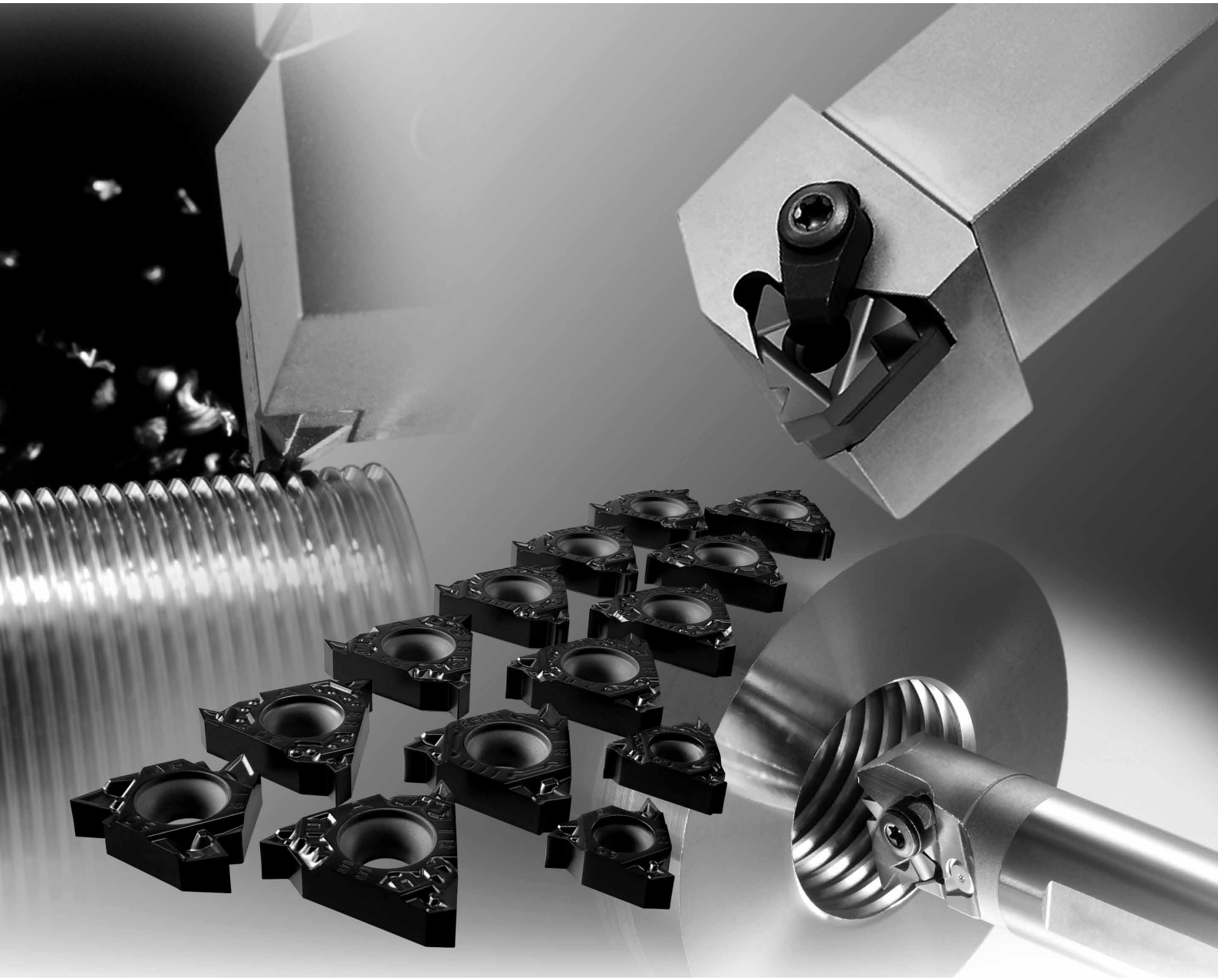
B053E

MMT THREADING SERIES

FOR HIGHLY EFFICIENT AND PRECISION MACHINING OVER A WIDE RANGE OF THREADING APPLICATIONS

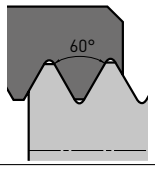
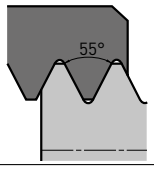
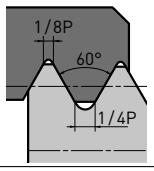
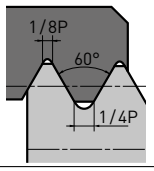
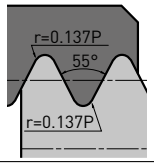
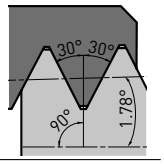


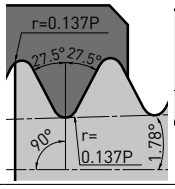
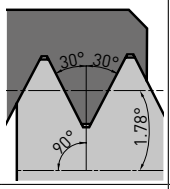
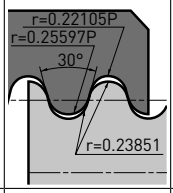
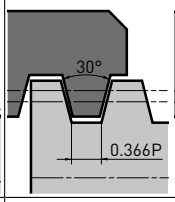
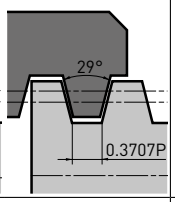
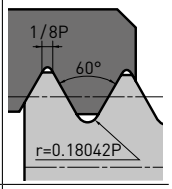
DIAEDGE

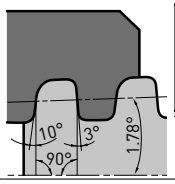
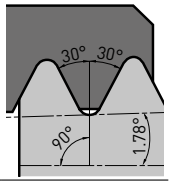
MITSUBISHI MATERIALS

THREAD PITCH CROSS REFERENCE

EXTERNAL THREADING

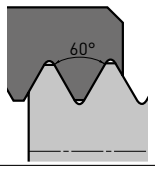
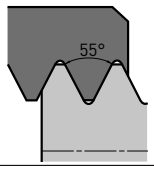
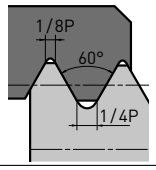
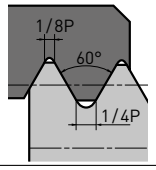
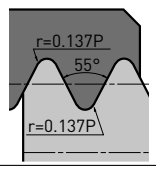
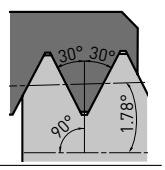
Application		General machining				Pipe fittings and couplings for gas and water	
		Partial Profile 60°	Partial Profile 55°	ISO Metric	American UN	Parallel pipe thread, Whitworth for BSW, BSP	American NPT
Type							
Symbol		M, UNC, UNF	W	M	UNC, UNF	G (PF), Rp (PS), W	NPT
Holder/Pitch		mm (thread/inch)	thread/inch	mm	thread/inch	thread/inch	thread/inch
MMT Holder	Full form	—	—	0.5 – 5.0	32 – 5	28 – 5	27, 18, 14, 11.5, 8
	Partial form	0.5 – 5.0 (48 – 5)	48 – 5	0.5 – 5.0	48 – 5	—	—

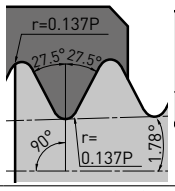
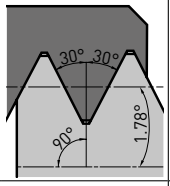
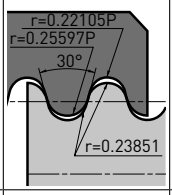
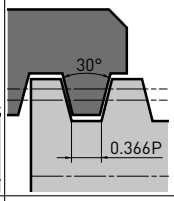
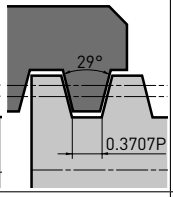
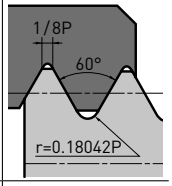
Application		Steam, gas and water line pipes		Pipe couplings for food and fire fighting industries	Motion transmissions		Aircraft and aerospace
		Taper pipe thread BSPT	American NPTF	Round DIN 405	ISO Trapezoidal 30°	American ACME	UNJ
Type							
Symbol		R (PT), Rc (PT), Rp	NPTF	Rd	Tr (TM)	ACME (Tw)	UNJ
Holder/Pitch		thread/inch	thread/inch	thread/inch	mm	thread/inch	thread/inch
MMT Holder	Full form	28, 19, 14, 11	27, 18, 14, 11.5, 8	10, 8, 6, 4	1.5, 2, 3, 4, 5	12, 10, 8, 6, 5	32 – 8
	Partial form	—	—	—	—	—	—

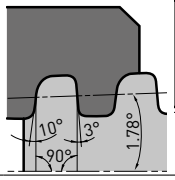
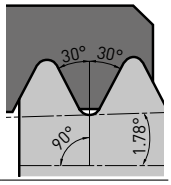
Application		Oil and gas	
		API Buttress casing	API Round casing & Tubing
Type			
Symbol		BCSG	CSG, LCSG
Holder/Pitch		thread/inch	thread/inch
MMT Holder	Full form	5	10, 8
	Partial form	—	—

THREAD PITCH CROSS REFERENCE

INTERNAL THREADING

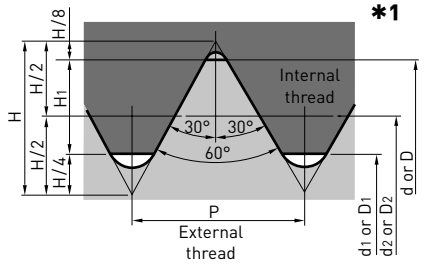
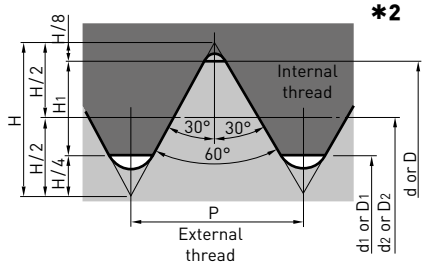
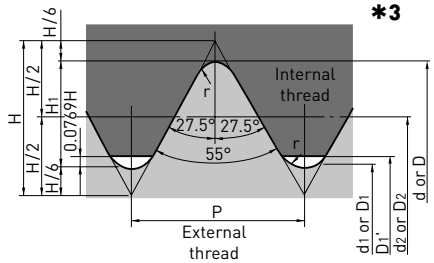
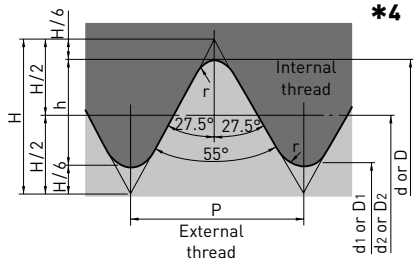
Application		General machining				Pipe fittings and couplings for gas and water	
		Partial Profile 60°	Partial Profile 55°	ISO Metric	American UN	Parallel pipe thread, Whitworth for BSW, BSP	American NPT
Type							
Symbol		M, UNC, UNF	W	M	UNC, UNF	G (PF), Rp (PS), W	NPT
Holder / Pitch		mm (thread/inch)	thread/inch	mm	thread/inch	thread/inch	thread/inch
MMT Boring Bar 	Full form	—	—	0.5 – 5.0	32 – 5	28 – 5	27, 18, 14, 11.5, 8
	Partial form	0.5 – 5.0 (48 – 5)	48 – 5	0.5 – 5.0	48 – 5	—	—

Application		Steam, gas and water line pipes		Pipe couplings for food and fire fighting industries	Motion transmissions		Aircraft and aerospace
		Taper pipe thread BSPT	American NPTF	Round DIN 405	ISO Trapezoidal 30°	American ACME	UNJ
Type							
Symbol		R (PT), Rc (PT), Rp	NPTF	Rd	Tr (TM)	ACME (Tw)	UNJ
Holder / Pitch		thread/inch	thread/inch	thread/inch	mm	thread/inch	thread/inch
MMT Boring Bar 	Full form	19, 14, 11	14, 11.5, 8	10, 8, 6, 4	1.5, 2, 3, 4, 5	12, 10, 8, 6, 5	—
	Partial form	—	—	—	—	—	* —

Application		Oil and gas	
		API Buttress casing	API Round casing & Tubing
Type			
Symbol		BCSG	CSG, LCSG
Holder / Pitch		thread/inch	thread/inch
MMT Boring Bar 	Full form	5	10, 8
	Partial form	—	—

* 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.

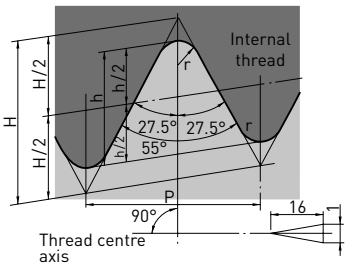
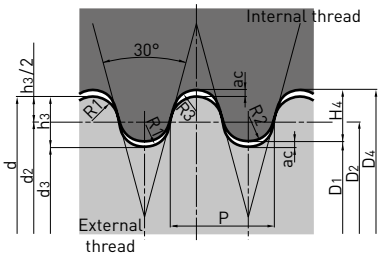
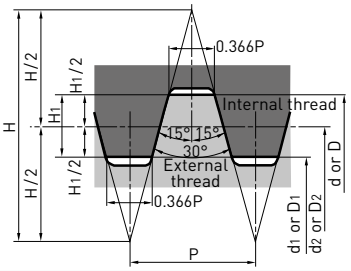
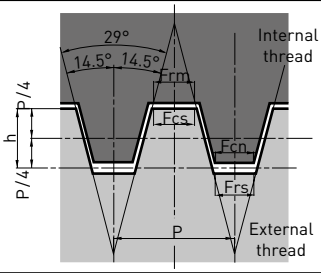
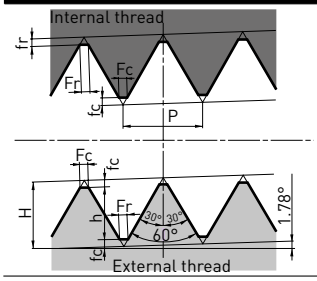
STANDARD THREAD AND CORRESPONDING INSERT / HOLDER

Standard thread type	Type	Ext./ Int.	Insert number	Wiper/ General	Tool holder	
ISO METRIC						
	M	Ext.	MMT○○ER○○○ISO	Wiper	MMTER○○○○○-C	15
			MMT○○ER○○○ISO-S	Wiper		
			MMT○○ER○○○60	General		
			MMT○○ER○○○60-S	General		
		Int.	MMT○○IR○○○ISO	Wiper	MMTIR○○A○○○-SP○ MMTIR○○A○16-C	23
			MMT○○IR○○○ISO-S	Wiper		
			MMT○○IR○○○60	General		
			MMT○○IR○○○60-S	General		
AMERICAN UN						
	UNC UNF	Ext.	MMT○○ER○○○UN	Wiper	MMTER○○○○○-C	15
			MMT○○ER○○○UN-S	Wiper		
			MMT○○ER○○○60	General		
			MMT○○ER○○○60-S	General		
		Int.	MMT○○IR○○○UN	Wiper	MMTIR○○A○○○-SP○ MMTIR○○A○16-C	23
			MMT○○IR○○○UN-S	Wiper		
			MMT○○IR○○○60	General		
			MMT○○IR○○○60-S	General		
WHITWORTH FOR BSW, BSP						
	W	Ext.	MMT○○ER○○○W	Wiper	MMTER○○○○○-C	15
			MMT○○ER○○○W-S	Wiper		
			MMT○○ER○○○55	General		
			MMT○○ER○○○55-S	General		
		Int.	MMT○○IR○○○W	Wiper	MMTIR○○A○○○-SP○ MMTIR○○A○16-C	23
			MMT○○IR○○○W-S	Wiper		
			MMT○○IR○○○55	General		
			MMT○○IR○○○55-S	General		
PARALLEL PIPE THREAD						
	PF G Rp	Ext.	MMT○○ER○○○W	Wiper	MMTER○○○○○-C	15
			MMT○○ER○○○W-S	Wiper		
		Int.	MMT○○IR○○○W	Wiper	MMTIR○○A○○○-SP○ MMTIR○○A○16-C	23
			MMT○○IR○○○W-S	Wiper		

*1 H = 0.866025P • d_2 = d-0.649519P • H_1 = 0.541266P • d_1 = d-1.082532P • D = d • D_2 = d_2 • D_1 = d_1
*2 H = 0.866025P • d_2 = d-0.649519P • H_1 = 0.541266P • d_1 = d-1.082532P • D = d • D_2 = d_2 • D_1 = d_1 • P=25.4 / thread
*3 H = 0.9605P • d_2 = d-H_1 • d_1 = d-2H_1 • r = 0.1373P • H_1 = 0.6403P • D_1'= d_1+2×0.0769H • D = d • D_2 = d_2 • D_1 = d_1 • P = 25.4 / thread
*4 H = 0.960491P • d_2 = d-h • d_1 = d-2h • r = 0.137329P • h = 0.640327P • D = d • D_2 = d_2 • D_1 = d_1 • P=25.4 / thread

Wiper: Insert order number is determined by selected pitch.
General: An insert is applicable to several pitch types.

STANDARD THREAD AND CORRESPONDING INSERT / HOLDER

Standard thread type		Type	Ext./ Int.	Insert number	Wiper/ General	Tool holder	
BSPT							
	*1	BSPT	Ext.	MMT○○ER○○○BSPT MMT○○ER○○○BSPT-S	Wiper	MMTER○○○○○-C	15
			Int.	MMT○○IR○○○BSPT MMT○○IR○○○BSPT-S	Wiper	MMTIR○○A○○○-SP○ MMTIR○○A○16-C	23
ROUND DIN 405							
	*2	Rd	Ext.	MMT○○ER○○○RD	Wiper	MMTER○○○○○-C	15
			Int.	MMT○○IR○○○RD		MMTIR○○A○○○-SP○ MMTIR○○A○16-C	23
ISO TRAPEZOIDAL 30°							
	*3	Tr	Ext.	MMT○○ER○○○TR	Wiper	MMTER○○○○○-C	15
			Int.	MMT○○IR○○○TR		MMTIR○○A○○○-SP○ MMTIR○○A○16-C	23
AMERICAN ACME							
		ACME	Ext.	MMT○○ER○○○ACME	Wiper	MMTER○○○○○-C	15
			Int.	MMT○○IR○○○TACME		MMTIR○○A○○○-SP○ MMTIR○○A○16-C	23
AMERICAN NPT							
	*4	NPT	Ext.	MMT○○ER○○○NPT	Wiper	MMTER○○○○○-C	15
			Int.	MMT○○IR○○○NPT		MMTIR○○A○○○-SP○ MMTIR○○A○16-C	23

*1 H = 0.960237P • h = 0.640327P • r = 0.137278P • P = 25.4 / thread
*2 ac = 0.05P • $h_3 = H_4 = 0.5P$ • $R_1 = 0.238507P$ • $R_2 = 0.255967P$ • $R_3 = 0.221047P$ • P = 25.4 / thread
*3 H = 1.866P • $d_2 = d-0.5P$ • $d_1 = d-P$ • $H_1 = 0.5P$ • D = d • $D_2 = d_2$ • $D_1 = d_1$
*4 H = 0.866025P • h = 0.800000p

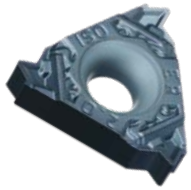
Wiper: Insert order number is determined by selected pitch.
General: An insert is applicable to several pitch types.

FEATURES OF MMT SERIES

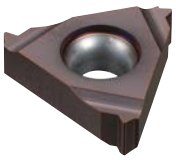
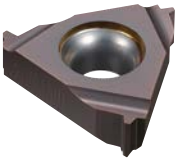
A WIDE VARIETY OF PRODUCTS

M-CLASS INSERTS WITH 3-D CHIPBREAKERS

M, UNC, UNF, W, G, Rp, R, Rc



G-CLASS GROUND INSERTS

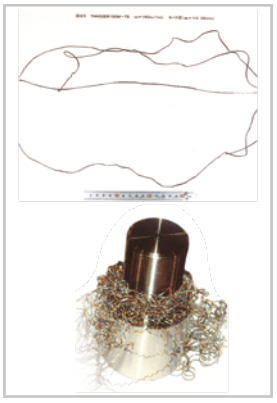
M, UNC, UNF, W, G, Rp, R, Rc, NPTF, NPT	Rd, CSG, LCSG	Tr, ACME, BCSG
		

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

Workpiece	DIN 41CrMo4
Insert	MMT16ER150ISO-S
Grade	VP15TF
Vc (m/min)	120
Cutting method	Radial infeed
Depth of cut	Fixed cut area
Pass (times)	6
Coolant	Wet

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

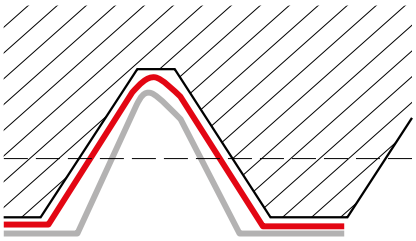
MMT



Conventional

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

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	Class 2



High precision threading can be achieved by using MMT inserts that feature ground rake faces and peripheral cutting edges.

MMT series
Theoretical thread profile
Conventional insert

FEATURES OF MMT SERIES

NEW

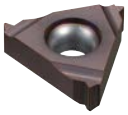
AG TYPE IS ADDED TO THE ACCURATE M-CLASS TYPE 3-D CHIPBREAKER

For general purpose 60° and 55° inner/outer diameter threading, the AG type has been added to the precision M-class 3-D chipbreaker range, which is applicable to 48 – 8 threads and a pitch of 0.5 – 3.0 mm to meet a wide range of needs.
The M-class precision 3-D chipbreaker improves chip control and contributes to tool cost reduction.

CHOOSING M-CLASS INSERTS WITH 3-D CHIPBREAKERS OR G-CLASS INSERTS

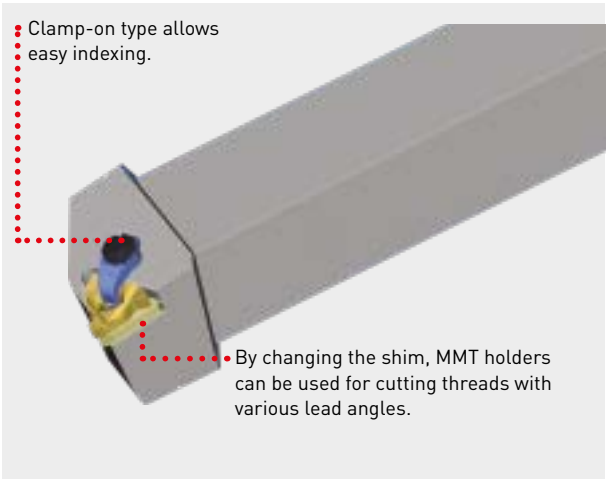
- For ideal chip control and a high cost performance ratio, M-class inserts with 3-D chipbreakers are recommended.
- G-class inserts are recommended where higher precision is required.

Insert	Chip control	Precision of thread
M-class inserts with 3-D chipbreakers 	◎	○

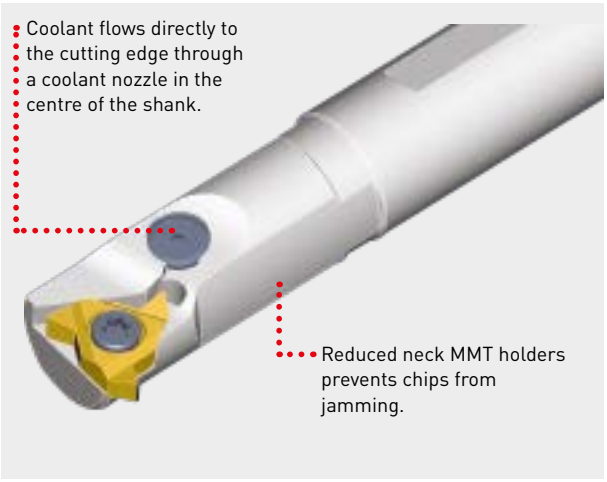
Insert	Chip control	Precision of thread
G-class inserts 	○	◎

HOLDER (USE OF SPECIAL SURFACE TREATMENT)

EXTERNAL



INTERNAL

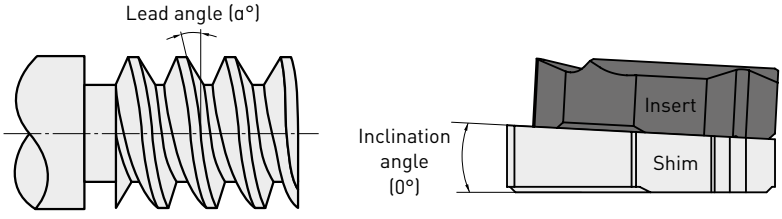


Order number of coolant guide screw: TFS03006
(Except MMTIR1316/MMTIR1516)

SUITABLE FOR THREADING WITH A LARGE LEAD ANGLE

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

Standard shim delivered with the holder.



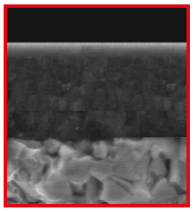
By changing only the shim, MMT holders can be used for turning of threads with various lead angles as well as the turning of left hand threads.

PVD COATED CARBIDE GRADE FOR STABLE THREADING

MP9025

Tough grade with an emphasis on cutting edge stability.

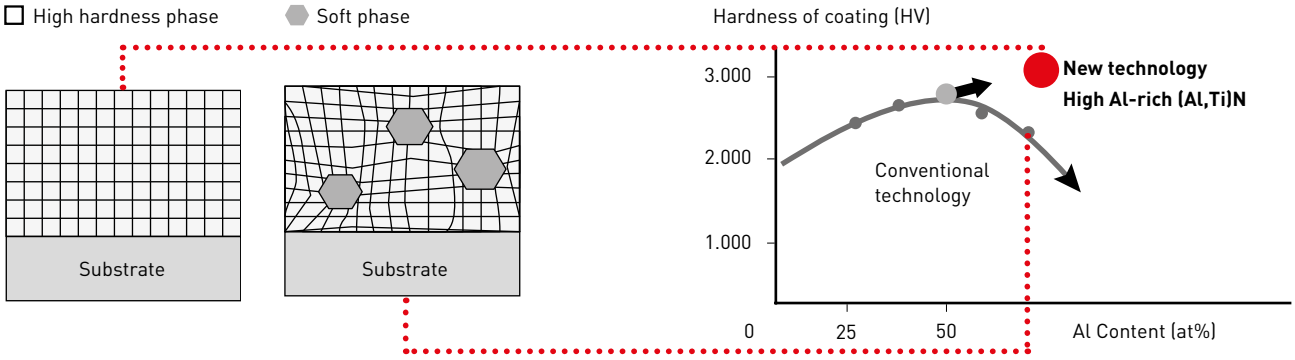
Demonstrates excellent fracture resistance when machining at low cutting speeds, internal machining, and even on small corner R sizes.
With excellent adhesion resistance, it is effective when machining heat resistant alloys and precipitation hardening stainless steel.



- High Al-rich (Al,Ti)N single layer coating technology
- Special cemented carbide substrate

HIGH Al AND CONVENTIONAL COATING COMPARISON

The new technology, high Al-rich (Al,Ti)N single layer coating provides stabilisation of the high hardness phase and succeeds in dramatically improving wear, crater and welding resistance.



VP10MF

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

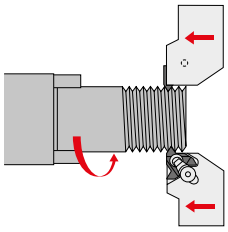
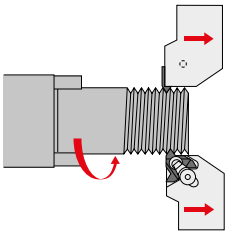
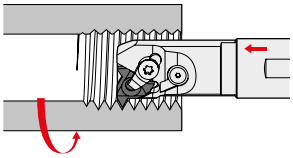
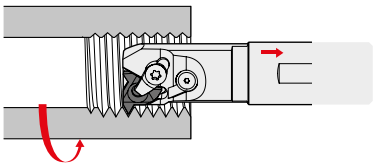
VP15TF

High fracture resistance during low rigidity applications such as bar feed machining. Able to withstand harsh conditions for long periods where conventional inserts would be liable to breakage.
Effective combination of high cost performance M-class inserts with 3-D chipbreakers.

VP20RT

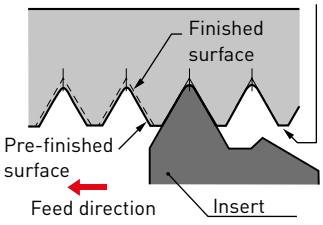
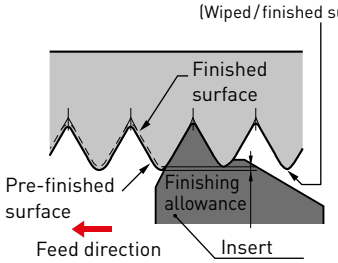
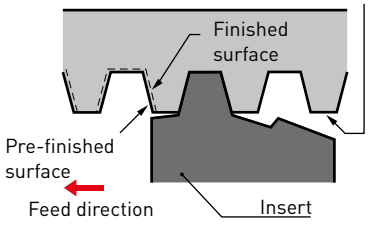
Suitable for stainless steel boring and unstable machining where inserts are vulnerable to fracturing.
Effective combination of high cost performance M-class inserts with 3-D chipbreakers.

THREADING METHODS

	Right hand thread	Left hand thread
External		
Internal		

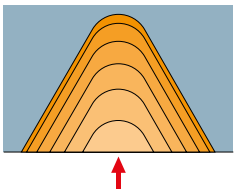
- Usually, threads are cut with the feed towards the chuck.
- When machining left hand threads, note that clamping rigidity is lowered due the application of back turning.
- When machining left hand threads, the lead angle is negative. Ensure an appropriate lead angle by changing the shim.

INSERT TYPES

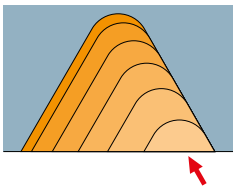
Partial form	Full form	Semi-full form (Trapezoidal threads only)
• The same insert can be used for a range of pitches. • Shorter tool life because the corner radius of the insert is smaller than that of the full form insert. • Finishing with another operation is necessary.	• No deburring needed after threading. • Requires different threading inserts.	• No deburring needed after threading. • Requires different threading inserts. • Finishing with another operation is necessary.
Crest radius (Additional turning necessary to finish the thread crest.) 	Crest radius (Wiped / finished surface.) 	Crest radius (Additional turning necessary to finish the thread crest.) 

THREADING METHODS

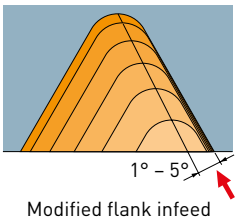
INFEED METHODS



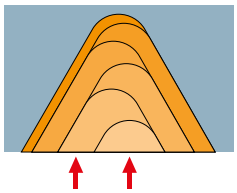
Radial infeed



Flank infeed



Modified flank infeed

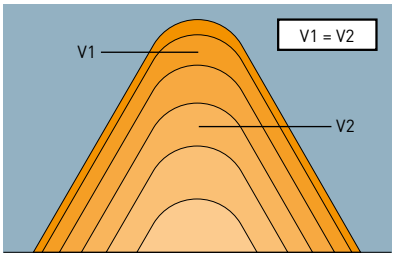


Incremental infeed

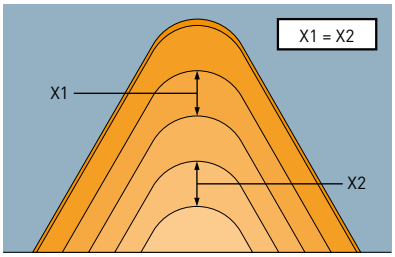
ADVANTAGES			
• Easiest to use. (Standard programme for threading) • Wide application. (Cutting conditions easy to change.) • Uniform wear of the right and left sides of the cutting edge.	• Relatively easy to use. (Semi-standard programme for threading.) • Reduced cutting force. • Suitable for large pitch threads or materials that peel easily. • Good chip discharge.	• Preventing flank wear on the right side of the cutting edge. • Reduced cutting force. • Suitable for large pitch threads or materials that peel easily. • Good chip discharge.	• Uniform flank wear of the right and left sides of the cutting edge. • Reduced cutting force. • Suitable for large pitch threads or materials that peel easily.

DISADVANTAGES			
• Difficult chip control. • Subject to vibration in the later in stages of cutting. • Ineffective for large pitch threading. • Heavy load on the corner radius.	• Large flank wear on the right side of the cutting edge. • Relatively difficult to change cutting depth. (Re-programming necessary)	• Complex machining programming. • Difficult to change cutting depth. (Re-programming necessary)	• Complex machining programming. • Difficult to change cutting depth. (Re-programming necessary) • Difficult chip control.

THREADING DEPTH



Fixed cut area



Fixed cutting depth

ADVANTAGES	
• Easy to use. (Standard programme for threading.) • Superior resistance to vibration. (Constant cutting force.)	• Reduced load on corner 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.

DISADVANTAGES	
• Long chips generated during the final pass. • Complex calculation of cutting depth when changing the number of passes.	• Subject to vibration in the later stages of cutting. (Increased cutting force) • In some cases, changing the NC programme is necessary.

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

THREADING METHODS

FORMULAE TO CALCULATE INFEED FOR EACH PASS IN A REDUCED SERIES

$$\triangle ap_n = \frac{ap}{\sqrt{n_{ap}-1}} \times \sqrt{b}$$

$\triangle ap_n$: 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 n–1

(Example)
External threading (ISO Metric)
Pitch: 1.0 mm
ap: 0.6 mm
n_{ap}: 5 passes

1st Pass $\triangle ap_1 = \frac{0.60}{\sqrt{5-1}} \times \sqrt{0.3} = 0.16 \rightarrow \mathbf{0.16}$ $(\triangle ap_1)$

2st Pass $\triangle ap_2 = \frac{0.60}{\sqrt{5-1}} \times \sqrt{2-1} = 0.3 \rightarrow \mathbf{0.14}$ $(\triangle ap_2 - \triangle ap_1)$

3st Pass $\triangle ap_3 = \frac{0.60}{\sqrt{5-1}} \times \sqrt{3-1} = 0.42 \rightarrow \mathbf{0.12}$ $(\triangle ap_3 - \triangle ap_2)$

4st Pass $\triangle ap_4 = \frac{0.60}{\sqrt{5-1}} \times \sqrt{4-1} = 0.52 \rightarrow \mathbf{0.1}$ $(\triangle ap_4 - \triangle ap_3)$

5st Pass $\triangle ap_5 = \frac{0.60}{\sqrt{5-1}} \times \sqrt{5-1} = 0.6 \rightarrow \mathbf{0.08}$ $(\triangle ap_5 - \triangle ap_4)$

NC PROGRAMME FOR MODIFIED FLANK INFEED

(Example)
M12 x 1.0 5 passes modified 5°

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

SELECTING CUTTING CONDITIONS

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

1. 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.

THREADING METHODS

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 programme," 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.

HOW TO EFFECTIVELY USE MMT SERIES

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

REDUCED COST MACHINING

ADVICE ON IMPROVED THREADING

INCREASING TOOL LIFE

- To prevent damage to the corner 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 0.2 mm to make the chips thicker.

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 wiping 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.

PIPE THREADS AND TOOL SELECTION

Parallel pipe thread G(PF)

min	Thread	Number of threads	Standard internal diameter
—	G 1/16	28	6.561
1	G 1/8	28	8.556
2	G 1/4	19	11.445
3	G 3/8	19	14.950
4	G 1/2	14	18.631
5	G 5/8	14	20.587
6	G 3/4	14	24.117
7	G 7/8	14	27.877
8	G 1	11	30.291
9	G 1 1/8	11	34.939
10	G 1 1/4	11	38.952

Same as PF.

Taper pipe thread R, Rc(PT)

min	Thread	Number of threads	Standard internal diameter
—	R 1/16	28	6.561
1	R 1/8	28	8.556
2	R 1/4	19	11.445
3	R 3/8	19	14.950
4	R 1/2	14	18.631
5	—	—	—
6	R 3/4	14	24.117
7	—	—	—
8	R 1	11	30.291
9	—	—	—
10	R 1 1/4	11	38.952

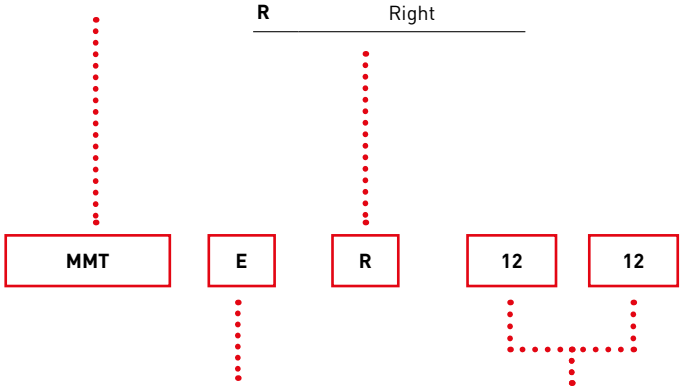
Same as Rc, PT.

1. Please note that as part of industry practice, pipe screws are sometimes referred to as "minutes" in inch conversion units.
2. One "minute" equals 1/8 inch (1 inch= 25.4 mm)
3. 1 1/4 inches are sometimes referred to as "inch 2 minutes" (1/4= 2/8= 2 minutes).
4. The pitch is pre-determined for each nominal diameter. Note the minimum machining diameter especially when internal threading.

MMT SERIES ORDER NUMBER

HOLDERS

EXTERNAL



Designation
MMT

Application	
E	External

Hand of tool	
R	Right

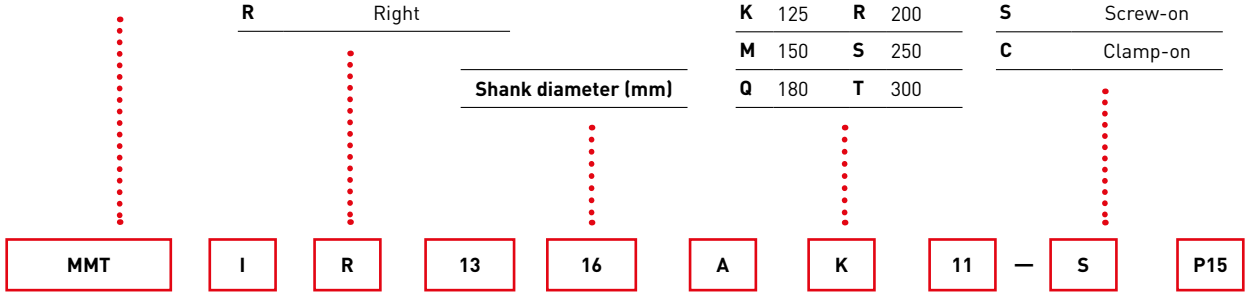
Tool size (mm) (Height and width)	
12	12
16	16
20	20
25	25
32	32

Tool length (mm)	
H	100
K	125
M	150
P	170

Method of holding	
C	Clamp-on

Insert size (mm)	
16	9.525
22	12.7

INTERNAL



Designation
MMT

Application	
I	Internal

Hand of tool	
R	Right

Min.Cutting diameter (mm)
13

Shank diameter (mm)
16

Shank material	
A	Steel shank with coolant hole

Tool length (mm)			
K	125	**R**	200
M	150	**S**	250
Q	180	**T**	300

Insert size (mm)	
11	6.35
16	9.525
22	12.7

Method of holding	
S	Screw-on
C	Clamp-on

Lead angle	
P15	1.5°
P25	2.5°
P35	3.5°

MMT SERIES ORDER NUMBER

INSERTS

M-CLASS

Designation
MMT

Diameter of inscribed circle (mm)	
11	6.35
16	9.525

16

Application	
E	External
I	Internal

Hand of tool	
R	Right

R

Pitch		
100	1.0 mm	**A** 0.5 – 1.5 mm or 48 – 16 thread/inch
125	1.25 mm	
150	1.5 mm	**G** 1.75 – 3.0 mm or 14 – 8 thread/inch
175	1.75 mm	
200	2.0 mm	
250	2.5 mm	**AG** 0.5 – 3.0 mm or 48 – 8 thread/inch
300	3.0 mm	

100

Threading type	
60	Partial Profile 60°
55	Partial Profile 55°
ISO	ISO Metric
W	Whitworth for BSW, BSP
BSPT	BSPT
UN	American UN

ISO

S

M-class inserts with 3-D chipbreakers

G-CLASS

Designation
MMT

Diameter of inscribed circle (mm)	
11	6.35
16	9.525
22	12.7

16

Application	
E	External
I	Internal

Hand of tool	
R	Right

R

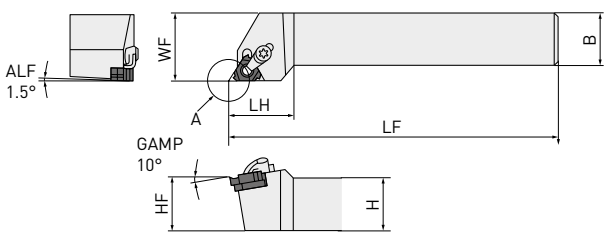
Pitch		
050	0.5 mm	**A** 0.5 – 1.5 mm or 48 – 16 thread/inch
075	0.75 mm	
100	1.0 mm	
125	1.25 mm	**G** 1.75 – 3.0 mm or 14 – 8 thread/inch
150	1.5 mm	
175	1.75 mm	
200	2.0 mm	**AG** 0.5 – 3.0 mm or 48 – 8 thread/inch
250	2.5 mm	
300	3.0 mm	
350	3.5 mm	**N** 3.5 – 5.0 mm or 7 – 5 thread/inch
400	4.0 mm	
450	4.5 mm	
500	5.0 mm	

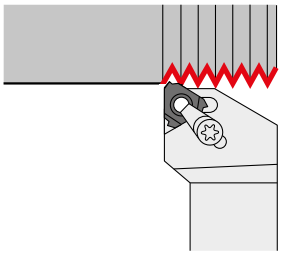
050

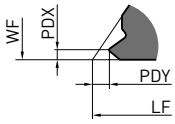
Threading type	
60	Partial Profile 60°
55	Partial Profile 55°
ISO	ISO Metric
W	Whitworth for BSW, BSP
BSPT	BSPT
UN	American UN
RD	Round DIN 405
TR	ISO Trapezoidal 30°
ACME	American ACME
UNJ	UNJ
APBU	API Buttress Casing
APRD	API Round Casing&Tubing
NPT	NPT
NPTF	NPTF

MMTE HOLDER

EXTERNAL THREADING







Details of position A
Refer to the insert standards for dimensions PDX and PDY.

Right hand tool holder only.

Order number	Stock R	H	B	LF	LH	HF	WF	Insert number
MMTER1212H16-C	●	12	12	100	25	12	16	MMT16ER ○○○○○
MMTER1616H16-C	●	16	16	100	25	16	20	
MMTER2020K16-C	●	20	20	125	26	20	25	
MMTER2525M16-C	●	25	25	150	28	25	32	
MMTER3232P16-C	●	32	32	170	32	32	40	
MMTER2525M22-C	●	25	25	150	32	25	32	MMT22ER ○○○○○
MMTER3232P22-C	●	32	32	170	32	32	40	

(5 inserts per case)

22 Vc

SPARE PARTS

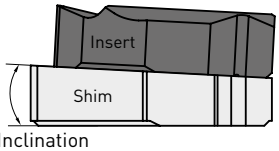
Order number	Clamp bridge	Clamp screw *	Stop ring	Shim screw *	Shim	Wrench 1. 2.
MMTER1212H16-C	SETK51	SETS51	CR4	HFC03008	CTE32TP15	1.TKY15F 2.HKY20R
MMTER1616H16-C						
MMTER2020K16-C						
MMTER2525M16-C						
MMTER3232P16-C						
MMTER2525M22-C	SETK61	SETS61	CR5	HFC04010	CTE43TP15	1.TKY20F 2.HKY25R
MMTER3232P22-C						

1. Select and use a shim as shown below (sold separately), dependant on the lead angle.
* Clamp Torque (N • m): SETS51 = 3.5, SETS61 = 5.0, HFC03008 = 1.5, HFC04010 = 2.2

SHIM

Lead angle (α°)	Order number	Stock R	Inclination angle (0°)	Applicable holder
-1.5°	CTE32TN15	●	-3°	MMTER ○○○○○ 16-C
-0.5°	CTE32TN05	●	-2°	
0.5°	CTE32TP05	●	-1°	
1.5°	CTE32TP15	●	0°	
2.5°	CTE32TP25	●	1°	
3.5°	CTE32TP35	●	2°	
4.5°	CTE32TP45	●	3°	

Lead angle (α°)	Order number	Stock R	Inclination angle (0°)	Applicable holder
-1.5°	CTE43TN15	●	-3°	MMTER ○○○○○ 22-C
-0.5°	CTE43TN05	●	-2°	
0.5°	CTE43TP05	●	-1°	
1.5°	CTE43TP15	●	0°	
2.5°	CTE43TP25	●	1°	
3.5°	CTE43TP35	●	2°	
4.5°	CTE43TP45	●	3°	



Inclination angle (0°)

Standard shim delivered with the holder.

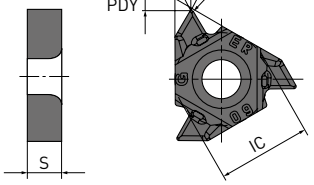
● : Inventory maintained. ★ : Inventory maintained in Japan.

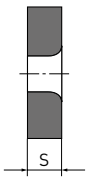
MMT

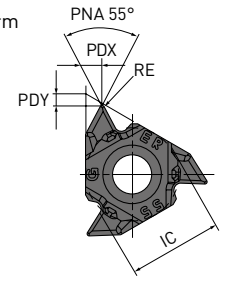
M-CLASS INSERTS WITH 3-D CHIPBREAKERS

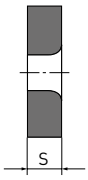
INSERTS

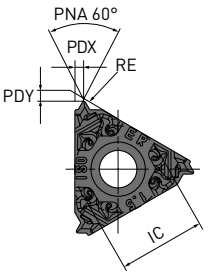
Order number	NEW MP9025	VP15TF	VP20RT	Pitch mm	Thread/ inch	IC	S	PDY	PDX	RE	Total cutting depth	Geometry
PARTIAL PROFILE 60°												
MMT16ERAG60-S	●	●	●	0.5–3.0	48–8	9.525	3.44	1.2	1.7	0.08	—	Partial form
MMT16ERA60-S	●		●	0.5–1.5	48–16	9.525	3.44	0.8	0.9	0.06	—	
MMT16ERG60-S	●		●	1.75–3.0	14–8	9.525	3.44	1.2	1.7	0.23	—	
PARTIAL PROFILE 55°												
MMT16ERAG55-S	●	●	●		48–8	9.525	3.44	1.2	1.7	0.07	—	Partial form
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	Full form
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	Full form
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	

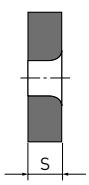


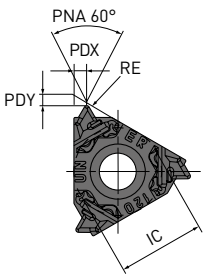












1/2

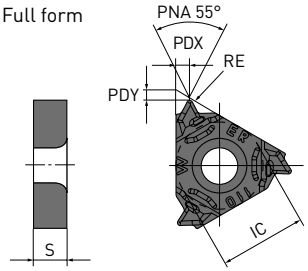
(5 inserts per case)

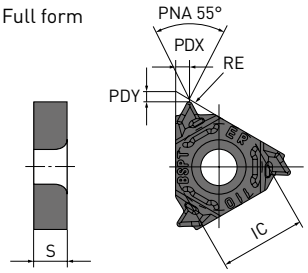
● / ★ = Expansion

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

MMT – M-CLASS INSERTS WITH 3-D CHIPBREAKERS

Order number	NEW MP9025	VP15TF	VP20RT	Pitch mm	Thread/ inch	IC	S	PDY	PDX	RE	Total cutting depth	Geometry
WHITWORTH FOR BSW, BSP												
MMT16ER190W-S	●		●		19	9.525	3.44	0.8	1.0	0.18	0.86	Full form
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	Full form
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	





2/2

(5 inserts per case)

1. Identification: Please see page 14 (M-Class).

● / ★ = Expansion

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

MMT

G-CLASS GROUND INSERTS

INSERTS

Order number	Thread tolerance	VP10MF	VP15TF	Pitch mm	thread/ inch	IC	S	PDY	PDX	RE	Total cutting depth	Geometry
PARTIAL PROFILE 60°												
MMT16ERAG60	—	●		0.5 – 3.0	48 – 8	9.525	3.44	1.2	1.7	0.08	—	Partial form
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	—	
MMT22ERN60	—	●		3.5 – 5.0	7 – 5	12.7	4.64	1.7	2.5	0.53	—	
PARTIAL PROFILE 55°												
MMT16ERAG55	—	●			48 – 8	9.525	3.44	1.2	1.7	0.07	—	Partial form
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	—	
MMT22ERN55	—	●			7 – 5	12.7	4.64	1.7	2.5	0.44	—	
ISO METRIC												
MMT16ER050ISO	6g	●		0.5		9.525	3.44	0.6	0.4	0.06	0.31	
MMT16ER075ISO	6g	●		0.75		9.525	3.44	0.6	0.6	0.10	0.46	
MMT16ER100ISO	6g	●	●	1.0		9.525	3.44	0.7	0.7	0.16	0.61	Full form
MMT16ER125ISO	6g	●	●	1.25		9.525	3.44	0.8	0.9	0.19	0.77	
MMT16ER150ISO	6g	●	●	1.5		9.525	3.44	0.8	1.0	0.23	0.92	
MMT16ER175ISO	6g	●	●	1.75		9.525	3.44	0.9	1.2	0.21	1.07	
MMT16ER200ISO	6g	●	●	2.0		9.525	3.44	1.0	1.3	0.31	1.23	
MMT16ER250ISO	6g	●	●	2.5		9.525	3.44	1.1	1.5	0.32	1.53	
MMT16ER300ISO	6g	●	●	3.0		9.525	3.44	1.2	1.6	0.46	1.84	
MMT22ER350ISO	6g	●		3.5		12.7	4.64	1.6	2.3	0.45	2.15	
MMT22ER400ISO	6g	●		4.0		12.7	4.64	1.6	2.3	0.52	2.45	
MMT22ER450ISO	6g	●		4.5		12.7	4.64	1.7	2.4	0.58	2.76	
MMT22ER500ISO	6g	●		5.0		12.7	4.64	1.7	2.5	0.63	3.07	

1/4

(5 inserts per case)

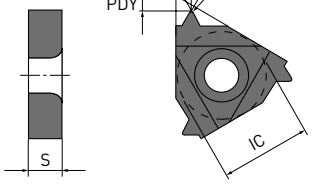
1. Identification: Please see page 14 (G-Class).

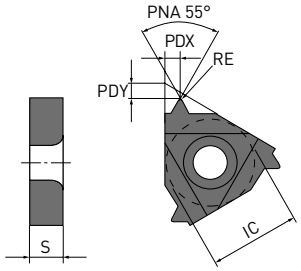
● : Inventory maintained. ★ : Inventory maintained in Japan.

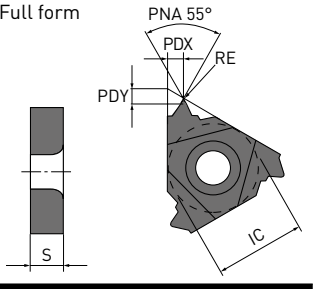
MMT – G-CLASS GROUND INSERTS

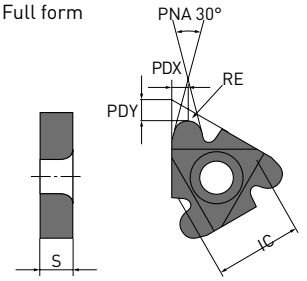
INSERTS

Order number	Thread tolerance	VP10MF	VP15TF	Pitch mm	thread/ inch	IC	S	PDY	PDX	RE	Total cutting depth	Geometry
AMERICAN UN												
MMT16ER320UN	2A	●			32	9.525	3.44	0.6	0.6	0.09	0.49	Full form
MMT16ER280UN	2A	●			28	9.525	3.44	0.6	0.7	0.10	0.56	
MMT16ER240UN	2A	●			24	9.525	3.44	0.7	0.8	0.16	0.65	
MMT16ER200UN	2A	●			20	9.525	3.44	0.8	0.9	0.19	0.78	
MMT16ER180UN	2A	●			18	9.525	3.44	0.8	1.0	0.21	0.87	
MMT16ER160UN	2A	●	●		16	9.525	3.44	0.9	1.1	0.24	0.97	
MMT16ER140UN	2A	●	●		14	9.525	3.44	1.0	1.2	0.22	1.11	
MMT16ER130UN	2A	●			13	9.525	3.44	1.0	1.3	0.24	1.20	
MMT16ER120UN	2A	●	●		12	9.525	3.44	1.1	1.4	0.32	1.30	
MMT16ER110UN	2A	●			11	9.525	3.44	1.1	1.5	0.29	1.42	
MMT16ER100UN	2A	●			10	9.525	3.44	1.1	1.5	0.32	1.56	
MMT16ER090UN	2A	●			9	9.525	3.44	1.2	1.7	0.35	1.73	
MMT16ER080UN	2A	●			8	9.525	3.44	1.2	1.6	0.48	1.95	
MMT22ER070UN	2A	●			7	12.7	4.64	1.6	2.3	0.47	2.22	
MMT22ER060UN	2A	●			6	12.7	4.64	1.6	2.3	0.53	2.60	
MMT22ER050UN	2A	●			5	12.7	4.64	1.7	2.5	0.64	3.12	
WHITWORTH FOR BSW, BSP												
MMT16ER280W	Medium class A	●			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												
MMT16ER280BSPT	Standard BSPT	●			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												
MMT16ER100RD	7h	●			10	9.525	3.44	1.1	1.2	0.60	1.27	Full form
MMT16ER080RD	7h	●			8	9.525	3.44	1.4	1.3	0.75	1.59	
MMT16ER060RD	7h	●			6	9.525	3.44	1.5	1.7	1.00	2.12	
MMT22ER040RD	7h	●			4	12.7	4.64	2.2	2.3	1.51	3.18	









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

MMT – G-CLASS GROUND INSERTS

INSERTS

Order number	Thread tolerance	VP10MF	Pitch mm	thread/ inch	IC	S	PDY	PDX	RE RER/L	Total cutting depth	Geometry
ISO TRAPEZOIDAL 30°											
MMT16ER150TR	7e	●	1.5		9.525	3.44	1.0	1.1	0.08	0.90	Semi full form
MMT16ER200TR	7e	●	2.0		9.525	3.44	1.1	1.3	0.15	1.25	
MMT16ER300TR	7e	●	3.0		9.525	3.44	1.3	1.5	0.15	1.75	
MMT22ER400TR	7e	●	4.0		12.7	4.64	1.7	1.9	0.15	2.25	
MMT22ER500TR	7e	●	5.0		12.7	4.64	2.1	2.5	0.15	2.75	
AMERICAN ACME											
MMT16ER120ACME	3G	●		12	9.525	3.44	1.1	1.2	0.08	1.19	Semi full form
MMT16ER100ACME	3G	●		10	9.525	3.44	1.3	1.4	0.08	1.52	
MMT16ER080ACME	3G	●		8	9.525	3.44	1.4	1.5	0.10	1.84	
MMT22ER060ACME	3G	●		6	12.7	4.64	1.8	2.1	0.10	2.37	
MMT22ER050ACME	3G	●		5	12.7	4.64	2.0	2.3	0.10	2.79	
UNJ											
MMT16ER320UNJ	3A	●		32	9.525	3.44	0.6	0.7	0.13	0.46	Full form
MMT16ER280UNJ	3A	●		28	9.525	3.44	0.7	0.7	0.14	0.52	
MMT16ER240UNJ	3A	●		24	9.525	3.44	0.7	0.8	0.17	0.61	
MMT16ER200UNJ	3A	●		20	9.525	3.44	0.8	0.9	0.20	0.73	
MMT16ER180UNJ	3A	●		18	9.525	3.44	0.8	1.0	0.22	0.81	
MMT16ER160UNJ	3A	●		16	9.525	3.44	0.9	1.1	0.25	0.92	
MMT16ER140UNJ	3A	●		14	9.525	3.44	1.0	1.2	0.29	1.05	
MMT16ER120UNJ	3A	●		12	9.525	3.44	1.1	1.3	0.33	1.22	
MMT16ER100UNJ	3A	●		10	9.525	3.44	1.2	1.5	0.40	1.47	
MMT16ER080UNJ	3A	●		8	9.525	3.44	1.2	1.6	0.51	1.83	
API BUTTRESS CASING											
MMT22ER050APBU	Standard API	●		5	12.7	4.64	3.1	1.9	0.74/0.18	1.55	Full form
API ROUND CASING&TUBING											
MMT16ER100APRD	Standard API RD	●		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	

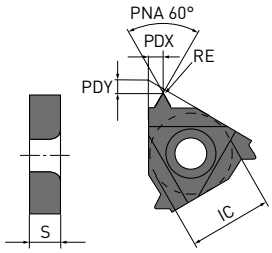
(5 inserts per case)

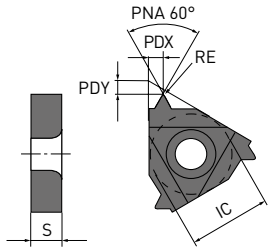
● : Inventory maintained. ★ : Inventory maintained in Japan.

MMT – G-CLASS GROUND INSERTS

INSERTS

Order number	Thread tolerance	VP10MF	Pitch mm	thread/ inch	IC	S	PDY	PDX	RE RER/L	Total cutting depth	Geometry
AMERICAN NPT											
MMT16ER270NPT	Standard NPT	●		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											
MMT16ER270NPTF	Class 2	●		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	





4/4

(5 inserts per case)

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

MMTE HOLDER

RECOMMENDED CUTTING CONDITIONS

EXTERNAL THREADING

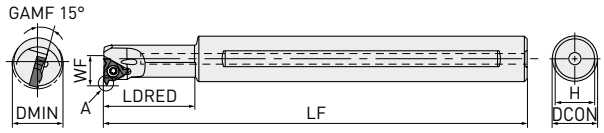
	Material	Hardness	Grade	Vc
P	Mild steel	≤180HB	MP9025	80 (60–100)
			VP10MF	150 (70–230)
			VP15TF	100 (60–140)
			VP20RT	80 (60–100)
	Carbon steel Alloy steel	180 – 280HB	MP9025	80 (60–100)
			VP10MF	140 (80–200)
			VP15TF	100 (60–140)
			VP20RT	80 (60–100)
M	Stainless steel	≤200HB	MP9025	80 (40–120)
			VP15TF	80 (40–120)
			VP20RT	80 (40–120)
K	Gray cast iron	Tensile Strength ≤350MPa	VP10MF	140 (80–200)
			VP15TF	90 (60–120)
S	Heat-resistant alloy	—	MP9025	30 (20– 40)
			VP10MF	45 (15– 70)
			VP15TF	30 (20– 40)
			VP20RT	30 (20– 40)
	Titanium alloy	—	MP9025	45 (25– 65)
			VP10MF	60 (40– 80)
			VP15TF	45 (25– 65)
			VP20RT	45 (25– 65)
H	Heat-treated alloy	45 – 55HRC	VP10MF	50 (30– 70)
			VP15TF	40 (20– 60)

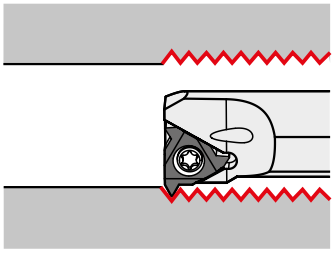
1/1

MMTI BORING BARS

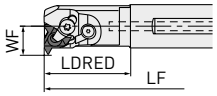
INTERNAL THREADING

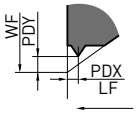
1 Screw-on type





2 Clamp-on type

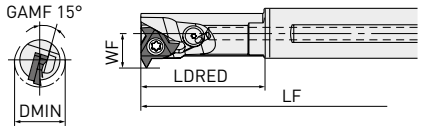




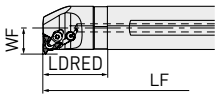
Details of position A.
Refer to the insert standards for dimensions PDX and PDY.

Right hand tool holder only.

3 Screw-on type



4 Clamp-on type



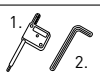
Order number	Stock R	Lead angle	DCON	LF	LDRED	WF	H	DMIN	Insert number	Type
MMTIR1316AK11-SP15	●	1.5°	16	125	25	8.7	15	13		1
MMTIR1316AK11-SP25	●	2.5°	16	125	25	8.7	15	13		1
MMTIR1316AK11-SP35	●	3.5°	16	125	25	8.7	15	13	MMT11IR	1
MMTIR1516AM11-SP15	●	1.5°	16	150	32	9.7	15	15	○○○○○	1
MMTIR1516AM11-SP25	●	2.5°	16	150	32	9.7	15	15		1
MMTIR1516AM11-SP35	●	3.5°	16	150	32	9.7	15	15		1
MMTIR1916AM16-SP15	●	1.5°	16	150	40	12.2	15	19		2
MMTIR1916AM16-SP25	●	2.5°	16	150	40	12.2	15	19		2
MMTIR1916AM16-SP35	●	3.5°	16	150	40	12.2	15	19	MMT16IR	2
MMTIR2420AQ16-C	●	1.5°	20	180	40	14.2	19	24	○○○○○	3
MMTIR2925AS16-C	●	1.5°	25	250	60	16.7	23.4	29		3
MMTIR3732AS16-C	●	1.5°	32	250	48	20.5	30.4	37		4
MMTIR2420AQ22-SP15	●	1.5°	20	180	50	15.5	19	24		2
MMTIR2420AQ22-SP25	●	2.5°	20	180	50	15.5	19	24		2
MMTIR2420AQ22-SP35	●	3.5°	20	180	50	15.5	19	24	MMT22IR	2
MMTIR3025AR22-C	●	1.5°	25	200	38	17.8	23.4	30	○○○○○	4
MMTIR3832AS22-C	●	1.5°	32	250	48	21.8	30.4	38		4
MMTIR4640AT22-C	●	1.5°	40	300	60	26.2	38	46		4

1/1

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

MMTI – INTERNAL THREADING

SPARE PARTS

Order number		 *		 1. * 2.		 1. 2.	
	Clamp bridge	Clamp screw	Stop ring	1. Shim screw 2. Embedded shim screw	Shim	Wrench	Type
MMTIR1316AK11-SP15	—	TS25	—	—	—	1.TKY08F	1
MMTIR1316AK11-SP25	—	TS25	—	—	—	1.TKY08F	1
MMTIR1316AK11-SP35	—	TS25	—	—	—	1.TKY08F	1
MMTIR1516AM11-SP15	—	TS25	—	—	—	1.TKY08F	1
MMTIR1516AM11-SP25	—	TS25	—	—	—	1.TKY08F	1
MMTIR1516AM11-SP35	—	TS25	—	—	—	1.TKY08F	1
MMTIR1916AM16-SP15	—	CS350860T	—	—	—	1.TKY15F	2
MMTIR1916AM16-SP25	—	CS350860T	—	—	—	1.TKY15F	2
MMTIR1916AM16-SP35	—	CS350860T	—	—	—	1.TKY15F	2
MMTIR2420AQ16-C	SETK51	SETS51	CR4	1.HFC03006 / 2.TFS03006	CTI32TP15	1.TKY15F / 2.HKY20R	3
MMTIR2925AS16-C	SETK51	SETS51	CR4	1.HFC03006 / 2.TFS03006	CTI32TP15	1.TKY15F / 2.HKY20R	3
MMTIR3732AS16-C	SETK51	SETS51	CR4	1.HFC03006 / 2.TFS03006	CTI32TP15	1.TKY15F / 2.HKY20R	4
MMTIR2420AQ22-SP15	—	TS43	—	—	—	1.TKY15F	2
MMTIR2420AQ22-SP25	—	TS43	—	—	—	1.TKY15F	2
MMTIR2420AQ22-SP35	—	TS43	—	—	—	1.TKY15F	2
MMTIR3025AR22-C	SETK61	SETS61	CR5	1.HFC04008 / 2.TFS03006	CTI43TP15	1.TKY20F / 2.HKY25R	4
MMTIR3832AS22-C	SETK61	SETS61	CR5	1.HFC04008 / 2.TFS03006	CTI43TP15	1.TKY20F / 2.HKY25R	4
MMTIR4640AT22-C	SETK61	SETS61	CR5	1.HFC04008 / 2.TFS03006	CTI43TP15	1.TKY20F / 2.HKY25R	4

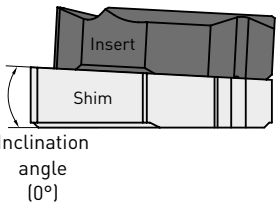
1. Select and use a shim as shown below (sold separately), dependant on the lead angle.
   • A screw-on tool holder uses no shim. (The holder body has a lead angle.) Use a tool holder with the appropriate lead angle.
   • Min. cutting diameter (DMIN) shows the internal hole diameter, not the thread diameter.

* Clamp Torque (N • m): TS25 = 1.0, CS350860T = 3.5, SETS51 = 3.5, TS43 = 3.5, SETS61 = 5.0, HFC03006 = 1.5, HFC04008 = 2.2

SHIM

Lead angle (α°)	Order number	Stock R	Inclination angle (0°)	Applicable holder
-1.5°	CTI32TN15	●	-3°	MMTIR ○○○○ ○○16-C
-0.5°	CTI32TN05	●	-2°	
0.5°	CTI32TP05	●	-1°	
1.5°	CTI32TP15	●	0°	
2.5°	CTI32TP25	●	1°	
3.5°	CTI32TP35	●	2°	
4.5°	CTI32TP45	●	3°	

Lead angle (α°)	Order number	Stock R	Inclination angle (0°)	Applicable holder
-1.5°	CTI43TN15	●	-3°	MMTIR ○○○○ ○○22-C
-0.5°	CTI43TN05	●	-2°	
0.5°	CTI43TP05	●	-1°	
1.5°	CTI43TP15	●	0°	
2.5°	CTI43TP25	●	1°	
3.5°	CTI43TP35	●	2°	
4.5°	CTI43TP45	●	3°	



Standard shim delivered with the holder.

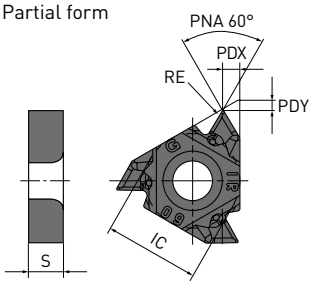
● : Inventory maintained. ★ : Inventory maintained in Japan.

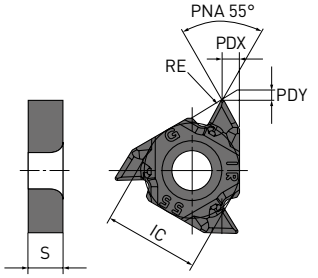
MMT

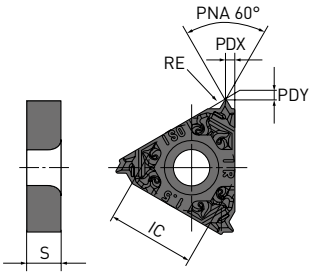
M-CLASS INSERTS WITH 3-D CHIPBREAKERS

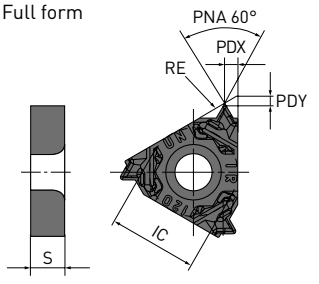
INSERTS

Order number	NEW MP9025	VP15TF	VP20RT	Pitch mm	Thread/ inch	IC	S	PDY	PDX	RE	Total cutting depth	Geometry
PARTIAL PROFILE 60°												
MMT11IRA60-S	●		●	0.5 – 1.5	48 – 16	6.35	3.04	0.8	0.9	0.03	—	Partial form
MMT16IRAG60-S	●	●	●	0.5 – 3.0	48 – 8	9.525	3.44	1.2	1.7	0.05	—	
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	—	Partial form
MMT16IRAG55-S	●	●	●		48 – 8	9.525	3.44	1.2	1.7	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	Full form
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	Full form
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	









1/2

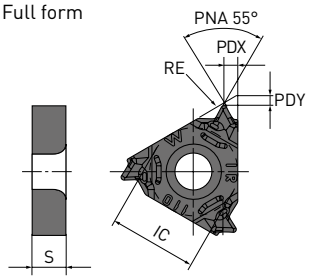
● / ★ = Expansion

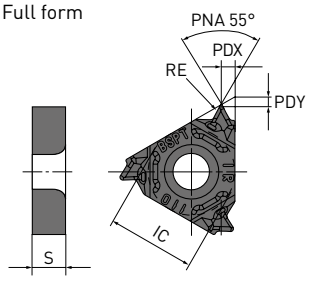
● : Inventory maintained. ★ : Inventory maintained in Japan.

MMT – M-CLASS INSERTS WITH 3-D CHIPBREAKERS

INSERTS

Order number	NEW MP9025	VP15TF	VP20RT	Pitch mm	Thread/ inch	IC	S	PDY	PDX	RE	Total cutting depth	Geometry
WHITWORTH FOR BSW, BSP												
MMT16IR190W-S	●		●		19	9.525	3.44	0.8	1.0	0.18	0.86	Full form
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	Full form
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	





(5 inserts per case)

1. Identification: Please see page 14 (M-Class).

● / ★ = Expansion

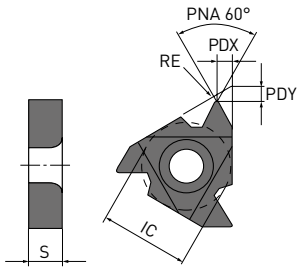
● : Inventory maintained. ★ : Inventory maintained in Japan.

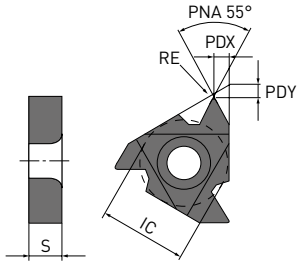
MMT

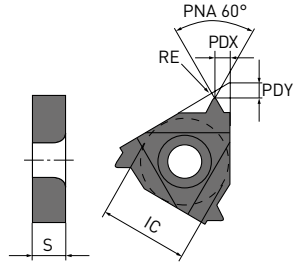
G-CLASS GROUND INSERTS

INSERTS

Order number	Thread tolerance	VP10MF	VP15TF	Pitch mm	thread/ inch	IC	S	PDY	PDX	RE	Total cutting depth	Geometry
PARTIAL PROFILE 60°												
MMT11IRA60	–	●	●	0.5 – 1.5	48 – 16	6.35	3.04	0.8	0.9	0.05	–	Partial form
MMT16IRAG60	–	●		0.5 – 3.0	48 – 8	9.525	3.44	1.2	1.7	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	–	
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	–	Partial form
MMT16IRAG55	–	●			48 – 8	9.525	3.44	1.2	1.7	0.07	–	
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	–	
MMT22IRN55	–	●			7 – 5	12.7	4.64	1.7	2.5	0.44	–	
ISO METRIC												
MMT11IR050ISO	6H	●		0.5		6.35	3.04	0.6	0.4	0.03	0.29	Full form
MMT11IR075ISO	6H	●		0.75		6.35	3.04	0.6	0.6	0.04	0.43	
MMT11IR100ISO	6H	●	●	1.0		6.35	3.04	0.6	0.7	0.10	0.58	
MMT11IR125ISO	6H	●	●	1.25		6.35	3.04	0.8	0.9	0.12	0.72	
MMT11IR150ISO	6H	●	●	1.5		6.35	3.04	0.8	1.0	0.14	0.87	
MMT11IR175ISO	6H	●		1.75		6.35	3.04	0.9	1.1	0.10	1.01	
MMT11IR200ISO	6H	●		2.0		6.35	3.04	0.9	1.1	0.18	1.15	
MMT16IR050ISO	6H	●		0.5		9.525	3.44	0.6	0.4	0.03	0.29	
MMT16IR075ISO	6H	●		0.75		9.525	3.44	0.6	0.6	0.04	0.43	
MMT16IR100ISO	6H	●	●	1.0		9.525	3.44	0.6	0.7	0.10	0.58	
MMT16IR125ISO	6H	●	●	1.25		9.525	3.44	0.8	0.9	0.12	0.72	
MMT16IR150ISO	6H	●	●	1.5		9.525	3.44	0.8	1.0	0.14	0.87	
MMT16IR175ISO	6H	●	●	1.75		9.525	3.44	0.9	1.2	0.10	1.01	
MMT16IR200ISO	6H	●	●	2.0		9.525	3.44	1.0	1.3	0.18	1.15	
MMT16IR250ISO	6H	●	●	2.5		9.525	3.44	1.1	1.5	0.15	1.44	
MMT16IR300ISO	6H	●	●	3.0		9.525	3.44	1.1	1.5	0.26	1.73	
MMT22IR350ISO	6H	●		3.5		12.7	4.64	1.6	2.3	0.22	2.02	
MMT22IR400ISO	6H	●		4.0		12.7	4.64	1.6	2.3	0.25	2.31	
MMT22IR450ISO	6H	●		4.5		12.7	4.64	1.6	2.3	0.28	2.60	
MMT22IR500ISO	6H	●		5.0		12.7	4.64	1.6	2.3	0.32	2.89	







(5 inserts per case)

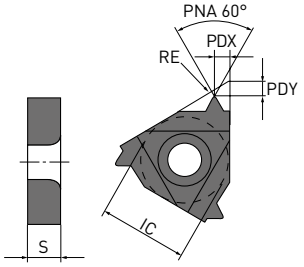
1. Identification: Please see page 14 (G-Class).

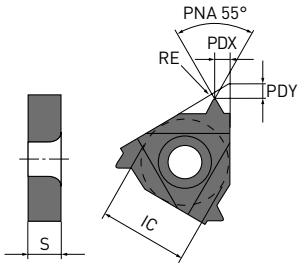
● : Inventory maintained. ★ : Inventory maintained in Japan.

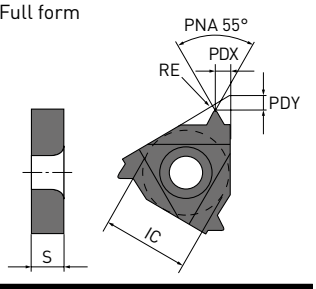
MMT – G-CLASS GROUND INSERTS

INSERTS

Order number	Thread tolerance	VP10MF	VP15TF	Pitch mm	thread/ inch	IC	S	PDY	PDX	RE	Total cutting depth	Geometry
AMERICAN UN												
MMT11IR320UN	2B	●			32	6.35	3.04	0.6	0.6	0.04	0.46	Full form
MMT11IR280UN	2B	●			28	6.35	3.04	0.6	0.7	0.05	0.52	
MMT11IR240UN	2B	●			24	6.35	3.04	0.7	0.8	0.09	0.61	
MMT11IR200UN	2B	●			20	6.35	3.04	0.8	0.9	0.11	0.73	
MMT11IR180UN	2B	●			18	6.35	3.04	0.8	1.0	0.12	0.81	
MMT11IR160UN	2B	●			16	6.35	3.04	0.9	1.1	0.14	0.92	
MMT11IR140UN	2B	●			14	6.35	3.04	0.9	1.1	0.11	1.05	
MMT16IR320UN	2B	●			32	9.525	3.44	0.6	0.6	0.04	0.46	
MMT16IR280UN	2B	●			28	9.525	3.44	0.6	0.7	0.05	0.52	
MMT16IR240UN	2B	●			24	9.525	3.44	0.7	0.8	0.09	0.61	
MMT16IR200UN	2B	●			20	9.525	3.44	0.8	0.9	0.11	0.73	
MMT16IR180UN	2B	●			18	9.525	3.44	0.8	1.0	0.12	0.81	
MMT16IR160UN	2B	●	●		16	9.525	3.44	0.9	1.1	0.14	0.92	
MMT16IR140UN	2B	●	●		14	9.525	3.44	0.9	1.2	0.11	1.05	
MMT16IR130UN	2B	●			13	9.525	3.44	1.0	1.3	0.10	1.13	
MMT16IR120UN	2B	●	●		12	9.525	3.44	1.1	1.4	0.18	1.22	
MMT16IR110UN	2B	●			11	9.525	3.44	1.1	1.5	0.13	1.33	
MMT16IR100UN	2B	●			10	9.525	3.44	1.1	1.5	0.15	1.47	
MMT16IR090UN	2B	●			9	9.525	3.44	1.2	1.7	0.17	1.63	
MMT16IR080UN	2B	●			8	9.525	3.44	1.1	1.5	0.27	1.83	
MMT22IR070UN	2B	●			7	12.7	4.64	1.6	2.3	0.23	2.09	
MMT22IR060UN	2B	●			6	12.7	4.64	1.6	2.3	0.26	2.44	
MMT22IR050UN	2B	●			5	12.7	4.64	1.6	2.3	0.32	2.93	
WHITWORTH FOR BSW, BSP												
MMT11IR190W	Medium class A	●			19	6.35	3.04	0.8	1.0	0.19	0.86	Full form
MMT11IR140W		●			14	6.35	3.04	0.9	1.1	0.26	1.16	
MMT16IR280W		●			28	9.525	3.44	0.6	0.7	0.09	0.58	
MMT16IR260W		●			26	9.525	3.44	0.7	0.8	0.10	0.63	
MMT16IR200W		●			20	9.525	3.44	0.8	0.9	0.18	0.81	
MMT16IR190W		●	●		19	9.525	3.44	0.8	1.0	0.19	0.86	
MMT16IR180W		●			18	9.525	3.44	0.8	1.0	0.20	0.90	
MMT16IR160W		●			16	9.525	3.44	0.9	1.1	0.23	1.02	
MMT16IR140W		●	●		14	9.525	3.44	1.0	1.2	0.26	1.16	
MMT16IR120W		●			12	9.525	3.44	1.1	1.4	0.30	1.36	
MMT16IR110W		●	●		11	9.525	3.44	1.1	1.5	0.33	1.48	
MMT16IR100W		●			10	9.525	3.44	1.1	1.5	0.37	1.63	
MMT16IR090W		●			9	9.525	3.44	1.2	1.7	0.34	1.81	
MMT16IR080W		●			8	9.525	3.44	1.2	1.5	0.39	2.03	
MMT22IR070W		●			7	12.7	4.64	1.6	2.3	0.46	2.32	
MMT22IR060W		●			6	12.7	4.64	1.6	2.3	0.53	2.71	
MMT22IR050W		●			5	12.7	4.64	1.7	2.4	0.66	3.25	
BSPT												
MMT11IR190BSPT	Standard BSPT	●			19	6.35	3.04	0.8	0.9	0.14	0.86	Full form
MMT11IR140BSPT		●			14	6.35	3.04	0.9	1.0	0.26	1.16	
MMT16IR190BSPT		●	●		19	9.525	3.44	0.8	0.9	0.14	0.86	
MMT16IR140BSPT		●	●		14	9.525	3.44	1.0	1.2	0.26	1.16	
MMT16IR110BSPT		●	●		11	9.525	3.44	1.1	1.5	0.33	1.48	





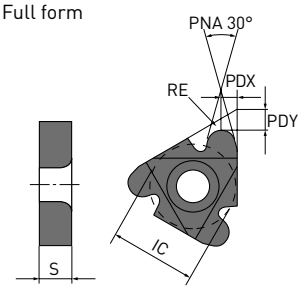


● : Inventory maintained. ★ : Inventory maintained in Japan.

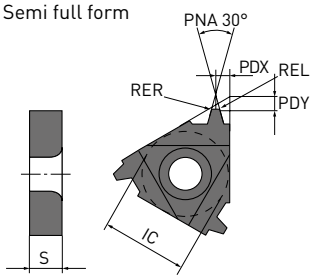
MMT – G-CLASS GROUND INSERTS

INSERTS

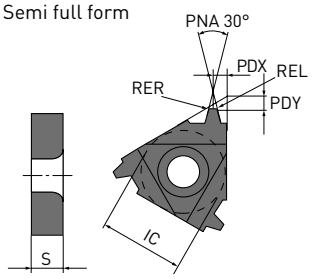
Order number	Thread tolerance	VP10MF	VP15TF	Pitch mm	thread/ inch	IC	S	PDY	PDX	RE	Total cutting depth	Geometry
ROUND DIN 405												
MMT16IR100RD	7H	●			10	9.525	3.44	1.1	1.2	0.55	1.27	Full form
MMT16IR080RD	7H	●			8	9.525	3.44	1.4	1.4	0.70	1.59	
MMT16IR060RD	7H	●			6	9.525	3.44	1.4	1.5	0.93	2.12	
MMT22IR040RD	7H	●			4	12.7	4.64	2.2	2.3	1.40	3.18	



Order number	Thread tolerance	VP10MF	Pitch mm	thread/ inch	IC	S	PDY	PDX	RE RER/L	Total cutting depth	Geometry
ISO TRAPEZOIDAL 30°											
MMT16IR150TR	7H	●	1.5		9.525	3.44	1.0	1.1	0.08	0.90	Semi full form
MMT16IR200TR	7H	●	2.0		9.525	3.44	1.1	1.3	0.15	1.25	
MMT16IR300TR	7H	●	3.0		9.525	3.44	1.3	1.5	0.15	1.75	
MMT22IR400TR	7H	●	4.0		12.7	4.64	1.7	1.9	0.15	2.25	
MMT22IR500TR	7H	●	5.0		12.7	4.64	2.1	2.5	0.15	2.75	



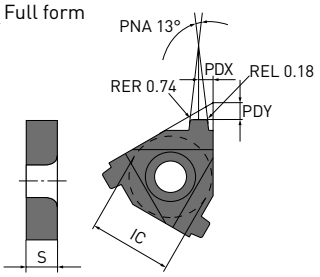
AMERICAN ACME											
MMT16IR120ACME	3G	●		12	9.525	3.44	1.2	1.3	0.05	1.19	Semi full form
MMT16IR100ACME	3G	●		10	9.525	3.44	1.2	1.3	0.08	1.52	
MMT16IR080ACME	3G	●		8	9.525	3.44	1.4	1.5	0.10	1.84	
MMT22IR060ACME	3G	●		6	12.7	4.64	1.8	2.1	0.10	2.37	
MMT22IR050ACME	3G	●		5	12.7	4.64	2.0	2.3	0.10	2.79	



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											
MMT22IR050APBU	Standard API	●		5	12.7	4.64	2.8	1.9	0.74/0.18	1.55	Full form

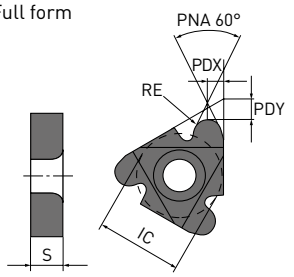


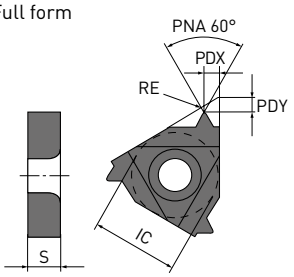
● : Inventory maintained. ★ : Inventory maintained in Japan.

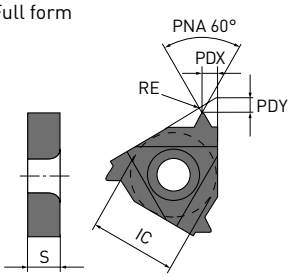
MMT – G-CLASS GROUND INSERTS

INSERTS

Order number	Thread tolerance	VP10MF	Pitch mm	thread/ inch	IC	S	PDY	PDX	RE RER/L	Total cutting depth	Geometry
API ROUND CASING&TUBING											
MMT16IR100APRD	Standard API RD	●		10	9.525	3.44	1.2	1.4	0.34	1.41	Full form
MMT16IR080APRD		●		8	9.525	3.44	1.3	1.5	0.41	1.81	
AMERICAN NPT											
MMT16IR270NPT	Standard NPT	●		27	9.525	3.44	0.7	0.8	0.04	0.66	Full form
MMT16IR180NPT		●		18	9.525	3.44	0.8	1.0	0.08	1.01	
MMT16IR140NPT		●		14	9.525	3.44	0.9	1.2	0.09	1.33	
MMT16IR115NPT		●		11.5	9.525	3.44	1.1	1.5	0.11	1.64	
MMT16IR080NPT		●		8	9.525	3.44	1.3	1.8	0.14	2.42	
AMERICAN NPTF											
MMT16IR140NPTF	Class 2	●		14	9.525	3.44	0.9	1.2	0.04	1.35	Full form
MMT16IR115NPTF		●		11.5	9.525	3.44	1.1	1.5	0.04	1.63	
MMT16IR080NPTF		●		8	9.525	3.44	1.3	1.8	0.04	2.38	







5/5

(5 inserts per case)

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

MMTI BORING BARS

RECOMMENDED CUTTING CONDITIONS

INTERNAL THREADING

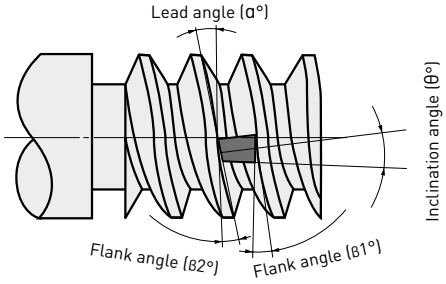
	Material	Hardness	Grade	Vc
P	Mild steel	≤180HB	MP9025	80 (60–100)
			VP10MF	150 (70–230)
			VP15TF	100 (60–140)
			VP20RT	80 (60–100)
	Carbon steel Alloy steel	180 – 280HB	MP9025	80 (60–100)
			VP10MF	140 (80–200)
			VP15TF	100 (60–140)
			VP20RT	80 (60–100)
M	Stainless steel	≤200HB	MP9025	80 (40–120)
			VP15TF	80 (40–120)
			VP20RT	80 (40–120)
K	Gray cast iron	Tensile Strength ≤350MPa	VP10MF	140 (80–200)
			VP15TF	90 (60–120)
S	Heat-resistant alloy	—	MP9025	30 (20– 40)
			VP10MF	45 (15– 70)
			VP15TF	30 (20– 40)
			VP20RT	30 (20– 40)
	Titanium alloy	—	MP9025	45 (25– 65)
			VP10MF	60 (40– 80)
			VP15TF	45 (25– 65)
			VP20RT	45 (25– 65)
H	Heat-treated alloy	45 – 55HRC	VP10MF	50 (30– 70)
			VP15TF	40 (20– 60)

CUTTING CONDITIONS OF MMT SERIES

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 (β1,β2). No need to change a shim for general threading with an MMT holder. 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.



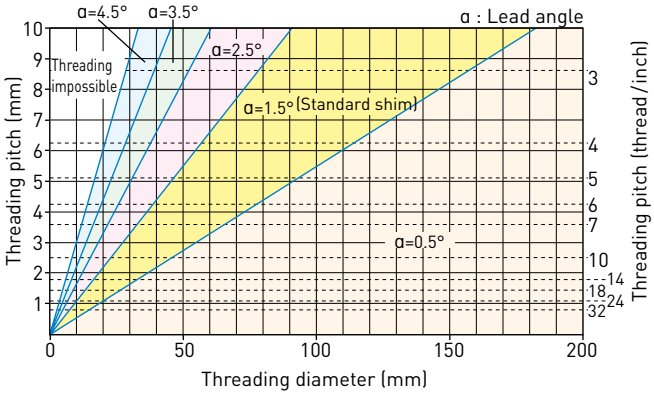
SHIM REFERENCE TABLE (THREADING DIAMETER) (THREAD ANGLE 60˚ AND 55˚)

Lead angle	Right hand thread						Left hand thread *		
Pitch (mm)	Threading impossible	4.5°	3.5°	2.5°	1.5°	0.5°	Threading impossible	-1.5°	-0.5°
0.5	≤Ø1.7	Ø1.7 – Ø2.3	Ø2.3 – Ø3.0	Ø3.0 – Ø4.6	Ø4.6 – Ø9.1	≥Ø9.1	≤Ø3.6	Ø3.6 – Ø9.1	≥Ø9.1
0.75	≤Ø2.5	Ø2.5 – Ø3.4	Ø3.4 – Ø4.6	Ø4.6 – Ø6.8	Ø6.8 – Ø13.7	≥Ø13.7	≤Ø5.5	Ø5.5 – Ø13.7	≥Ø13.7
1	≤Ø3.3	Ø3.3 – Ø4.6	Ø4.6 – Ø6.1	Ø6.1 – Ø9.1	Ø9.1 – Ø18.2	≥Ø18.2	≤Ø7.3	Ø7.3 – Ø18.2	≥Ø18.2
1.25	≤Ø4.1	Ø4.1 – Ø5.7	Ø5.7 – Ø7.6	Ø7.6 – Ø11.4	Ø11.4 – Ø22.8	≥Ø22.8	≤Ø9.1	Ø9.1 – Ø22.8	≥Ø22.8
1.5	≤Ø5.0	Ø5.0 – Ø6.8	Ø6.8 – Ø9.1	Ø9.1 – Ø13.7	Ø13.7 – Ø27.4	≥Ø27.4	≤Ø10.9	Ø10.9 – Ø27.4	≥Ø27.4
1.75	≤Ø5.8	Ø5.8 – Ø8.0	Ø8.0 – Ø10.6	Ø10.6 – Ø16.0	Ø16.0 – Ø31.9	≥Ø31.9	≤Ø12.8	Ø12.8 – Ø31.9	≥Ø31.9
2	≤Ø6.6	Ø6.6 – Ø9.1	Ø9.1 – Ø12.1	Ø12.1 – Ø18.2	Ø18.2 – Ø36.5	≥Ø36.5	≤Ø14.6	Ø14.6 – Ø36.5	≥Ø36.5
2.5	≤Ø8.3	Ø8.3 – Ø11.4	Ø11.4 – Ø15.2	Ø15.2 – Ø22.8	Ø22.8 – Ø45.6	≥Ø45.6	≤Ø18.2	Ø18.2 – Ø45.6	≥Ø45.6
3	≤Ø9.9	Ø9.9 – Ø13.7	Ø13.7 – Ø18.2	Ø18.2 – Ø27.3	Ø27.3 – Ø54.7	≥Ø54.7	≤Ø21.9	Ø21.9 – Ø54.7	≥Ø54.7
3.5	≤Ø11.6	Ø11.6 – Ø15.9	Ø15.9 – Ø21.3	Ø21.3 – Ø31.9	Ø31.9 – Ø63.8	≥Ø63.8	≤Ø25.5	Ø25.5 – Ø63.8	≥Ø63.8
4	≤Ø13.2	Ø13.2 – Ø18.2	Ø18.2 – Ø24.3	Ø24.3 – Ø36.5	Ø36.5 – Ø72.9	≥Ø72.9	≤Ø29.2	Ø29.2 – Ø72.9	≥Ø72.9
4.5	≤Ø14.9	Ø14.9 – Ø20.5	Ø20.5 – Ø27.3	Ø27.3 – Ø41.0	Ø41.0 – Ø82.1	≥Ø82.1	≤Ø32.8	Ø32.8 – Ø82.1	≥Ø82.1
5	≤Ø16.5	Ø16.5 – Ø22.8	Ø22.8 – Ø30.4	Ø30.4 – Ø45.6	Ø45.6 – Ø91.2	≥Ø91.2	≤Ø36.5	Ø36.5 – Ø91.2	≥Ø91.2

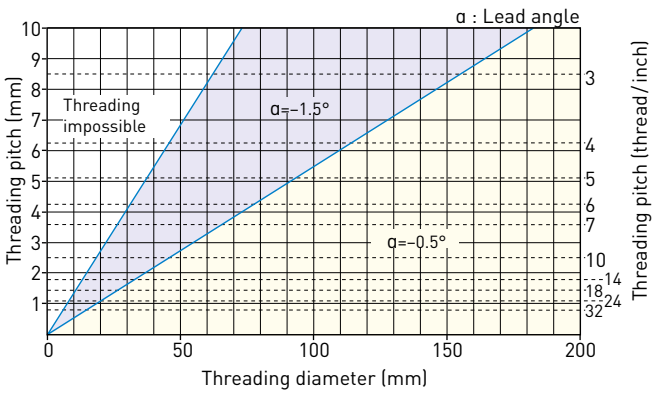
* Back turning in the case of left hand threads.

SHIM REFERENCE GRAPH (THREAD ANGLE 60˚ AND 55˚)

Right hand thread



Left hand thread



1. When a thread lead angle ≤ the tool flank angle, change the shim to prevent side interference with the insert. (Refer to the table on page 33/34 for the calculation of thread lead angle and tool flank angle.)

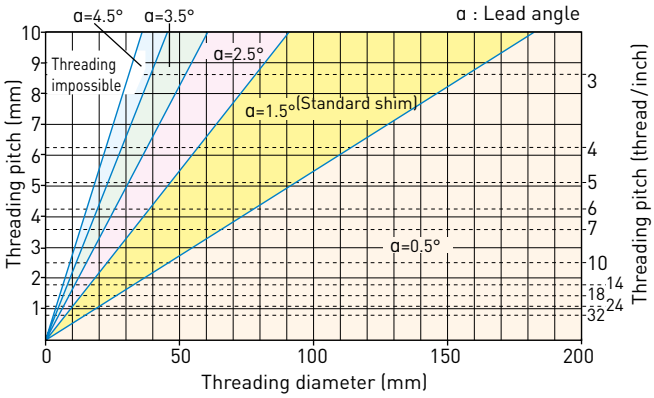
SHIM REFERENCE TABLE (THREADING DIAMETER) (THREAD ANGLE 30° AND 29°)

Lead angle	Right hand thread						Left hand thread *		
Pitch (mm)	Threading impossible	4.5°	3.5°	2.5°	1.5°	0.5°	Threading impossible	-1.5°	-0.5°
0.5	≤Ø1.8	Ø1.8 – Ø2.3	Ø2.3 – Ø3.0	Ø3.0 – Ø4.6	Ø4.6 – Ø9.1	≥Ø9.1	≤Ø4.6	Ø4.6 – Ø9.1	≥Ø9.1
0.75	≤Ø2.7	Ø2.7 – Ø3.4	Ø3.4 – Ø4.6	Ø4.6 – Ø6.8	Ø6.8 – Ø13.7	≥Ø13.7	≤Ø6.8	Ø6.8 – Ø13.7	≥Ø13.7
1	≤Ø3.6	Ø3.6 – Ø4.6	Ø4.6 – Ø6.1	Ø6.1 – Ø9.1	Ø9.1 – Ø18.2	≥Ø18.2	≤Ø9.1	Ø9.1 – Ø18.2	≥Ø18.2
1.25	≤Ø4.5	Ø4.5 – Ø5.7	Ø5.7 – Ø7.6	Ø7.6 – Ø11.4	Ø11.4 – Ø22.8	≥Ø22.8	≤Ø11.4	Ø11.4 – Ø22.8	≥Ø22.8
1.5	≤Ø5.5	Ø5.5 – Ø6.8	Ø6.8 – Ø9.1	Ø9.1 – Ø13.7	Ø13.7 – Ø27.4	≥Ø27.4	≤Ø13.7	Ø13.7 – Ø27.4	≥Ø27.4
1.75	≤Ø6.4	Ø6.4 – Ø8.0	Ø8.0 – Ø10.6	Ø10.6 – Ø16.0	Ø16.0 – Ø31.9	≥Ø31.9	≤Ø16.0	Ø16.0 – Ø31.9	≥Ø31.9
2	≤Ø7.3	Ø7.3 – Ø9.1	Ø9.1 – Ø12.1	Ø12.1 – Ø18.2	Ø18.2 – Ø36.5	≥Ø36.5	≤Ø18.2	Ø18.2 – Ø36.5	≥Ø36.5
2.5	≤Ø9.1	Ø9.1 – Ø11.4	Ø11.4 – Ø15.2	Ø15.2 – Ø22.8	Ø22.8 – Ø45.6	≥Ø45.6	≤Ø22.8	Ø22.8 – Ø45.6	≥Ø45.6
3	≤Ø10.9	Ø10.9 – Ø13.7	Ø13.7 – Ø18.2	Ø18.2 – Ø27.3	Ø27.3 – Ø54.7	≥Ø54.7	≤Ø27.3	Ø27.3 – Ø54.7	≥Ø54.7
3.5	≤Ø12.7	Ø12.7 – Ø15.9	Ø15.9 – Ø21.3	Ø21.3 – Ø31.9	Ø31.9 – Ø63.8	≥Ø63.8	≤Ø31.9	Ø31.9 – Ø63.8	≥Ø63.8
4	≤Ø14.6	Ø14.6 – Ø18.2	Ø18.2 – Ø24.3	Ø24.3 – Ø36.5	Ø36.5 – Ø72.9	≥Ø72.9	≤Ø36.5	Ø36.5 – Ø72.9	≥Ø72.9
4.5	≤Ø16.4	Ø16.4 – Ø20.5	Ø20.5 – Ø27.3	Ø27.3 – Ø41.0	Ø41.0 – Ø82.1	≥Ø82.1	≤Ø41.0	Ø41.0 – Ø82.1	≥Ø82.1
5	≤Ø18.2	Ø18.2 – Ø22.8	Ø22.8 – Ø30.4	Ø30.4 – Ø45.6	Ø45.6 – Ø91.2	≥Ø91.2	≤Ø45.6	Ø45.6 – Ø91.2	≥Ø91.2

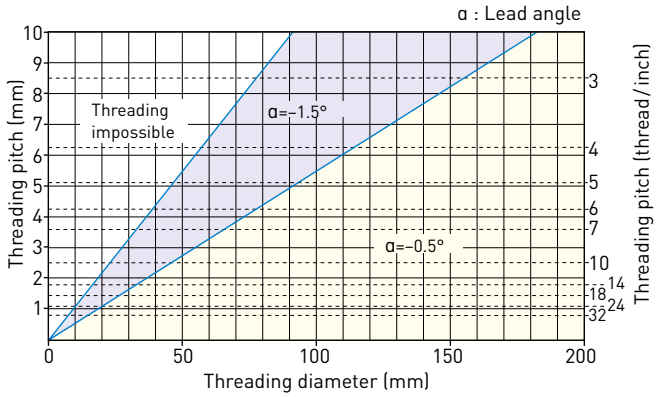
* Back turning in the case of left hand threads.

SHIM REFERENCE GRAPH (THREAD ANGLE 30° AND 29°)

Right hand thread



Left hand thread



1. When a thread lead angle ≤ the tool flank angle, change the shim to prevent side interference with the insert. (Refer to the table on page 33/34 for the calculation of thread lead angle and tool flank angle.)

SELECTION TABLE

Lead angle	Opening angle 60°/55° Right hand thread		Opening angle 60°/55° Left hand thread *		Opening angle 30°/29° Right hand thread		Opening 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	Compatible	Compatible
2.5	P25	P25	Compatible	Compatible	P25	P25	Compatible	Compatible
3	P35	P35	Compatible	Compatible	P35	P35	Compatible	Compatible
3.5	P35	P35	Compatible	Compatible	P35	P35	Compatible	Compatible
4	P45	P45	Compatible	Compatible	P45	P45	Compatible	Compatible
4.5	P45	P45	Compatible	Compatible	P45	P45	Compatible	Compatible
5	P45	P45	Compatible	Compatible	Compatible	Compatible	Compatible	Compatible
5.5	Compatible	Compatible	Compatible	Compatible	Compatible	Compatible	Compatible	Compatible

* Back turning in the case of left hand threads.

CUTTING CONDITIONS OF MMT SERIES

When replacing a shim, check if the difference between the thread lead angle and shim inclination angle is within:
2.5° – 0.5° where thread helix angle is 60° (55°)
2° – 1° where thread helix angle is 30° (29°)
* Inclination angle of a standard shim is 0°
* The holder has a 1.5° lead angle

EXAMPLE OF SELECTING A SHIM

- When the thread lead angle is 2.2° and in the case when the thread helix angle is 60°

1. (2.2° lead angle) – (2.5 – 0.5°) = -0.3° – 1.7° shim inclination angle is appropriate.
Threading with a standard shim (0° inclination angle) is possible. But, replacing it with a shim with a 1° inclination angle is recommended, refer to Standard Shim List on pages 15 and 23.

2. In the case when the thread helix angle is 30°
(2.2° lead angle) – (2 – 1°) = -0.2° – 1.2° shim inclination angle is appropriate.
Replacing it with a shim with a 1° inclination angle is recommended, referring to the Standard shim list on pages 15 and 23.

CALCULATION OF THREAD LEAD ANGLE

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

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

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 (β2, β1) 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.

Please refer to the "Calculation of thread lead angle" on the website from given QR Code.
https://www.mitsubishicarbide.com/index.php?cID=2884

MMT – STANDARD OF DEPTH OF CUT EXTERNAL (RADIAL INFEED)

ISO METRIC

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 chipbreakers
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

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 chipbreakers
32	0.49	0.17	0.15	0.11	0.06											MMT16ER320UN	—
28	0.56	0.17	0.14	0.10	0.09	0.06										MMT16ER280UN	—
24	0.65	0.18	0.16	0.14	0.11	0.06										MMT16ER240UN	—
20	0.78	0.20	0.18	0.13	0.11	0.10	0.06									MMT16ER200UN	—
18	0.87	0.22	0.20	0.15	0.13	0.11	0.06									MMT16ER180UN	—
16	0.97	0.22	0.20	0.15	0.12	0.11	0.11	0.06								MMT16ER160UN	MMT16ER160UN-S
14	1.11	0.23	0.21	0.16	0.13	0.11	0.11	0.10	0.06							MMT16ER140UN	MMT16ER140UN-S
13	1.20	0.25	0.22	0.17	0.14	0.13	0.12	0.11	0.06							MMT16ER130UN	—
12	1.30	0.28	0.23	0.18	0.16	0.14	0.13	0.12	0.06							MMT16ER120UN	MMT16ER120UN-S
11	1.42	0.28	0.23	0.19	0.16	0.14	0.13	0.12	0.11	0.06						MMT16ER110UN	—
10	1.56	0.28	0.24	0.19	0.16	0.14	0.13	0.13	0.12	0.11	0.06					MMT16ER100UN	—
9	1.73	0.34	0.29	0.22	0.17	0.15	0.14	0.13	0.12	0.11	0.06					MMT16ER090UN	—
8	1.95	0.35	0.30	0.24	0.19	0.16	0.15	0.14	0.13	0.12	0.11	0.06				MMT16ER080UN	—
7	2.22	0.37	0.33	0.28	0.24	0.20	0.17	0.16	0.15	0.14	0.12	0.06				MMT22ER070UN	—
6	2.60	0.42	0.35	0.29	0.25	0.21	0.18	0.17	0.16	0.15	0.13	0.12	0.11	0.06		MMT22ER060UN	—
5	3.12	0.43	0.39	0.31	0.27	0.24	0.22	0.20	0.19	0.19	0.18	0.17	0.15	0.12	0.06	MMT22ER050UN	—

MMT – STANDARD OF DEPTH OF CUT EXTERNAL (RADIAL INFEED)

WHITWORTH FOR BSW, BSP

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 chipbreakers
28	0.58	0.17	0.14	0.11	0.10	0.06										MMT16ER280W	—
26	0.63	0.18	0.15	0.13	0.11	0.06										MMT16ER260W	—
20	0.81	0.20	0.18	0.14	0.12	0.11	0.06									MMT16ER200W	—
19	0.86	0.21	0.19	0.15	0.13	0.12	0.06									MMT16ER190W	MMT16ER190W-S
18	0.90	0.25	0.19	0.15	0.13	0.12	0.06									MMT16ER180W	—
16	1.02	0.21	0.18	0.15	0.13	0.11	0.09	0.09	0.06							MMT16ER160W	—
14	1.16	0.23	0.21	0.17	0.14	0.12	0.12	0.11	0.06							MMT16ER140W	MMT16ER140W-S
12	1.36	0.27	0.25	0.20	0.16	0.15	0.14	0.13	0.06							MMT16ER120W	—
11	1.48	0.27	0.24	0.20	0.17	0.15	0.14	0.13	0.12	0.06						MMT16ER110W	MMT16ER110W-S
10	1.63	0.27	0.25	0.20	0.17	0.15	0.15	0.13	0.13	0.12	0.06					MMT16ER100W	—
9	1.81	0.28	0.26	0.21	0.18	0.16	0.15	0.14	0.13	0.12	0.12	0.06				MMT16ER090W	—
8	2.03	0.30	0.27	0.22	0.19	0.17	0.16	0.15	0.14	0.13	0.12	0.12	0.06			MMT16ER080W	—
7	2.32	0.34	0.32	0.26	0.22	0.20	0.18	0.17	0.16	0.15	0.14	0.12	0.06			MMT22ER070W	—
6	2.71	0.35	0.33	0.27	0.23	0.21	0.20	0.19	0.17	0.16	0.15	0.14	0.13	0.12	0.06	MMT22ER060W	—
5	3.25	0.42	0.40	0.35	0.29	0.26	0.24	0.22	0.20	0.19	0.18	0.17	0.15	0.12	0.06	MMT22ER050W	—

BSPT

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 chipbreakers
28	0.58	0.17	0.14	0.11	0.10	0.06										MMT16ER280BSPT	—
19	0.86	0.22	0.19	0.15	0.12	0.12	0.06									MMT16ER190BSPT	MMT16ER190BSPT-S
14	1.16	0.24	0.20	0.17	0.14	0.12	0.12	0.11	0.06							MMT16ER140BSPT	MMT16ER140BSPT-S
11	1.48	0.25	0.23	0.21	0.18	0.16	0.14	0.13	0.12	0.06						MMT16ER110BSPT	MMT16ER110BSPT-S

1. Set the finishing allowance on a diameter at approx. 0.1 mm when using a full form insert.
2. Please note the cutting depth and the number of passes when a corner radius of a partial form insert or of an internal threading insert is small to prevent damage to the insert corner.
3. 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.

MMT – STANDARD OF DEPTH OF CUT EXTERNAL (RADIAL INFEED)

ROUND DIN 405

thread/ inch	Total cutting depth	Number of passes															Insert type
		1	2	3	4	5	6	7	8	9	10	11	12	13	14		
10	1.27	0.23	0.21	0.20	0.19	0.16	0.12	0.10	0.06								MMT16ER100RD
8	1.59	0.23	0.21	0.20	0.19	0.18	0.16	0.14	0.12	0.10	0.06						MMT16ER080RD
6	2.12	0.26	0.25	0.24	0.22	0.21	0.19	0.17	0.16	0.14	0.12	0.10	0.06				MMT16ER060RD
4	3.18	0.34	0.33	0.32	0.30	0.28	0.26	0.24	0.22	0.20	0.19	0.17	0.15	0.12	0.06		MMT22ER040RD

ISO TRAPEZOIDAL 30°

Pitch (mm)	Total cutting depth	Number of passes															Insert type
		1	2	3	4	5	6	7	8	9	10	11	12	13	14		
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

thread/ inch	Total cutting depth	Number of passes															Insert type
		1	2	3	4	5	6	7	8	9	10	11	12	13	14		
12	1.19	0.27	0.23	0.20	0.17	0.14	0.12	0.06									MMT16ER120ACME
10	1.52	0.29	0.25	0.21	0.18	0.16	0.14	0.12	0.11	0.06							MMT16ER100ACME
8	1.84	0.30	0.26	0.22	0.19	0.16	0.15	0.14	0.13	0.12	0.11	0.06					MMT16ER080ACME
6	2.37	0.34	0.30	0.27	0.24	0.21	0.19	0.16	0.14	0.12	0.12	0.11	0.11	0.06			MMT22ER060ACME
5	2.79	0.36	0.33	0.30	0.26	0.23	0.20	0.18	0.17	0.16	0.15	0.14	0.13	0.12	0.06		MMT22ER050ACME

UNJ

thread/ inch	Total cutting depth	Number of passes															Insert type
		1	2	3	4	5	6	7	8	9	10	11					
32	0.46	0.16	0.14	0.10	0.06												MMT16ER320UNJ
28	0.52	0.16	0.12	0.09	0.09	0.06											MMT16ER280UNJ
24	0.61	0.17	0.14	0.14	0.10	0.06											MMT16ER240UNJ
20	0.73	0.19	0.16	0.13	0.10	0.09	0.06										MMT16ER200UNJ
18	0.81	0.23	0.18	0.14	0.10	0.10	0.06										MMT16ER180UNJ
16	0.92	0.26	0.21	0.14	0.12	0.10	0.09										MMT16ER160UNJ
14	1.05	0.26	0.23	0.17	0.12	0.11	0.10	0.06									MMT16ER140UNJ
12	1.22	0.28	0.27	0.20	0.17	0.13	0.11	0.06									MMT16ER120UNJ
10	1.47	0.30	0.29	0.21	0.15	0.13	0.12	0.11	0.10	0.06							MMT16ER100UNJ
8	1.83	0.31	0.30	0.23	0.18	0.15	0.14	0.13	0.12	0.11	0.10	0.06					MMT16ER080UNJ

1. Set the finishing allowance on a diameter at approx. 0.1 mm when using a full form insert.
2. Please note the cutting depth and the number of passes when a corner radius of a partial form insert or of an internal threading insert is small to prevent damage to the insert corner.
3. 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.

MMT – STANDARD OF DEPTH OF CUT EXTERNAL (RADIAL INFEED)

API BUTTRESS CASING

thread/ inch	Total cutting depth	Number of passes															Insert type
		1	2	3	4	5	6	7	8	9	10	11					
5	1.55	0.25	0.23	0.17	0.15	0.13	0.12	0.12	0.11	0.11	0.10	0.06					MMT22ER050APBU

API ROUND CASING&TUBING

thread/ inch	Total cutting depth	Number of passes															Insert type
		1	2	3	4	5	6	7	8	9	10	11	12				
10	1.41	0.25	0.23	0.16	0.14	0.12	0.12	0.12	0.11	0.10	0.06						MMT16ER100APRD
8	1.81	0.25	0.24	0.19	0.16	0.14	0.14	0.13	0.13	0.13	0.13	0.11	0.06				MMT16ER080APRD

AMERICAN NPT

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	
27	0.66	0.15	0.13	0.12	0.11	0.09	0.06										MMT16ER270NPT
18	1.01	0.20	0.16	0.14	0.13	0.12	0.11	0.09	0.06								MMT16ER180NPT
14	1.33	0.23	0.19	0.16	0.14	0.13	0.12	0.11	0.10	0.09	0.06						MMT16ER140NPT
11.5	1.64	0.24	0.19	0.17	0.15	0.15	0.13	0.13	0.12	0.11	0.10	0.09	0.06				MMT16ER115NPT
8	2.42	0.33	0.28	0.23	0.20	0.18	0.16	0.15	0.14	0.13	0.12	0.12	0.11	0.11	0.10	0.06	MMT16ER080NPT

AMERICAN NPTF

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	
27	0.64	0.16	0.14	0.11	0.09	0.08	0.06										MMT16ER270NPTF
18	1.00	0.19	0.16	0.14	0.13	0.12	0.11	0.09	0.06								MMT16ER180NPTF
14	1.35	0.23	0.21	0.16	0.14	0.13	0.12	0.11	0.10	0.09	0.06						MMT16ER140NPTF
11.5	1.63	0.24	0.23	0.19	0.15	0.13	0.11	0.11	0.11	0.10	0.10	0.10	0.06				MMT16ER115NPTF
8	2.38	0.32	0.27	0.23	0.19	0.17	0.16	0.15	0.14	0.13	0.12	0.12	0.11	0.11	0.10	0.06	MMT16ER080NPTF

1. Set the finishing allowance on a diameter at approx. 0.1 mm when using a full form insert.
2. Please note the cutting depth and the number of passes when a corner radius of a partial form insert or of an internal threading insert is small to prevent damage to the insert corner.
3. 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.

MMT – STANDARD OF DEPTH OF CUT EXTERNAL (RADIAL INFEED)

ISO METRIC

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 chipbreakers	
0.5	0.29	0.09	0.07	0.07	0.06											MMT11IR050ISO	MMT16IR050ISO	—	—
0.75	0.43	0.15	0.13	0.09	0.06											MMT11IR075ISO	MMT16IR075ISO	—	—
1.0	0.58	0.17	0.15	0.11	0.09	0.06										MMT11IR100ISO	MMT16IR100ISO	MMT11IR100ISO-S	MMT16IR100ISO-S
1.25	0.72	0.18	0.16	0.12	0.11	0.09	0.06									MMT11IR125ISO	MMT16IR125ISO	MMT11IR125ISO-S	MMT16IR125ISO-S
1.5	0.87	0.21	0.20	0.16	0.13	0.11	0.06									MMT11IR150ISO	MMT16IR150ISO	MMT11IR150ISO-S	MMT16IR150ISO-S
1.75	1.01	0.21	0.20	0.15	0.12	0.10	0.09	0.08	0.06							MMT11IR175ISO	MMT16IR175ISO	—	MMT16IR175ISO-S
2.0	1.15	0.24	0.22	0.18	0.14	0.12	0.10	0.09	0.06							MMT11IR200ISO	MMT16IR200ISO	—	MMT16IR200ISO-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					—	MMT16IR250ISO	—	MMT16IR250ISO-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			—	MMT16IR300ISO	—	MMT16IR300ISO-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			—	MMT22IR350ISO	—	—
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	—	MMT22IR400ISO	—	—
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	—	MMT22IR450ISO	—	—
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	—	MMT22IR500ISO	—	—

AMERICAN UN

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 chipbreakers
32	0.46	0.16	0.14	0.10	0.06											MMT11IR320UN	MMT16IR320UN	—
28	0.52	0.16	0.13	0.09	0.08	0.06										MMT11IR280UN	MMT16IR280UN	—
24	0.61	0.17	0.15	0.13	0.10	0.06										MMT11IR240UN	MMT16IR240UN	—
20	0.73	0.18	0.15	0.13	0.11	0.10	0.06									MMT11IR200UN	MMT16IR200UN	—
18	0.81	0.20	0.18	0.14	0.12	0.11	0.06									MMT11IR180UN	MMT16IR180UN	—
16	0.92	0.20	0.18	0.15	0.12	0.11	0.10	0.06								MMT11IR160UN	MMT16IR160UN	MMT16IR160UN-S
14	1.05	0.21	0.18	0.15	0.13	0.11	0.11	0.10	0.06							MMT11IR140UN	MMT16IR140UN	MMT16IR140UN-S
13	1.13	0.22	0.19	0.16	0.14	0.13	0.12	0.11	0.06							—	MMT16IR130UN	—
12	1.22	0.24	0.22	0.18	0.16	0.13	0.12	0.11	0.06							—	MMT16IR120UN	MMT16IR120UN-S
11	1.33	0.24	0.22	0.20	0.15	0.12	0.12	0.11	0.11	0.06						—	MMT16IR110UN	—
10	1.47	0.25	0.22	0.21	0.14	0.13	0.12	0.12	0.11	0.11	0.06					—	MMT16IR100UN	—
9	1.63	0.31	0.23	0.21	0.17	0.15	0.14	0.13	0.12	0.11	0.06					—	MMT16IR090UN	—
8	1.83	0.31	0.26	0.21	0.18	0.16	0.15	0.14	0.13	0.12	0.11	0.06				—	MMT16IR080UN	—
7	2.09	0.36	0.30	0.24	0.21	0.18	0.17	0.16	0.15	0.14	0.12	0.06				—	MMT22IR070UN	—
6	2.44	0.40	0.33	0.25	0.23	0.19	0.17	0.16	0.15	0.14	0.13	0.12	0.11	0.06		—	MMT22IR060UN	—
5	2.93	0.41	0.35	0.31	0.26	0.23	0.21	0.20	0.19	0.17	0.15	0.14	0.13	0.12	0.06	—	MMT22IR050UN	—

1. Set the finishing allowance on a diameter at approx. 0.1 mm when using a full form insert.
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3. 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.

MMT – STANDARD OF DEPTH OF CUT INTERNAL (RADIAL INFEED)

WHITWORTH FOR BSW, BSP

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 chipbreakers
28	0.58	0.17	0.14	0.11	0.10	0.06										—	MMT16IR280W	—
26	0.63	0.18	0.15	0.13	0.11	0.06										—	MMT16IR260W	—
20	0.81	0.20	0.18	0.14	0.12	0.11	0.06									—	MMT16IR200W	—
19	0.86	0.21	0.19	0.15	0.13	0.12	0.06									MMT11IR190W	MMT16IR190W	MMT16IR190W-S
18	0.90	0.25	0.19	0.15	0.13	0.12	0.06									—	MMT16IR180W	—
16	1.02	0.21	0.18	0.15	0.13	0.11	0.09	0.09	0.06							—	MMT16IR160W	—
14	1.16	0.23	0.21	0.17	0.14	0.12	0.12	0.11	0.06							MMT11IR140W	MMT16IR140W	MMT16IR140W-S
12	1.36	0.27	0.25	0.20	0.16	0.15	0.14	0.13	0.06							—	MMT16IR120W	MMT16IR120W-S
11	1.48	0.27	0.24	0.20	0.17	0.15	0.14	0.13	0.12	0.06						—	MMT16IR110W	—
10	1.63	0.27	0.25	0.20	0.17	0.15	0.15	0.13	0.13	0.12	0.06					—	MMT16IR100W	—
9	1.81	0.28	0.26	0.21	0.18	0.16	0.15	0.14	0.13	0.12	0.12	0.06				—	MMT16IR090W	—
8	2.03	0.30	0.27	0.22	0.19	0.17	0.16	0.15	0.14	0.13	0.12	0.12	0.06			—	MMT16IR080W	—
7	2.32	0.34	0.32	0.26	0.22	0.20	0.18	0.17	0.16	0.15	0.14	0.12	0.06			—	MMT22IR070W	—
6	2.71	0.35	0.33	0.27	0.23	0.21	0.20	0.19	0.17	0.16	0.15	0.14	0.13	0.12	0.06	—	MMT22IR060W	—
5	3.25	0.42	0.40	0.35	0.29	0.26	0.24	0.22	0.20	0.19	0.18	0.17	0.15	0.12	0.06	—	MMT22IR050W	—

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3. 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.

MMT – STANDARD OF DEPTH OF CUT INTERNAL (RADIAL INFEED)

BSPT

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 chipbreakers
19	0.86	0.22	0.19	0.15	0.12	0.12	0.06				MMT11IR190BSPT	MMT16IR190BSPT	MMT16IR190BSPT-S
14	1.16	0.24	0.20	0.17	0.14	0.12	0.12	0.11	0.06		MMT11IR140BSPT	MMT16IR140BSPT	MMT16IR140BSPT-S
11	1.48	0.25	0.23	0.21	0.18	0.16	0.14	0.13	0.12	0.06	—	MMT16IR110BSPT	MMT16IR110BSPT-S

ROUND DIN 405

thread/ inch	Total cutting depth	Number of passes														Insert type
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	
10	1.27	0.23	0.21	0.20	0.19	0.16	0.12	0.10	0.06							MMT16IR100RD
8	1.59	0.23	0.21	0.20	0.19	0.18	0.16	0.14	0.12	0.10	0.06					MMT16IR080RD
6	2.12	0.26	0.25	0.24	0.22	0.21	0.19	0.17	0.16	0.14	0.12	0.10	0.06			MMT16IR060RD
4	3.18	0.34	0.33	0.32	0.30	0.28	0.26	0.24	0.22	0.20	0.19	0.17	0.15	0.12	0.06	MMT22IR040RD

ISO TRAPEZOIDAL 30°

Pitch (mm)	Total cutting depth	Number of passes														Insert type
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	
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

thread/ inch	Total cutting depth	Number of passes														Insert type
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	
12	1.19	0.27	0.23	0.20	0.17	0.14	0.12	0.06								MMT16IR120ACME
10	1.52	0.29	0.25	0.21	0.18	0.16	0.14	0.12	0.11	0.06						MMT16IR100ACME
8	1.84	0.30	0.26	0.22	0.19	0.16	0.15	0.14	0.13	0.12	0.11	0.06				MMT16IR080ACME
6	2.37	0.34	0.30	0.27	0.24	0.21	0.19	0.16	0.14	0.12	0.12	0.11	0.11	0.06		MMT22IR060ACME
5	2.79	0.36	0.33	0.30	0.26	0.23	0.20	0.18	0.17	0.16	0.15	0.14	0.13	0.12	0.06	MMT22IR050ACME

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MMT – STANDARD OF DEPTH OF CUT INTERNAL (RADIAL INFEED)

API BUTTRESS CASING

thread/ inch	Total cutting depth	Number of passes														Insert type
		1	2	3	4	5	6	7	8	9	10	11				
5	1.55	0.25	0.23	0.17	0.15	0.13	0.12	0.12	0.11	0.11	0.10	0.06				MMT22IR050APBU

API ROUND CASING&TUBING

thread/ inch	Total cutting depth	Number of passes														Insert type
		1	2	3	4	5	6	7	8	9	10	11	12			
10	1.41	0.25	0.23	0.16	0.14	0.12	0.12	0.12	0.11	0.10	0.06					MMT16IR100APRD
8	1.81	0.25	0.24	0.19	0.16	0.14	0.14	0.13	0.13	0.13	0.13	0.11	0.06			MMT16IR080APRD

AMERICAN NPT

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	
27	0.66	0.15	0.13	0.12	0.11	0.09	0.06										MMT16IR270NPT
18	1.01	0.20	0.16	0.14	0.13	0.12	0.11	0.09	0.06								MMT16IR180NPT
14	1.33	0.23	0.19	0.16	0.14	0.13	0.12	0.11	0.10	0.09	0.06						MMT16IR140NPT
11.5	1.64	0.24	0.19	0.17	0.15	0.15	0.13	0.13	0.12	0.11	0.10	0.09	0.06				MMT16IR115NPT
8	2.42	0.33	0.28	0.23	0.20	0.18	0.16	0.15	0.14	0.13	0.12	0.12	0.11	0.11	0.10	0.06	MMT16IR080NPT

AMERICAN NPTF

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	
14	1.35	0.23	0.21	0.16	0.14	0.13	0.12	0.11	0.10	0.09	0.06						MMT16IR140NPTF
11.5	1.63	0.24	0.23	0.19	0.15	0.13	0.11	0.11	0.11	0.10	0.10	0.10	0.06				MMT16IR115NPTF
8	2.38	0.32	0.27	0.23	0.19	0.17	0.16	0.15	0.14	0.13	0.12	0.12	0.11	0.11	0.10	0.06	MMT16IR080NPTF

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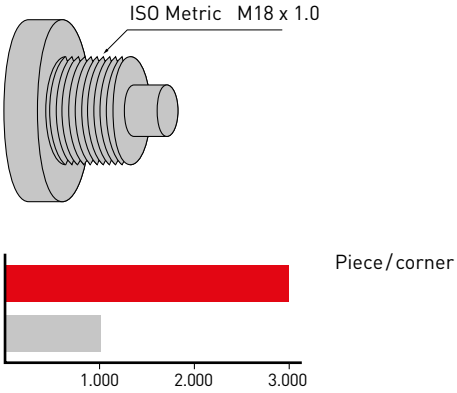
TROUBLE SHOOTING

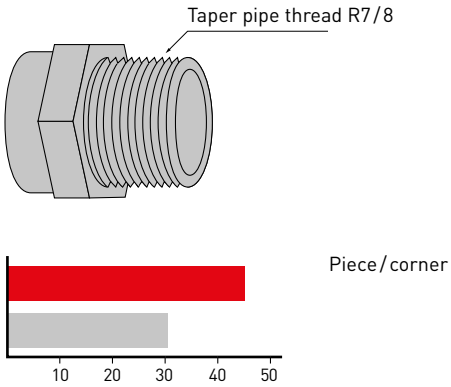
Problems	Observation	Causes	Solutions
Low thread precision	Threads do not mesh with each other.	Incorrect tool installation.	Set the insert centre height at 0 mm.
			Check holder inclination (Lateral).
	Shallow thread.	Incorrect depth of cut.	Modify the depth of cut.
		Lack of insert wear or plastic deformation resistance.	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 chipbreaker.
		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 centre height at 0 mm.
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 mm depth of cut, larger than 0.05 mm depth of cut 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.	Chamfer the workpiece entry and exit faces.
	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.

APPLICATION EXAMPLES

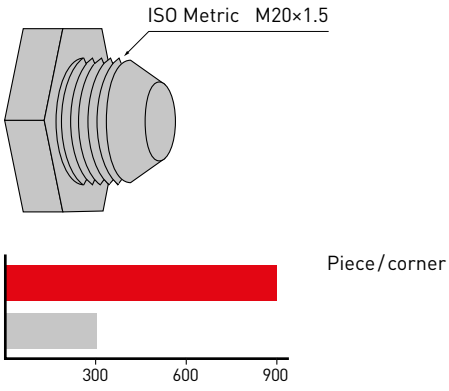
Insert	MMT16ER100ISO (VP10MF)
Workpiece	JIS SCM35 Plug
Vc (m/min)	120
Pass	5
Cutting method	Radial infeed
Depth of cut (mm)	Fixed cut area
Coolant	Wet cutting
Results	MMT inserts had less wear than conventional products. Tool life increased 3 fold.



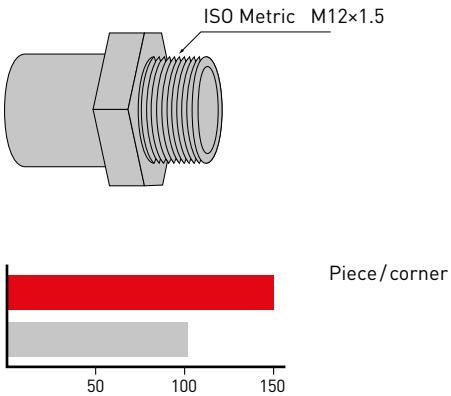
Insert	MMT16ER110BSPT (VP15TF)
Workpiece	JIS SUS316 Bolt
Vc (m/min)	100
Pass	20
Cutting method	Radial infeed
Depth of cut (mm)	Fixed cut area
Coolant	Wet cutting
Results	MMT inserts suitable for unstable machining without sudden fracturing. Tool life extended by 1.5 times.



Insert	MMT16ER150ISO-S (VP15TF)
Workpiece	JIS S45C Bolt
Vc (m/min)	140
Pass	6
Cutting method	Radial infeed
Depth of cut (mm)	Fixed cut area
Coolant	Wet cutting
Results	MMT inserts had better chip control and produced smaller burrs on incomplete threads compared to conventional products. 3 times longer tool life was possible.



Insert	MMT16ER150ISO-S (VP15TF)
Workpiece	JIS SCM435 Bolt
Vc (m/min)	80
Pass	10
Cutting method	Radial infeed
Depth of cut (mm)	Fixed cut area
Coolant	Wet cutting
Results	Better chip control from the MMT inserts prevented chips wrapping around the workpiece. Tool life lengthened x 1.5



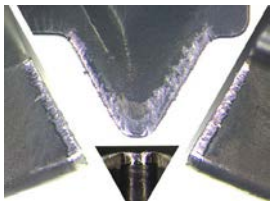
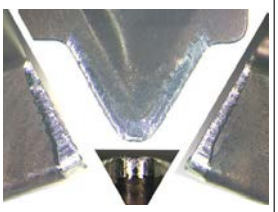
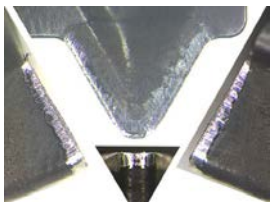
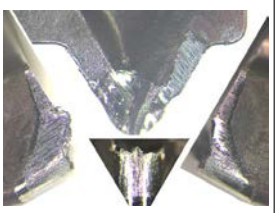
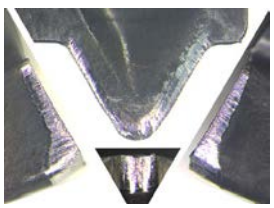
MMT A Conventional tool

CUTTING PERFORMANCE

INCONEL®718 – COMPARISON OF WEAR BY MACHINING LENGTH

When threading heat resistant alloys, compound damage such as wear and plastic deformation was reduced and achieved excellent wear resistance.

Workpiece	Inconel®718
Insert	ISO Metric 60°
Vc (m/min)	30
Pitch (mm)	1.5
Depth of cut	Total 12 passes, total depth of cut 0.92 mm, ap = 0.1 mm x 3 passes, 0.08 mm x 4 passes, 0.06 mm x 5 passes
Cutting mode	Wet cutting

Cutting length (m)	MP9025	Conventional A	Conventional B	Conventional C
20				
25				Not machinable
35				

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