

Contents:

Page:

Contents:

Page:

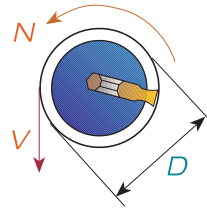
Conversion of Cutting Speed to Rotational Speed	2
Tool Selection	3
Carmex Mill-Thread catalog and CNC Tool Wizard	4
Example of Thread Milling CNC Program for Internal Threading	4
Mill-Thread Inserts Speed and Feed Selection	5
Cutting Data Slim MT Type	6
Spiral Mill-Thread Inserts Speed and Feed Selection	7
Spiral Finish Speed Selection	7
Cutting Data D-Thread type	8
Cutting Data CMT type	9
Cutting Data CMT Spiral Multi Flute Inserts	10
Cutting Data CMT Milling cutter	11
Mill-Thread Solid Carbide Grades, Speed and Feed Selection	12
MT, MTB, MTZ, EMT types	12

Cutting Data Solid Carbide Tapered End Mills	13
Cutting Data MTQ type	14
FMT - Fast MT type Case Study	15
Cutting Data FMT type	16
Cutting Data AMT type	17
Cutting Data Mini Mill-Thread MTS, MTI & FMTI types	18-19
Cutting Data MTSB type	19
Cutting Data DMT type	20
Cutting Data DMTH type	20
Case Studies	21
Cutting Data MT Drill - MTD type	22
MT drill working cycle	22
Cutting Data Mini Mill-Thread MTSH and FSH type	23
Cutting Data MTH type	24

Conversion of Cutting Speed to Rotational Speed

Conversion of selected cutting speed to rotational speed is calculated by the following formula:

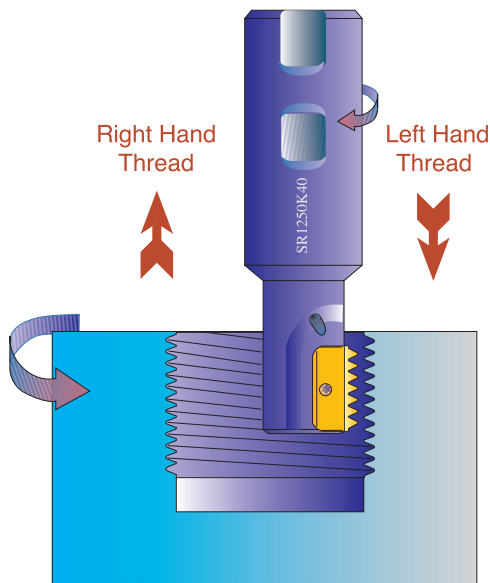
$$N = \frac{V \times 12}{\pi \times D} = \frac{400 \times 12}{3.14 \times 1.25} = 1222 \text{ RPM}$$



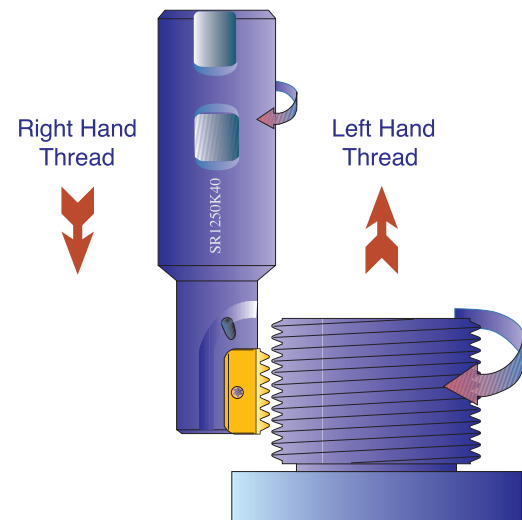
Example: $V=400 \text{ ft/min}$
 $D=1.25$

D=Cutting diameter

Internal Thread



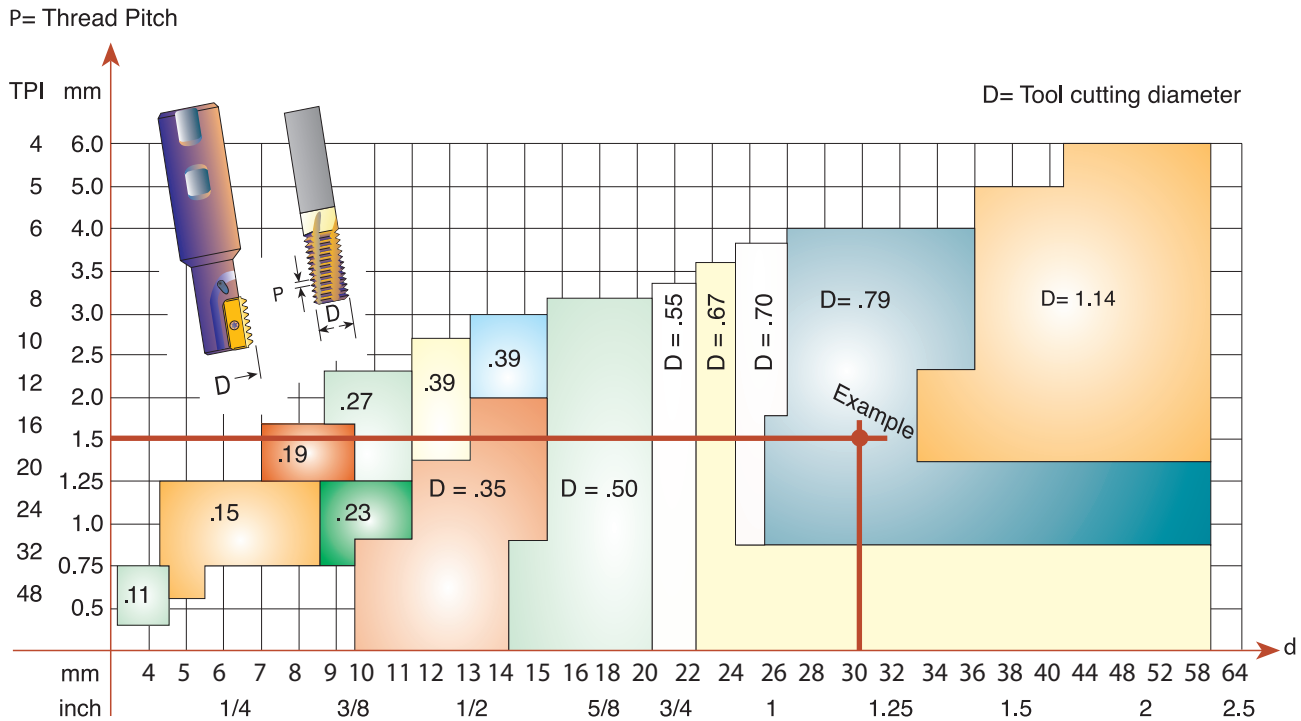
External Thread



Tool Selection

For indexable and solid carbide Mill Threads

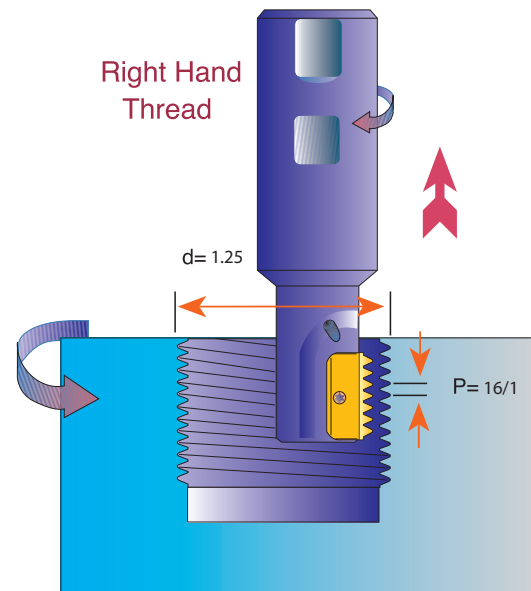
The following chart provides a fairly accurate visual selection tool for Internal Threading. The chart is suitable for the following thread forms: ISO, UN, WHIT, NPT, NPTF, BSPT and PG.



Any tool with a small cutting diameter can produce larger diameter threads.

Example: Internal thread 1 1/4 x 16UN:
Find a Milling Tool to produce d=1.25 Internal right hand UN thread with a thread pitch P=16/1
As can be seen from the chart above, the two red lines intersect at a selected tool with a cutting diameter of D=.79

Chosen toolholder: SR0790 H21
Insert: 21 I 16 UN MT7

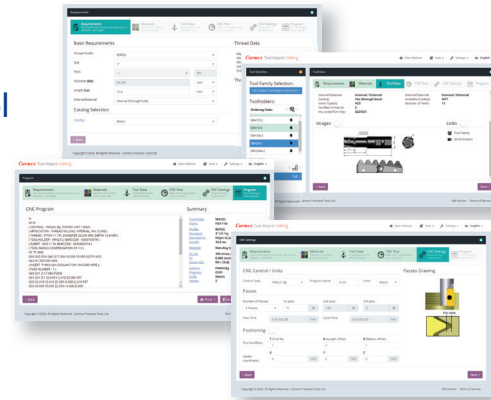


If you need assistance, please call your local distributor and ask for help in selecting the appropriate tool as well as for a CNC program to suit your CNC milling machine.

Carmex Mill-Thread catalog and CNC Tool Wizard

This software is provided by Carmex to assist you, the thread milling user, to select and apply the correct tool to machine threads on CNC machining centers. The program will find tools and inserts which are suitable for your application, calculate cutting data and generate a CNC program for a variety of controls.

The software is available at our website:
carmex.com



Example of Thread Milling CNC Program for Internal Threading

Right hand thread (climb milling) from bottom up.
 Program is based on tool center.
 This method of programming needs no tool radius compensation value other than an offset for wear.

$A = \frac{D_0 - D}{2}$	A = Radius of tool path D ₀ = Major thread dia. D = Cutting dia.
-------------------------	---

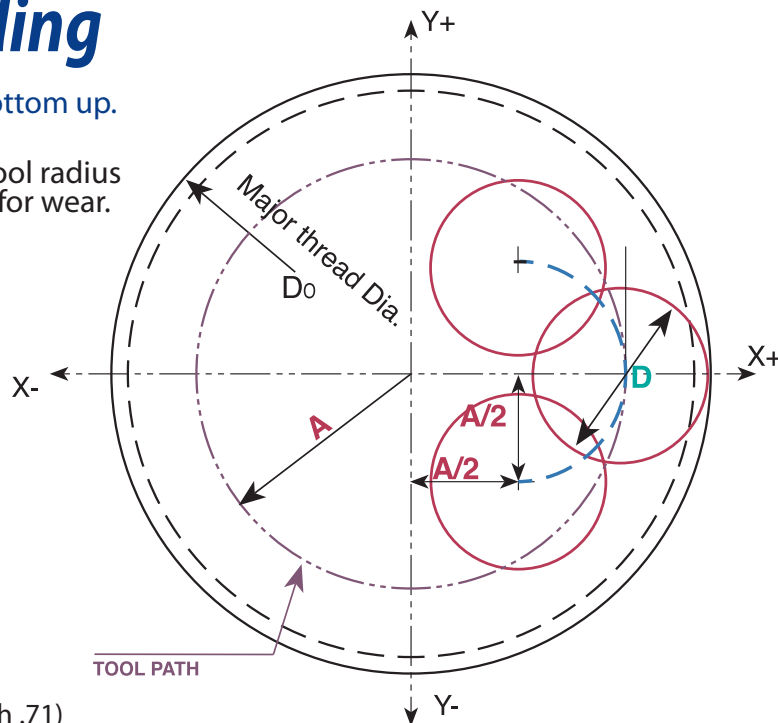
General Program

```
G90 G00 G54 G43 H1X0 Y0 Z10 S---
G00 Z- ( TO THREAD DEPTH )
G01 G91 G41 D1 X(A/2) Y-(A/2) Z0 F---
G03 X(A/2) Y(A/2) R(A/2) Z(1/8 PITCH)
G03 X0 Y0 I-(A) J0 Z(PITCH)
G03 X-(A/2) Y(A/2) R(A/2) Z(1/8 PITCH)
G01 G40 X-(A/2) Y-(A/2) Z0
G90 X0 Y0 Z0
```

Internal Thread

EXAMPLE: 1 1/4 - 12UNF (Thread depth .71)
 TOOLHOLDER: SR0790 H21 (Cutting Dia. .79)
 INSERT: 21 I 12 UN
 $A = (1.25 - .79)/2 = .23$

```
G90 G00 G54 G43 H1X0 Y0 Z0.39 S2800
G00 Z-0.71
G01 G91 G41X0.1150Y-0.1150 Z0 F3.35 D1
G03 X0.1150
Y0.1150 R0.1150 Z0.0104
G03 X0 Y0 I-0.23 J0 Z0.0833
G03 X-0.1150 Y0.1150 R0.1150 Z0.0104
G01 G40 X-0.1150 Y-0.1150 Z0
G90 G0 X0 Y0 Z0
```



Mill-Thread Inserts Speed and Feed Selection

MT7 Sub-Micron Grade with Titanium Aluminum Nitride multi-layer coating (ISO K10 - K20). This is a general purpose grade, which can be used with all materials; it should be run at medium to high cutting speeds.

ISO	Materials	Cutting Speed ft/min MT7
P	Low and Medium Carbon Steels	380 - 920
	High Carbon Steels	430 - 660
	Alloy Steels, Treated Steels	340 - 590
M	Stainless Steels	430 - 620
	Cast Steels	490 - 620
K	Cast Iron	260 - 560
N	Non-Ferrous & Aluminum	590 - 1120
	Synthetics, Duroplastics, Thermoplastics	380 - 1500
S	Nickel Alloys, Titanium Alloys	80 - 300

Recommended FEED RATE: .002 - .006



Cutting Data

Slim MT type

MT17 Advanced NEW submicron carbide grade with multi-layer PVD coating, provides high performance in all machining conditions. The new grade ensures high abrasive wear resistance, machining wide range of materials including steels, tough and difficult materials and high alloyed steels.

ISO	Material	Conditions	Cutting Conditions	
			Cutting Speed (ft/min)	Feed Rate (inch/tooth)
P	Non-Alloy Steel and Cast Steel, Free Cutting Steel	Annealed < 0.25% C Annealed ≥ 0.25% C Annealed ≥ 0.55% C Quenched & Tempered < 0.55% C Quenched & Tempered ≥ 0.55% C	360-720 330-690 295-490 230-460 180-230	(.0022 * D) / .87
	Low Alloy Steel and Cast Steel (less than 5% alloying elements)	Annealed Quenched & Tempered	200-360 200-295	(.0022 * D) / .87
	High Alloy Steel, Cast Steel, and Tool Steel	Annealed Quenched & Tempered	180-295 150-260	
M	Stainless Steel and Cast Steel	Ferritic Martensitic Austenitic	295-655 260-520 200-360	(.0022 * D) / .87
		High alloy Austenitic & Duplex	130-230	(.0018 * D) / .87
K	Cast Iron Nodular (GGG)	Ferritic	295-410	(.0022 * D) / .87
		Pearlitic	295-360	
	Grey Cast Iron (GG)	Ferritic	360-475	
		Pearlitic	260-410	
	Malleable Cast Iron	Ferritic	360-410	
		Pearlitic	260-390	
N	Aluminum-Wrought Alloy	Not Cureable	440-1150	
		Cured	330-885	
	Aluminum-Cast, Alloyed	Not Cureable ≤ 12% Si Cured High Temperature > 12% Si	295-885 295-740 295-590	(.0020 * D) / .87
		Copper Alloys	Free Cutting > 1% Pb Brass Electrolytic Copper	
	Non Metallic	Duroplastics, Fiber Plastics Hard Rubber	230-885 230-885	
S	High Temperature/Super Alloys (Fe based)	Annealed Cured	100-160	
	High Temperature/Super Alloys (Ni or Co based)	Annealed	80-150	
		Cured Cast		
Titanium Alloys	Alpha + Beta Alloys Cured	100-130		

D= Cutting diameter.

B12-6

Spiral Mill-Thread Inserts Speed and Feed Selection

MT7 Sub-Micron Grade with Titanium Aluminum Nitride multi-layer coating (ISO K10 - K20). This is a general purpose grade, which can be used with all materials; it should be run at medium to high cutting speeds.

ISO	Materials	Cutting Speed ft/min MT7
P	Low and Medium Carbon Steels	480 - 1200
	High Carbon Steels	540 - 840
	Alloy Steels, Treated Steels	440 - 755
M	Stainless Steels	540 - 800
	Cast Steels	620 - 800
K	Cast Iron	330 - 720
N	Non-Ferrous & Aluminum	755 - 1440
	Synthetics, Duroplastics, Thermoplastics	480 - 1940
S	Nickel Alloys, Titanium Alloys	100 - 380

Recommended FEED RATE: .002 - .006

As you may note, cutting speed is shown in range terms. In most standard cases choosing a speed in the middle of the range would be a good choice for a start.

For hard metals reduce cutting speed.

Spiral Finish Speed Selection

MT7 Sub-Micron Grade with Titanium Aluminum Nitride multi-layer coating (ISO K10 - K20). This is a general purpose grade, which can be used with all materials; it should be run at medium to high cutting speeds.

ISO	Materials	Cutting Speed ft/min
P	Low and Medium Carbon Steels	660 - 1080
	High Carbon Steels	560 - 770
	Alloy Steels, Treated Steels	330 - 640
M	Stainless Steels	590 - 755
	Cast Steels	590 - 755
K	Cast Iron	660 - 1150
N	Non-Ferrous and Aluminum	1640 - 3610
	Synthetics, Duroplastics, Thermoplastics	1310 - 4920
S	Nickel Alloys, Titanium Alloys	100 - 180

B12-7

Cutting Data

D-Thread type

MT7 Sub-Micron Grade with Titanium Aluminum Nitride multi-layer coating (ISO K10 - K20). This is a general purpose grade, which can be used with all materials; it should be run at medium to high cutting speeds.

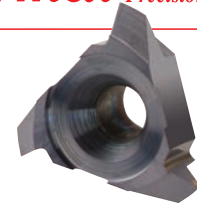
ISO	Materials	Cutting Speed ft/min
P	Low and Medium Carbon Steels <0.55%C	330 - 670
	High Carbon Steels ≥0.55%C	330 - 590
	Alloy Steels, Treated Steels	330 - 460
M	Stainless Steels - Free Cutting	280 - 410
	Stainless Steels - Austenitic	260 - 380
	Cast Steels	380 - 510
K	Cast Iron	250 - 480
N	Aluminum ≤12%Si, Copper	490 - 980
	Aluminum >12% Si	490 - 980
	Synthetics, Duroplastics, Thermoplastics	330 - 1150
S	Nickel Alloys, Titanium Alloys	150 - 310

Recommended FEED RATE: .003 - .006



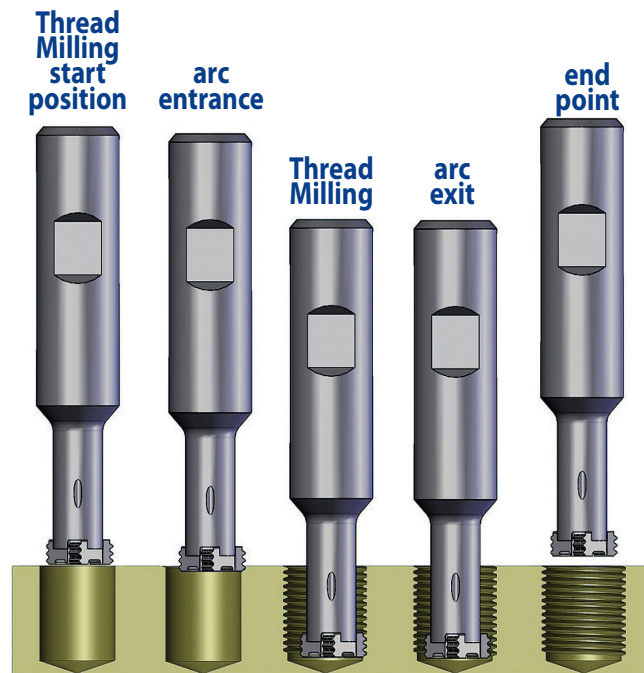
Cutting Data

CMT type



MT7 Sub-Micron Grade with Titanium Aluminum Nitride multi-layer coating (ISO K10 - K20). This is a general purpose grade, which can be used with all materials; it should be run at medium to high cutting speeds.

ISO	Materials	Cutting Speed ft/min	Feed inch/tooth Cutting Diameter=D			
			Ø.39	Ø.47	Ø.70	Ø.98
P	Low and Medium Carbon Steels <0.55%C	197 - 394	.0063	.0067	.0079	.0087
	High Carbon Steels ≥0.55%C	197 - 295	.0055	.0063	.0079	.0087
	Alloy Steels, Treated Steels	164 - 262	.0039	.0047	.0063	.0071
M	Stainless Steels - Free Cutting	230 - 328	.0039	.0043	.0059	.0067
	Stainless Steels - Austenitic	197 - 295	.0039	.0043	.0059	.0067
	Cast Steels	230 - 295	.0039	.0047	.0063	.0071
K	Cast Iron	131 - 262	.0063	.0067	.0079	.0087
N	Aluminum ≤12%Si, Copper	328 - 656	.0063	.0067	.0079	.0087
	Aluminum >12% Si	197 - 459	.0039	.0043	.0061	.0071
	Synthetics, Duroplastics, Thermoplastics	164 - 656	.0075	.0075	.0087	.0094
S	Nickel Alloys, Titanium Alloys	66 - 131	.0028	.0028	.0039	.0047
H	Hardened Steel 45 - 50HRc	197 - 230	.0035	.0035	.0051	.0059
	Hardened Steel 50 - 55HRc	164 - 197	.0031	.0031	.0047	.0055



Cutting Data

CMT Spiral Multi Flute Inserts



Carbide grade - MT8:

Sub-Micron Grade with Aluminum Titanium Nitride (AlTiN) multi-layer coating (ISO K10-K20). Extremely high heat resistant and smooth cutting operation, for high performance, and normal machining conditions. General purpose for all materials.

ISO Standard	Material	Cutting Speed ft/min	Feed inch/tooth Cutting Diameter = D
			Ø.63-Ø1.38
P	Low and Medium Carbon Steels <0.55%C	197 - 394	.0055 - .0094
	High Carbon Steels ≥0.55%C	197 - 295	.0047 - .0094
	Alloy Steels, Treated Steels	164 - 262	.0031 - .0079
M	Stainless Steel-Free Cutting	230 - 328	.0031 - .0075
	Stainless Steel-Austenitic	197 - 295	.0031 - .0075
	Cast Steels	230 - 295	.0031 - .0079
K	Cast Iron	131 - 262	.0055 - .0094
N	Aluminum ≤12%Si, Copper	328 - 656	.0055 - .0102
	Aluminum >12%Si	197 - 459	.0031 - .0087
	Synthetics, Duroplastics, Thermoplastics	164 - 656	.0067 - .0110
S	Nickel Alloys, Titanium Alloys.	66 - 131	.0020 - .0055
H	Hardened Steel, 45-50HRc	197 - 230	.0028 - .0067
	Hardened Steel, 51-55HRc	164 - 197	.0024 - .0063

Cutting Data

CMT Milling cutter



MT7 Sub-Micron Grade with Titanium Aluminum Nitride multi-layer coating (ISO K10 - K20). This is a general purpose grade, which can be used with all materials; it should be run at medium to high cutting speeds.

ISO Standard	Material	Cutting Speed ft/min	Feed inch/tooth
P	Low and Medium Carbon Steels <0.55%C	197 - 394	.0020-.0059
	High Carbon Steels ≥0.55%C	197 - 295	.0020-.0039
	Alloy Steels, Treated Steels	164 - 262	.0020-.0039
M	Stainless Steel-Free Cutting	230 - 328	.0016-.0051
	Stainless Steel-Austenitic	197 - 295	.0016-.0039
	Cast Steels	230 - 295	.0016-.0051
K	Cast Iron	131 - 262	.0020-.0059
N	Aluminum ≤12%Si, Copper	328 - 656	.0020-.0098
	Aluminum >12%Si	197 - 459	.0012-.0039
	Synthetics, Duroplastics, Thermoplastics	164 - 656	.0020-.0098
S	Nickel alloys, Titanium Alloys.	66 - 131	.0012-.0039
H	Hardened Steel, ≤ 45 HRc	197 - 230	.0012-.0039



Mill-Thread Solid Carbide Grades, Speed and Feed Selection

MT type

MT7 Sub-Micron Grade with Titanium Aluminum Nitride multi-layer coating (ISO K10 - K20). This is a general purpose grade, which can be used with all materials; it should be run at medium to high cutting speeds.

ISO	Materials	Cutting Speed ft/min	Feed inch/tooth Cutting Diameter=D										
			Ø.08	Ø.12	Ø.16	Ø.24	Ø.31	Ø.39	Ø.47	Ø.55	Ø.63	Ø.79	Ø.98
P	Low and Medium Carbon Steels <0.55%C	300 - 660	.0012	.0016	.0016	.0024	.0028	.0032	.0037	.0042	.0047	.0057	.0070
	High Carbon Steels ≥0.55%C	330 - 480	.0009	.0011	.0013	.0018	.0022	.0026	.0031	.0035	.0039	.0048	.0059
	Alloy Steels, Treated Steels												
M	Stainless Steels - Free Cutting	180 - 430	.0008	.0012	.0010	.0016	.0020	.0024	.0024	.0028	.0031	.0035	.0043
	Stainless Steels - Austenitic												
	Cast Steels	390 - 440	.0008	.0009	.0010	.0013	.0016	.0018	.0021	.0023	.0026	.0031	.0038
K	Cast Iron	210 - 390	.0011	.0014	.0017	.0022	.0027	.0032	.0037	.0042	.0047	.0057	.0070
N	Aluminum ≤12%Si, Copper	440 - 920	.0011	.0014	.0017	.0022	.0027	.0032	.0037	.0042	.0047	.0057	.0070
	Aluminum >12% Si	300 - 660	.0008	.0009	.0010	.0013	.0016	.0018	.0021	.0023	.0026	.0031	.0038
	Synthetics, Duroplastics, Thermoplastics	300 - 1050	.0021	.0024	.0027	.0032	.0038	.0043	.0049	.0054	.0060	.0071	.0085
S	Nickel Alloys, Titanium Alloys												

For cutters with long cutting length reduce feed rate by 40%

MTB, MTZ, EMT types

ISO	Materials	Cutting Speed ft/min	Feed inch/tooth Cutting Diameter=D										
			Ø.08	Ø.12	Ø.16	Ø.24	Ø.31	Ø.39	Ø.47	Ø.55	Ø.63	Ø.79	Ø.98
P	Low and Medium Carbon Steels <0.55%C	330 - 820	.0012	.0016	.0016	.0024	.0028	.0032	.0037	.0042	.0047	.0057	.0070
	High Carbon Steels ≥0.55%C	360 - 590	.0009	.0011	.0013	.0018	.0022	.0026	.0031	.0035	.0039	.0048	.0059
	Alloy Steels, Treated Steels	300 - 520	.0008	.0009	.0010	.0013	.0016	.0018	.0021	.0023	.0026	.0031	.0038
M	Stainless Steels - Free Cutting	200 - 520	.0008	.0012	.0010	.0016	.0020	.0024	.0024	.0028	.0031	.0035	.0043
	Stainless Steels - Austenitic	200 - 390	.0008	.0008	.0012	.0012	.0016	.0020	.0020	.0024	.0028	.0031	.0039
	Cast Steels	430 - 560	.0008	.0009	.0010	.0013	.0016	.0018	.0021	.0023	.0026	.0031	.0038
K	Cast Iron	230 - 490	.0011	.0014	.0017	.0022	.0027	.0032	.0037	.0042	.0047	.0057	.0070
N	Aluminum ≤12%Si, Copper	490 - 1150	.0011	.0014	.0017	.0022	.0027	.0032	.0037	.0042	.0047	.0057	.0070
	Aluminum >12% Si	330 - 820	.0008	.0009	.0010	.0013	.0016	.0018	.0021	.0023	.0026	.0031	.0038
	Synthetics, Duroplastics, Thermoplastics	330 - 1310	.0021	.0024	.0027	.0032	.0038	.0043	.0049	.0054	.0060	.0071	.0085
S	Nickel Alloys, Titanium Alloys	70 - 260	.0009	.0009	.0010	.0010	.0011	.0012	.0013	.0014	.0015	.0017	.0019

For cutters with long cutting length reduce feed rate by 40%

Cutting Data

Solid Carbide Tapered End Mills

ISO	Materials	Cutting Speed ft/min	Feed inch/tooth		
			SC0652D12	SC0375D09	SC0500D12
P	Low and Medium Carbon Steels <0.55%C	360 - 660	.0008 - .0014	.0016 - .0035	.0020 - .0039
	High Carbon Steels ≥0.55%C	390 - 460	.0007 - .0014	.0012 - .0030	.0016 - .0039
	Alloy Steels, Treated Steels	330 - 390	.0006 - .0014	.0008 - .0177	.0010 - .0020
M	Stainless Steels - Free Cutting	330 - 390	.0006 - .0014	.0012 - .0031	.0012 - .0039
	Stainless Steels - Austenitic	260 - 330	.0004 - .0010	.0008 - .0024	.0008 - .0039
	Cast Steels	390 - 490	.0006 - .0014	.0012 - .0031	.0012 - .0039
K	Cast Iron	330 - 430	.0008 - .0014	.0012 - .0035	.0016 - .0039
N	Aluminum ≤12%Si, Copper	590 - 820	.0010 - .0018	.0012 - .0035	.0016 - .0039
	Aluminum >12% Si	390 - 660	.0006 - .0014	.0010 - .0035	.0012 - .0039
	Synthetics, Duroplastics, Thermoplastics	590 - 2620	.0010 - .0018	.0012 - .0035	.0016 - .0039
S	Nickel Alloys, Titanium Alloys	160 - 230	.0006 - .0014	.0008 - .0028	.0012 - .0039
H	Hardened Steel, 45-50HRc	160 - 230	.0004 - .0010	.0008 - .0020	.0012 - .0028
	Hardened Steel, 51-55HRc	130 - 200	.0004 - .0010	.0006 - .0014	.0008 - .0026



MTQ type

Thread mills with relieved neck and internal coolant for milling medium and large threads on relatively deep work pieces.

- To produce medium and large threads on relatively deep work pieces.
- To use overhang according to the application.
- To perform deep threads at the bottom of the application.

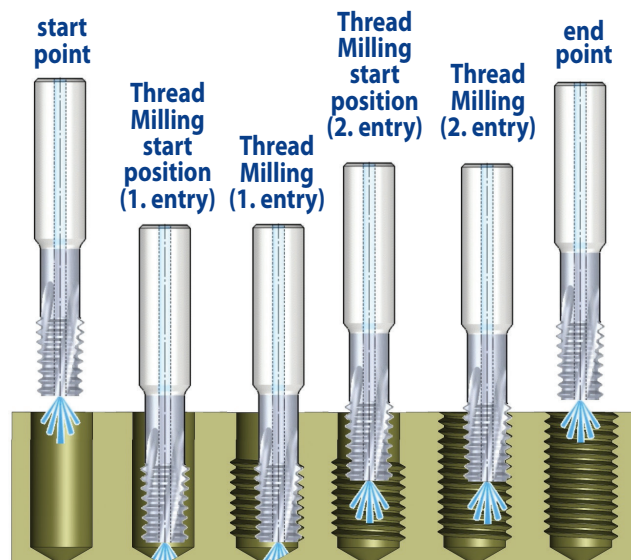
Advantages

- Provides high rigidity and stability (anti-vibration).
- Accomplishes deep threads in one pass.
- Relatively low cutting forces due to short cutting length.
- Threads length up to 3D.

Cutting Data

MT7 Sub-Micron Grade with Titanium Aluminum Nitride multi-layer coating (ISO K10 - K20). This is a general purpose grade, which can be used with all materials; it should be run at medium to high cutting speeds.

ISO	Materials	Cutting Speed ft/min	Feed inch/tooth Cutting Diameter=D					
			Ø.39	Ø.47	Ø.55	Ø.63	Ø.79	Ø.98
P	Low and Medium Carbon Steels < 0.55%C	330 - 820	.0022	.0026	.0029	.0033	.0040	.0049
	High Carbon Steels ≥ 0.55%C	360 - 590	.0018	.0021	.0025	.0028	.0034	.0041
	Alloy Steels, Treated Steels	300 - 520	.0013	.0014	.0016	.0018	.0022	.0026
M	Stainless Steels - Free Cutting	200 - 520	.0017	.0017	.0019	.0022	.0025	.0030
	Stainless Steels - Austenitic	200 - 390	.0014	.0014	.0017	.0019	.0022	.0028
	Cast Steels	430 - 560	.0013	.0014	.0016	.0018	.0022	.0026
K	Cast Iron	230 - 490	.0022	.0026	.0029	.0033	.0040	.0049
N	Aluminum ≤ 12%Si, Copper	490 - 1150	.0022	.0026	.0029	.0033	.0040	.0049
	Aluminum > 12% Si	330 - 820	.0013	.0014	.0016	.0018	.0022	.0026
	Synthetics, Duroplastics, Thermoplastics	330 - 1310	.0030	.0034	.0038	.0042	.0050	.0059
S	Nickel Alloys, Titanium Alloys	70 - 260	.0009	.0009	.0010	.0010	.0012	.0013



FMT - Fast MT type

- Carmex has designed a unique line of solid carbide thread milling tools FMT for increased productivity and high performance.
- Large number of flutes enables to achieve significant shorter machining time.

FMT vs. Taps

Features	FMT	Taps
Thread up to bottom at blind hole	Possible	Not possible
Machining load	Very low	High
Thread surface quality	High	Medium
Process reliability	Very reliable, especially for expensive work pieces	Medium
Thread geometry	Very accurate	Medium
Cycle time	Same or faster than tap	Fast

MT8 Sub Micron grade with advanced PVD triple coating (ISO K10-K20). Extremely high heat resistant and smooth cutting operation, for high performance and normal machining conditions. General purpose for all materials.

Case Study

Application

Internal right hand thread: M6x1.0
 Thread length: .39, Blind hole
 Bore size: Ø.197
 Chamfer: .035

Work piece material

Steel SAE 4340

Cutter description

FMT08048F10 1.0 ISO- with internal coolant
 Shank diameter: Ø8 mm
 Cutting diameter: Ø.189
 Number of flutes: 6
 Cutting length: .41
 Total length: 2.5

Cutting conditions

Cutting speed: 426 ft/min Feed: .0006 inch/tooth

Machine

Mori Seiki NV5000 Coolant: emulsion 5%

Results

Tool life : 2,170 threads
 Cycle time: 1.5 sec



Cutting Data

FMT - Fast MT type

MT8 Sub Micron grade with advanced PVD triple coating (ISO K10-K20).
Extremely high heat resistant and smooth cutting operation, for high performance and normal machining conditions. General purpose for all materials.

ISO Standard	Materials	Cutting Speed ft/min	Feed inch/tooth Cutting Diameter = D				
			Ø.17	Ø.24	Ø.31	Ø.39	Ø.47
P	Low and Medium Carbon Steels < 0.55%C	330 - 820	.0012	.0024	.0028	.0031	.0035
	High Carbon Steels ≥ 0.55%C	360 - 590	.0012	.0020	.0024	.0028	.0031
	Alloy Steels, Treated Steels	300 - 520	.0008	.0012	.0016	.0020	.0020
M	Stainless Steel - Free Cutting	200 - 520	.0012	.0016	.0020	.0024	.0024
	Stainless Steel - Austenitic	200 - 390	.0004	.0012	.0016	.0020	.0020
	Cast Steels	430 - 560	.0008	.0012	.0016	.0020	.0020
K	Cast Iron	230 - 490	.0016	.0024	.0028	.0031	.0035
N	Aluminum ≤ 12%Si, Copper	490 - 1150	.0016	.0024	.0028	.0031	.0035
	Aluminum > 12%Si	330 - 820	.0012	.0012	.0016	.0020	.0020
	Synthetics, Duroplastics, Thermoplastics	330 - 1310	.0024	.0031	.0039	.0043	.0047
S	Nickel Alloys, Titanium Alloys.	70 - 260	.0008	.0012	.0012	.0012	.0012
H	Hardened Steel, 45-50HRc	195 - 230	.0008	.0012	.0012	.0012	.0012

AMT Solid Carbide Thread Mills for Aluminum Machining

Solid carbide thread mills for High-speed Aluminum machining. High-speed aluminum machining requires tools that minimize the tendency of Aluminum to stick to the tool cutting edges, provides high surface finish, ensuring efficient chip evacuation and sufficient strength of the cutting edge to absorb the cutting forces.

Features

- Optimized carbide grade for Aluminum, cast iron and stainless steels
- Cylindrical shank (Weldon shank - upon request)
- With internal coolant bore
- Uncoated, smooth cutting edge
- High thread surface quality
- Same tool for right hand or left hand internal threads
- Additional items with cutting chamfer

Cutting Data

AMT

K20 Uncoated Sub- Micron carbide grade for Aluminum and non-ferrous materials, Stainless Steels and Titanium.

ISO Standard	Materials	Cutting Speed ft/min	Feed inch/tooth Cutting Diameter = D		
			D ≤ .16	.16 < D < .35	D ≥ .35
P	Low & Medium Carbon Steels < 0.55%C	160 - 460	.0002 - .0012	.0004 - .0020	.0008 - .0039
	High Carbon Steels ≥0.55%C	200 - 430	.0002 - .0008	.0004 - .0016	.0008 - .0035
	Alloy Steels, Treated Steels				
M	Stainless Steel-Free Cutting	130 - 390	.0002 - .0008	.0004 - .0016	.0008 - .0035
	Stainless Steel-Austenitic				
	Cast Steels	230 - 390	.0002 - .0012	.0004 - .0020	.0008 - .0039
K	Cast Iron	160 - 390	.0002 - .0012	.0004 - .0020	.0008 - .0039
N	Aluminum ≤12%Si, Copper	430 - 820	.0002 - .0016	.0004 - .0024	.0008 - .0051
	Aluminum >12%Si	260 - 590	.0002 - .0016	.0004 - .0024	.0008 - .0051
	Synthetics, Duroplastics, Thermoplastics	260 - 590	.0002 - .0016	.0004 - .0024	.0008 - .0051
S	Nickel alloys, Titanium alloys	65 - 260	.0002 - .0008	.0004 - .0016	.0008 - .0035

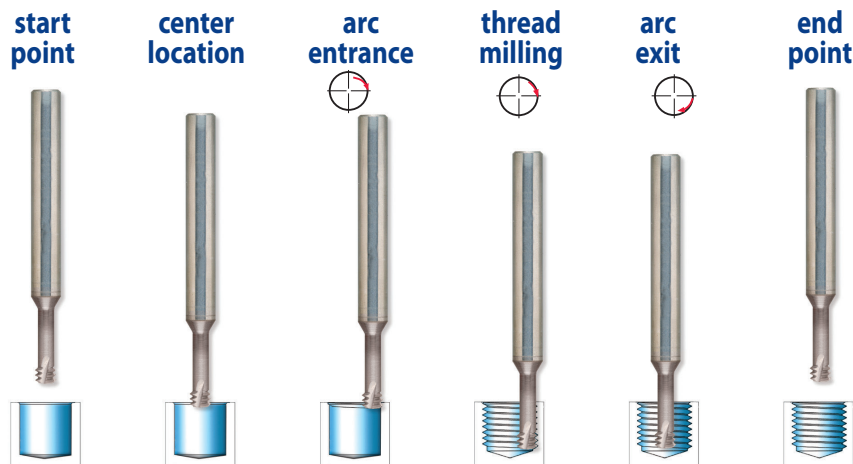
B12-17

Cutting Data

Mini Mill-Thread MTS, MTI and FMTI types

- MT6** Ultra-Fine carbide grade with high hardness and toughness provides an excellent solution for machining steels, stainless steels, and super alloys Ni or Ti base. With a universal PVD multi-layer coating, provides high heat and wear resistance.
- MT7** Sub-Micron Grade with Titanium Aluminum Nitride multi-layer coating (ISO K10 - K20). This is a general purpose grade, which can be used with all materials; it should be run at medium to high cutting speeds.
- MT8** Sub-Micron Grade with Aluminum Titanium Nitride (AlTiN) multi-layer coating (ISO K10-K20). Extremely high heat resistant and smooth cutting operation, for high performance, and normal machining conditions. General purpose for all materials.
- MT11** Ultra-fine Sub-Micron grade with advanced PVD triple coating.

ISO Standard	Materials	Cutting Speed ft/min	Feed inch/tooth Cutting Diameter = D													
			Ø.04	Ø.06	Ø.08	Ø.12	Ø.16	Ø.20	Ø.24	Ø.28	Ø.31	Ø.35	Ø.39	Ø.47	Ø.55	Ø.63
P	Low and Medium Carbon Steels < 0.55%C	200-390	.0016	.0020	.0020	.0028	.0035	.0043	.0051	.0055	.0059	.0063	.0063	.0067	.0071	.0071
	High Carbon Steels ≥ 0.55%C	200-300	.0012	.0016	.0020	.0024	.0031	.0035	.0039	.0047	.0051	.0055	.0055	.0063	.0067	.0071
	Alloy Steels, Treated Steels	160-260	.0012	.0016	.0016	.0020	.0020	.0024	.0028	.0028	.0031	.0035	.0039	.0047	.0051	.0055
M	Stainless Steels - Free Cutting	230-330	.0008	.0012	.0012	.0016	.0020	.0024	.0024	.0028	.0031	.0035	.0039	.0043	.0047	.0051
	Stainless Steels - Austenitic	200-300	.0008	.0012	.0012	.0016	.0020	.0024	.0024	.0028	.0031	.0035	.0039	.0043	.0047	.0051
	Cast Steels	230-300	.0012	.0016	.0016	.0020	.0020	.0024	.0028	.0028	.0031	.0035	.0039	.0047	.0051	.0055
K	Cast Iron	130-260	.0016	.0020	.0020	.0028	.0035	.0043	.0051	.0055	.0059	.0063	.0063	.0067	.0071	.0071
N	Aluminum ≤12%Si, Copper	330-660	.0016	.0020	.0020	.0028	.0035	.0043	.0051	.0055	.0059	.0063	.0063	.0067	.0071	.0071
	Aluminum >12% Si	200-460	.0012	.0012	.0012	.0016	.0020	.0024	.0024	.0028	.0031	.0035	.0039	.0043	.0051	.0054
	Synthetics, Duroplastics, Thermoplastics	160-660	.0035	.0039	.0043	.0047	.0055	.0063	.0071	.0075	.0075	.0075	.0075	.0075	.0079	.0079
S	Nickel Alloys and Titanium Alloys	70-130	.0012	.0012	.0012	.0016	.0016	.0020	.0024	.0024	.0024	.0028	.0028	.0028	.0031	.0031



Mini Mill-Thread vs. Taps

Features	Mini Mill-Thread	Taps
Thread surface quality	High	Medium
Thread geometry	Very accurate	Medium
Thread tolerances	4H, 5H, 6H with std cutter	6H with standard tap, 4H with specific tap
Machining time	Same as tap or shorter	Short
Tool breakage	Almost not possible	Could happen often
Machining load	Very low	High
Range of thread diameters	Wide range of diameters	Specific tap for each diameter
Right/Left hand threading	Same cutter	Specific tap for each
Geometric shape	Full profile	Partial profile

Cutting Data

MTSB type

Carbide grade - MT7:

Sub-Micron Grade with Titanium Aluminum Nitride multi-layer coating (ISO K10 - K20). This is a general purpose grade, which can be used with all materials; it should be run at medium to high cutting speeds.

ISO Standard	Materials	Cutting Speed ft/min	Feed inch/tooth					
			Cutting Diameter=D					
			Ø.04	Ø.06	Ø.08	Ø.12	Ø.16	Ø.20
P	Low and Medium Carbon Steels < 0.55%C	200 - 390	.0016	.0020	.0020	.0028	.0035	.0043
	High Carbon Steels ≥ 0.55%C	200 - 300	.0012	.0016	.0020	.0024	.0031	.0035
	Alloy Steels, Treated Steels	160 - 260	.0012	.0016	.0016	.0020	.0020	.0024
M	Stainless Steel - Free Cutting	230 - 330	.0008	.0012	.0012	.0016	.0020	.0024
	Stainless Steel - Austenitic	200 - 300	.0008	.0012	.0012	.0016	.0020	.0024
	Cast Steels	230 - 300	.0012	.0016	.0016	.0020	.0020	.0024
K	Cast Iron	130 - 260	.0016	.0020	.0020	.0028	.0035	.0043
N	Aluminum ≤ 12%Si, Copper	330 - 660	.0016	.0020	.0020	.0028	.0035	.0043
	Aluminum > 12%Si	200 - 460	.0012	.0012	.0012	.0016	.0020	.0024
	Synthetics, Duroplastics, Thermoplastics	160 - 660	.0035	.0039	.0043	.0047	.0055	.0063
S	Nickel Alloys, Titanium Alloys.	70 - 130	.0012	.0012	.0012	.0016	.0016	.0020
H	Hardened Steel, 45-50HRc	200 - 230	.0012	.0016	.0016	.0020	.0020	.0024

Cutting Data

DMT type

MT7 Sub-Micron Grade with Titanium Aluminum Nitride multi-layer coating (ISO K10 - K20). This is a general purpose grade, which can be used with all materials; it should be run at medium to high cutting speeds.

ISO	Materials	Cutting Speed ft/min	Feed inch/tooth Cutting Diameter=D						
			Ø.16	Ø.20	Ø.24	Ø.31	Ø.35	Ø.39	Ø.47
P	Low and Medium Carbon Steels <0.55%C	200 - 395	.0012	.0012	.0016	.0020	.0020	.0020	.0020
	High Carbon Steels ≥0.55%C	200 - 295	.0008	.0012	.0012	.0016	.0016	.0016	.0020
	Alloy Steels, Treated Steels	165 - 260	.0008	.0008	.0008	.0008	.0012	.0012	.0016
M	Stainless Steels - Free Cutting	230 - 330	.0008	.0008	.0008	.0008	.0012	.0012	.0012
	Stainless Steels - Austenitic	200 - 295	.0008	.0008	.0008	.0008	.0012	.0012	.0012
	Cast Steels	230 - 295	.0008	.0008	.0008	.0008	.0012	.0012	.0016
K	Cast Iron	130 - 260	.0012	.0012	.0016	.0020	.0020	.0020	.0020
N	Aluminum ≤12%Si, Copper	330 - 655	.0012	.0012	.0016	.0020	.0020	.0020	.0020
	Aluminum >12% Si	200 - 460	.0008	.0008	.0008	.0008	.0012	.0012	.0012
	Synthetics, Duroplastics, Thermoplastics	165 - 655	.0016	.0020	.0020	.0024	.0024	.0024	.0024

DMTH type

MT11 Ultra-fine Sub-Micron grade with advanced PVD triple Blue coating.

ISO	Materials	Cutting Speed ft/min	Feed inch/tooth Cutting Diameter=D								
			Ø.08	Ø.12	Ø.16	Ø.20	Ø.24	Ø.31	Ø.35	Ø.39	Ø.47
P	Low and Medium Carbon Steels <0.55%C	190 - 390	.0008	.0008	.0012	.0012	.0016	.0020	.0020	.0020	.0020
	High Carbon Steels ≥0.55%C	190 - 290	.0008	.0008	.0008	.0012	.0012	.0016	.0016	.0016	.0020
	Alloy Steels, Treated Steels	160 - 260	.0008	.0008	.0008	.0008	.0008	.0008	.0012	.0012	.0016
M	Stainless Steels - Free Cutting	230 - 330	.0008	.0008	.0008	.0008	.0008	.0008	.0012	.0012	.0012
	Stainless Steels - Austenitic	190 - 290	.0008	.0008	.0008	.0008	.0008	.0008	.0012	.0012	.0012
	Cast Steels	230 - 290	.0008	.0008	.0008	.0008	.0008	.0008	.0012	.0012	.0016
K	Cast Iron	130 - 260	.0012	.0012	.0012	.0012	.0016	.0020	.0020	.0020	.0020
N	Aluminum ≤10%Si, Copper	330 - 650	.0012	.0012	.0012	.0012	.0016	.0020	.0020	.0020	.0020
	Aluminum >10% Si	190 - 460	.0008	.0008	.0008	.0008	.0008	.0008	.0012	.0012	.0012
	Synthetics, Duroplastics, Thermoplastics	160 - 650	.0016	.0020	.0016	.0020	.0020	.0024	.0024	.0024	.0024
S	Nickel Alloys, Titanium Alloys and High Temp. Alloys	65 - 130	.0008	.0012	.0012	.0016	.0020	.0020	.0024	.0024	.0024
H	Hardened Steels 45-50 HRc	190 - 230	.0008	.0008	.0008	.0012	.0016	.0016	.0020	.0020	.0020
	Hardened Steels 50-55 HRc	160 - 190	.0004	.0004	.0004	.0008	.0012	.0012	.0016	.0016	.0016

B12-20

Case Studies

Case Study no. 1

Tool Description	DMTH 08047 C14 1.0 ISO MT11
Internal Thread	M6x1.0
Thread Length	.47
Material	Steel SAE 4340 12-15 HRc
Cutting Data	Vc= 295 ft/min Fz= .00118 inch/tooth
Cycle Time	28 seconds
Tool Life	776

Case Study no. 2

Tool Description	DMTH 08047 C14 1.0 ISO MT11
Internal Thread	M6x1.0
Thread Length	.47
Material	Steel SAE 4340 44-45 HRc
Cutting Data	Vc=232 ft/min Fz=.00079 inch/tooth
Cycle Time	53 seconds
Tool Life	196



Cutting Data

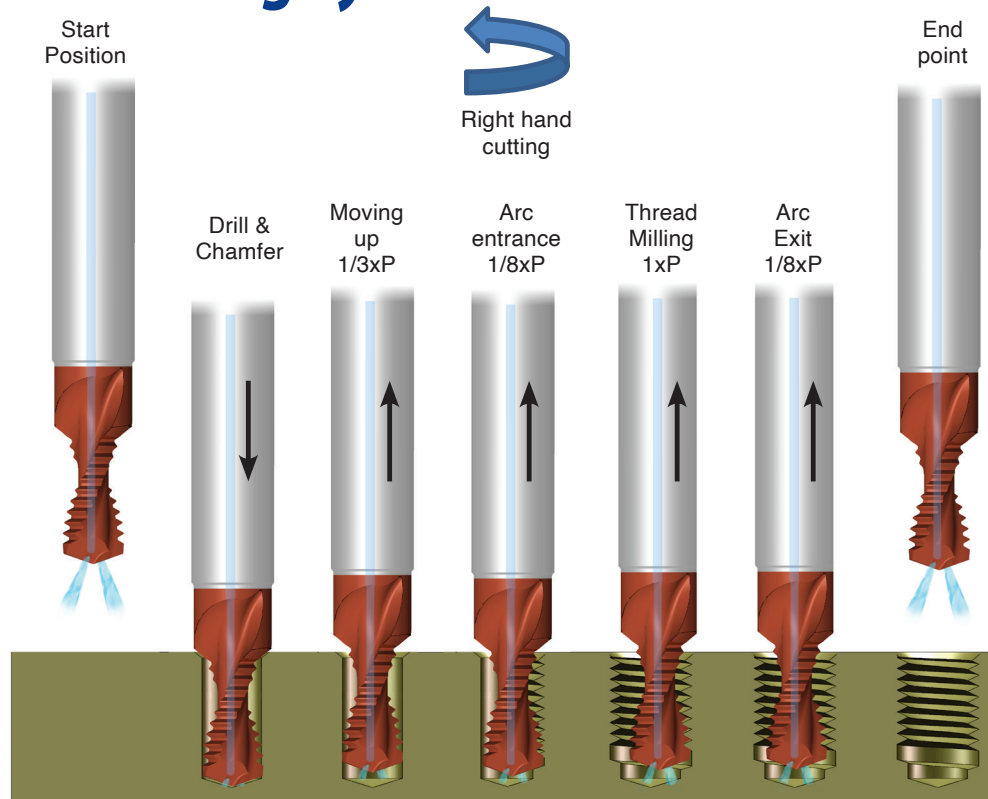
MT Drill - MTD

Carbide grade K20: Uncoated Sub-Micron carbide grade dedicated for machining Aluminum and Cast Iron.

MT7: Sub-Micron carbide grade combines high hardness and toughness, with PVD triple coating for smooth cutting and high performance.

Material Group	Materials	Cutting Speed ft/min		Feed inch/r Cutting Diameter = D			Feed inch/tooth Cutting Diameter = D		
				Drilling			Mill Thread		
		K20	MT7	D ≤ .16	.16 < D < .24	D ≥ .24	D ≤ .16	.16 < D < .24	D ≥ .24
K	Cast Iron	160 - 260	260 - 390	.0039 - .0059	.0059 - .0079	.0059 - .0118	.0002 - .0012	.0004 - .0020	.0008 - .0039
N	Aluminum ≤12%Si, Copper	330 - 820	330 - 1150	.0024 - .0039	.0039 - .0079	.0079 - .0118	.0002 - .0016	.0004 - .0024	.0008 - .0051
	Aluminum >12%Si	---	260 - 590	.0020 - .0028	.0039 - .0059	.0059 - .0098	.0002 - .0016	.0004 - .0024	.0008 - .0051
	Synthetics, Duroplastics, Thermoplastics	200 - 330	260 - 590	.0039 - .0079	.0079 - .0118	.0079 - .0118	.0002 - .0016	.0004 - .0024	.0008 - .0051

MT Drill working cycle



B12-22

Cutting Data

Mini Mill-Thread MTSH and FSH

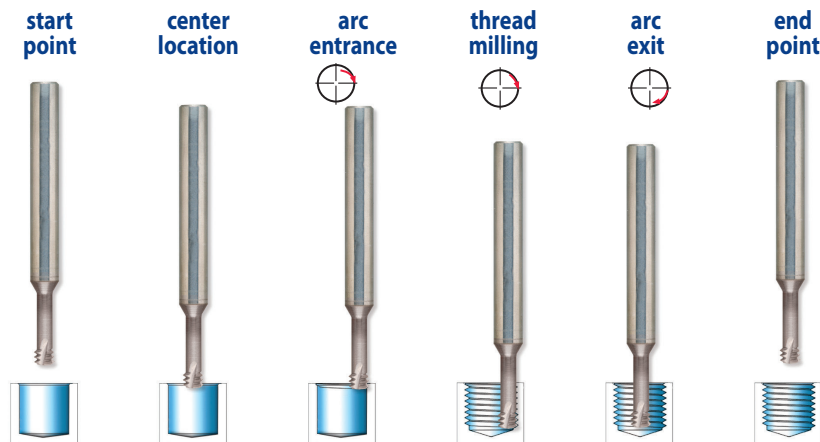
MT9 Sub-Micron Grade with advanced PVD triple coating.

MT6 Ultra-Fine carbide grade with high hardness and toughness provides an excellent solution for machining steels, stainless steels, and super alloys Ni or Ti base. With a universal PVD multi-layer coating, provides high heat and wear resistance.

MT3 Ultra-Fine carbide grade with PVD multi-layer coating for machining Super Alloys and Hard materials up to 65 HRc. Provides supreme edge stability with high heat and wear resistance. For increased productivity and high performance.

Left hand cutting for CNC code use M04

ISO	Materials	Hardness HRc	Cutting Speed ft/min	Feed inch/tooth Cutting Diameter = D													
				Ø.04	Ø.06	Ø.08	Ø.12	Ø.16	Ø.20	Ø.24	Ø.28	Ø.31	Ø.35	Ø.39	Ø.47	Ø.55	Ø.63
S	Nickel Alloys, Titanium Alloys and High Temp. Alloys		70-130	.0012	.0012	.0012	.0016	.0016	.0020	.0024	.0024	.0024	.0028	.0028	.0028	.0031	.0031
H	Hardened Steels	45-50	200-230	.0012	.0016	.0016	.0020	.0020	.0024	.0024	.0028	.0028	.0031	.0031	.0035	.0039	.0043
		51-55	160-200	.0008	.0012	.0012	.0016	.0016	.0020	.0020	.0024	.0024	.0028	.0028	.0031	.0035	.0039
		56-62	130-160	.0004	.0008	.0008	.0012	.0012	.0016	.0016	.0020	.0020	.0024	.0024	.0028	.0031	.0035



Case Study

Application	Internal Thread M4 X 0.7
Thread Depth	.315
Workpiece Material	Tool Steel: D2
Hardness	60-62 (HRc)
Cutter Description	MTSH0250C35 0.7 ISO
Machining Conditions	Cutting Speed: 144 ft / min Feed: .0012 Inch / tooth
Machine	Mori Seiki VN5000
Control	Fanuc
Cooling Lubricant	Emulsion
Tool Life (No. of Threads)	84

B12-23

Cutting Data

MTH type

MT11 Sub-Micron Grade with advanced PVD triple coating.

ISO	Materials	Hardness HRc	Cutting Speed ft/min	Feed inch/tooth Cutting Diameter = D								
				Ø.10	Ø.12	Ø.16	Ø.20	Ø.24	Ø.28	Ø.31	Ø.35	Ø.39
S	Nickel Alloys, Titanium Alloys and High Temp. Alloys		66-164	.0008	.0008	.0008	.0008	.0012	.0012	.0012	.0012	.0016
H	Hardened Steels Cast Iron	45-50	230-262	.0008	.0012	.0012	.0016	.0016	.0020	.0020	.0024	.0028
		51-55	197-230	.0004	.0008	.0008	.0012	.0012	.0016	.0016	.0020	.0024
		56-62	131-164	.0002	.0004	.0004	.0008	.0008	.0012	.0012	.0016	.0020

For cutters with long cutting length reduce feed rate by 40%

