
1	$\leq \phi 3.6$	$\phi 3.6 - \phi 4.6$	$\phi 4.6 - \phi 6.1$	$\phi 6.1 - \phi 9.1$	$\phi 9.1 - \phi 18.2$	$\geq \phi 18.2$	$\leq \phi 9.1$	$\phi 9.1 - \phi 18.2$	$\geq \phi 18.2$
1.25	$\leq \phi 4.5$	$\phi 4.5 - \phi 5.7$	$\phi 5.7 - \phi 7.6$	$\phi 7.6 - \phi 11.4$	$\phi 11.4 - \phi 22.8$	$\geq \phi 22.8$	$\leq \phi 11.4$	$\phi 11.4 - \phi 22.8$	$\geq \phi 22.8$
1.5	$\leq \phi 5.5$	$\phi 5.5 - \phi 6.8$	$\phi 6.8 - \phi 9.1$	$\phi 9.1 - \phi 13.7$	$\phi 13.7 - \phi 27.4$	$\geq \phi 27.4$	$\leq \phi 13.7$	$\phi 13.7 - \phi 27.4$	$\geq \phi 27.4$
1.75	$\leq \phi 6.4$	$\phi 6.4 - \phi 8.0$	$\phi 8.0 - \phi 10.6$	$\phi 10.6 - \phi 16.0$	$\phi 16.0 - \phi 31.9$	$\geq \phi 31.9$	$\leq \phi 16.0$	$\phi 16.0 - \phi 31.9$	$\geq \phi 31.9$
2	$\leq \phi 7.3$	$\phi 7.3 - \phi 9.1$	$\phi 9.1 - \phi 12.1$	$\phi 12.1 - \phi 18.2$	$\phi 18.2 - \phi 36.5$	$\geq \phi 36.5$	$\leq \phi 18.2$	$\phi 18.2 - \phi 36.5$	$\geq \phi 36.5$
2.5	$\leq \phi 9.1$	$\phi 9.1 - \phi 11.4$	$\phi 11.4 - \phi 15.2$	$\phi 15.2 - \phi 22.8$	$\phi 22.8 - \phi 45.6$	$\geq \phi 45.6$	$\leq \phi 22.8$	$\phi 22.8 - \phi 45.6$	$\geq \phi 45.6$
3	$\leq \phi 10.9$	$\phi 10.9 - \phi 13.7$	$\phi 13.7 - \phi 18.2$	$\phi 18.2 - \phi 27.3$	$\phi 27.3 - \phi 54.7$	$\geq \phi 54.7$	$\leq \phi 27.3$	$\phi 27.3 - \phi 54.7$	$\geq \phi 54.7$
3.5	$\leq \phi 12.7$	$\phi 12.7 - \phi 15.9$	$\phi 15.9 - \phi 21.3$	$\phi 21.3 - \phi 31.9$	$\phi 31.9 - \phi 63.8$	$\geq \phi 63.8$	$\leq \phi 31.9$	$\phi 31.9 - \phi 63.8$	$\geq \phi 63.8$
4	$\leq \phi 14.6$	$\phi 14.6 - \phi 18.2$	$\phi 18.2 - \phi 24.3$	$\phi 24.3 - \phi 36.5$	$\phi 36.5 - \phi 72.9$	$\geq \phi 72.9$	$\leq \phi 36.5$	$\phi 36.5 - \phi 72.9$	$\geq \phi 72.9$
4.5	$\leq \phi 16.4$	$\phi 16.4 - \phi 20.5$	$\phi 20.5 - \phi 27.3$	$\phi 27.3 - \phi 41.0$	$\phi 41.0 - \phi 82.1$	$\geq \phi 82.1$	$\leq \phi 41.0$	$\phi 41.0 - \phi 82.1$	$\geq \phi 82.1$
5	$\leq \phi 18.2$	$\phi 18.2 - \phi 22.8$	$\phi 22.8 - \phi 30.4$	$\phi 30.4 - \phi 45.6$	$\phi 45.6 - \phi 91.2$	$\geq \phi 91.2$	$\leq \phi 45.6$	$\phi 45.6 - \phi 91.2$	$\geq \phi 91.2$

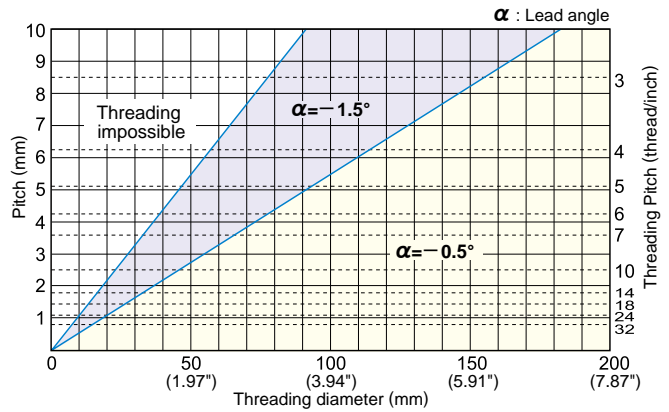
(Note) Back turning in the case of left hand threads.

Shim reference graph (Thread angle 30° and 29°)

Right Hand Thread



Left Hand Thread



Note) When a thread lead angle \leq the tool flank angle, change the shim to prevent side interference with the insert.
(Refer to the table below for the calculation of thread lead angle and tool flank angle.)

Shim selection table

Lead angle	Threading angle 60°/55° Right Hand Thread		Threading angle 60°/55° Left Hand Thread		Threading angle 30°/29° Right Hand Thread		Threading angle 30°/29° Left Hand Thread	
0	P05	P05	N05	N05	P05	P05	N05	N05
0.5	P05	P05	N05	N05	P05	P05	N05	N05
1	P15	P15	N15	N15	P15	P15	N15	N15
1.5	P15	P15	N15	N15	P15	P15	N15	N15
2	P25	P25	N15	N15	P25	P25	Not Available	Not Available
2.5	P25	P25	Not Available	Not Available	P25	P25	Not Available	Not Available
3	P35	P35	Not Available	Not Available	P35	P35	Not Available	Not Available
3.5	P35	P35	Not Available	Not Available	P35	P35	Not Available	Not Available
4	P45	P45	Not Available	Not Available	P45	P45	Not Available	Not Available
4.5	P45	P45	Not Available	Not Available	P45	P45	Not Available	Not Available
5	P45	P45	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
5.5	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available

(Note) Back turning in the case of left hand threads.

When replacing a shim, check if the difference between the thread lead angle and shim inclination angle is within: $2.5^\circ - 0.5^\circ$ where thread angle is $60^\circ (55^\circ)$ $2^\circ - 1^\circ$ where thread angle is $30^\circ (29^\circ)$

* Inclination angle of a standard shim is 0° .

* The holder has a 1.5° lead angle.

Calculation of thread lead angle

$$\tan \alpha = \frac{l}{\pi d} = \frac{nP}{\pi d}$$

α : Lead angle
 l : Lead
 n : Number of thread starts
 P : Pitch
 d : Pitch diameter of thread

Example of selecting a shim

When the thread lead angle is 2.2°

① In the case when the thread angle is 60°

(2.2° lead angle) - ($2.5^\circ - 0.5^\circ$) = $-0.3^\circ - 1.7^\circ$ shim inclination angle is appropriate.

Threading with a standard shim (0° inclination angle) is possible. But, replacing with a shim with a 1° inclination angle is recommended, refer to Standard Shim List on pages G012 and G013.

② In the case when the thread angle is 30°

(2.2° lead angle) - ($2^\circ - 1^\circ$) = $0.2^\circ - 1.2^\circ$ shim inclination angle is appropriate.

Replacing with a shim with a 1° inclination angle is recommended, referring to Standard Shim List on pages G012 and G013.

Relief angle of an insert set on a holder

Thread helix angle	Internal relief angle	External relief angle
60°	8.8°	5.8°
55°	7.9°	5.2°
30°	4.1°	2.7°
29°	4°	2.6°

Relief angles (β_2, β_1) of an insert become small when the thread helix angle of a trapezoidal, round, or other thread is small. Take care when selecting a shim.

Standard of Depth of Cut (External Threading)

EXTERNAL (RADIAL INFEED)

ISO Metric

(mm)

Pitch (mm)	Total Cutting Depth	Number of Passes														Insert Type		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	G-class ground inserts	M-class inserts with 3-D chip breakers	
0.5	0.31	0.10	0.08	0.07	0.06												MMT16ER050ISO	-
0.75	0.46	0.16	0.14	0.10	0.06												MMT16ER075ISO	-
1.0	0.61	0.18	0.15	0.12	0.10	0.06											MMT16ER100ISO	MMT16ER100ISO-S
1.25	0.77	0.19	0.17	0.14	0.11	0.10	0.06										MMT16ER125ISO	MMT16ER125ISO-S
1.5	0.92	0.22	0.21	0.17	0.14	0.12	0.06										MMT16ER150ISO	MMT16ER150ISO-S
1.75	1.07	0.22	0.21	0.16	0.13	0.11	0.09	0.09	0.06								MMT16ER175ISO	MMT16ER175ISO-S
2.0	1.23	0.24	0.23	0.17	0.16	0.14	0.12	0.11	0.06								MMT16ER200ISO	MMT16ER200ISO-S
2.5	1.53	0.26	0.23	0.19	0.17	0.15	0.13	0.12	0.11	0.11	0.06						MMT16ER250ISO	MMT16ER250ISO-S
3.0	1.84	0.27	0.25	0.20	0.18	0.16	0.14	0.13	0.12	0.12	0.11	0.10	0.06				MMT16ER300ISO	MMT16ER300ISO-S
3.5	2.15	0.33	0.30	0.24	0.21	0.18	0.17	0.15	0.14	0.14	0.12	0.11	0.06				MMT22ER350ISO	-
4.0	2.45	0.34	0.31	0.24	0.22	0.19	0.17	0.16	0.14	0.14	0.13	0.12	0.12	0.11	0.06		MMT22ER400ISO	-
4.5	2.76	0.38	0.34	0.28	0.24	0.22	0.20	0.18	0.16	0.16	0.15	0.14	0.13	0.12	0.06		MMT22ER450ISO	-
5.0	3.07	0.42	0.38	0.32	0.27	0.24	0.22	0.20	0.18	0.18	0.17	0.16	0.15	0.12	0.06		MMT22ER500ISO	-

American UN

(inch)

Pitch (thread/inch)	Total Cutting Depth	Number of Passes														Insert Type		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	G-class ground inserts	M-class inserts with 3-D chip breakers	
32	.019	.007	.006	.004	.002												MMT16ER320UN	-
28	.022	.007	.006	.004	.003	.002											MMT16ER280UN	-
24	.026	.007	.006	.006	.005	.002											MMT16ER240UN	-
20	.031	.008	.007	.005	.005	.004	.002										MMT16ER200UN	-
18	.034	.009	.008	.006	.005	.004	.002										MMT16ER180UN	-
16	.038	.009	.008	.006	.005	.004	.004	.002									MMT16ER160UN	MMT16ER160UN-S
14	.044	.009	.008	.006	.005	.005	.005	.004	.002								MMT16ER140UN	MMT16ER140UN-S
13	.047	.010	.009	.007	.006	.005	.005	.003	.002								MMT16ER130UN	-
12	.051	.011	.009	.007	.006	.006	.005	.005	.002								MMT16ER120UN	MMT16ER120UN-S
11	.056	.011	.009	.007	.006	.006	.006	.005	.004	.002							MMT16ER110UN	-
10	.061	.011	.009	.007	.006	.006	.006	.005	.005	.004	.002						MMT16ER100UN	-
9	.068	.013	.011	.009	.007	.006	.006	.005	.005	.004	.002						MMT16ER090UN	-
8	.077	.014	.012	.009	.007	.006	.006	.006	.006	.005	.004	.002					MMT16ER080UN	-
7	.087	.015	.013	.011	.009	.008	.007	.006	.006	.005	.005	.002					MMT22ER070UN	-
6	.102	.017	.014	.011	.010	.008	.007	.007	.006	.006	.005	.005	.004	.002			MMT22ER060UN	-
5	.123	.017	.015	.012	.011	.009	.009	.008	.007	.007	.007	.007	.006	.006	.002		MMT22ER050UN	-

Whitworth for BSW, BSP

(inch)

Pitch (thread/inch)	Total Cutting Depth	Number of Passes														Insert Type		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	G-class ground inserts	M-class inserts with 3-D chip breakers	
28	.023	.007	.006	.004	.004	.002											MMT16ER280W	-
26	.025	.007	.006	.005	.005	.002											MMT16ER260W	-
20	.032	.008	.007	.006	.005	.004	.002										MMT16ER200W	-
19	.034	.008	.007	.006	.006	.005	.002										MMT16ER190W	MMT16ER190W-S
18	.035	.010	.007	.006	.005	.005	.002										MMT16ER180W	-
16	.040	.008	.007	.006	.005	.004	.004	.004	.002								MMT16ER160W	-
14	.046	.009	.008	.007	.006	.005	.005	.004	.002								MMT16ER140W	MMT16ER140W-S
12	.054	.011	.010	.008	.006	.006	.006	.005	.002								MMT16ER120W	-
11	.058	.011	.009	.008	.007	.006	.006	.005	.005	.002							MMT16ER110W	MMT16ER110W-S
10	.064	.011	.010	.008	.007	.006	.006	.005	.005	.004	.002						MMT16ER100W	-
9	.071	.011	.010	.008	.007	.006	.006	.006	.005	.005	.005	.002					MMT16ER090W	-
8	.080	.012	.011	.009	.007	.007	.006	.006	.006	.005	.005	.004	.002				MMT16ER080W	-
7	.091	.013	.013	.010	.009	.008	.007	.007	.006	.006	.006	.004	.002				MMT22ER070W	-
6	.107	.014	.013	.011	.009	.008	.008	.007	.007	.006	.006	.006	.005	.005	.002		MMT22ER060W	-
5	.128	.017	.016	.014	.011	.010	.009	.009	.008	.007	.007	.007	.006	.005	.002		MMT22ER050W	-

- (Note) · Set the finishing allowance on a diameter at approx. .004 inch when using a full form insert.
 · Please note the cutting depth and the number of passes when a nose radius of a partial or semi-full form insert or of an internal threading insert is small to prevent damage to the insert nose.
 · Please set the cutting depth sufficiently deep enough on materials such as hardened steel or austenitic stainless steel to help prevent premature wear and chipping caused by the outer layer of the material.

Standard of Depth of Cut (External Threading)

EXTERNAL (RADIAL INFEEED)

BSPT

(inch)

Pitch (thread/inch)	Total Cutting Depth	Number of Passes											Insert Type					
		1	2	3	4	5	6	7	8	9				G-class ground inserts	M-class inserts with 3-D chip breakers			
28	.023	.007	.006	.004	.004	.002											MMT16ER280BSPT	—
19	.034	.009	.007	.006	.005	.005	.002										MMT16ER190BSPT	MMT16ER190BSPT-S
14	.046	.009	.008	.007	.006	.005	.005	.004	.002								MMT16ER140BSPT	MMT16ER140BSPT-S
11	.058	.010	.009	.008	.007	.006	.006	.005	.005	.002							MMT16ER110BSPT	MMT16ER110BSPT-S

Round DIN 405

(inch)

Pitch (thread/inch)	Total Cutting Depth	Number of Passes														Insert Type	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	G-class ground inserts	
10	.050	.009	.008	.008	.007	.006	.005	.005	.002								MMT16ER100RD
8	.063	.009	.008	.008	.007	.007	.006	.006	.005	.005	.002						MMT16ER080RD
6	.083	.010	.010	.009	.009	.008	.007	.007	.006	.006	.005	.004	.002				MMT16ER060RD
4	.125	.013	.013	.013	.012	.011	.010	.009	.009	.008	.007	.007	.006	.005	.002		MMT22ER040RD

ISO Trapezoidal 30°

(mm)

Pitch (mm)	Total Cutting Depth	Number of Passes														Insert Type	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	G-class ground inserts	
1.5	0.90	0.23	0.21	0.16	0.13	0.11	0.06										MMT16ER150TR
2.0	1.25	0.29	0.26	0.21	0.17	0.14	0.12	0.06									MMT16ER200TR
3.0	1.75	0.32	0.31	0.24	0.19	0.18	0.17	0.15	0.13	0.06							MMT16ER300TR
4.0	2.25	0.33	0.32	0.24	0.22	0.21	0.17	0.16	0.15	0.14	0.13	0.12	0.06				MMT22ER400TR
5.0	2.75	0.35	0.32	0.26	0.24	0.22	0.21	0.19	0.19	0.17	0.15	0.14	0.13	0.12	0.06		MMT22ER500TR

American ACME

(inch)

Pitch (thread/inch)	Total Cutting Depth	Number of Passes														Insert Type	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	G-class ground inserts	
12	.047	.011	.009	.008	.007	.006	.004	.002									MMT16ER120ACME
10	.060	.011	.010	.008	.007	.006	.006	.005	.005	.002							MMT16ER100ACME
8	.072	.012	.010	.009	.007	.006	.006	.006	.005	.005	.004	.002					MMT16ER080ACME
6	.093	.013	.012	.011	.009	.008	.007	.006	.006	.005	.005	.004	.005	.002			MMT22ER060ACME
5	.110	.014	.013	.012	.010	.009	.008	.007	.007	.006	.006	.006	.005	.005	.002		MMT22ER050ACME

UNJ

(inch)

Pitch (thread/inch)	Total Cutting Depth	Number of Passes											Insert Type				
		1	2	3	4	5	6	7	8	9	10	11	G-class ground inserts				
32	.018	.006	.006	.004	.002												MMT16ER320UNJ
28	.020	.006	.005	.004	.003	.002											MMT16ER280UNJ
24	.024	.007	.006	.006	.003	.002											MMT16ER240UNJ
20	.029	.007	.006	.005	.005	.004	.002										MMT16ER200UNJ
18	.032	.009	.007	.006	.004	.004	.002										MMT16ER180UNJ
16	.036	.010	.008	.006	.005	.004	.003										MMT16ER160UNJ
14	.041	.010	.009	.007	.005	.004	.004	.002									MMT16ER140UNJ
12	.048	.011	.011	.008	.007	.005	.004	.002									MMT16ER120UNJ
10	.058	.012	.011	.008	.006	.005	.005	.005	.004	.002							MMT16ER100UNJ
8	.072	.012	.012	.009	.007	.006	.006	.005	.005	.004	.004	.002					MMT16ER080UNJ

API Buttress Casing

(inch)

Pitch (thread/inch)	Total Cutting Depth	Number of Passes											Insert Type				
		1	2	3	4	5	6	7	8	9	10	11	G-class ground inserts				
5	.061	.010	.009	.007	.006	.005	.005	.005	.004	.004	.004	.002					MMT22ER050APBU

- (Note)
- Set the finishing allowance on a diameter at approx. .004 inch when using a full form insert.
 - Please note the cutting depth and the number of passes when a nose radius of a partial or semi-full form insert or of an internal threading insert is small to prevent damage to the insert nose.
 - Please set the cutting depth sufficiently deep enough on materials such as hardened steel or austenitic stainless steel to help prevent premature wear and chipping caused by the outer layer of the material.

API Round Casing & Tubing

(inch)

Pitch (thread/ inch)	Total Cutting Depth	Number of Passes														Insert Type	
		1	2	3	4	5	6	7	8	9	10	11	12				G-class ground inserts
10	.056	.010	.009	.006	.006	.005	.005	.005	.004	.004	.002						MMT16ER100APRD
8	.071	.010	.009	.007	.006	.006	.006	.005	.005	.005	.005	.005	.002				MMT16ER080APRD

American NPT

(inch)

Pitch (thread/ inch)	Total Cutting Depth	Number of Passes															Insert Type
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	G-class ground inserts
27	.026	.006	.005	.005	.004	.004	.002										MMT16ER270NPT
18	.040	.008	.006	.006	.005	.005	.004	.004	.002								MMT16ER180NPT
14	.052	.009	.007	.006	.006	.005	.005	.004	.004	.004	.002						MMT16ER140NPT
11.5	.065	.009	.007	.007	.006	.006	.005	.005	.005	.005	.004	.004	.002				MMT16ER115NPT
8	.095	.013	.011	.009	.008	.007	.006	.006	.006	.005	.005	.005	.004	.004	.004	.002	MMT16ER080NPT

American NPTF

(inch)

Pitch (thread/ inch)	Total Cutting Depth	Number of Passes															Insert Type
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	G-class ground inserts
27	.025	.006	.006	.004	.004	.003	.002										MMT16ER270NPTF
18	.039	.007	.006	.006	.005	.005	.004	.004	.002								MMT16ER180NPTF
14	.053	.009	.008	.006	.006	.005	.005	.004	.004	.004	.002						MMT16ER140NPTF
11.5	.064	.009	.009	.007	.006	.005	.005	.005	.004	.004	.004	.004	.002				MMT16ER115NPTF
8	.094	.013	.011	.009	.007	.007	.006	.006	.006	.005	.005	.005	.004	.004	.004	.002	MMT16ER080NPTF

- (Note) · Set the finishing allowance on a diameter at approx. .004 inch when using a full form insert.
- Please note the cutting depth and the number of passes when a nose radius of a partial or semi-full form insert or of an internal threading insert is small to prevent damage to the insert nose.
 - Please set the cutting depth sufficiently deep enough on materials such as hardened steel or austenitic stainless steel to help prevent premature wear and chipping caused by the outer layer of the material.

Standard of Depth of Cut (Internal Threading)

INTERNAL (RADIAL INFEEED)

ISO Metric

(mm)

Pitch (mm)	Total Cutting Depth	Number of Passes														Insert Type				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	G-class ground inserts		M-class inserts with 3-D chip breakers		
0.5	0.29	0.09	0.07	0.07	0.06												MMT11R050ISO	MMT16R050ISO	—	—
0.75	0.43	0.15	0.13	0.09	0.06												MMT11R075ISO	MMT16R075ISO	—	—
1.0	0.58	0.17	0.15	0.11	0.09	0.06											MMT11R100ISO	MMT16R100ISO	MMT11R100ISO-S	MMT16R100ISO-S
1.25	0.72	0.18	0.16	0.12	0.11	0.09	0.06										MMT11R125ISO	MMT16R125ISO	MMT11R125ISO-S	MMT16R125ISO-S
1.5	0.87	0.21	0.20	0.16	0.13	0.11	0.06										MMT11R150ISO	MMT16R150ISO	MMT11R150ISO-S	MMT16R150ISO-S
1.75	1.01	0.21	0.20	0.15	0.12	0.10	0.09	0.08	0.06								MMT11R175ISO	MMT16R175ISO	—	MMT16R175ISO-S
2.0	1.15	0.24	0.22	0.18	0.14	0.12	0.10	0.09	0.06								MMT11R200ISO	MMT16R200ISO	—	MMT16R200ISO-S
2.5	1.44	0.25	0.24	0.21	0.15	0.13	0.12	0.10	0.09	0.09	0.06						—	MMT16R250ISO	—	MMT16R250ISO-S
3.0	1.73	0.26	0.25	0.22	0.17	0.14	0.13	0.12	0.11	0.10	0.09	0.08	0.06				—	MMT16R300ISO	—	MMT16R300ISO-S
3.5	2.02	0.32	0.30	0.23	0.19	0.17	0.15	0.14	0.13	0.12	0.11	0.10	0.06				—	MMT22R350ISO	—	—
4.0	2.31	0.33	0.31	0.24	0.22	0.18	0.15	0.14	0.13	0.12	0.12	0.11	0.10	0.10	0.06		—	MMT22R400ISO	—	—
4.5	2.60	0.36	0.33	0.28	0.24	0.21	0.19	0.16	0.15	0.14	0.13	0.12	0.12	0.11	0.06		—	MMT22R450ISO	—	—
5.0	2.89	0.41	0.38	0.32	0.27	0.24	0.21	0.18	0.16	0.15	0.14	0.13	0.12	0.12	0.06		—	MMT22R500ISO	—	—

American UN

(inch)

Pitch (thread/inch)	Total Cutting Depth	Number of Passes														Insert Type				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	G-class ground inserts		M-class inserts with 3-D chip breakers		
32	.018	.006	.006	.004	.002												MMT11R320UN	MMT16R320UN	—	—
28	.020	.006	.005	.004	.003	.002											MMT11R280UN	MMT16R280UN	—	—
24	.024	.007	.006	.005	.004	.002											MMT11R240UN	MMT16R240UN	—	—
20	.029	.007	.006	.005	.005	.004	.002										MMT11R200UN	MMT16R200UN	—	—
18	.032	.008	.007	.006	.005	.004	.002										MMT11R180UN	MMT16R180UN	—	—
16	.036	.008	.007	.006	.005	.004	.004	.002									MMT11R160UN	MMT16R160UN	MMT16R160UN-S	—
14	.041	.008	.007	.006	.005	.005	.004	.004	.002								MMT11R140UN	MMT16R140UN	MMT16R140UN-S	—
13	.044	.009	.007	.006	.006	.005	.005	.004	.002								—	MMT16R130UN	—	—
12	.048	.009	.009	.007	.006	.005	.005	.005	.002								—	MMT16R120UN	MMT16R120UN-S	—
11	.052	.009	.009	.008	.006	.005	.005	.004	.004	.002							—	MMT16R110UN	—	—
10	.058	.010	.009	.008	.006	.005	.005	.005	.004	.004	.002						—	MMT16R100UN	—	—
9	.064	.012	.009	.008	.007	.006	.006	.005	.005	.004	.002						—	MMT16R090UN	—	—
8	.072	.012	.010	.008	.007	.006	.006	.006	.005	.005	.005	.002					—	MMT16R080UN	—	—
7	.082	.014	.012	.009	.008	.007	.007	.006	.006	.006	.005	.002					—	MMT22R070UN	—	—
6	.096	.016	.013	.010	.009	.007	.007	.006	.006	.006	.005	.005	.004	.002			—	MMT22R060UN	—	—
5	.115	.016	.014	.012	.010	.009	.008	.008	.007	.007	.006	.006	.005	.005	.002		—	MMT22R050UN	—	—

Whitworth for BSW, BSP

(inch)

Pitch (thread/inch)	Total Cutting Depth	Number of Passes														Insert Type				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	G-class ground inserts		M-class inserts with 3-D chip breakers		
28	.023	.007	.006	.004	.004	.002											—	MMT16R280W	—	—
26	.025	.007	.006	.005	.005	.002											—	MMT16R260W	—	—
20	.032	.008	.007	.006	.005	.004	.002										—	MMT16R200W	—	—
19	.034	.008	.007	.006	.006	.005	.002										MMT11R190W	MMT16R190W	MMT16R190W-S	—
18	.035	.010	.007	.006	.005	.005	.002										—	MMT16R180W	—	—
16	.040	.008	.007	.006	.005	.004	.004	.004	.002								—	MMT16R160W	—	—
14	.046	.009	.008	.007	.006	.005	.005	.004	.002								MMT11R140W	MMT16R140W	MMT16R140W-S	—
12	.054	.011	.010	.008	.006	.006	.006	.005	.002								—	MMT16R120W	MMT16R120W-S	—
11	.058	.011	.009	.008	.007	.006	.006	.005	.004	.002							—	MMT16R110W	—	—
10	.064	.011	.010	.008	.007	.006	.006	.005	.005	.004	.002						—	MMT16R100W	—	—
9	.071	.011	.010	.008	.007	.006	.006	.006	.005	.005	.005	.002					—	MMT16R090W	—	—
8	.080	.012	.011	.009	.007	.007	.006	.006	.006	.005	.005	.004	.002				—	MMT16R080W	—	—
7	.091	.013	.013	.010	.009	.008	.007	.007	.006	.006	.006	.004	.002				—	MMT22R070W	—	—
6	.107	.014	.013	.011	.009	.008	.008	.007	.007	.006	.006	.006	.005	.005	.002		—	MMT22R060W	—	—
5	.128	.017	.016	.014	.011	.010	.009	.009	.008	.007	.007	.007	.006	.005	.002		—	MMT22R050W	—	—

(Note) • Set the finishing allowance on a diameter at approx. .004 inch when using a full form insert.
 • Please note the cutting depth and the number of passes when a nose radius of a partial or semi-full form insert or of an internal threading insert is small to prevent damage to the insert nose.
 • Please set the cutting depth sufficiently deep enough on materials such as hardened steel or austenitic stainless steel to help prevent premature wear and chipping caused by the outer layer of the material.

THREADING

BSPT

(inch)

Pitch (thread/inch)	Total Cutting Depth	Number of Passes														Insert Type			
		1	2	3	4	5	6	7	8	9							G-class ground inserts		M-class inserts with 3-D chip breakers
19	.034	.009	.007	.006	.005	.005	.002										MMT11IR190BSPT	MMT16IR190BSPT	MMT16IR190BSPT-S
14	.046	.009	.008	.007	.006	.005	.005	.004	.002								MMT11IR140BSPT	MMT16IR140BSPT	MMT16IR140BSPT-S
11	.058	.010	.009	.008	.007	.006	.006	.005	.005	.002							—	MMT16IR110BSPT	MMT16IR110BSPT-S

Round DIN 405

(inch)

Pitch (thread/inch)	Total Cutting Depth	Number of Passes														Insert Type				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14		G-class ground inserts			
10	.050	.009	.008	.008	.007	.006	.005	.005	.002									MMT16IR100RD		
8	.063	.009	.008	.008	.007	.007	.006	.006	.005	.002								MMT16IR080RD		
6	.083	.010	.010	.009	.009	.008	.007	.007	.006	.006	.005	.004	.002					MMT16IR060RD		
4	.125	.013	.013	.013	.012	.011	.010	.009	.009	.008	.007	.007	.006	.005	.002			MMT22IR040RD		

ISO Trapezoidal 30°

(mm)

Pitch (mm)	Total Cutting Depth	Number of Passes														Insert Type				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14		G-class ground inserts			
1.5	0.90	0.23	0.21	0.16	0.13	0.11	0.06											MMT16IR150TR		
2	1.25	0.29	0.26	0.21	0.17	0.14	0.12	0.06										MMT16IR200TR		
3	1.75	0.32	0.31	0.24	0.19	0.18	0.17	0.15	0.13	0.06								MMT16IR300TR		
4	2.25	0.33	0.32	0.24	0.22	0.21	0.17	0.16	0.15	0.14	0.13	0.12	0.06					MMT22IR400TR		
5	2.75	0.35	0.32	0.26	0.24	0.22	0.21	0.19	0.19	0.17	0.15	0.14	0.13	0.12	0.06			MMT22IR500TR		

American ACME

(inch)

Pitch (thread/inch)	Total Cutting Depth	Number of Passes														Insert Type				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14		G-class ground inserts			
12	.047	.011	.009	.008	.007	.006	.004	.002										MMT16IR120ACME		
10	.060	.011	.010	.008	.007	.006	.006	.005	.005	.002								MMT16IR100ACME		
8	.072	.012	.010	.009	.007	.006	.006	.006	.005	.005	.004	.002						MMT16IR080ACME		
6	.093	.013	.012	.011	.009	.008	.007	.006	.006	.005	.005	.005	.004	.002				MMT22IR060ACME		
5	.110	.014	.013	.012	.010	.009	.008	.007	.007	.006	.006	.006	.005	.005	.002			MMT22IR050ACME		

API Buttress Casing

(inch)

Pitch (thread/inch)	Total Cutting Depth	Number of Passes														Insert Type				
		1	2	3	4	5	6	7	8	9	10	11					G-class ground inserts			
5	.061	.010	.009	.007	.006	.005	.005	.005	.004	.004	.004	.002						MMT22IR050APBU		

API Round Casing & Tubing

(inch)

Pitch (thread/inch)	Total Cutting Depth	Number of Passes														Insert Type				
		1	2	3	4	5	6	7	8	9	10	11	12				G-class ground inserts			
10	.056	.010	.009	.006	.006	.005	.005	.005	.004	.004	.002							MMT16IR100APRD		
8	.071	.010	.009	.007	.006	.006	.006	.005	.005	.005	.005	.005	.002					MMT16IR080APRD		

- (Note) · Set the finishing allowance on a diameter at approx. .004 inch when using a full form insert.
 · Please note the cutting depth and the number of passes when a nose radius of a partial or semi-full form insert or of an internal threading insert is small to prevent damage to the insert nose.
 · Please set the cutting depth sufficiently deep enough on materials such as hardened steel or austenitic stainless steel to help prevent premature wear and chipping caused by the outer layer of the material.

Standard of Depth of Cut (Internal Threading)

INTERNAL (RADIAL INFEED)

American NPT

(inch)

Pitch (thread/ inch)	Total Cutting Depth	Number of Passes															Insert Type
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	G-class ground inserts
27	.026	.006	.005	.005	.004	.004	.002										MMT16IR270NPT
18	.040	.008	.006	.006	.005	.005	.004	.004	.002								MMT16IR180NPT
14	.052	.009	.007	.006	.006	.005	.005	.004	.004	.004	.002						MMT16IR140NPT
11.5	.065	.009	.007	.007	.006	.006	.005	.005	.005	.005	.004	.004	.002				MMT16IR115NPT
8	.095	.013	.011	.009	.008	.007	.006	.006	.006	.005	.005	.005	.004	.004	.004	.002	MMT16IR080NPT

American NPTF

(inch)

Pitch (thread/ inch)	Total Cutting Depth	Number of Passes															Insert Type
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	G-class ground inserts
14	.053	.009	.008	.006	.006	.005	.005	.004	.004	.004	.002						MMT16IR140NPTF
11.5	.064	.009	.009	.007	.006	.005	.005	.005	.004	.004	.004	.004	.002				MMT16IR115NPTF
8	.094	.013	.011	.009	.007	.007	.006	.006	.006	.005	.005	.005	.004	.004	.004	.002	MMT16IR080NPTF

- (Note)
- Set the finishing allowance on a diameter at approx. .004 inch when using a full form insert.
 - Please note the cutting depth and the number of passes when a nose radius of a partial or semi-full form insert or of an internal threading insert is small to prevent damage to the insert nose.
 - Please set the cutting depth sufficiently deep enough on materials such as hardened steel or austenitic stainless steel to help prevent premature wear and chipping caused by the outer layer of the material.

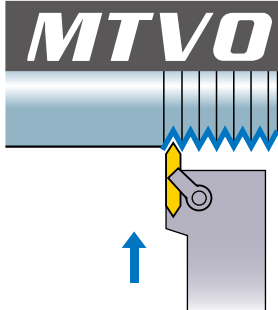
TROUBLE SHOOTING

Problems	Observation	Causes	Solutions	
Low thread precision.	Threads do not mesh with each other.	Incorrect tool installation.	Set the insert center height at 0". Check holder inclination (Lateral).	
		Shallow thread.	Modify the depth of cut. Refer to "Quickly generated flank wear." and "Large plastic deformation." below.	
	Poor surface finish.	Surface damage.	Chips wrap around or clog the work pieces.	Change to flank infeed and control the chip discharge direction. Change to an M-class insert with a 3-D chip breaker.
The side of the insert cutting edge interferes with the workpiece.			Check the lead angle and select an appropriate shim.	
Surface tears.			Built-up edge (Welding).	Increase cutting speed. Increase coolant pressure and volume.
		Cutting resistance too high.	Decrease depth of cut per pass.	
Surface vibrations.		Cutting speed too high.	Decrease the cutting speed.	
		Insufficient work piece or tool clamping.	Re-check work piece and tool clamping. (Chuck pressure, clamping allowance)	
		Incorrect tool installation.	Set the insert center height at 0".	
Short tool life.		Flank wear quickly generated.	Cutting speed too high.	Decrease the cutting speed.
			Too many passes causes abrasive wear.	Reduce the number of passes.
	Small depth of cut for the finishing pass.		Do not re-cut at 0" depth of cut. Depth of cut larger than .002" is recommended.	
	Non-uniform wear of the right and left sides of the cutting edge.	The work piece lead angle and the tool lead angle do not match.	Check the work piece lead angle and select an appropriate shim.	
	Chipping and fracture.	Cutting speed too low.	Increase cutting speed.	
			Cutting resistance too high.	Increase the number of passes and decrease the cutting resistance per pass.
		Unstable clamping.	Check work piece deflection. Shorten tool overhang. Recheck work piece and tool clamping. (Chuck pressure, clamping allowance)	
			Chip packing.	Increase coolant pressure to blow away chips. Change the tool pass to control chips. (Lengthen each pass to allow the coolant to clear the chips. Change from standard internal cutting to back turning to prevent chip jamming.
				Non-chamfered work pieces causes high resistance at the start of each pass.
		Large plastic deformation.	High cutting speed and large heat generation.	Decrease the cutting speed.
			Lack of coolant supply.	Check coolant is supply is sufficient. Increase coolant pressure and volume.
	Cutting resistance too high.			Increase the number of passes and decrease the cutting resistance per pass.

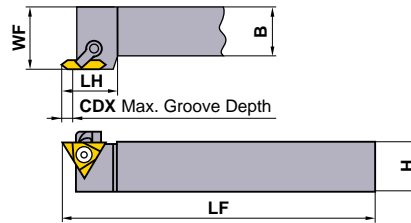
MTVVO HOLDER

- Multi-clamp type.
- Precision class insert.
- Positive insert produces a good finished surface.

- Holder is capable of performing both grooving and threading.
- Economical due to the use of 3 cutting edges.



External grooving, Threading



Right hand tool holder shown.

Order Number	Stock		Insert Number	Dimensions (inch)						Insert Screw	Clamp Screw	Clamp	
	R	L		H	B	LF	LH	WF	CDX				
MTVOR/L-8-3B	●	●	TNMC	32	.500	.500	4.500	1.000	.750	.057 / .156	GTS1	XNS35	CL6
MTVOR/L-10-3B	●	●		32	.625	.625	4.500	1.000	.875	.057 / .156	GTS1	XNS35	CL6
MTVOR/L-12-3B	●	●		32	.750	.750	4.500	1.000	1.000	.057 / .156	GTS1	XNS35	CL6
MTVOR/L-12-4B	●	●		43	.750	.750	4.500	1.063	1.000	.156 / .234	GTS2	XNS36	CL6
MTVOR/L-16-4D	●	●		43	1.000	1.000	6.000	1.063	1.250	.156 / .234	GTS2	XNS36	CL6
MTVOR/L-16-5D	●	●		54	1.000	1.000	6.000	1.250	1.250	.297	GTS3	XNS36	CL6
MTVOR/L-20-4D	●	●		43	1.250	1.250	6.000	1.063	1.500	.156 / .234	GTS2	XNS36	CL6

(Note) Please use right hand insert for right hand holder and left hand insert for left hand holder.

INSERTS (THREADING)

Order Number	Class	Stock		Min. Pitch (T.P.I.)	Dimensions (inch)			Geometry
		Coated	Carbide		IC	S	RE	
		UP20M	UTi20T					
TNMC32NV	E	●	●	8	.375	.125	.004	
TNMC43NV	E	●	●	6	.500	.187	.004	
TNMC54NV	E	●	●	4	.625	.250	.004	

INSERTS (GROOVING)

Order Number	Class	Stock		Dimensions (inch)					Geometry
		Coated	Carbide	CW	IC	S	PDPT	RE	
		UP20M	UTi20T						
TNMC32NGR032	EI	●	●	.032	.375	.125	.057	≤.003	
TNMC32NGL032	EI	●	●	.032	.375	.125	.057	≤.003	
TNMC32NGR063	EI	●	●	.063	.375	.125	.156	≤.003	
TNMC32NGL063	EI	●	●	.063	.375	.125	.156	≤.003	
TNMC43NGR063	EI	●	●	.063	.500	.188	.156	≤.003	
TNMC43NGL063	EI	●	●	.063	.500	.188	.156	≤.003	
TNMC43NGR094	EI	●	●	.094	.500	.188	.156	≤.003	
TNMC43NGL094	EI	●	●	.094	.500	.188	.156	≤.003	
TNMC43NGR125	EI	●	●	.125	.500	.188	.234	≤.003	
TNMC43NGL125	EI	●	●	.125	.500	.188	.234	≤.003	
TNMC43NGR156	EI	●	●	.156	.500	.188	.234	≤.003	
TNMC43NGL156	EI	●	●	.156	.500	.188	.234	≤.003	
TNMC54NGR187	EI	●	●	.187	.625	.250	.297	≤.003	
TNMC54NGL187	EI	●	●	.187	.625	.250	.297	≤.003	

Right hand insert shown.

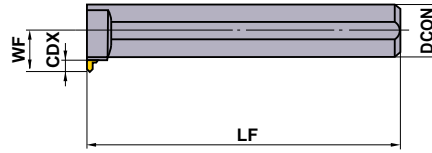
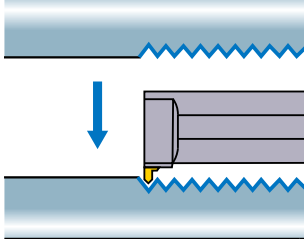
STHN/O TYPE

- Multi-clamp type.
- Precision class insert.
- Positive insert produces a good finished surface.

- Holder is capable of performing both grooving and threading.
- Economical due to the use of 3 cutting edges.

S-STHN/O

Internal grooving, Threading, Boring



Right hand tool holder shown.

Order Number	Stock		Insert Number	Dimensions (inch)						Clamp Screw	Wrench	
	R	L		DCON	LF	WF	GAMF	DMIN	CDX			
S16-STHNR/L-3	●	●	TNMC	32	1.000	10.000	.656	10°	1.250	.060 / .156	GTS1	TKY10F
S20-STHNR/L-4	●	●		43	1.250	12.000	.843	10°	1.750	.156 / .234	GTS2	TKY20F
S24-STHNR/L-4	●	●		43	1.500	14.000	.968	10°	2.250	.156 / .234	GTS2	TKY20F
S32-STHNR/L-4	●	●		43	2.000	14.000	1.218	10°	3.000	.156 / .234	GTS2	TKY20F
S32-STHOR/L-5	●	●		54	2.000	14.000	1.250	0	4.000	.297	GTS3	TKY20F

(Note) Please use left hand insert for right hand holder and right hand insert for left hand holder.

INSERTS (THREADING)

Order Number	Class	Stock		Min. Pitch (T.P.I.)	Dimensions (inch)			Geometry
		Coated	Carbide		IC	S	RE	
		UP20M	UTi20T					
TNMC32NV	E	●	●	8	.375	.125	.004	
TNMC43NV	E	●	●	6	.500	.187	.004	
TNMC54NV	E	●	●	4	.625	.250	.004	

THREADING

INSERTS (GROOVING)

Order Number	Class	Stock		Dimensions (inch)					Geometry
		Coated	Carbide	CW	IC	S	PDPT	RE	
		UP20M	UTi20T						
TNMC32NGR032	E	●	●	.032	.375	.125	.057	≤.003	
TNMC32NGL032	E	●	●	.032	.375	.125	.057	≤.003	
TNMC32NGR063	E	●	●	.063	.375	.125	.156	≤.003	
TNMC32NGL063	E	●	●	.063	.375	.125	.156	≤.003	
TNMC43NGR063	E	●	●	.063	.500	.188	.156	≤.003	
TNMC43NGL063	E	●	●	.063	.500	.188	.156	≤.003	
TNMC43NGR094	E	●	●	.094	.500	.188	.156	≤.003	
TNMC43NGL094	E	●	●	.094	.500	.188	.156	≤.003	
TNMC43NGR125	E	●	●	.125	.500	.188	.234	≤.003	
TNMC43NGL125	E	●	●	.125	.500	.188	.234	≤.003	
TNMC43NGR156	E	●	●	.156	.500	.188	.234	≤.003	
TNMC43NGL156	E	●	●	.156	.500	.188	.234	≤.003	
TNMC54NGR187	E	●	●	.187	.625	.250	.297	≤.003	
TNMC54NGL187	E	●	●	.187	.625	.250	.297	≤.003	

Right hand insert shown.

THREADING

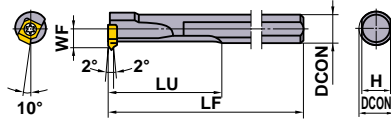
F TYPE

- Min. cutting diameter 10mm.
- Screw-on type.
- Usable for various applications.
- Max. groove depth: 3mm.

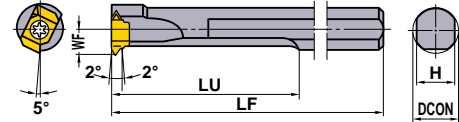
FSL51

Internal grooving, Threading

1 Corner type (FSL5108R,5110R)



2 Corner type (FSL5112R,5114R,5116R)



Metric Standard

Right hand tool holder only.

Order Number	Stock	Insert Number			Dimensions (mm)							Max. Groove Depth (mm)	Clamp Screw	Wrench	
		R	Grooving	Threading	DCON	H	LF	LU	WF	CW ^{*2}	DMIN ^{*1}				
FSL5108R	★		10 \odot L	MLT	1001L	8	7	125	30	4.8	1.2	10	1.0	TS25	TKY08F
FSL5110R	★	MLG	10 \odot L	MLT	1001L	10	9	150	40	5.8	1.5	12	1.0	TS25	TKY08F
FSL5112R	★		14 \odot L	MLT	1401L	12	10.8	180	50	6.8	1.5	14	2.0	TS32	TKY08F
FSL5114R	★	MLG	14 \odot L	MLT	1401L	14	12.4	180	60	7.8	2.0	16	2.0	TS32	TKY08F
FSL5116R	★	MLG	20 \odot L	MLT	2001L	16	14	200	70	9.7	2.0	20	3.0	TS43	TKY15F
											3.0				

*1 DMIN : Min. Cutting Diameter

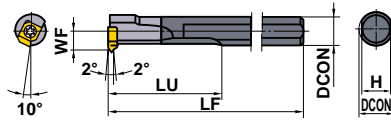
*2 CW : Please refer to page G038.

THREADING

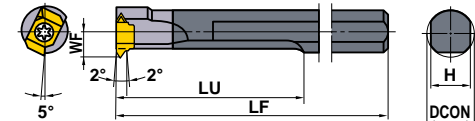
FSL52

Carbide shank

1 Corner type (FSL5208R,5210R)



2 Corner type (FSL5212R,5214R,5216R)



Metric Standard

Right hand tool holder only.

Order Number	Stock	Insert Number			Dimensions (mm)							Max. Groove Depth (mm)	Clamp Screw	Wrench	
		R	Grooving	Threading	DCON	H	LF	LU	WF	CW ^{*2}	DMIN ^{*1}				
FSL5208R	★		10 \odot L	MLT	1001L	8	7	125	60	4.8	1.2	10	1.0	TS25	TKY08F
FSL5210R	★	MLG	10 \odot L	MLT	1001L	10	9	150	70	5.8	1.5	12	1.0	TS25	TKY08F
FSL5212R	★		14 \odot L	MLT	1401L	12	10.8	180	80	6.8	1.5	14	2.0	TS32	TKY08F
FSL5214R	★	MLG	14 \odot L	MLT	1401L	14	12.4	180	85	7.8	2.0	16	2.0	TS32	TKY08F
FSL5216R	★	MLG	20 \odot L	MLT	2001L	16	14	200	115	9.7	2.0	20	3.0	TS43	TKY15F
											3.0				

*1 DMIN : Min. Cutting Diameter

*2 CW : Please refer to page G038.

RECOMMENDED CUTTING CONDITIONS

Work Material	Hardness	Grade	Cutting Speed (SFM)	Feed (inch/rev)
P Carbon Steel Alloy Steel	180—280HB	UP20M • UTi20T	295 (195—390)	.002 (.0008—.003)
	280—350HB	UP20M • UTi20T	260 (165—330)	.001 (.0008—.0015)

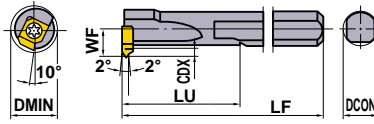
F TYPE

- Min. cutting diameter .390inch.
- Screw-on type.
- Usable for various applications.
- Max. groove depth: .118inch.

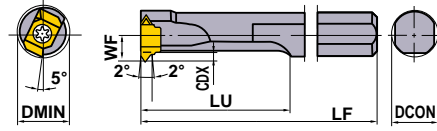
S-SL5N

Internal grooving, Threading



1 Corner type (S-SL5NR05 / 06)



2 Corner type (S-SL5NR08 / 10 / 12)



Right hand tool holder only.

Order Number	Stock	Insert Number		Dimensions (inch)								
		Grooving	Threading	DCON	LF	LU	WF	CW ^{*2}	DMIN ^{*1}	CDX		
S-SL5NR05	●	MLG10W○○○L	MLT1001L	.313	5.000	1.250	.188	.062	.390	.039	TS25	TKY08F
S-SL5NR06	●	MLG10W○○○L	MLT1001L	.375	6.000	1.500	.219	.094	.449	.039	TS25	TKY08F
S-SL5NR08	●	MLG14W○○○L	MLT1401L	.500	7.000	2.000	.281	.062 .094 .125	.579	.079	TS32	TKY08F
S-SL5NR10	●	MLG20W○○○L	MLT2001L	.625	8.000	3.000	.375	.094 .125	.791	.118	TS43	TKY15F
S-SL5NR12	●	MLG20W○○○L	MLT2001L	.750	10.000	4.000	.438	.156	.902	.118	TS43	TKY15F

*1 DMIN : Min. Cutting Diameter

*2 CW : Please refer to page G038.

RECOMMENDED CUTTING CONDITIONS

Work Material	Hardness	Grade	Cutting Speed (SFM)	Feed (inch/rev)
P Carbon Steel Alloy Steel	180—280HB	UP20M • UTi20T	295 (195—390)	.002 (.0008— .003)
	280—350HB	UP20M • UTi20T	260 (165—330)	.001 (.0008— .0015)

THREADING

INSERTS > G038
 SPARE PARTS > M001
 TECHNICAL DATA > N001

THREADING

F TYPE

- Min. cutting diameter .390inch.
- Screw-on type.
- Usable for various applications.
- Max. groove depth: .118inch.

INSERTS

Application	CW (inch)	Order Number	Carbide		Dimensions (inch)					Geometry			
			UTi20T	HTi10	L	W1	PDPT	S	BCH				
Grooving	Inch	.062	MLG10W062L		●	.276	.197	.039	.094	.004	MLG...L (1 Corner type) 		
		Metric	.047 (1.2mm)	MLG1012L	●		.276	.197	.039	.094		.004	
			.059 (1.5mm)	MLG1015L	●		.276	.197	.039	.094		.004	
		.079 (2.0mm)	MLG1020L	●		.276	.197	.039	.094	.004			
	Inch	.062	MLG14W062L		▲	.465	.256	.079	.187	.004		MLG...L (2 Corner type) 	
		Metric	.059 (1.5mm)	MLG1415L	●		.465	.256	.079	.187			.004
			.079 (2.0mm)	MLG1420L	●		.465	.256	.079	.187			.004
			.118 (3.0mm)	MLG1430L	●		.465	.256	.079	.187			.004
			.079 (2.0mm)	MLG2020L	●		.661	.356	.118	.250			.004
			.118 (3.0mm)	MLG2030L	●		.661	.356	.118	.250			.004
		.157 (4.0mm)	MLG2040L	●		.661	.356	.118	.250	.004			

Application	Min.Pitch	Order Number	Coated	Carbide	Dimensions (inch)				Geometry
			UP20M	UTi20T	L	W1	S	RE	
Threading	13T.P.I	MLT1001L	●	●	.276	.197	.094	.004	MLT1001L (1 Corner type)
	11T.P.I	MLT1401L	●	●	.465	.256	.187	.004	
	8T.P.I	MLT2001L	●	●	.661	.356	.250	.004	
									MLT1401L /2001L (2 Corner type)

● : Inventory maintained.

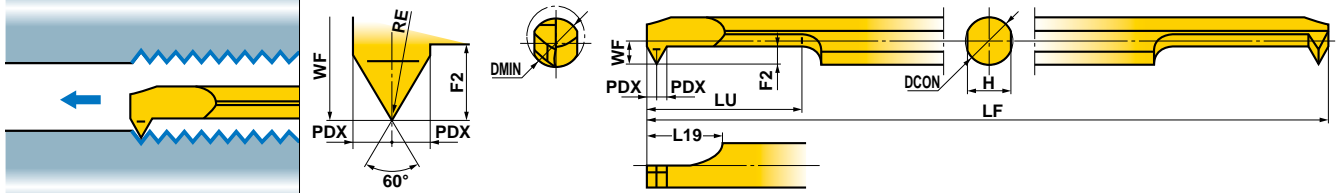
▲ : This item to be discontinued within two years.

SPARE PARTS > M001
TECHNICAL DATA > N001

MICRO-MINI TWIN

CT

Internal threading



Order Number	Stock		Breaker	Threads				Dimensions (mm)									
	Micro Grain Carbide	Coated		Metric Screw		Unified Screw		DMIN	RE	DCON	LF	LU	L19	WF	PDX	F2	H
	TF15	VP15TF		Thread	Pitch (mm)	Thread	Pitch (thread/inch)										
CT0305RS-M4	●	●	Without	≥ M4	0.5-1.0	≥ NO.8-32UNC	36-24	3	0.03	3	50	5.2	6	1.3	0.6	1.2	2.7
CT03RS-M4	●	●	Without	≥ M4	0.5-1.0	≥ NO.8-36UNF	36-24	3	0.03	3	50	10.2	6	1.3	0.6	1.2	2.7
CT03RS-M4B	●	●	With	≥ M4	0.5-1.0		36-24	3	0.03	3	50	10.2	6	1.3	0.6	1.2	2.7
CT0407RS-M6	●	●	Without	≥ M6	0.75-1.25	≥ 1/4-20UNC	28-20	4.5	0.05	4	60	7.6	7	1.8	0.8	1.7	3.6
CT04RS-M6	●	●	Without	≥ M6	0.75-1.25	≥ 1/4-28UNF	28-20	4.5	0.05	4	60	15.6	7	1.8	0.8	1.7	3.6
CT04RS-M6B	●	●	With	≥ M6	0.75-1.25		28-20	4.5	0.05	4	60	15.6	7	1.8	0.8	1.7	3.6
CT0511RS-M8	●	●	Without	≥ M8	0.75-1.5	≥ 5/16-18UNC	24-18	6	0.05	5	70	11	8	2.3	1	2.2	4.5
CT05RS-M8	●	●	Without	≥ M8	0.75-1.5	≥ 5/16-24UNF	24-18	6	0.05	5	70	21	8	2.3	1	2.2	4.5
CT05RS-M8B	●	●	With	≥ M8	0.75-1.5		24-18	6	0.05	5	70	21	8	2.3	1	2.2	4.5
CT0611RS-M10	●	●	Without	≥ M10	0.75-1.75	≥ 3/8-16UNC	24-16	7	0.05	6	75	11	8	2.8	1	2.2	5.4
CT06RS-M10	●	●	Without	≥ M10	0.75-1.75	≥ 3/8-24UNF	24-16	7	0.05	6	75	21	8	2.8	1	2.2	5.4
CT06RS-M10B	●	●	With	≥ M10	0.75-1.75		24-16	7	0.05	6	75	21	8	2.8	1	2.2	5.4

THREAD PITCH FOR THE CT TYPE

Order Number	Metric Thread								Unified Thread						
	P (mm)								P (thread/inch)						
	0.50	0.70	0.75	0.80	1.00	1.25	1.50	1.75	36	32	28	24	20	18	16
CT03RS-M4/M4B	○	○	○	○	○	-	-	-	○	○	○	○	-	-	-
CT04RS-M6/M6B	-	-	○	-	○	○	-	-	-	-	○	○	○	-	-
CT05RS-M8/M8B	-	-	○	-	○	○	○	-	-	-	-	○	○	○	-
CT06RS-M10/M10B	-	-	○	-	○	○	○	○	-	-	-	○	○	○	○

(Note) For internal threads that are larger than the minimum diameter of the Micro Mini Twin (CT type) it is possible to machining the above thread pitches. For the minimum diameter please refer to the standards.

DEPTH OF CUT FOR THE CT TYPE

● Metric Thread

P (pitch)	0.5	0.7	0.75	0.8	1	1.25	1.5	1.75			
D.O.C. (mm)	0.3	0.43	0.46	0.44	0.49	0.62	0.6	0.76	0.92	1.09	
Re* (Corner radius)	0.03	0.03	0.03	0.05	0.03	0.03	0.05	0.05	0.05	0.05	
Number of Passes	1	0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.07	0.07	
	2	0.05	0.06	0.06	0.06	0.06	0.07	0.07	0.07	0.07	
	3	0.05	0.06	0.06	0.05	0.06	0.06	0.06	0.07	0.07	0.07
	4	0.04	0.05	0.05	0.05	0.05	0.06	0.06	0.07	0.07	0.07
	5	0.04	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.07	0.07
	6	0.03	0.04	0.04	0.04	0.04	0.05	0.05	0.06	0.06	0.07
	7	0.03	0.04	0.04	0.04	0.04	0.05	0.05	0.06	0.06	0.06
	8		0.04	0.04	0.03	0.04	0.04	0.04	0.05	0.06	0.06
	9		0.03	0.03	0.03	0.03	0.04	0.04	0.05	0.05	0.06
	10			0.03	0.03	0.03	0.04	0.04	0.05	0.05	0.06
	11				0.03	0.03	0.03	0.04	0.05	0.05	0.05
	12					0.03	0.03	0.04	0.05	0.05	0.05
	13						0.03	0.04	0.04	0.05	0.05
	14							0.03	0.04	0.05	0.05
	15								0.04	0.04	0.04
	16									0.04	0.04
	17										0.04
	18										
	19										0.04
	20										0.03

● Unified Thread

P (thread/inch)	36	32	28	24	20	18	16		
D.O.C. (inch)	.0169	.0193	.0220	.0213	.0260	.0252	.0307	.0343	.0386
Re* (Corner radius)	.0012	.0012	.0012	.0020	.0012	.0020	.0020	.0020	.0020
Number of Passes	1	.0024	.0024	.0028	.0024	.0028	.0028	.0028	.0028
	2	.0024	.0024	.0024	.0024	.0028	.0028	.0028	.0028
	3	.0024	.0024	.0024	.0024	.0024	.0024	.0028	.0028
	4	.0020	.0020	.0024	.0020	.0024	.0024	.0024	.0028
	5	.0020	.0020	.0020	.0020	.0024	.0024	.0024	.0028
	6	.0016	.0016	.0020	.0020	.0020	.0020	.0024	.0024
	7	.0016	.0016	.0016	.0016	.0020	.0020	.0024	.0024
	8	.0016	.0016	.0016	.0016	.0016	.0020	.0020	.0024
	9	.0012	.0012	.0016	.0016	.0016	.0016	.0020	.0020
	10		.0012	.0012	.0012	.0016	.0016	.0020	.0020
	11		.0012	.0012	.0012	.0012	.0016	.0020	.0020
	12			.0012	.0012	.0012	.0016	.0020	.0020
	13				.0012	.0012	.0016	.0016	.0020
	14					.0012	.0012	.0016	.0016
	15						.0012	.0012	.0016
	16							.0012	.0016
	17								.0012
	18								
	19								.0012
	20								

* Even though the pitch maybe the same, the depth of cut varies according to the corner radius. For the Micro Mini Twin CT type CT03RS-M4, and CT03RS-M4B the corner radius is 0.03mm(.0012inch), for other types it is 0.05mm(.0020inch). For further details please refer to the standards section.

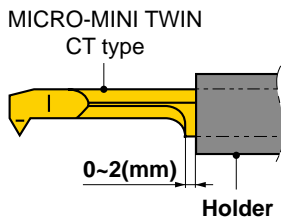
HOLDER

HOLDER CROSS REFERENCE LIST OF INCH SHANK STANDARD

Holder		MICRO-MINI TWIN	Machine Makers	
Type	Order Number	CT		
Round Type Holder φ.625inch	ID : Metric Type	RBH10189A	0305RS-M4, 03RS-M4(B)	Citizen Precision Machinery Co., Ltd. NC lathes
		RBH10252A	0407RS-M6, 04RS-M6(B)	
		RBH10315A	0511RS-M8, 05RS-M8(B)	
		RBH10378A	0611RS-M10, 06RS-M10(B)	
		RBH10441A	—	
Round Type Holder φ.750inch	ID : Metric Type	RBH19030N	0305RS-M4, 03RS-M4(B)	Citizen Precision Machinery Co., Ltd.
		RBH19040N	0407RS-M6, 04RS-M6(B)	
		RBH19050N	0511RS-M8, 05RS-M8(B)	
		RBH19060N	0611RS-M10, 06RS-M10(B)	
		RBH19070N	—	
Round Type Holder φ1.000inch	ID : Metric Type	RBH16189A	0305RS-M4, 03RS-M4(B)	Citizen Precision Machinery Co., Ltd. NC lathes
		RBH16252A	0407RS-M6, 04RS-M6(B)	
		RBH16315A	0511RS-M8, 05RS-M8(B)	
		RBH16378A	0611RS-M10, 06RS-M10(B)	
		RBH16441A	—	

* Mitsubishi Materials obtained the makers' approval before entering their names in the list.

RECOMMENDED TOOL OVERHANG



(Note) For LU, refer to page G039(CTtype).

RECOMMENDED CUTTING CONDITIONS

Work Material	Cutting Speed (SFM)
P General Steel	100—260
M Stainless Steel	100—260
K Cast Iron	100—260
N Non Ferrous Materials	165—330

(Note 1) Recommend wet machining.

(Note 2) Please remember when machining small diameters and high speeds there is the possibility that the machine can not keep up with the set feed.

HOLDER CROSS REFERENCE LIST OF METRIC SHANK STANDARD

Holder		MICRO-MINI TWIN	Machine Makers
Type	Order Number	CT	
Round Type Holder φ16mm	RBH1630N	0305RS-M4, 03RS-M4(B)	MIYANO MACHINERY JAPAN INC. NC lathes
	RBH1640N	0407RS-M6, 04RS-M6(B)	
	RBH1650N	0511RS-M8, 05RS-M8(B)	
	RBH1660N	0611RS-M10, 06RS-M10(B)	
	RBH1670N	—	
Round Type Holder φ20mm	RBH2030N	0305RS-M4, 03RS-M4(B)	Citizen Precision Machinery Co., Ltd. Tsunami Corporation MIYANO MACHINERY JAPAN INC. NC lathes
	RBH2040N	0407RS-M6, 04RS-M6(B)	
	RBH2050N	0511RS-M8, 05RS-M8(B)	
	RBH2060N	0611RS-M10, 06RS-M10(B)	
	RBH2070N	—	
Round Type Holder φ22mm	RBH2230N	0305RS-M4, 03RS-M4(B)	STAR MICRONICS CO., LTD.
	RBH2240N	0407RS-M6, 04RS-M6(B)	
	RBH2250N	0511RS-M8, 05RS-M8(B)	
	RBH2260N	0611RS-M10, 06RS-M10(B)	
	RBH2270N	—	
Round Type Holder φ25mm	RBH2530N	0305RS-M4, 03RS-M4(B)	Tsunami Corporation MIYANO MACHINERY JAPAN INC. NC lathes
	RBH2540N	0407RS-M6, 04RS-M6(B)	
	RBH2550N	0511RS-M8, 05RS-M8(B)	
	RBH2560N	0611RS-M10, 06RS-M10(B)	
	RBH2570N	—	
Square Type Holder □10mm	SBH1030R	0305RS-M4, 03RS-M4(B)	NC lathes
	SBH1040R	0407RS-M6, 04RS-M6(B)	
	SBH1050R	0511RS-M8, 05RS-M8(B)	
	SBH1060R	0611RS-M10, 06RS-M10(B)	
	SBH1070R	—	

* Mitsubishi Materials obtained the makers' approval before entering their names in the list.