



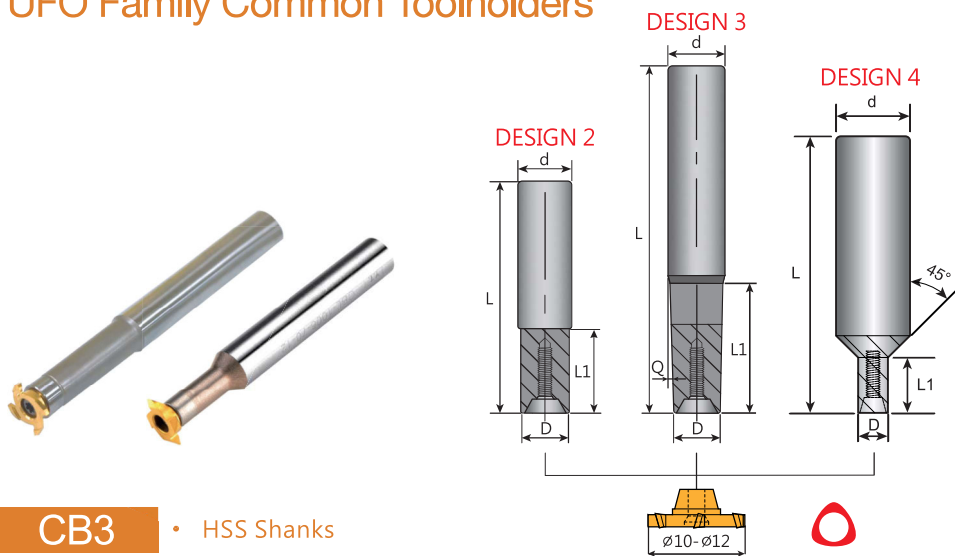
UFO THREAD MILLING

Features



PRODUCT SPECIFICATIONS

UFO Family Common Toolholders



CB3 • HSS Shanks

Order code	Dimensions (mm)					Design	KG	Inserts	Screw	Key
	D	d	L	L1	Q					
CB3-0606-55-12	6.5	6	55	10	-	2	Ø10 Ø11 Ø12	C03012	T09P	
CB3-0808-80-12	7.9	8	80							
CB3-1006-100-12	6.5	10	100	20	1°	3				
CB3-1008-100-12	7.9			30						
CB3-1606-60-12	6.5	16	60	12	-	4				
CB3-1608-65-12	7.9									65

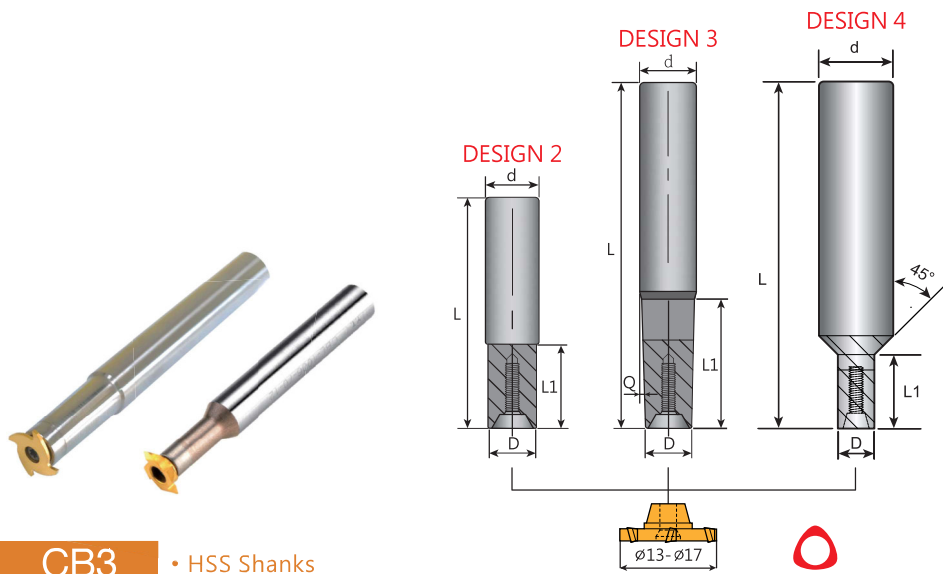
CB3W • Carbide Shanks

Order code	Dimensions (mm)					Design	KG	Inserts	Screw	Key
	D	d	L	L1	Q					
CB3W-0808-80-12	7.9	8	80	10	-	2	Ø10 Ø11 Ø12	C03012	T09P	
CB3W-1008-100-12	7.9	10	100	30	1°	3				

• To check the max. AR, please refer to the page of relative inserts or cutters.

UFO Family Common Toolholders

UFO Family



CB3 • HSS Shanks

Order code	Dimensions (mm)					Design	KG	Inserts	Screw	Key
	D	d	L	L1	Q					
CB3-0808-55-15	7.9	8	55	10	-	2	0.08	ø13 ø14 ø15 ø16 ø17	C03012	T09P
CB3-1010-90-15	9.9	10	90							
CB3-1208-110-15	7.9	12	110	30	1°	3	0.14			
CB3-1210-120-15	9.9		120				0.15			
CB3-1608-75-15	7.9	16	75	16	-	4	0.24			
CB3-1610-80-15	9.9		80				20			

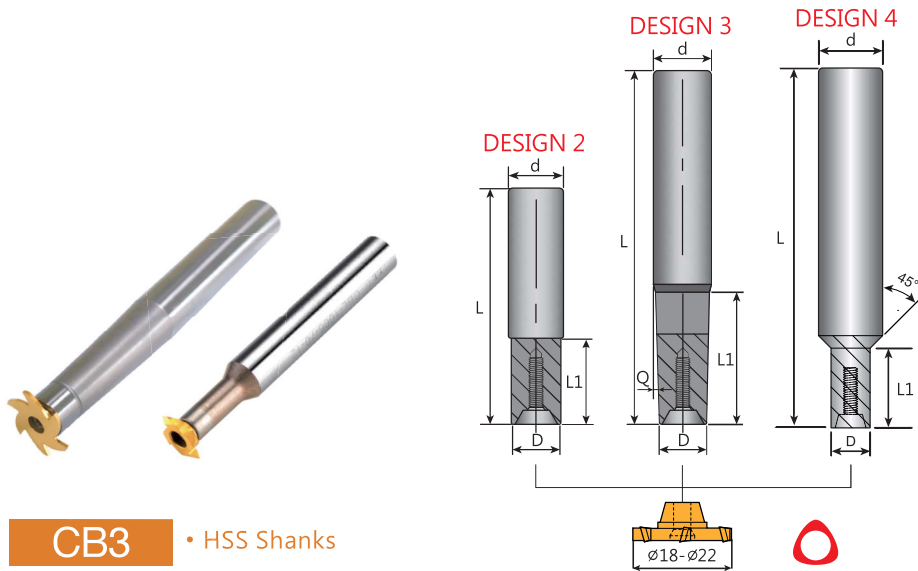
CB3W • Carbide Shanks

Order code	Dimensions (mm)					Design	KG	Inserts	Screw	Key
	D	d	L	L1	Q					
CB3W-1010-90-15	9.9	10	90	10	-	2	0.15	ø13 ø14 ø15 ø16 ø17	C03012	T09P
CB3W-1208-110-15	7.9	12	110	30	1°	3	0.21			
CB3W-1210-120-15	9.9		120				0.24			

• To check the max. AR, please refer to the page of relative inserts or cutters.



UFO Family Common Toolholders



CB3 • HSS Shanks

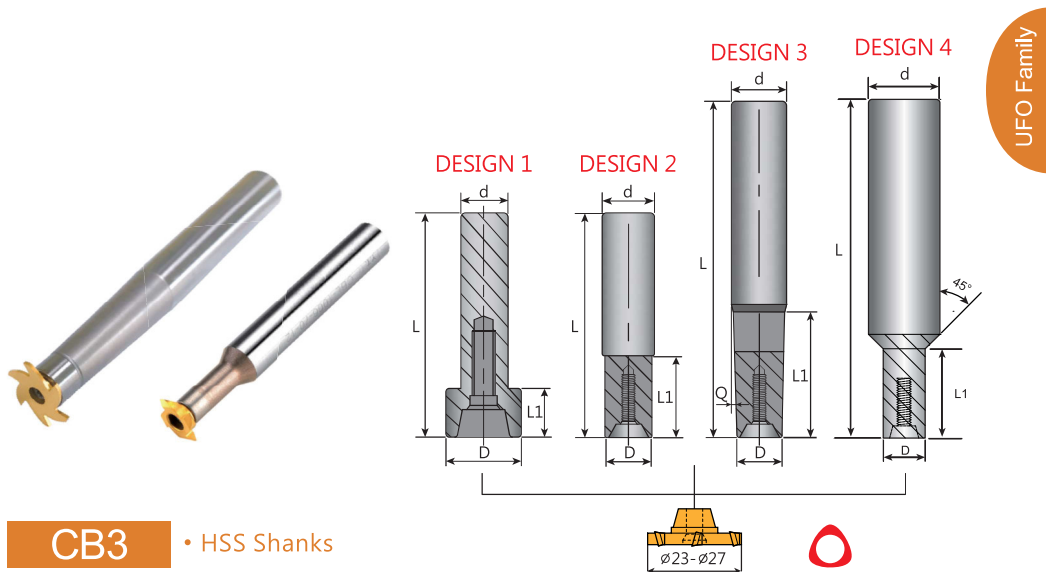
Order code	Dimensions (mm)					Design	KG	Inserts	Screw	Key
	D	d	L	L1	Q					
CB3-1010-80-20	9.8	10	80	12	-	2	ø18 ø19 ø20 ø21 ø22	C03513	T10P	
CB3-1010-100-20			100		-					
CB3-1210-90-20		12	90	25	3.2°	3				
CB3-1210-130-20			130	40	1.7°					
CB3-1610-90-20	11.8	16	90	20	-	4	0.20	C03513	T10P	
CB3-1612-95-20			95	25	-	4	0.23			
CB3-1612-150-20			150	55	2.4°	3	0.29			
CB3-1616-150-20	15.8		20		-	2	0.31			

CB3W • Carbide Shanks

Order code	Dimensions (mm)					Design	KG	Inserts	Screw	Key
	D	d	L	L1	Q					
CB3W-1010-100-20	9.8	10	100	12	-	2	0.18	ø18 ø19 ø20 ø21 ø22	C03513	T10P
CB3W-1212-150-20	11.8	12	150	20	-	2	0.32			

• To check the max. AR, please refer to the page of relative inserts or cutters.

UFO Family Common Toolholders



CB3 • HSS Shanks

Order code	Dimensions (mm)					Design	KG	Inserts	Screw	Key
	D	d	L	L1	Q					
CB3-1012-50-25	11.8	10	50	10	-	1	0.11	ø 23 ø 24 ø 25 ø 26 ø 27	C04017	T15P
CB3-1212-90-25		12	90	12	-	2	0.16			
CB3-1212-110-25		110	35	4.2°	0.18					
CB3-1612-110-25		16	150	55	2.4°	3	0.31			
CB3-1612-150-25			25	-	4	0.50				
CB3-2012-95-25		15.8	20	95	30	-	4			
CB3-2016-95-25	19.8	150		20	-	2	0.46			

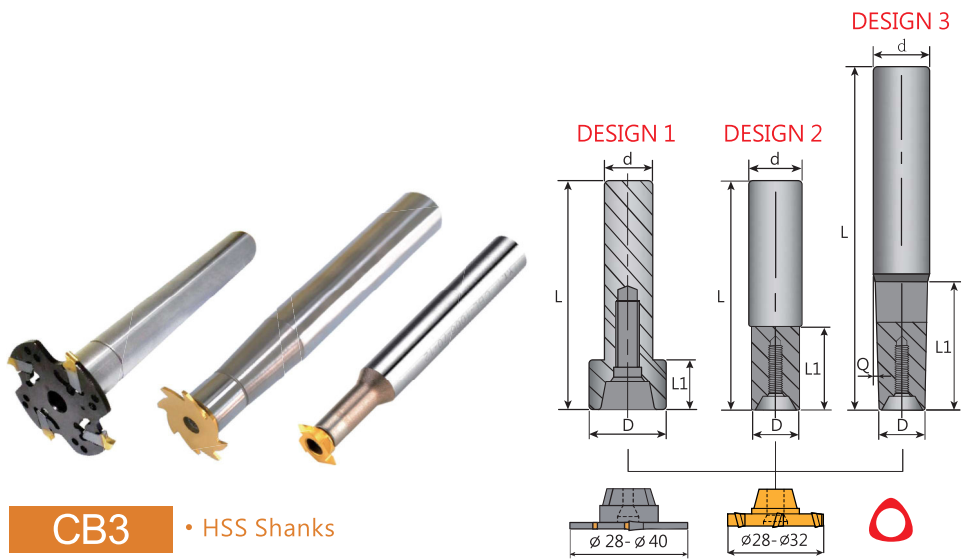
CB3W • Carbide Shanks

Order code	Dimensions (mm)					Design	KG	Inserts	Screw	Key
	D	d	L	L1	Q					
CB3W-1212-110-25	11.8	12	110	12	-	2	0.26	ø 23 ø 24 ø 25 ø 26 ø 27	C04017	T15P
CB3W-1616-150-25	15.8	16	150	20			0.54			

• To check the max. AR, please refer to the page of relative inserts or cutters.



UFO Family Common Toolholders



CB3 • HSS Shanks

Order code	Dimensions (mm)					Design	KG	Inserts	Screw	Key		
	D	d	L	L1	Q							
CB3-1016-50-30	15.8	10	50	10	-	1	0.13	C05016	T20P			
CB3-1616-120-30		16	120	15	-	2	0.28					
CB3-1616-150-30										20	150	45
CB3-2016-150-30		70	2.0°	0.45								
CB3-2016-180-30					180	20	-					
CB3-2020-180-30		19.8										

CB3W • Carbide Shanks

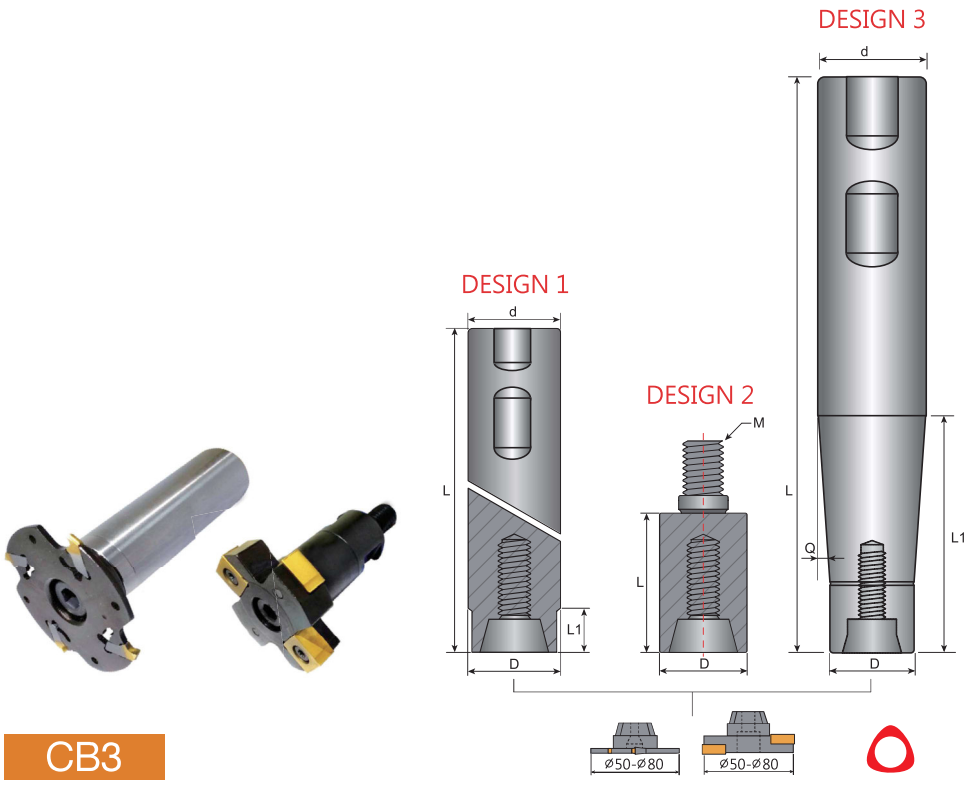
Order code	Dimensions (mm)					Design	KG	Inserts	Screw	Key
	D	d	L	L1	Q					
CB3W-1616-150-30	15.8	16	150	15	-	2	0.55	C05016	T20P	
CB3W-2016-180-30		20	180	70	2.0°	3	0.87			

• To check the max. AR, please refer to the page of relative inserts or cutters.

UFO Family Common Toolholders

- Combi Toolholders P. 285 - 286

UFO Family



CB3

Order code	Dimensions (mm)						Design	KG	Inserts	Screw	Key
	D	d	L	L1	M	Q					
CB3-2525-110	24.8	25	110	15	-	-	1	0.42	Ø 50 Ø 80	M0825	-
CB3-2525-170			170		-	-					
CB3-25	25.0	-	40	-	12	-	2	0.17			
CB3-3225-110	24.8	32	110	40	-	10°	3	0.62			
CB3-3225-170			170	70	-	4°		0.96			

• To check the max. AR, please refer to the page of relative inserts or cutters.



UFO THREAD MILLING



Features

Available in
materials

P K M
N S H

Cost
200~300%
SAVING

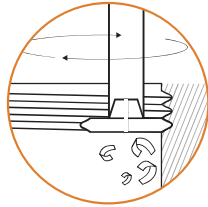
Applicable
Machines
CNC Milling machine

Efficiency
400%
UP

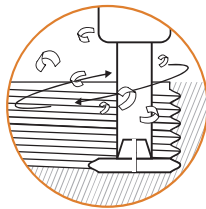
Durability
300%
UP



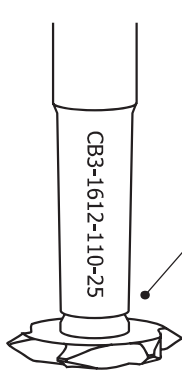
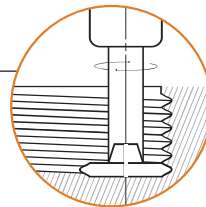
1 / Excellent chip evacuation



2 / High stability & Low cutting forces



3 / Same insert can make different pitches of thread.



Product Advantages

Indexable UFO thread mill - Excellent in chip evacuation and small cutting force.

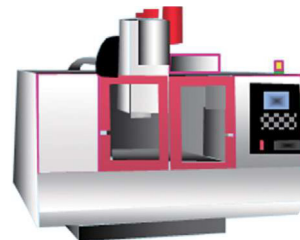
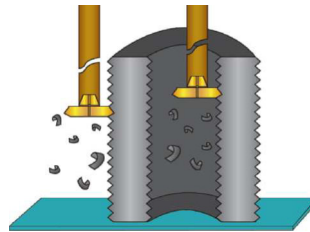
Insert Design

1. Yih Troun provides UFO thread milling inserts applicable to metric, UN and withworth both in full profile and partial profile. Full profile inserts are available from $\text{Ø}10/\text{pitch}1.0$; partial profile inserts are available from $\text{Ø}12/\text{pitch}1.0$.
2. Unique tapered polygon design to get the excellent stability in high speed machining.
3. The front-mounted insert are positioned in a taper seat for center-positioning, giving secure and continuous performance.
4. High productivity with many teeth (4-6 teeth).

New

UFO thread mill is the best choice for expensive components, it's excellent in chip evacuation, averts chip twining and tap breakage at the last stage of machining, exempts machines from unscheduled down time.

The UFO thread mill insert generates machining cutting force least from its single-point design. It's the first choice for medium to large threads milling in BT30 CNC machining centers, thin-walled components and unstable conditions such as milling thread with a long overhang.



Old

Machining with conventional HSS/ carbide solid tap gets problems easily in chip evacuation, tap breakage on the parts and machining stoppage, It takes time and cost to remove the breakage tap.



Advantages Of Partial Profile Ufo Thread Milling

FIG.1

Same UFO thread milling insert is applicable to a wide range of hole sizes and thread pitches.

If use taps, it needs different taps for different hole sizes and different pitches.

FIG.2

UFO thread milling achieves full-bottom threading in a blind hole with a least drill depth.

It's easy to fix thread tolerance by programme.

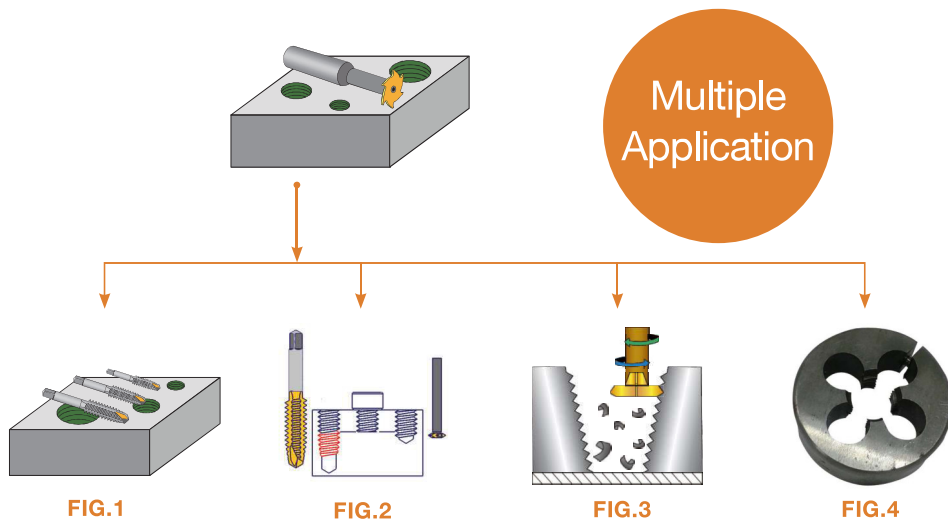
FIG.3

Same UFO thread milling inserts can be used in PT/NPT thread.





It provides better tool life and less cutting force than PT/NPT tap.

FIG.4

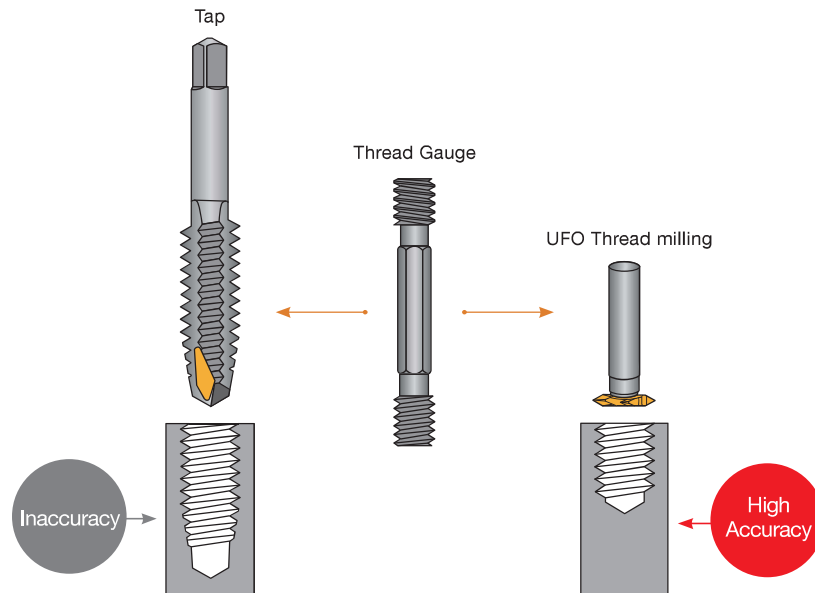
Same UFO thread milling insert is available for both external and internal threads.



Tools Comparison

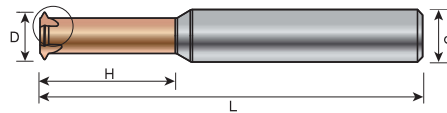
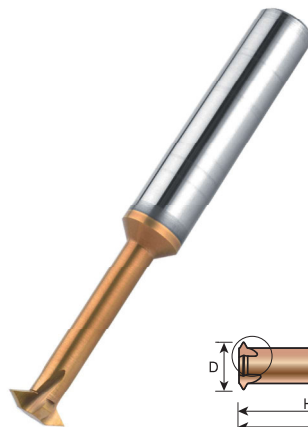
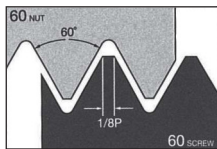
UFO partial profile insert	Tap	Solid carbide thread milling	Thread milling insert
			
One insert applicable to a wide pitch range	Single pitch	Single pitch	Single pitch
		expensive	
min dia. 12mm , 4~6 teeth			large size and less no. of tooth
	deeper pre-drilling hole is required		
single cutting edge with multiple teeth results in less cutting force, available even in small horse power M/C	bigger horse power M/C is required in big hole machining	multiple pitches design results in higher cutting force and lower feed in machining difficult material	multiple pitches design results in higher cutting force and lower feed in machining difficult material
less cutting force in machining taper thread	additional taper tap is required	not available in taper thread	not available in taper thread

Precise Thread By UFO Thread Milling



Solid Carbide Thread Milling - Partial Profile 60°

- Cutting Data P. 125

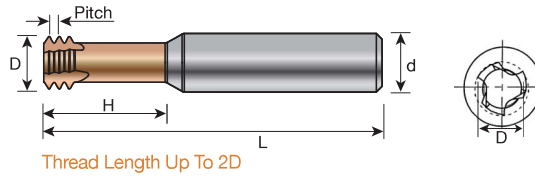
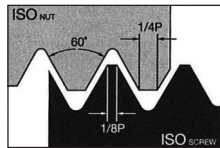


Order code	Pitch Range		D	H	T	d	L
	MM	TPI					
AT0195-50	0.35-0.6	72-40	1.95	6.0	3	3	50
AT0245-50	0.5-0.8	48-32	2.45	7.7	3	3	50
AT0315-50	0.5-0.8	48-32	3.15	10	3	4	50
AT0400-50	0.5-1.0	48-24	4.0	12	3	4	50
AT0470-60	0.5-1.25	48-20	4.7	15	3	6	60
AT0600-60	0.5-1.25	48-20	6.0	18	3	6	60
AT0800-60	0.75-1.5	32-16	8.0	24	3	8	60
AT1000-80	1.0-2.5	24-10	10	30	4	10	80



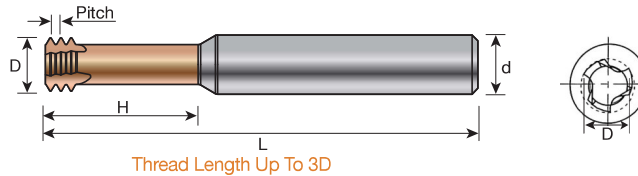
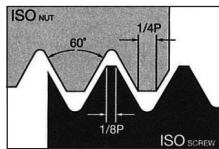
Solid Carbide Thread Milling 2D (Full-Profile) 60°

- Cutting Data P. 125



Order code	Thread Size	Pitch	D	H	T	d	L
BT0240-50	M3.0 X 0.5	0.5	2.4	6.4	3	4	50
BT0275-50	M3.5 X 0.6	0.6	2.75	7.4	3	4	50
BT0315-60	M4 X 0.7	0.7	3.15	8.6	3	6	60
BT0400-60	M5 X 0.8	0.8	4.0	12.0	3	6	60
BT0475-60	M6 X 1.0	1.0	4.75	13.0	3	6	60
BT0600-60	M8 X 1.25	1.25	6.5	17.3	3	8	60
BT0790-60	M10 X 1.5	1.5	7.9	22.0	3	8	60
BT0950-80	M12 X 1.75	1.75	9.5	25.5	3	10	80

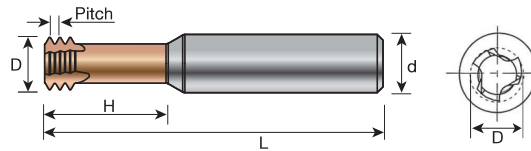
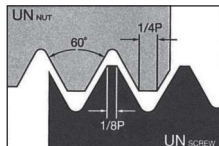
Solid Carbide Thread Milling 3D (Full-Profile) 60°



Order code	Thread Size	Pitch	D	H	T	d	L
BTL0240-50	M3.0 X 0.5	0.5	2.4	9.3	3	4	50
BTL0315-60	M4.0 X 0.7	0.7	3.15	12.4	3	6	60
BTL0400-60	M5 X 0.8	0.8	4.0	15.6	3	6	60
BTL0475-60	M6 X 1.0	1.0	4.75	19.0	3	6	60
BTL0650-60	M8 X 1.25	1.25	6.5	24.3	3	8	60
BTL0790-60	M10 X 1.5	1.5	7.9	31.0	3	8	60
BTL0950-80	M12 X 1.75	1.75	9.5	36.5	3	10	80

Solid Carbide Thread Milling 2D (Full-Profile) UN 60°

- Cutting Data P. 125

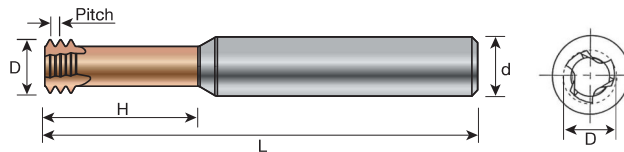
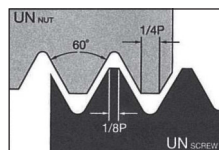


Thread Length Up To 2D

Order code	UNC	UNF	T.P.I	D	H	T	d	L
UT404-50	No.5 - 40 UNC	No.6 - 40 UNF	40	2.46	7.1	3	4	50
UT364-50	-	No.8 - 36 UNF	36	3.31	8.8	3	4	50
UT324-50	No.6 - 32 UNC	-	32	2.57	7.3	3	4	50
UT326-60	No.8 - 32 UNC	No.10 - 32 UNF	32	3.22	10.1	3	6	60
UT286-60	-	1/4 - 28 UNF	28	5.2	14	3	6	60
UT246-60	No.10 - 24 UNC	-	24	3.55	10.4	3	6	60
UT248-60	-	5/16 - 24 UNF	24	6.65	16.7	3	8	60
UT206-60	1/4 - 20 UNC	7/16 - 20 UNF	20	4.85	13.7	3	6	60
UT208-60	-	7/16 - 20 UNF	20	7.95	24	3	8	60
UT186-60	5/16 - 18 UNC	-	18	5.95	16.5	3	6	60
UT168-60	3/8 - 16 UNC	-	16	6.9	21	3	8	60
UT148-60	7/16 - 14 UNC	-	14	7.95	23.5	3	8	60
UT1310-80	1/2 - 13 UNC	-	13	9.3	27	3	10	80

UFO Family

Solid Carbide Thread Milling 3D (Full-Profile) UN 60°



Thread Length Up To 3D

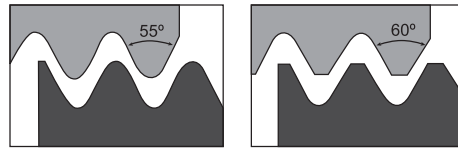
Order code	UNC	UNF	T.P.I	D	H	T	d	L
UTL404-50	No.5 - 40 UNC	No.6 - 40 UNF	40	2.46	9.8	3	4	50
UTL324-60	No.6 - 32 UNC	-	32	2.57	10.7	3	4	50
UTL326-60	No.8 - 32 UNC	No.10 - 32 UNF	32	3.22	12.7	3	6	60
UTL286-60	-	1/4 - 28 UNF	28	5.2	19.3	3	6	60
UTL248-60	-	5/16 - 24 UNF	24	6.65	24.2	3	8	60
UTL206-60	1/4 - 20 UNC	7/16 - 20 UNF	20	4.85	19.4	3	6	60



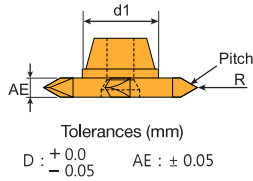
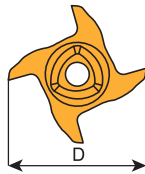
UFO Thread Milling Inserts (Partial Profile)

- Toolholders P. 24
- Cutting Data P. 126 - 127

External / Internal



Inserts 2 PCS / Box



Dimensions (mm)								
D	d1	AE	Pitch mm	Pitch t.p.i	Angle	R	Minimum hole diameter	
							MM	INCH
12	6.5	3.2	-	16~10	55°	0.08~0.1	16.51	0.65"
		2.0	1.0~1.5	-	60°	0.05	14.00	-
		3.2	1.75~2.5	-	-	0.08~0.1	-	-

Inserts	Order Code	Grades										
		Carbide				Cermet			Uncoated			
		B100	C200	C250	F20	F30	CE25	CE100	CE60	K10		CE
 55° BSW/BSF	3T1-0612-55-16~10TPI-E											 BSW Defined by: B.S.84:1956 DIN 259, ISO228/1:1982 BSF Defined by: B.S.2779:1956 Tolerance class: BSW - Medium class A, BSF-Medium class
	3T1-0612-55-16~10TPI-ME	⊙										
 60° ISO Metric(M,MF)	3T1-0612-60-1.0~1.5-E											 Defined by: R262 (DIN 13) Tolerance class: 6g/6H
	3T1-0612-60-1.75~2.5-E											
	3T1-0612-60-1.0~1.5-ME	⊙										
	3T1-0612-60-1.75~2.5-ME	⊙										

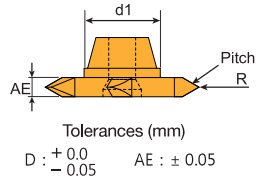
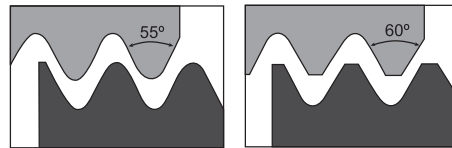
- ■ Steel ■ Stainless Steel ■ Steel/Stainless Steel/Super alloy ■ Cast Iron ■ Aluminum ■ Steel/Cast Iron
- ⊙ Steel/Stainless Steel/Cast Iron
- Prices and stocks are based on present conditions
- Please specify model numbers and the grade of inserts, ie.: 3T1-0612-55-16~10TPI-E,F20

UFO Thread Milling Inserts (Partial Profile)

- Toolholders P. 25
- Cutting Data P. 126 - 127

UFO Family

External / Internal



Inserts 2 PCS / Box

Dimensions (mm)								
D	d1	AE	Pitch mm	Pitch t.p.i	Angle	R	Minimum hole diameter	
							MM	INCH
15	7.9	4.0	-	11~8	55°	0.08~0.1	17.78	0.7"
		2.0	1.0~1.5	-	60°	0.05	17.00	-
		4.0	1.75~3.0			0.08~0.1		

Inserts	Order Code	Grades														
		Carbide					Cermet			Uncoated						
		B100	C200	C250	F20	F30	CE25	CE100	CE60	K10	CE					
 55° BSW/BSF	3T1-0815-55-11~8TPI-E														 BSW Defined by: B.S.84:1956, DIN 259:ISO228/1:1982 BSF Defined by: B.S.2779:1956 Tolerance class: BSW- Medium class A, BSF-Medium class	
	3T1-0815-55-11~8TPI-ME	⊙														
 60° ISO Metric(M,MF)	3T1-0815-60-1.0~1.5-E															 Defined by: R262 (DIN 13) Tolerance class: 6g/6H
	3T1-0815-60-1.75~3.0-E															
	3T1-0815-60-1.0~1.5-ME	⊙														
	3T1-0815-60-1.75~3.0-ME	⊙														

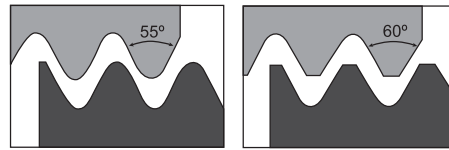
- ■ Steel ■ Stainless Steel ■ Steel/Stainless Steel/Super alloy ■ Cast Iron ■ Aluminum ■ Steel/Cast Iron
- ⊙ Steel/Stainless Steel/Cast Iron
- Prices and stocks are based on present conditions
- Please specify model numbers and the grade of inserts, ie.: 3T1-0815-55-11~8TPI-E,F20



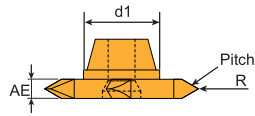
UFO Thread Milling Inserts (Partial Profile)

- Toolholders P. 26
- Cutting Data P. 126 - 127

External / Internal



Inserts 2 PCS / Box



Tolerances (mm)
D : $\begin{matrix} +0.0 \\ -0.05 \end{matrix}$ AE : ± 0.05

Dimensions (mm)

D	d1	AE	Pitch mm	Pitch t.p.i	Angle	R	Minimum hole diameter	
							MM	INCH
20	9.9	4.6	-	11~6	55°	0.08~0.1	22.86	0.9"
		2.0	1.0~1.5	-	60°	0.05	22.00	-
		4.6	1.75~3.5			0.08~0.1		

Inserts	Order Code	Grades											
		Carbide				Cermet			Uncoated				
		B100	C200	C250	F20	F30	CE25	CE100	CE60	K10		CE	
 55° BSW/BSF	3T1-1020-55-11~6TPI-E												 BSW Defined by: B.S.84:1956, DIN 259, ISO228/1:1982 BSF Defined by: B.S.2779:1956 Tolerance class: BSW- Medium class A, BSF-Medium class
	3T1-1020-55-11~6TPI-ME	⊗											
 60° ISO Metric(M,MF)	3T1-1020-60-1.0~1.5-E												 Defined by: R262 (DIN 13) Tolerance class:6g/6H
	3T1-1020-60-1.75~3.5-E												
	3T1-1020-60-1.0~1.5-ME	⊗											
	3T1-1020-60-1.75~3.5-ME	⊗											

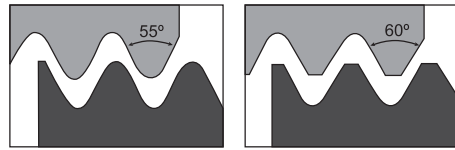
- Steel Stainless Steel Steel/Stainless Steel/Super alloy Cast Iron Aluminum Steel/Cast Iron
- Steel/Stainless Steel/Cast Iron
- Prices and stocks are based on present conditions
- Please specify model numbers and the grade of inserts, ie.: 3T1-1020-55-11~6TPI-E,F20

UFO Thread Milling Inserts (Partial Profile)

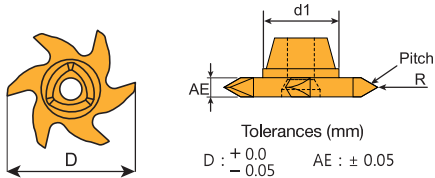
- Toolholders P. 27
- Cutting Data P. 126 - 127

UFO Family

External / Internal



Inserts 2 PCS / Box



Dimensions (mm)								
D	d1	AE	Pitch mm	Pitch t.p.i	Angle	R	Minimum hole diameter	
							MM	INCH
25	12	4.6	-	11~5	55°	0.08~0.1	28.58	1.125"
		2.0	1.0~1.5	-	60°	0.05	27.00	-
		4.6	1.75~5.0	-		0.08~0.1		

Inserts	Order Code	Grades												
		Carbide					Cermet			Uncoated				
		B100	C200	C250	F20	F30	CE25	CE100	CE60	K10	CE			
 55° BSW/BSF	3T1-1225-55-11~5TPI-E													 BSW Defined by: B.S.84:1956, DIN 259, ISO 228/1:1982 BSF Defined by: B.S.2779:1956 Tolerance class: BSW-Medium class A, BSF-Medium class
	3T1-1225-55-11~5TPI-ME	⊙												
 60° ISO Metric(M,MF)	3T1-1225-60-1.0~1.5-E													 Defined by: R262 (DIN 13) Tolerance class: 6g/6H
	3T1-1225-60-1.75~5.0-E													
	3T1-1225-60-1.0~1.5-ME	⊙												
	3T1-1225-60-1.75~5.0-ME	⊙												

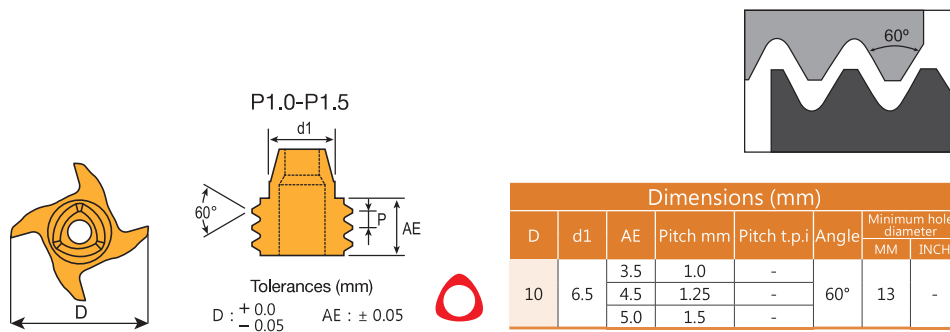
- ■ Steel ■ Stainless Steel ⊙ Steel/Stainless Steel/Super alloy ■ Cast Iron ■ Aluminum ■ Steel/Cast Iron
- ⊙ Steel/Stainless Steel/Cast Iron
- Prices and stocks are based on present conditions
- Please specify model numbers and the grade of inserts, ie.: 3T1-1225-55-11~5TPI-E, F20



UFO Thread Milling Inserts(Full Profile)

- Toolholders P. 24
- Cutting Data P. 126 - 127

ISO



Inserts	Order Code	Grades									
		Carbide					Cermet		Uncoated		
		B100	C200	C250	F20	F30	CE100	CE60	K10	CE	
 ISO Metric(M,MF)	3T0610-ISO1.0-E										 Defined by: R262 (DIN 13) Tolerance class: 6g/6H
	3T0610-ISO1.25-E										
	3T0610-ISO1.5-E										
	3T0610-ISO1.0-ME										 Inserts 2 PCS / Box
	3T0610-ISO1.25-ME										
	3T0610-ISO1.5-ME										

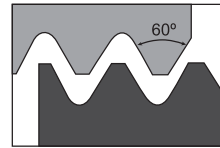
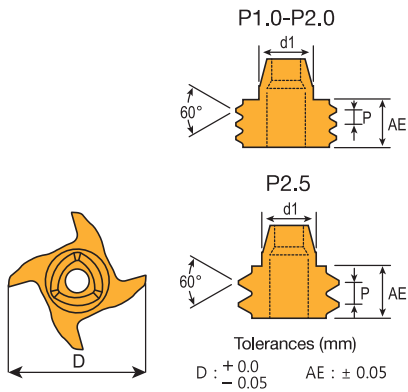
- Steel Stainless Steel Steel/Stainless Steel/Super alloy Cast Iron Aluminum Steel/Cast Iron
- Steel/Stainless Steel/Cast Iron
- Prices and stocks are based on present conditions
- Please specify model numbers and the grade of inserts, ie.: 3T0610-ISO1.0-E, F20

UFO Thread Milling Inserts (Full Profile)

- Toolholders P. 24
- Cutting Data P. 126 - 127

UFO Family

ISO



Dimensions (mm)							
D	d1	AE	Pitch mm	Pitch t.p.i	Angle	Minimum hole diameter	
						MM	INCH
12	6.5	3.5	1.0	-	60°	14	-
		4.5	1.25	-			
		5.0	1.5	-			
		6.5	2.0	-			
		5.5	2.5	-			

Inserts	Order Code	Grades										
		Carbide					Cermet		Uncoated			
		B100	C200	C250	F20	F30	CE100	CE60	K10	CE		
<p>ISO Metric(M,MF)</p>	3T0612-ISO1.0-E											<p>Defined by: R262 (DIN 13) Tolerance class: 6g/6H</p>
	3T0612-ISO1.25-E											
	3T0612-ISO1.5-E											
	3T0612-ISO2.0-E											
	3T0612-ISO2.5-E											
	3T0612-ISO1.0-ME	⊙										<p>Inserts 2 PCS / Box</p>
	3T0612-ISO1.25-ME	⊙										
	3T0612-ISO1.5-ME	⊙										
	3T0612-ISO2.0-ME	⊙										
	3T0612-ISO2.5-ME	⊙										

- ■ Steel ■ Stainless Steel ■ Steel/Stainless Steel/Super alloy ■ Cast Iron ■ Aluminum ■ Steel/Cast Iron
- ⊙ Steel/Stainless Steel/Cast Iron
- Prices and stocks are based on present conditions
- Please specify model numbers and the grade of inserts, ie.: 3T0612-ISO1.0-E, F20



UFO Thread Milling Inserts (Full Profile)

- Toolholders P. 24
- Cutting Data P. 126 - 127

UNC

TPI 16 - TPI 13

TPI 12 - TPI 10

Dimensions (mm)

D	d1	AE	Pitch mm	Pitch t.p.i	Angle	Minimum hole diameter	
						MM	INCH
12	6.5	5.0	-	16	60°	14	0.55"
		6.0	-	14			
		6.5	-	13			
		4.5	-	12			
		5.0	-	11			
		5.5	-	10			

Tolerances (mm)

D : ± 0.0
-0.05

AE : ± 0.05

Inserts	Order Code	Grades										
		Carbide					Cermet		Uncoated			
		B100	C200	C250	F20	F30	CE100	CE60	K10	CE		
 UNC/UNF	3T0612-UNC16-E											 Defined by: R262 (DIN 13) Tolerance class: 6g/6H * M.O.Q: 12PCS * Make-to-Order.
	3T0612-UNC14-E											
	3T0612-UNC13-E											
	3T0612-UNC12-E											
	3T0612-UNC11-E											
	3T0612-UNC10-E											
	3T0612-UNC16-ME											
	3T0612-UNC14-ME											
	3T0612-UNC13-ME											
	3T0612-UNC12-ME											
	3T0612-UNC11-ME											
	3T0612-UNC10-ME											

- ■ Steel ■ Stainless Steel ■ Steel/Stainless Steel/Super alloy ■ Cast Iron ■ Aluminum ■ Steel/Cast Iron
- ⊙ Steel/Stainless Steel/Cast Iron
- Prices and stocks are based on present conditions
- Please specify model numbers and the grade of inserts, ie.: 3T0612-UNC16-E,F20

UFO Thread Milling Inserts (Full Profile)

- Toolholders P. 24
- Cutting Data P. 126 - 127

UFO Family

BSW

TPI 16 - TPI 14

TPI 12 - TPI 10

Dimensions (mm)

D	d1	AE	Pitch mm	Pitch t.p.i	Angle	Minimum hole diameter	
						MM	INCH
12	6.5	5.0	-	16	55°	16.51	0.65"
		5.5	-	14			
		4.5	-	12			
		5.0	-	11			
		5.5	-	10			

Tolerances (mm)

D : $\begin{matrix} +0.0 \\ -0.05 \end{matrix}$ AE : ± 0.05

Inserts	Order Code	Grades										
		Carbide					Cermet		Uncoated			
		B100	C200	C250	F20	F30	CE100	CE60	K10	CE		
 BSW/BSF	3T0612-BSW16-E											 BSW Defined by: B.S.84:1956 DIN 239:ISO228/1:1982 BSF Defined by: B.S.2779:1956 Tolerance class: BSW-Medium class A, BSF-Medium class
	3T0612-BSW14-E											
	3T0612-BSW12-E											
	3T0612-BSW11-E											
	3T0612-BSW10-E											
	3T0612-BSW16-ME											
	3T0612-BSW14-ME											
	3T0612-BSW12-ME											
	3T0612-BSW11-ME											
	3T0612-BSW10-ME											

* M.O.Q: 12PCS
* Make-to-Order.

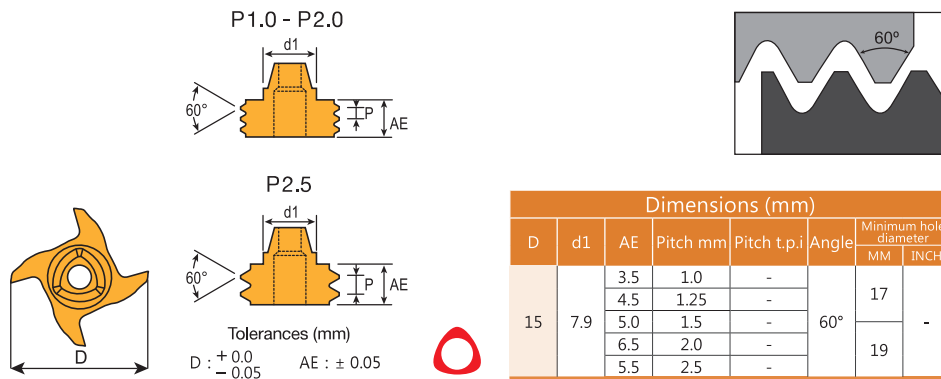
- ■ Steel ■ Stainless Steel ■ Steel/Stainless Steel/Super alloy ■ Cast Iron ■ Aluminum ■ Steel/Cast Iron
- ■ Steel/Stainless Steel/Cast Iron
- Prices and stocks are based on present conditions
- Please specify model numbers and the grade of inserts, ie.: 3T0612-BSW16-E,F20



UFO Thread Milling Inserts (Full Profile)

- Toolholders P. 25
- Cutting Data P. 126 - 127

ISO



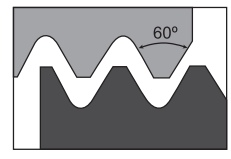
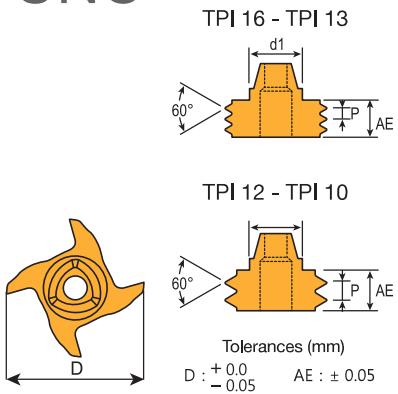
Inserts	Order Code	Grades										
		Carbide					Cermet		Uncoated			
		B100	C200	C250	F20	F30	CE100	CE60	K10		CE	
 ISO Metric (M,MF)	3T0815-ISO1.0-E											 Defined by: R262 (DIN 13) Tolerance class: 6g/6H
	3T0815-ISO1.25-E											
	3T0815-ISO1.5-E											
	3T0815-ISO2.0-E											
	3T0815-ISO2.5-E											
	3T0815-ISO1.0-ME	⊙										 Inserts 2 PCS / Box
	3T0815-ISO1.25-ME	⊙										
	3T0815-ISO1.5-ME	⊙										
	3T0815-ISO2.0-ME	⊙										
	3T0815-ISO2.5-ME	⊙										

- Steel Stainless Steel Steel/Stainless Steel/Super alloy Cast Iron Aluminum Steel/Cast Iron
- Steel/Stainless Steel/Cast Iron
- Prices and stocks are based on present conditions
- Please specify model numbers and the grade of inserts, ie.: 3T0815-ISO1.0-E,F20

UFO Thread Milling Inserts (Full Profile)

- Toolholders P. 25
- Cutting Data P. 126 - 127

UNC



Dimensions (mm)							
D	d1	AE	Pitch mm	Pitch t.p.i	Angle	Minimum hole diameter	
						MM	INCH
15	7.9	5.0	-	16	60°	17.78	0.7"
		6.0	-	14			
		6.5	-	13			
		4.5	-	12			
		5.0	-	11			
		5.5	-	10			

Inserts	Order Code	Grades									
		Carbide					Cermet		Uncoated		
		B100	C200	C250	F20	F30	CE100	CE60	K10		CE
<p>UNC/UNF</p>	3T0815-UNC16-E										<p>Defined by: R262 (DIN 13) Tolerance class:6g/6H</p>
	3T0815-UNC14-E										
	3T0815-UNC13-E										
	3T0815-UNC12-E										
	3T0815-UNC11-E										
	3T0815-UNC10-E										
	3T0815-UNC16-ME										<p>* M.O.Q: 12PCS * Make-to-Order.</p>
	3T0815-UNC14-ME										
	3T0815-UNC13-ME										
	3T0815-UNC12-ME										
	3T0815-UNC11-ME										
	3T0815-UNC10-ME										

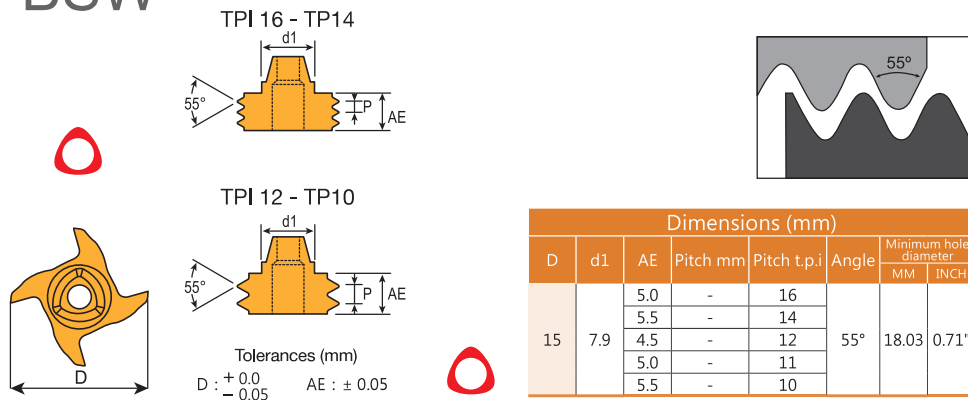
- ■ Steel ■ Stainless Steel ⊗ Steel/Stainless Steel/Super alloy ■ Cast Iron ■ Aluminum ■ Steel/Cast Iron
- ⊗ Steel/Stainless Steel/Cast Iron
- Prices and stocks are based on present conditions
- Please specify model numbers and the grade of inserts, ie.: 3T0815-UNC16-E,F20



UFO Thread Milling Inserts (Full Profile)

- Toolholders P. 25
- Cutting Data P. 126 - 127

BSW



Inserts	Order Code	Grades									
		Carbide					Cermet		Uncoated		
		B100	C200	C250	F20	F30	CE100	CE60	K10	CE	
 BSW/BSF	3T0815-BSW16-E										 BSW Defined by: B.S.84:1956 DIN 259, ISO228/1:1982 BSF Defined by: B.S.2779:1956 Tolerance class: BSW- Medium class A, BSF-Medium class
	3T0815-BSW14-E										
	3T0815-BSW12-E										
	3T0815-BSW11-E										
	3T0815-BSW10-E										
	3T0815-BSW16-ME	⊙									
	3T0815-BSW14-ME	⊙									
	3T0815-BSW12-ME	⊙									
	3T0815-BSW11-ME	⊙									
	3T0815-BSW10-ME	⊙									

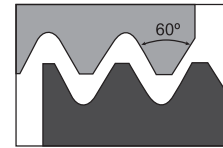
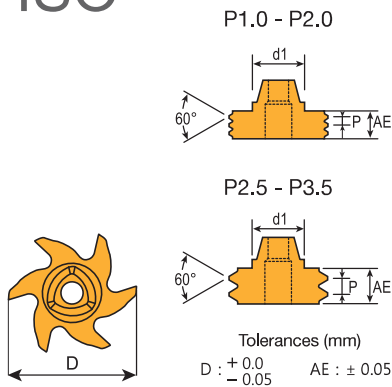
* M.O.Q: 12PCS
 * Make-to-Order.

- ■ Steel ■ Stainless Steel ⊙ Steel/Stainless Steel/Super alloy ■ Cast Iron ■ Aluminum ■ Steel/Cast Iron
- ⊙ Steel/Stainless Steel/Cast Iron
- Prices and stocks are based on present conditions
- Please specify model numbers and the grade of inserts, ie.: 3T1020-BSW16-E,F20

UFO Thread Milling Inserts (Full Profile)

- Toolholders P. 26
- Cutting Data P. 126 - 127

ISO



UFO Family

Dimensions (mm)							
D	d1	AE	Pitch mm	Pitch t.p.i	Angle	Minimum hole diameter	
						MM	INCH
20	9.9	3.5	1.0	-	60°	22	-
		4.5	1.25	-		24	
		5.0	1.5	-		26	
		6.5	2.0	-			
		5.5	2.5	-			
		6.5	3.0	-			
		7.5	3.5	-			

Inserts	Order Code	Grades										
		Carbide					Cermet		Uncoated			
		B100	C200	C250	F20	F30	CE100	CE60	K10	CE		
 ISO Metric (M,MF)	3T1020-ISO1.0-E											 Defined by: R262 (DIN 13) Tolerance class: 6g/6H
	3T1020-ISO1.25-E											
	3T1020-ISO1.5-E											
	3T1020-ISO2.0-E											
	3T1020-ISO2.5-E											
	3T1020-ISO3.0-E											
	3T1020-ISO3.5-E											
	3T1020-ISO1.0-ME	⊙										 Inserts 2 PCS / Box
	3T1020-ISO1.25-ME	⊙										
	3T1020-ISO1.5-ME	⊙										
	3T1020-ISO2.0-ME	⊙										
	3T1020-ISO2.5-ME	⊙										
	3T1020-ISO3.0-ME	⊙										
	3T1020-ISO3.5-ME	⊙										

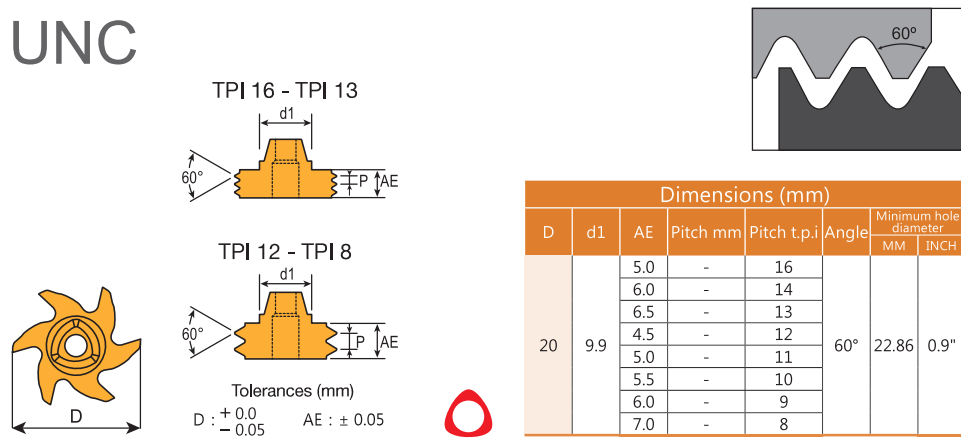
- ■ Steel ■ Stainless Steel ⊙ Steel/Stainless Steel/Super alloy ■ Cast Iron ■ Aluminum ■ Steel/Cast Iron
- ⊙ Steel/Stainless Steel/Cast Iron
- Prices and stocks are based on present conditions
- Please specify model numbers and the grade of inserts, ie.: 3T1020-ISO1.0-E,F20



UFO Thread Milling Inserts (Full Profile)

- Toolholders P. 26
- Cutting Data P. 126 - 127

UNC



Inserts	Order Code	Grades												
		Carbide					Cermet		Uncoated					
		B100	C200	C250	F20	F30	CE100	CE60	K10	CE				
 UNC/UNF	3T1020-UNC16-E												 Defined by: R262 (DIN 13) Tolerance class: 6g/6H	
	3T1020-UNC14-E													
	3T1020-UNC13-E													
	3T1020-UNC12-E													
	3T1020-UNC11-E													
	3T1020-UNC10-E													
	3T1020-UNC9-E													
	3T1020-UNC8-E													
	3T1020-UNC16-ME	⊙												* M.O.Q: 12PCS * Make-to-Order.
	3T1020-UNC14-ME	⊙												
	3T1020-UNC13-ME	⊙												
	3T1020-UNC12-ME	⊙												
	3T1020-UNC11-ME	⊙												
	3T1020-UNC10-ME	⊙												
3T1020-UNC9-ME	⊙													
3T1020-UNC8-ME	⊙													

- Steel Stainless Steel Steel/Stainless Steel/Super alloy Cast Iron Aluminum Steel/Cast Iron
- Steel/Stainless Steel/Cast Iron
- Prices and stocks are based on present conditions
- Please specify model numbers and the grade of inserts, ie.: 3T1020-UNC16-E,F20

UFO Thread Milling Inserts (Full Profile)

- Toolholders P. 26
- Cutting Data P. 126 - 127

BSW

UFO Family

TPI 16 - TPI 14

TPI 12 - TPI 8

Tolerances (mm)
D : +0.0
-0.05 AE : ± 0.05

Dimensions (mm)								
D	d1	AE	Pitch mm	Pitch t.p.i.	Angle	Minimum hole diameter		
						MM	INCH	
20	9.9		5.0	-	16	55°	22.86	0.9"
			5.5	-	14			
			4.5	-	12			
			5.0	-	11			
			5.5	-	10			
			6.0	-	9			
			7.0	-	8			

Inserts	Order Code	Grades								Material		
		Carbide					Cermets		Uncoated	E	ME	
		B100	C200	C250	F20	F30	CE100	CE60	K10			CE
 BSW/BSF	3T1020-BSW16-E											
	3T1020-BSW14-E											
	3T1020-BSW12-E											
	3T1020-BSW11-E											
	3T1020-BSW10-E											
	3T1020-BSW9-E											
	3T1020-BSW8-E											
	3T1020-BSW16-ME											
	3T1020-BSW14-ME											
	3T1020-BSW12-ME											
	3T1020-BSW11-ME											
	3T1020-BSW10-ME											
	3T1020-BSW9-ME											
	3T1020-BSW8-ME											

BSW Defined by: B.S.84:1956, DIN 259, ISO228/1:1982
 BSF Defined by: B.S.2779:1956
 Tolerance class: BSW-Medium class A, BSF-Medium class

* M.O.Q: 12PCS
 * Make-to-Order.

- ■ Steel ■ Stainless Steel ■ Steel/Stainless Steel/Super alloy ■ Cast Iron ■ Aluminum ■ Steel/Cast Iron
- ■ Steel/Stainless Steel/Cast Iron
- Prices and stocks are based on present conditions
- Please specify model numbers and the grade of inserts, ie.: 3T1020-BSW16-E,F20



TECHNICAL GUIDE

Thread Infeed Depth and Number of Passes Recommendation

Below recommended data are applicable to steel

• External ISO - metric threads

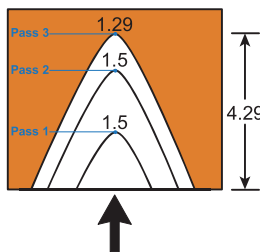
Pitch(mm)	6.0	5.5	5.0	4.5	4.0	3.5	3.0	2.5	2.0	1.75	1.5	1.25	1.0	0.80	0.75	0.50
Tot.inf.depth (mm)	3,82	3,52	3,19	2,87	2,53	2,23	1,92	1,60	1,25	1,13	0,93	0,81	0,65	0,52	0,48	0,48
Pass 1 (mm)	1,50	1,50	1,30	1,60	1,53	1,23	1,0	1,60	1,25	1,13	0,93	0,81	0,65	0,52	0,48	0,48
Pass 2 (mm)	1,30	1,20	1,10	1,37	1,0	1,0	0,92	-	-	-	-	-	-	-	-	-
Pass 3 (mm)	1,02	0,82	0,79	-	-	-	-	-	-	-	-	-	-	-	-	-

• Internal ISO-metric threads

Pitch(mm)	6.0	5.5	5.0	4.5	4.0	3.5	3.0	2.5	2.0	1.75	1.5	1.25	1.0	0.80	0.75	0.50
Tot.inf.depth (mm)	3,54	3,25	2,96	2,65	2,33	2,05	1,78	1,48	1,17	1,05	0,85	0,75	0,60	0,49	0,46	0,31
Pass 1 (mm)	1,50	1,30	1,60	1,50	1,33	1,10	1,0	1,48	1,17	1,05	0,85	0,75	0,60	0,49	0,46	0,31
Pass 2 (mm)	1,20	1,10	1,39	1,15	1,0	0,95	0,78	-	-	-	-	-	-	-	-	-
Pass 3 (mm)	0,84	0,85	-	-	-	-	-	-	-	-	-	-	-	-	-	-

• Internal-Inch threads

Pitch TPI	4.0	4.5	5.0	6.0	7.0	8.0	9.0	10	11	12	14	16	18	19	20	26	28
Tot.inf.depth (mm)	4,29	3,82	3,44	2,96	2,50	2,17	1,93	1,76	1,58	1,45	1,20	1,13	1,01	0,96	0,92	0,72	0,69
Pass 1 (mm)	1,50	1,50	1,50	1,60	1,40	1,20	1,10	1,76	1,58	1,45	1,20	1,13	1,01	0,96	0,92	0,72	0,69
Pass 2 (mm)	1,50	1,30	1,20	1,36	1,10	0,97	0,83	-	-	-	-	-	-	-	-	-	-
Pass 3 (mm)	1,29	1,02	0,74	-	-	-	-	-	-	-	-	-	-	-	-	-	-



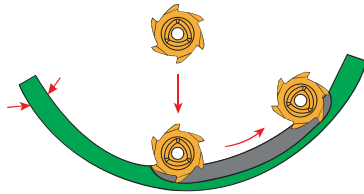
Example of thread infeed method

- To stainless steel, the infeed depth per pass should be decreased.
- The threading insert nose radius is relatively small and can be easily damaged if it is overloaded.

Technical Guide

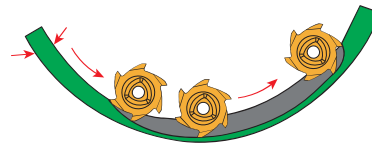
Internal Thread

①



Plunging is not recommended

②



Ramping is the best choice

Highly Recommended

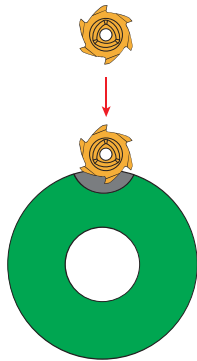
UFO Family

① Plunging to mill : Fz reduce to 50%

② Ramping to mill : Fz remain 100%

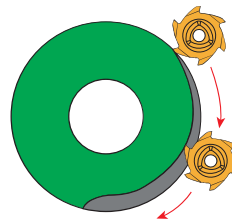
External Thread

①



Plunging is not recommended

②



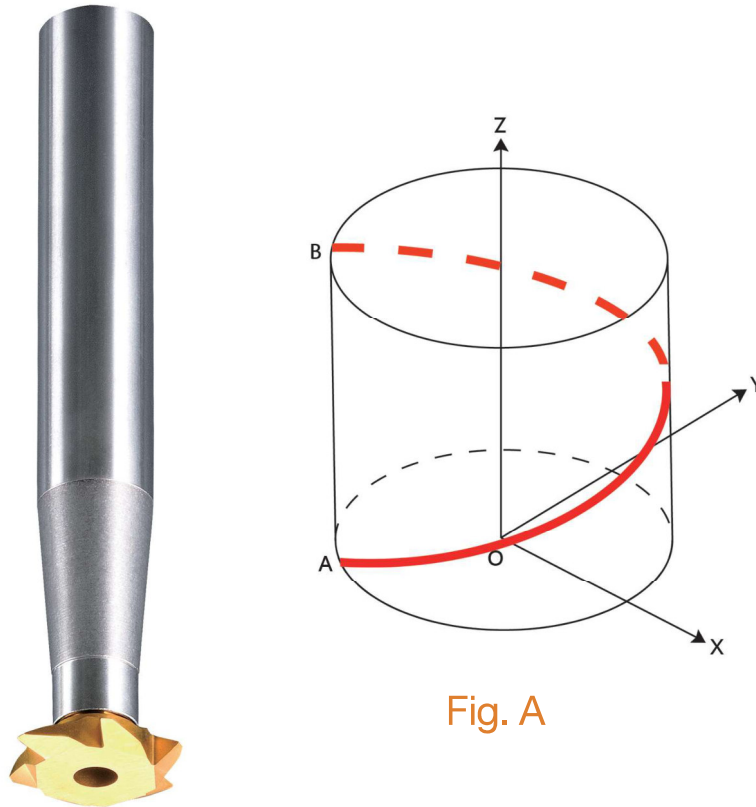
Ramping is the best choice

Highly Recommended



About Thread Milling

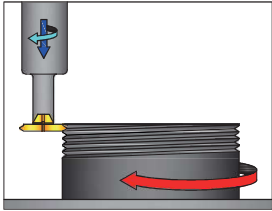
In order to perform a thread milling operation, a milling machine with three-axis control capable of helical interpolation is required. Helical interpolation is a CNC function, producing movement along helical paths. This helical motion combines circular movements in the X and Y planes and perpendicular linear motions in the Z plane simultaneously. For example, the path from point A to point B (Fig.A) on the surface of the cylinder making a circular movement in the xy plane with a linear displacement in the Z direction.



Thread Milling Methods

External

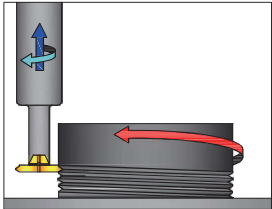
FIG.1



Right Hand Thread-Climb Milling



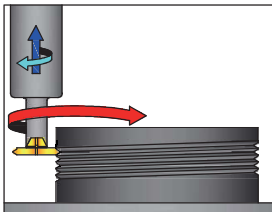
FIG.2



Left Hand Thread-Climb Milling

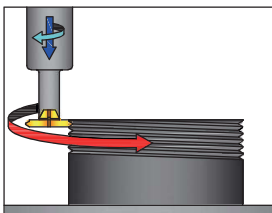


FIG.3



Right Hand Thread-Conventional Milling

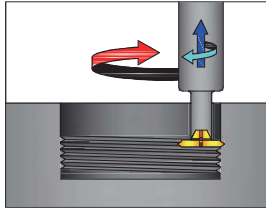
FIG.4



Left Hand Thread-Conventional Milling

Internal

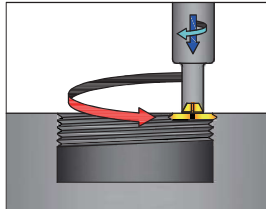
FIG.1



Right Hand Thread-Climb Milling



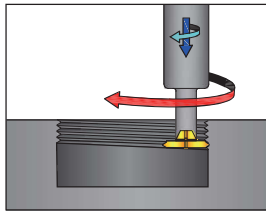
FIG.2



Left Hand Thread-Climb Milling

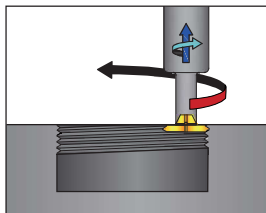


FIG.3



Right Hand Thread-Conventional Milling

FIG.4



Left Hand Thread-Conventional Milling

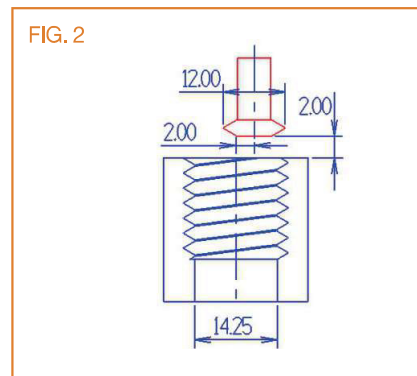
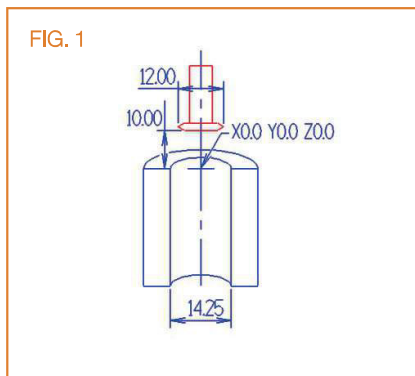
UFO Family



Internal Thread Milling Example CNC Code - Partial Profile Programm

Method 1/Tool offset-cutter compensation

- Insert code / 3T1-0612-60-1.0~2.5
- Milling / Climb milling / Internal thread
- Thread / M16x2.0P
- CNC programme / Fanuc / Mitsubishi



Fanuc

```

G90 G0 G54 X0.0 Y0.0
G43 Z10.0 H1 S3978 M3 (On centerline of workpiece Fig1)
M7
G00 Z1.0 (Move to the starting point Fig 2)
G01 Z-6.0 F200
G41 D ? (cutter compensation)
G91 G03 X2.0 Y0.0 R2.0 F150
G03I-2.0 Z2.0 F630 (Thread milling)
G03I-2.0 Z2.0
G03I-2.0 Z2.0
G03I-2.0 Z2.0
G90 G01 X0.0 Y0.0 (Move out from workpiece,ready to retract)
G90 G00 Z50.0 M9 (Retract the tool)
G40 (Offset finish)
M30 (Programme finish, check the quality of thread, modify G41 D figure)
    
```

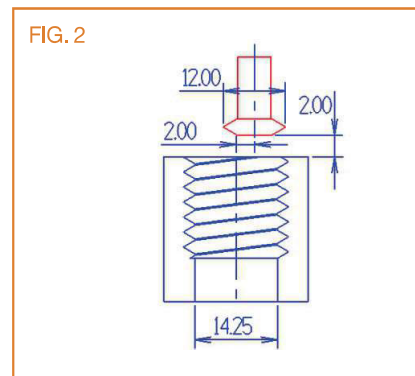
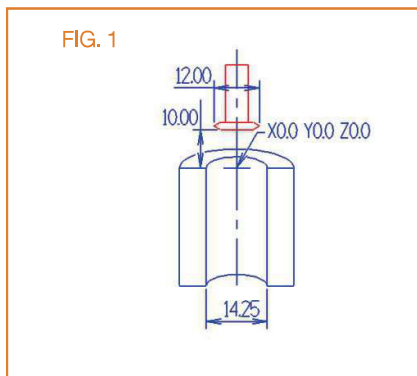
Exact cutting data
see page 125-127

Internal Thread Milling Example CNC Code - Partial Profile Programm

Method 2: Reset the starting point(X) and (I)figure

- Insert code / 3T1-0612-60-1.0~2.5
- Milling / Climb milling / Internal thread
- Thread / M16x2.0P
- CNC programme / Fanuc / Mitsubishi

UFO Family



Fanuc

```
G90 G0 G54 X0.0 Y0.0
G43 Z10.0 H1 S3978 M3 (On centerline of workpiece Fig1)
M7
G00 Z1.0 (Move to the starting point Fig 2)
G01 Z-6.0 F200
G91 G03 X2.0 Y0.0 R2.0 F150
G03 I-2.0 Z2.0 F630 (Thread milling)
G03 I-2.0 Z2.0
G03 I-2.0 Z2.0
G03 I-2.0 Z2.0
G90 G01 X0.0 Y0.0 (Move out from workpiece,ready to retract)
G90 G00 Z50.0 M9 (Retract the tool)
M30 (Programme finish, check the quality of thread, modify X.I. figure)
```

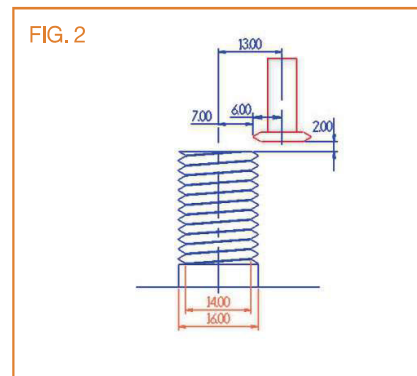
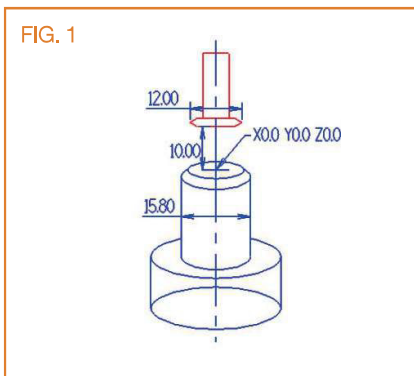
Exact cutting data
see page 125-127



External Thread Milling Example CNC Code - Partial Profile Programm

Method 1/Tool offset-cutter compensation

- Insert code / 3T1-0612-60-1.0~2.5
- Milling / Climb milling / External thread
- Thread / M16x2.0P
- CNC programme / Fanuc/Mitsubishi



Fanuc

```
G90 G0 G54 X0.0 Y0.0
G43 Z10.0 H1 S3978 M3 (On centerline of workpiece Fig1)
M7
G00 X13.0 Y0.0 (Move to the starting point Fig 2)
G41 D? (cutter compensation)
G01 Z2.0 F200
G91 G02I-13.0 Z-2.0 F630 (Thread milling)
G02I-13.0 Z-2.0
G02I-13.0 Z-2.0
G02I-13.0 Z-2.0
G90 G01 X16.0 (Move out from workpiece,ready to retract)
G90 G00 Z50.0 M9 (Retract the tool)
G40 (Offset finish)
M30 (Programme finish, check the quality of thread, modify G41 D figure)
```

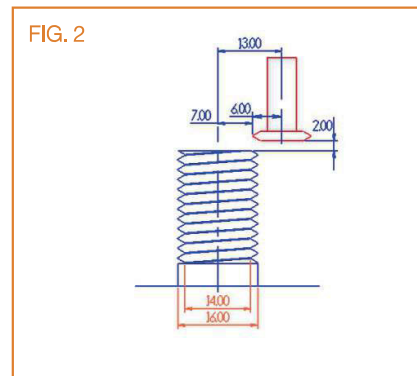
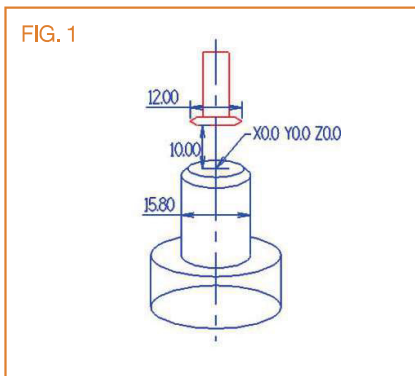
Exact cutting data
see page 125-127

External Thread Milling Example CNC Code - Partial Profile Programm

Method 2: Reset the starting point(X) and (I)figure

- Insert code / 3T1-0612-60-1.0-2.5
- Milling / Climb milling / External thread
- Thread / M16×2.0P
- CNC programme / Fanuc / Mitsubishi

UFO Family



Fanuc

```
G90 G0 G54 X0.0 Y0.0
G43 Z10.0 H1 S3978 M3 (On centerline of workpiece Fig1)
M7
G00 X13.0 Y0.0 (Move to the contour starting point Fig 2)
G01 Z2.0 F200
G91 G02 I-13.0 Z-2.0 F630 (Thread milling)
G02 I-13.0 Z-2.0
G02 I-13.0 Z-2.0
G02 I-13.0 Z-2.0
G90 G01 X16.0 (Move out from workpiece,ready to retract)
G90 G00 Z50.0 M9 (Retract the tool)
M30 (Programme finish, check the quality of thread, modifyX.I figure)
```

Exact cutting data
see page 125-127



Recommended Preparatory Drill Diameter And Available Inserts

Insert diameter : ● \varnothing 12 ● \varnothing 15 ● \varnothing 20 ● \varnothing 25

Size	Maximum drill diameter		
	4H	5H	6H
M1 x 0.25	0.77	0.78	0.80
M1 x 0.20	0.82	0.83	0.84
M1.1 x 0.25	0.87	0.88	0.90
M1.1 x 0.20	0.92	0.93	0.94
M1.2 x 0.25	0.97	0.98	1.00
M1.2 x 0.20	1.02	1.03	1.04
M1.4 x 0.30	1.12	1.14	1.16
M1.4 x 0.20	1.22	1.23	1.24
M1.6 x 0.35	1.28	1.30	1.32
M1.6 x 0.20	1.42	1.43	1.44
M1.7 x 0.35	1.38	1.40	1.42
M1.7 x 0.30	1.42	1.44	1.46
M1.7 x 0.25	1.47	1.48	1.50
M1.7 x 0.20	1.52	1.53	1.54
M1.8 x 0.35	1.48	1.50	1.52
M1.8 x 0.20	1.62	1.63	1.64
M2 x 0.40	1.63	1.65	1.67
M2 x 0.25	1.77	1.78	1.80
M2.2 x 0.45	1.79	1.81	1.83
M2.2 x 0.25	1.97	1.98	2.00
M2.3 x 0.40	1.93	1.95	1.97
M2.3 x 0.35	1.98	2.00	2.02
M2.3 x 0.25	2.07	2.08	2.10
M2.5 x 0.45	2.09	2.11	2.13
M2.5 x 0.35	2.18	2.20	2.22
M2.6 x 0.45	2.19	2.22	2.23
M2.6 x 0.35	2.28	2.30	2.32
M3 x 0.50	2.54	2.57	2.59
M3 x 0.35	2.68	2.70	2.72
M3.5 x 0.60	2.95	2.97	3.01
M3.5 x 0.35	3.18	3.20	3.22
M4 x 0.70	3.35	3.38	3.42
M4 x 0.50	3.54	3.57	3.59
M4.5 x 0.75	3.80	3.83	3.87
M4.5 x 0.50	4.04	4.07	4.09
M5 x 0.90	4.15	4.19	4.23
M5 x 0.80	4.25	4.29	4.33
M5 x 0.50	4.54	4.57	4.59
M5.5 x 0.90	4.65	4.69	4.73
M5.5 x 0.75	4.80	4.83	4.87
M5.5 x 0.50	5.04	5.07	5.09
M6 x 1.00	5.06	5.10	5.15
M6 x 0.75	5.30	5.33	5.37
M6 x 0.50	5.54	5.57	5.59
M7 x 1.00	6.06	6.10	6.15
M7 x 0.75	6.30	6.33	6.37
M7 x 0.50	6.54	6.57	6.59
M8 x 1.25	6.81	6.85	6.91

Size	Maximum drill diameter		
	4H	5H	6H
M8 x 1.00	7.06	7.10	7.15
M8 x 0.75	7.30	7.33	7.37
M8 x 0.50	7.54	7.57	7.59
M9 x 1.25	7.81	7.85	7.91
M9 x 1.00	8.06	8.10	8.15
M9 x 0.75	8.30	8.33	8.37
M9 x 0.50	8.54	8.57	8.59
M10 x 1.50	8.52	8.61	8.67
M10 x 1.25	8.81	8.85	8.91
M10 x 1.00	9.06	9.10	9.15
M10 x 0.75	9.30	9.33	9.37
M10 x 0.50	9.54	9.57	9.59
M11 x 1.50	9.52	9.61	9.67
M11 x 1.00	10.06	10.10	10.15
M11 x 0.75	10.30	10.33	10.37
M11 x 0.50	10.54	10.57	10.59
M12 x 1.75	10.31	10.37	10.44
M12 x 1.50	10.56	10.61	10.67
M12 x 1.25	10.81	10.85	10.91
M12 x 1.00	11.06	11.10	11.15
M12 x 0.75	11.30	11.33	11.37
M12 x 0.50	11.54	11.57	11.59
M13 x 1.75	11.31	11.37	11.44
M13 x 1.50	11.56	11.61	11.67
M13 x 1.25	11.81	11.85	11.91
M13 x 1.00	12.06	12.10	12.15
M13 x 0.75	12.03	12.33	12.37
M13 x 0.50	12.54	12.57	12.59
M14 x 2.00	12.07	12.13	12.21
M14 x 1.50	12.56	12.61	12.67
M14 x 1.25	-	-	12.91
M14 x 1.00	13.06	13.10	13.15
M14 x 0.75	13.30	13.33	13.37
M14 x 0.50	13.54	13.57	13.59
M15 x 2.00	13.07	13.13	13.21
M15 x 1.50	13.56	13.61	13.67
M15 x 1.25	13.81	13.85	13.91
M15 x 1.00 ●	14.06	14.10	14.15
M15 x 0.75	14.30	14.33	14.37
M15 x 0.50	14.54	14.57	14.59
M16 x 2.00 ●	14.07	14.13	14.21
M16 x 1.50 ●	14.56	14.61	14.67
M16 x 1.00 ●	15.06	15.10	15.15
M17 x 2.00 ●	15.07	15.13	15.21
M17 x 1.50 ●	15.56	15.61	15.67
M17 x 1.25 ●	15.81	15.85	15.91
M17 x 1.00 ●	16.06	16.10	16.15

Recommended Preparatory Drill Diameter And Available Inserts

Insert diameter : ● $\varnothing 12$ ● $\varnothing 15$ ● $\varnothing 20$ ● $\varnothing 25$

Size	Maximum drill diameter			Size	Maximum drill diameter				
	4H	5H	6H		4H	5H	6H		
M17 x 0.75		16.30	16.33	16.37	M28 x 1.00	●●●●	27.06	27.10	27.15
M17 x 0.50		16.54	16.57	16.59	M30 x 3.50	●	26.56	26.66	26.77
M18 x 2.50	●	15.57	15.64	15.74	M30 x 3.00	●●●●	27.06	27.15	27.25
M18 x 2.00	●	16.07	16.13	16.21	M30 x 2.00	●●●●	28.07	28.13	28.21
M18 x 1.50	●	16.56	16.61	16.67	M30 x 1.50	●●●●	28.56	28.61	28.67
M18 x 1.00	●●	17.06	17.10	17.15	M30 x 1.00	●●●●	29.06	29.10	29.15
M19 x 2.50	●	16.57	16.64	16.74	M32 x 3.00	●●●●	29.06	29.15	29.25
M19 x 2.00	●●	17.07	17.13	17.21	M32 x 2.00	●●●●	30.07	30.13	30.21
M19 x 1.50	●●	17.56	17.61	17.67	M32 x 1.50	●●●●	30.56	30.61	30.67
M19 x 1.25	●●	17.81	17.85	17.91	M33 x 3.50	●●	29.56	29.66	29.77
M19 x 1.00	●●	18.06	18.10	18.15	M33 x 3.00	●●●●	30.06	30.15	30.25
M19 x 0.75		18.30	18.33	18.37	M33 x 2.00	●●●●	31.07	31.13	31.21
M19 x 0.50		18.54	18.57	18.59	M33 x 1.50	●●●●	31.56	31.61	31.67
M20 x 2.50	●●	17.57	17.64	17.74	M33 x 1.00	●●●●	32.06	32.10	32.15
M20 x 2.00	●●	18.07	18.13	18.21	M34 x 3.00	●●●●	31.06	31.15	31.25
M20 x 1.50	●●	18.56	18.61	18.67	M34 x 2.00	●●●●	32.07	32.13	32.21
M20 x 1.00	●●	19.06	19.10	19.15	M34 x 1.50	●●●●	32.56	32.61	32.67
M21 x 2.50	●●	18.57	18.64	18.74	M34 x 1.00	●●●●	33.06	33.10	33.15
M21 x 1.50	●●	19.56	19.61	19.67	M35 x 3.00	●●●●	32.06	32.15	32.25
M21 x 1.00	●●	20.06	20.10	20.15	M35 x 1.50	●●●●	33.56	33.61	33.67
M22 x 2.50	●●	19.57	19.64	19.74	M35 x 1.00	●●●●	34.06	34.10	34.15
M22 x 2.00	●●	20.07	20.13	20.21	M36 x 4.00	●	32.04	32.14	32.27
M22 x 1.50	●●	20.56	20.61	20.67	M36 x 3.00	●●●●	33.06	33.15	33.25
M22 x 1.00	●●	21.06	21.10	21.15	M36 x 2.00	●●●●	34.07	34.13	34.21
M23 x 2.50	●●	20.57	20.64	20.74	M36 x 1.50	●●●●	34.56	34.61	34.67
M23 x 2.00	●●	21.07	21.13	21.21	M36 x 1.00	●●●●	35.06	35.10	35.15
M23 x 1.50	●●	21.56	21.61	21.67	M37 x 1.50	●●●●	35.56	35.61	35.67
M23 x 1.00	●●●	22.06	22.10	22.15	M37 x 1.00	●●●●	36.06	36.10	36.15
M24 x 3.00	●	21.06	21.15	21.25	M38 x 4.00	●	34.04	34.14	34.27
M24 x 2.00	●●●	22.07	22.13	22.21	M38 x 3.00	●●●●	35.06	35.15	35.25
M24 x 1.50	●●●	22.56	22.61	22.67	M38 x 2.00	●●●●	36.07	36.13	36.21
M24 x 1.00	●●●	23.06	23.10	23.15	M38 x 1.50	●●●●	36.56	36.61	36.67
M25 x 3.00	●●	22.06	22.15	22.25	M39 x 4.00	●	35.04	35.14	35.27
M25 x 2.00	●●●	23.07	23.13	23.21	M39 x 3.00	●●●●	36.06	36.15	36.25
M25 x 1.50	●●●	23.56	23.61	23.67	M39 x 2.00	●●●●	37.07	37.13	37.21
M25 x 1.00	●●●	24.06	24.10	24.15	M39 x 1.50	●●●●	37.56	37.61	37.67
M26 x 3.00	●●	23.06	23.15	23.25	M39 x 1.00	●●●●	38.06	38.10	38.15
M26 x 2.00	●●●	24.07	24.13	24.21	M40 x 4.00	●	36.04	36.14	36.27
M26 x 1.50	●●●	24.56	24.61	24.67	M40 x 3.00	●●●●	37.06	37.15	37.25
M27 x 3.00	●●	24.06	24.15	24.25	M40 x 2.00	●●●●	38.07	38.13	38.21
M27 x 2.50	●●●	24.57	24.64	24.74	M40 x 1.50	●●●●	38.56	38.61	38.67
M27 x 2.00	●●●	25.07	25.13	25.21	M40 x 1.00	●●●●	39.06	39.10	39.15
M27 x 1.50	●●●	25.56	25.61	25.67	M42 x 4.50	●	37.55	37.65	37.79
M27 x 1.00	●●●	26.06	26.10	26.15	M42 x 4.00	●	38.04	38.14	38.27
M28 x 3.00	●●	25.06	25.15	25.25	M42 x 3.00	●●●●	39.06	39.15	39.25
M28 x 2.00	●●●	26.07	26.13	26.21	M42 x 2.00	●●●●	40.70	40.13	40.21
M28 x 1.50	●●●	26.56	26.61	26.67	M42 x 1.50	●●●●	40.56	40.61	40.67



Recommended Preparatory Drill Diameter And Available Inserts

Insert diameter : ● \varnothing 12 ● \varnothing 15 ● \varnothing 20 ● \varnothing 25

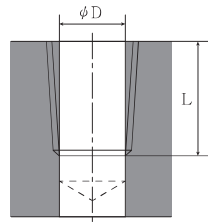
Size	Maximum drill diameter			
	4H	5H	6H	
M45 x 4.50	●	40.55	40.65	40.79
M45 x 4.00	●	41.04	41.14	41.27
M45 x 3.00	●●●	42.06	42.15	42.25
M45 x 2.00	●●●●	43.07	43.13	43.21
M45 x 1.50	●●●●●	43.56	43.61	43.67
M45 x 1.00	●●●●●●	44.06	44.10	44.15
M48 x 1.50	●●●●●	44.56	44.61	44.67
M48 x 5.00	●	43.03	43.14	43.29
M48 x 4.00	●	44.04	44.14	44.27
M48 x 3.00	●●●	45.06	45.15	45.25
M48 x 2.00	●●●●	46.07	46.13	46.21
M48 x 1.50	●●●●●	46.56	46.61	46.67
M48 x 1.00	●●●●●●	47.06	47.10	47.15
M50 x 5.00	●	45.03	45.14	45.29
M50 x 3.00	●●●	47.06	47.15	47.25
M50 x 2.00	●●●●	48.07	48.13	48.21
M50 x 1.50	●●●●●	48.56	48.61	48.67
M50 x 1.00	●●●●●●	49.10	49.10	49.15
M52 x 5.00	●	47.00	47.10	47.20
M52 x 4.00	●	48.00	48.10	48.20
M52 x 3.00	●●●	49.00	49.10	49.20
M52 x 2.00	●●●●	50.00	50.10	50.20
M52 x 1.50	●●●●●	50.50	50.60	50.60
M55 x 4.00	●	51.00	51.10	51.20
M55 x 3.00	●●●	52.00	52.10	52.20
M55 x 2.00	●●●●	53.00	53.10	53.20
M55 x 1.50	●●●●●	53.50	53.60	53.60
M56 x 5.50	●	50.50	50.60	50.70
M56 x 4.00	●	52.00	52.10	52.20
M56 x 3.00	●●●	53.00	53.10	53.20
M56 x 2.00	●●●●	54.00	54.10	54.20
M56 x 1.50	●●●●●	54.50	54.60	54.60
M58 x 4.00	●	54.00	54.10	54.20
M58 x 3.00	●●●	55.00	55.10	55.20
M58 x 2.00	●●●●	56.00	56.10	56.20
M58 x 1.50	●●●●●	56.50	56.60	56.60
M60 x 5.50	●	54.50	54.60	54.70
M60 x 4.00	●	56.00	56.10	56.20
M60 x 3.00	●●●	57.00	57.10	57.20
M60 x 2.00	●●●●	58.00	58.10	58.20
M60 x 1.50	●●●●●	58.50	58.60	58.60
M62 x 4.00	●	58.00	58.10	58.20
M62 x 3.00	●●●	59.00	59.10	59.20
M62 x 2.00	●●●●	60.00	60.10	60.2

Size	Maximum drill diameter			
	4H	5H	6H	
M62 x 1.50	●●●●	60.5	60.6	60.6
M64 x 6.00	●	58	58.1	58.2
M64 x 4.00	●	60	60.1	60.2
M64 x 3.00	●●●	61	61.1	61.2
M64 x 2.00	●●●●	62	62.1	62.2
M64 x 1.50	●●●●●	62.5	62.6	62.6
M65 x 4.00	●	61	61.1	61.2
M65 x 3.00	●●●	62	62.1	62.2
M65 x 2.00	●●●●	63	63.1	63.2
M65 x 1.50	●●●●●	63.5	63.6	63.6
M68 x 6.00	●	62	62.1	62.2
M68 x 4.00	●	64	64.1	64.2
M68 x 3.00	●●●	65	65.1	65.2
M68 x 2.00	●●●●	66	66.1	66.2
M68 x 1.50	●●●●●	66.5	66.6	66.6
M70 x 6.00	●	64	64.1	64.3
M70 x 4.00	●	66	66.1	66.2
M70 x 3.00	●●●	67	67.1	67.2
M70 x 2.00	●●●●	68	68.1	68.2
M72 x 6.00	●	66	66.1	66.3
M72 x 4.00	●	68	68.1	68.2
M72 x 3.00	●●●	69	69.1	69.2
M72 x 2.00	●●●●	70	70.1	70.2
M75 x 4.00	●	71	71.1	71.2
M75 x 3.00	●●●	72	72.1	72.2
M75 x 2.00	●●●●	73	73.1	73.2
M76 x 2.00	●●●●	74	74.1	74.2
M80 x 6.00	●●●●	74	74.1	74.3
M80 x 4.00	●	76	76.1	76.2
M80 x 3.00	●●●	77	77.1	77.2
M80 x 2.00	●●●●	78	78.1	78.2
M85 x 6.00	●	79	79.1	79.3
M85 x 4.00	●	81	81.1	81.2
M85 x 3.00	●●●	82	82.1	82.2
M85 x 2.00	●●●●	83	83.1	83.2
M90 x 6.00	●	84	84.1	84.3
M90 x 4.00	●	86	86.1	86.2
M90 x 2.00	●●●●	88	88.1	88.2
M95 x 6.00	●	89	89.1	89.3
M95 x 4.00	●	91	91.1	91.2
M95 x 2.00	●●●●	93	93.1	93.2
M100x 6.00	●	94	94.1	94.3
M100x 4.00	●	96	96.1	96.2
M100x 2.00	●●●●	98	98.1	98.2

RC (BSPT)

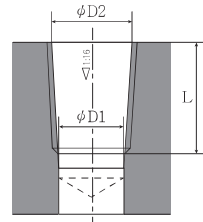
Recommended Thread Dia / T.P.I / Minimum Bore Dia

1. Cylindrical drilling without reamer



Nom. size D	P Gg/1" (tpi)	φ D	L
Rc 1/16"	28	6,15	7,85
1/8"	28	8,15	7,85
1/4"	19	10,85	11,65
3/8"	19	14,3	12,05
1/2"	14	17,8	15,9
3/4"	14	23,2	16,75
1"	11	29,2	19,65
1 1/4"	11	37,8	21,95
1 1/2"	11	43,7	21,95
2"	11	55,2	26,25

2. Cylindrical drilling with reamer to form taper thread



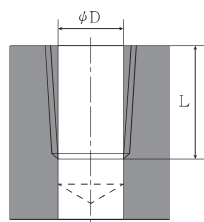
Nom. size D	P Gg/1" (tpi)	φ D1	φ D2	L
Rc 1/16"	28	6,1	6,56	7,85
1/8"	28	8,1	8,57	7,85
1/4"	19	10,75	11,45	11,65
3/8"	19	14,25	14,95	12,05
1/2"	14	17,7	18,63	15,9
3/4"	14	23,1	24,12	16,75
1"	11	29,1	30,29	19,65
1 1/4"	11	37,6	38,95	21,95
1 1/2"	11	43,5	44,85	21,95
2"	11	55	56,66	26,25

UFO Family

NPT

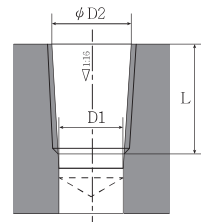
Recommended Thread Dia / T.P.I / Minimum Bore Dia

1. Cylindrical drilling without reamer



Nom. size D	P Gg/1" (tpi)	φ D	L
NPT 1/16"	27	6,15	8,3
1/8"	27	8,5	8,3
1/4"	18	11	12,15
3/8"	18	14,4	12,45
1/2"	14	17,8	16,3
3/4"	14	23,15	16,3
1"	11 1/2"	29,05	19,55
1 1/4"	11 1/2"	37,8	20,05
1 1/2"	11 1/2"	43,85	20,05
2"	11 1/2"	55,85	20,45

2. Cylindrical drilling with reamer to form taper thread



Nom. size D	P Gg/1" (tpi)	φ D1	φ D2	L
NPT 1/16"	27	5,95	6,39	8,3
1/8"	27	8,3	8,74	8,3
1/4"	18	10,75	11,36	12,15
3/8"	18	14,15	14,80	12,45
1/2"	14	17,45	18,32	16,3
3/4"	14	22,8	23,67	16,3
1"	11 1/2"	28,65	29,69	19,55
1 1/4"	11 1/2"	37,35	38,45	20,05
1 1/2"	11 1/2"	43,45	44,52	20,05
2"	11 1/2"	55,45	56,56	20,45

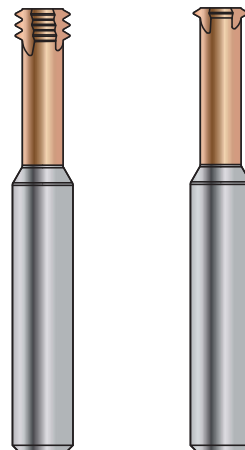


Recommended Cutting Data - Solid Carbide Thread Milling

UFO Family

• Recommended Cutting Speed, V_c (m/min)

Material group	Cutting Speed, V_c (m/min)		
1	255	230	200
2	200	180	162
3	180	162	145
4	160	145	130
5	144	130	116
6	130	117	105
7	40	-	-
8	160	-	80
9	160	-	80
10	80	-	50
11	80	-	50
12	136	116	102
13	122	102	95
14	109	95	88
15	85	78	-
16	1150	950	850
17	950	780	700
18	950	780	700
19	-	-	-
20	50	45	-
21	35	40	-
22	50	45	-



• F_z (mm/tooth)

 Pitch (mm)	f_z (mm/tooth)					
	Material group					
	1 2 3 4	5 6	8 9 10 11	12 13 14 15	16 17	20 21 22
1.0-1.5	0.04-0.06	0.03-0.05	0.04-0.06	0.04-0.07	0.05-0.08	0.03-0.04
1.75-2.5	0.05-0.07	0.04-0.06	0.05-0.07	0.05-0.08	0.06-0.09	0.04-0.05
3.0-4.0	0.06-0.08	0.05-0.07	0.06-0.08	0.06-0.09	0.07-0.1	0.05-0.06
5.0-6.0	0.06-0.08	0.05-0.07	0.06-0.08	0.06-0.09	0.07-0.1	0.05-0.06




Recommended Insert Grades - UFO Thread Milling Inserts



• UFO Thread Milling Cutter Insert Grade Selection

Material group	Recom. fz (mm/tooth) AR/Dc = 10%	Grades			
		ME	E		
1	-	B100	-	-	-
2	-	B100	-	-	-
3	-	B100	-	-	-
4	-	B100	-	-	-
5	-	B100	-	-	-
6	-	B100	-	-	-
7	-	B100	-	-	-
8	-	B100	-	-	-
9	-	B100	-	-	-
10	-	B100	-	-	-
11	-	B100	-	-	-
12	-	F20	-	-	-
13	-	F20	-	-	-
14	-	F20	-	-	-
15	-	F20	-	-	-
16	-	-	F20	-	-
17	-	-	F20	-	-
18	-	-	F20	-	-
19	-	B100	-	-	-
20	-	B100	-	-	-
21	-	B100	-	-	-
22	-	B100	-	-	-

• Fz (mm/tooth)

 Pitch (mm)	fz (mm/tooth)					
	Material group					
	1 2 3 4	5 6	8 9 10 11	12 13 14 15	16 17	20 21 22
1.0-1.5	0.04-0.06	0.03-0.05	0.04-0.06	0.04-0.07	0.05-0.08	0.03-0.04
1.75-2.5	0.05-0.07	0.04-0.06	0.05-0.07	0.05-0.08	0.06-0.09	0.04-0.05
3.0-4.0	0.06-0.08	0.05-0.07	0.06-0.08	0.06-0.09	0.07-0.1	0.05-0.06
5.0-6.0	0.06-0.08	0.05-0.07	0.06-0.08	0.06-0.09	0.07-0.1	0.05-0.06

Recommended Cutting Data - UFO Thread Milling Inserts



UFO Family

• Recommended Cutting Speed, V_c (m/min)

Material group	Grades						
	B100	C350	F20	CE60	CE	K10	F30
	Cutting speed, v_c (m/min)						
1	179 161 140	-	-	-	-	-	-
2	140 126 113	-	-	-	-	-	-
3	126 113 102	-	-	-	-	-	-
4	112 102 91	-	-	-	-	-	-
5	101 91 81	-	-	-	-	-	-
6	91 - -	-	-	-	-	-	-
7	40 - -	-	-	-	-	-	-
8	160 - 80	-	-	-	-	-	-
9	160 - 80	-	-	-	-	-	-
10	80 - 50	-	-	-	-	-	-
11	80 - 50	-	-	-	-	-	-
12	-	-	130 120 110	-	-	-	-
13	-	-	120 110 100	-	-	-	-
14	-	-	90 80 70	-	-	-	-
15	-	-	60 50 -	-	-	-	-
16	-	-	1150 950 850	-	-	-	-
17	-	-	950 780 700	-	-	-	-
18	-	-	950 780 700	-	-	-	-
19	-	-	-	-	-	-	-
20	50 45 -	-	-	-	-	-	-
21	35 40 -	-	-	-	-	-	-
22	50 45 -	-	- - -	-	-	-	-

UFO Gear Milling Insert - Make-to-Order



For machining small gears



Material Classification Groups

• Steel

mat. group	The material group of workpieces						
	W.- Nr	EN	EN-Nr	DIN	BS	AFNOR	JIS
1	1.1133	G 28 Mn6	1.1165	20 Mn5	120 M 19	20 M 5	SMnC 420 SMn 1 H; SCMn 2 S 10 C S 25 C S 10 C; S 9 CK S 15 C; S 15 CK S 22 C; S 20 CK S 25 C STKM 12 C
	1.1165	C10	1.0301	30 Mn5	120 M 36		
	1.0301			C 10	045 M 10	AF 34 C 10; XC 10	
	1.0401	C22+N	1.0402	C 15	080 M 15	AF3 7 C 12; XC 18	
	1.0402	C25+N	1.0406	C 22	050 A 20	C 20	
	1.0406	C 10E	1.1121	C 25	070 M 26	AF 50 C 30	
	1.1121	C 15R	1.1141	Ck 10	040 A 10	XC 10	
	1.1141	C 22E	1.1151	Ck 15	080 M 15	XC 15; XC 18	
	1.1151			Ck 22	040 A 22	XC25; XC 18	
	1.1158	S235JR	1.0037	Ck 25	060 A 25	XC 25	
	1.0037	S235JRG2	1.0038	St 37-2		E24-2	
	1.0116	S275J0H	1.0149	St 37-3	4360-40 C	E 24-3; E 24-4	
	1.0044	S275J2G3	1.0144	St 44-2	4360-43 B	E 28-2	
	1.0144			St 44-3 N	4360-43 C	E 28-3; E 28-4	
2	1.0721	10 S 20	1.0721	10 S 20	210 M 15	10 F 1	SUM 32 SUM 21 SUM 22 SUM 22 L
	1.0722			10 SPb 20		10 PbF 2	
	1.0723	15 SMn13	1.0725	15 S 20	210 A 15		
	1.0726	35 S20	1.0726	35 S 20	212 M 36	35 MF 4	
	1.0727	46 S20	1.0727	46 S 20	212 M 44	45 MF 4	
	1.0728	60 S20	1.0728	60 S 20		60 MF 4	
	1.0711			9 S 20	220 M 07		
	1.0715	11 SMn30	1.0715	9 SMn 28	230 M 07	S 250	
	1.0736	11 Smn37	1.0736	9 SMn 36	240 M 07	S 300	
	1.0718	11 SMnPb30	1.0718	9 SMnPb 28		S 250 Pb	
1.0737	11 SMnPb37	1.0737	9 SMnPb 36		S 300 Pb		
3	1.5622	G 28 Mn6+QT	1.1165	14 Ni 6	1503-245-420	16 N 6	SB 450 M SMn 438 (H); SCMn 3 S 30 C S 40 C S 45 C S 50 C S 30 C S 35 C S 40 C S 55 C SM 50 YA
	1.5423			16 Mo 5			
	1.1167			36 Mn 5			
	1.1157			40 Mn 4			
	1.0528			C 30			
	1.0501			C 35			
	1.0511			C 40			
	1.0503			C 45			
	1.0540			C 50			
	1.1178			Ck 30			
	1.1181			Ck 35			
	1.1186			Ck 40			
	1.1206			Ck 50			
	1.1203			Ck 55			
	1.0570			St 52-3			
1.0535	St 70-2						
4	1.5680	13 CrMo 4 5	1.7335	12 Ni 19	1501-620 Gr. 27 1503-660-440	Z 18 N 5	SNC 415 (H) SNC 815 (H) SCr 415 (H) SCM 415 (H) SNC 22 SCR 415 SCM 421 SMnC 420 (H) SMnC 21H SCR 420H
	1.7012			13 Cr 2			
	1.7335			13 CrMo 4 4			
	1.7715			14 MoV 6 3			
	1.5732			14 NiCr 10			
	1.5752			14 NiCr 14			
	1.7015			15 Cr 3			
	1.7262			15 CrMo 5			
	1.8521			15 CrMoV 5 9			
	1.5919			15 CrNi 6			
	1.5415			15 Mo 3			
	1.2735			15 NiCr 14			
	1.7337			16 CrMo 44			
	1.7131			16 MnCr 5			
	1.7139			16 MnCrS 5			
	1.5920			16 MnCrS 5			
	1.6587			17 CrNiMo 6			
	1.7311			20 CrMo 2			
1.7264	20 CrMo 5						
1.7147	20 MnCr 5						
1.7149	20 MnCrS 5						
1.7321	20 MoCr 4						
1.7323	20 MoCrS 4						
1.2162	21 MnCr 5						
				820 A 16	20 NC 6 18 NCD 6		
					18 CD 4 20 MC 5 20 MnCrS 5		
					20 NC 5		

• Steel

The material group of workpieces							
UNI	SS	AISI/ASTM	UNS	Condition	Misc. Brands	Structure	Form
G 22 Mn 3		1022; 1518	G10220				
C 10		1330	G13300				
C 15; C 16	1350	1010	G10100				
C 20; C 21	1450	1015	G10170				
C 25		1023	G10200				
C 10	1265	1025					
15; C 16	1370	1010	G10100				
C 20		1015	G10170				
C 25		1022					
Fe 360 B	1311	1025	G10250				
Fe 360 D FF	1312; 1313						
Fe 430 B FN	1412	A 573 Gr. 58					
Fe 430 D FF	1412; 1414	A 570 Gr. 40					
CF 10 S 20		1108					
CF 10 SPb 20		11 L 08					
	1922						
	1957	1140	G11400				
	1973	1146	G11460				
CF 9 S 22		1212	G12120				
CF 9 SMn 28	1912	1213	G12130				
CF 9 SMn 36		1215	G12150				
CF 9 SMnPb 28	1914	12 L 13	G12134				
CF 9 SMnPb 36	1926	12 L 14	G12144				
14 Ni 6		A 350-LF 5					
16 Mo 5	2120	4520	G45200				
		1335	G13350				
		1039	G10390				
C 35	1550	1035	G10350				
C 40		1040					
C 45	1650	1045	G10430				
		1049					
		1030					
C 35	1572	1035	G10340				
C 40		1040					
		1050					
C 50		1055					
Fe 510 B; C; D	2172; 2132						
Fe 690	1655	1055					
14 CrMo 4 5	2216	2515					
16 NiCr 11		A 182-F11; F12					
		3415					
		3310; 9314	G 33106				
		5015	G 50150				
12 CrMo 4							
16 CrNi 4		4320					
16 Mo 3	2912	A 204 Gr. A					
		P6	T 51605				
14 CrMo 4 5	2216	A 387 Gr.12 Cl.2					
16 MnCr 5	2511	5115	G51170				
18 NiCrMo 7							
20 MnCr 5							
		5120					
		5120 H	G51200				

• Steel

mat. group	The material group of workpieces						
	W.- Nr	EN	EN-Nr	DIN	BS	AFNOR	JIS
4	1.6523	20 NiCrMoS 2 2	1.6526	21 NiCrMo 2	805 M 20	20 NCD 2	SNCM 220 (H)
	1.7271			23 CrMoB 3 3			
	1.7218	25 CrMo 4	1.7218	25 CrMo 4	1717 CDS 110	25 CD 4 S	SCM420;SCM430
	1.7325			25 MoCr 4			
	1.7326			25 MoCrS 4			
	1.7030	28 Cr4	1.7030	28 Cr 4	530 A 30		
	1.6513			28 NiCrMo4			SNCM 431
	1.7707			30 CrMoV 9			
	1.6580			30 CrNiMo 8	823 M 30	30 CND 8	SNC 836
	1.8519	31 CrMoV 9	1.8519	31 CrMov 9		32 CDV 12	
	1.5755			31 NiCr 14	653 M 31	30 NC 11	
	1.7020			32 Cr 2			SCr 430 (H)
	1.7361			32 CrMo 12	722 M 24	30 CD 12	SCM 432;
	1.7033	34 Cr 4	1.7033	34 Cr 4	530 A 32	32 C 4	SCCrM3
	1.7220	34 CrMo 4	1.7220	34 CrMo 4	708 A 37	35 CD 4	
	1.2330			35 CrMo 4	708 A 37	34 CD 4	
	1.5864			35 NiCr 18			
	1.6511	36CrNiMo4+TA		36 CrNiMo 4	816 M 40	40 NCD 3	
	1.5736			36 NiCr 10		35 NC 11	
	1.5710			36 NiCr 6	640 A 35	35 NC 6	
	1.7034			37 Cr 4	530 A 36	38 C 4	
	1.5122			37 MnSi 4			
	1.7003	38 Cr2	1.7003	38 Cr 2		38 C 2	
	1.5120			38 MnSi 4			
	1.8523			39 CrMoV 13 9	897 M 39		
	1.2311			40 CrMnMo 7			
	1.2312			40 CrMnMoS 8 6		40 CMD 8S	SCr 440 (H)
	1.2738			40 CrMnNiMo 8		40 CND 8	SCM 440
	1.7035	41 Cr 4	1.7035	41 Cr4	530 M 40	42 C 4	SCr 440
	1.7223			41 CrMo 4	708 M 40	42 CD 4 TS	SCM 440 (H)
	1.7045			42 Cr 4	530 A 40	42 C 4 TS	
	1.7225	42 CrMo 4	1.7225	42 CrMo 4	708 M 40	42 CD 4	
	1.7561			42 CrV 6			
	1.5223			42 MnV 7			
	1.3563			43 CrMo 4			
	1.3561			44 Cr 2			
	1.7006			46 Cr 2		42 C 2	
	1.5121			46 MnSi 4			SCM 445 (H)
	1.3565			48 CrMo 4			SUP 10
	1.7228			50 CrMo 4	708 A 47		
	1.8159	50 CrV 4	1.8159	50 CrV 4	735 A 50	50 CV 4	
	1.5131	50 MnSi4	1.5131	50 MnSi 4			SUP 9(A)
	1.5141			53 MnSi 4			
	1.7176	55 Cr 3	1.7176	55 Cr3	527 A 60	55 C 3	
	1.0904	55 SiCr7	1.7100	55 Si 7	250 A 53	55 S 7	SUP 7
	1.2103			58 SiCr 8			
	1.0961			60 SiCr 7		60 SC 7	
	1.2101			62 SiMnCr4			
	1.1730			C 45W		Y3 42	
	1.1820			C 55W			SK7
	1.0601	C60+N	1.0601	C 60	080 A 62	CC 55	
	1.1740			C 60W		Y3 55	
	1.1744			C 67W			
	1.1520			C 70W1			
1.1620			C 70W2				
1.1750	C 75 W	1.1750	C 75W	BW 1A		SKC 3; SK 5;	
1.1525			C 80W1		Y1 90; Y1 80	SK 6	
1.1625			C 80W2	BW 1 B	Y1 80	SK 5	
1.1830			C 85W		Y3 90	S 45 C	
1.1191	C 45E	1.1191	Ck 45	080 M 46	XC 42	S 58 C	
1.1221	C 60E	1.1221	Ck 60	080 A 62	XC 60		
1.1231	C 67S	1.1231	Ck 67	060 A 67	XC 68		
1.1248	C 75S	1.1248	Ck 75	060 A 78	XC 75		
1.8159			GS-50 CrV 4				
1.0060	E 335	1.0060	St 60-2	4360-SSE; SSC	A 60-2	SM 58	

• Steel

The material group of workpieces							
UNI	SS	AISI/ASTM	UNS	Condition	Misc. Brands	Structure	Form
20 NiCrMo 2	2506	8620	G86170				
25 CrMo 4 (KB)	2225	4130	G41300				
		5130					
30 NiCrMo 8							
32 CrMo 12	2240	5132	G51320				
34 Cr 4 (KB)		4135; 4137	G41350				
35 CrMo 4	2234	4135	T 51620				
35 CrMo 4	2234						
38 NiCrMo 4 (KB)		9840	G98400				
35 NiCr 9		3435					
38 Cr 4		3135					
38 Cr 2		5135					
36 CrMoV 13 9							
		P 20					
		P 20+S					
		P 20+Ni					
41 Cr 4		5140	G51400				
41 CrMo 4	2244	4142; 4140	G41420				
42 Cr 4	2244	5140					
42 CrMo 4	2244	4142; 4140	G41400				
45 Cr 2		5045					
		5045					
51 CrV 4	2230	4150	G41470				
		6150	H61500				
55 Cr 3	2253	5155	G51550				
55 Si 8	2085; 2090	9255					
60 SiCr 8		9262					
C60		1060	G10600				
C 80 KU		W1	T72301				
C 80 KU		W 108					
C 45	1672		G10420				
C 60	1665; 1678	1064	G10640				
C 70	1770	1070	G10700				
C 75	1774; 1778	1078; 1080	G10780				
Fe 590; Fe 60-2		6150H					

• Steel

mat. group	The material group of workpieces							
	W.-Nr	EN	EN-Nr	DIN	BS	AFNOR	JIS	
4	1.4006	X 12 Cr 13	1.4006	X 10 Cr 13	410 S 21	Z 12 C 13	SUS 410	
	1.4724	X 10 CrAl 13	1.4724	X 10 CrAl 13	BH 12	Z 10 C 13	SUS 405	
	1.4762	X 10 CrAl 24	1.4762	X 10 CrAl 24		Z 10 CAS 24	SUH 442	
	1.4006	X 12 Cr 13	1.4006	X 12 Cr 13	410 S 21		SUS 410	
	1.4104	X 14 CrMoS 17	1.4104	X 12 CrMoS 17	411 S 29	Z 10 CF 17	SUS 430 F	
	1.4005	X 12 CrS 13	1.4005	X 12 CrS 13	416 S 21	Z 12 CF 13	SUS 416	
	1.4024	X 12 Cr 13	1.4024	X 15 Cr 13	420 S 29	Z 12 C 13	SUS 410 J 1	
	1.4521	X 2 CrMoTi18 2	1.4521	X 2 CrMoTi18 2				
	1.4521	X 2 CrMoTi18 2	1.4521	X 2 CrMoTi18 2				
	1.4003	X 2 CrNi 13	1.4003	X 2 CrNi 12				
	1.4313	X 3 CrNiMo 13 3	1.4313	X 5 CrNi 13 4	425 C 11	Z 5 CN 13.4	SCS 5	
	1.4512	X 5 CrTi 12	1.4512	X 5 CrTi 12	409 S 19	Z 6 CT 12	SUH 409	
	1.4000	X 6 Cr 13	1.4000	X 6 Cr 13	403 S 17	Z 6 C 12	SUS 403	
	1.4016	X 6 Cr 17	1.4016	X 6 Cr 17	430 S 15	Z 8 C 17	SUS 430	
	1.4002	X 6 CrAl 13	1.4002	X 6 CrAl 13	405 S 17	Z 6 CA 13	SUS 405	
	1.2341	X 6 CrMo 4	1.2341	X 6 CrMo 4				
	1.4510	X 6 CrTi 17	1.4510	X 6 CrTi 17		Z 8 CT 17	SUS 430 LX	
	1.4511	X 3 CrNb 17	1.4511	X 8 CrNb 17		Z 8 CNb 17	SUS 430 LX	
	5	1.7380	10 CrMo 9 10	1.7380	10 CrMo 9 10	1501-622 Gr. 31; 45	10 CD 9. 10	
		1.3505	100 Cr 6	1.3505	100 Cr 6	534 A 99	100 C 6	SUJ 2
1.2510				100 MnCrW 4	BO 1	90 MWCV 5	SKS 3	
1.2833				100 V 1	BW 2	Y1 105 V	SKS 43	
1.2419		105 WCr 6	1.2419	105 WCr 6		105 WC 13	SKS 31	
1.2210		107 CrV 3	1.2210	115 CrV 3		100 C 3		
1.2516				120 WV 4	BF 1	110 WC 20		
1.7735		14 CrMoV 6 9	1.7735	14 CrMoV 6 9		20 CDV 5.07		
1.5860				14 NiCr 18				
1.7709				21 CrMoV 5 7				
1.6746				32 NiCrMo 14 5	830 M 31	35 NCD 14		
1.8504		34 CrAl 6	1.8504	34 CrAl 6				
1.8507				34 CrAlMo 5	905 M 31	30 CAD 6.12		
1.8550		34 CrAlNi 7	1.8550	34 CrAlNi 7		34 CAND 7		
1.8506				34 CrAlS 5				
1.6582		34 CrNiMo 6	1.6582	34 CrNiMo 6	817 M 40	35 NCD 6	SNCM 447	
1.6546				40 NiCrMo 2 2	311-Type 7	40 NCD 2	SNCM 240	
1.6565				40 NiCrMo 6	311-Type 6		SNCM 439	
1.8509		41 CrAlMo 7 10	1.8509	41 CrAlMo 7	905 M 39	40 CAD 6.12	SACM 645	
1.2542				45 WCrV 7	BS 1			
1.2721				50 NiCr 13				
1.8161				58 CrV 4				
1.2826				60 MnSiCr 4				
1.2550				60 WCrV 7		55 WC 20		
1.7103				67 SiCr 5				
1.2108				90 CrSi 5				
1.1273				90 Mn 4				
1.2842		90 MnCrV 8	1.2842	90 MnCrV 8	BO 2	90 MV 8		
1.1545		C 105U	1.1545	C 105 W1		Y1 105		
1.1645				C 105 W2		Y1 105	SK 3	
1.1654				C 110 W				
1.1663				C 125 W		Y2 120	SK 2	
1.1673				C 135 W		Y2 140	SK 1	
1.1274		C 100S	1.1274	Ck 101	060 A 96		SUP 4	
1.2887				GS-34 CoCrMoV 19 12				
1.2392				G-X 28 CrMoV 5 1				
1.2606				G-X 37 CrMoW 5 1				
1.4749		X 18 CrN 28	1.4749	X 18 CrN 28		Z 18 C 25		
1.2764				X 19 NiCrMo 4				
1.4021		X 20 Cr 13	1.4021	X 20 Cr 13	420 S 37	Z 20 C 13	SUS 420 J1	
1.4935	X 20 CrMoWV 12 1	1.4935	X 20 CrMoWV 12 1					
1.4057	1	1.4057	X 20 CrNi 17 2	431 S 29	Z 15 CN 16.02	SUS 431		
1.4923	X 20 CrNi 17 2	1.4923	X 22 CrMoV 12 1	762	Z 21 CDV 12			
1.4028	X 22 CrMoV 12 1	1.4028	X 30 Cr 13	420 S 45	Z 30 C 13	SUS 420 J 2		
1.2316	X 30 Cr 13	1.2316	X 36 CrMo 17		Z 35CD17			
1.4418	X 38 CrMo 16	1.4418	X 4 CrNiMo 16 5		Z 6 CND 16.05.01			
1.4031	X 4 CrNiMo 16 5	1.4031	X 40 Cr 13	(420 S 45)	Z 40 C 14	SUS 420		
	X 39 Cr 13							

• Steel

The material group of workpieces							
UNI	SS	AISI/ASTM	UNS	Condition	Misc.Brands	Structure	Form
X 12 Cr 13	2302	410; CA-15	S41000			Martensite	
X 10 CrAl 12		405	S40500			Ferrite	
X 16 Cr 26		446	S44600			Ferrite	
	2302	410 S	S41000			Martensite	
X 10 CrS 17	2383	430 F	S43020			Ferrite	
X 12 CrS 13	2380	416	S41600			Martensite	
			J91201			Martensite	
	2326	444				Ferrite	
	2326	444				Ferrite	
		309	S40977			Ferrite	
X 6 CrNi 13 04	2385		S41500		F6NM	Martensite	
X 6 CrTi 12		409 L	S40900			Ferrite	
X 6 Cr 13	2301	403	S41008			Ferrite	
X 8 Cr 17	2320	430	S43000			Ferrite	
X 6 CrAl 13		405	S40500			Ferrite	
X 6 CrTi 17		430 Ti	S43036			Ferrite	
X 6 CrNb 17		430 Nb				Ferrite	
12 CrMo 9 10	2218	A 182-F22	J 21890				
100 Cr 6	2258	52100	G51986				
95 MnWCr 5 KU	2140	O1	T31501				
102 V 2 KU		W 210	T 72302				
107 WCr 5 KU							
107 CrV 3 KU		L2	T61202				
110 W 4 KU							
34 CrAlMo 7		A 355 CI. D	K 23545 K 52440 K 23745				
35 NiCrMo 6 (KW)	2541	4340	G87400				
40 NiCrMo 2 (KB)		8740					
		4340					
41 CrAlMo 7	2940	A 355 CI. A	K 24065				
45 WCrV 8 KU	2710	S1	T41901				
55 WCrV 8 KU							
90 MnVCr 8 KU		O2	T31502				
C 100 KU	1880	W 110					
C 100 KU							
C 120 KU		W 112					
C 140 KU	1870	1095	G10950				
	2322	446	S44600			Ferrite	
X 20 Cr 13	2303	420	S42000 S42200 S43100			Martensite	
X 16 CrNi 16	2321-03	431				Martensite	
X 22 CrMoV 12 1	2317					Martensite	
X 30 Cr 13	2304	420	J91153			Martensite	
X 38 CrMo 16 1 KU		422				Martensite	
	2387		-			Martensite	
X 40 Cr 14	2304,2314	420	S40280			Martensite	

• Steel

mat. group	The material group of workpieces								
	W.-Nr	EN	EN-Nr	DIN	BS	AFNOR	JIS		
5	1.4034	X 45 Cr 13	1.4034	X 45 Cr 13	(420 S 45)	Z 40 C 14	SUH 31 SUS 440A SUH 4 SUS 440 B		
	1.4873	X 45 CrNiW 18 9	1.4873	X 45 CrNiW 18 9	331 S 40	Z 35 CNWS 18.09			
	1.2767	X 45 NiCrMo 4	1.2767	X 45 NiCrMo 4	EN 20B	45 NCD 17			
	1.4109	X 70 CrMo 15	1.4109	X 65 CrMo 14		Z 70 D 14			
	1.4747	X 80 CrNiSi 20	1.4747	X 80 CrNiSi 20	443 S 65	Z 80 CSN 20.02			
	1.4112	X 90 CrMoV 18	1.4112	X 90 CrMoV 18	409 S 19	Z 2 CND 18 05			
6	1.2711	54 NiCrMoV 6	1.2711	54 NiCrMoV 6	BH 224	55 NCDV 6	SKT 4		
	1.2713		55 NiCrMoV 6		55 NCDV 7				
	1.2744		57 NiCrMoV 7 7						
	1.2762		75 CrMoNiW 6 7						
	1.2369		81 CrMov 42 16						
	1.2880		G-X 165 CrCoMo 12						
	1.2601		G-X 165 CrMoV 12						
	1.2201		G-X 165 CrV 12						
	1.3207		HS 10-4-3-10	1.3207	S 10-4-3-10	BT 42		Z 130 WKCDV 10-4-3-10	SKH 57
	1.3318			S 12-1-2	1.3318	S 12-1-2			
	1.3302			HS 12-1-4	1.3302	S 12-1-4			
	1.3202	HS 12-1-4-5		1.3202	S 12-1-4-5				
	1.3355	HS 18-0-1		1.3355	S 18-0-1	BT 1	Z 80 WCV 18-04-01	SKH 2	
	1.3265	HS 18-1-2-10		1.3265	S 18-1-2-10	BT 5		SKH 4 A	
	1.3257	HS 18-1-2-15		1.3257	S 18-1-2-15				
	1.3255	HS 18-1-2-5		1.3255	S 18-1-2-5	BT 4			
	1.3247	HS 2-10-1-8		1.3247	S 2-10-1-8	BM 42		Z 80 WKCV 18-05-04-0	SKH 3
	1.3346	HS 2-9-1		1.3346	S 2-9-1	BM 1		Z 110 DKCWV 09-08-04	SUH 4
	1.3348	HS 2-9-2		1.3348	S 2-9-2			Z 85 DCWV 08-04-02-0	SUS 440 B
	1.3249				S 2-9-2-8	BM 34		Z 100 DCWV 09-04-02-	
	1.3333	HS 3-3-2		1.3333	S 3-3-2				
	1.3343	HS 6-5-2		1.3343	S 6-5-2	BM 2			SKH 9; SKH 51
	1.3243	HS 6-5-2-5		1.3243	S 6-5-2-5		Z 85 WDCV 06-05-04-0	SKH 53	
	1.3344	HS 6-5-3		1.3344	S 6-5-3	BM 4	Z 85 WDKCV 06-05-04-02	SKH 52; SKH 53	
	1.3345	S 6-5-3C		1.3345	S 6-5-3C			SKH 55	
	1.3246	HS 7-4-2-5		1.3246	S 7-4-2-5		Z 120 WDCV 06-05-04-		
	1.2363	X 100 CrMoV 5		1.2363	X 100 CrMoV 5 1	BA 2		SKD 12	
	1.4125	X 105 CrMo 17	1.4125	X 105 CrMo 17		Z 110 WKCDV 07-05-04	SUS 440 C		
	1.2379	X 155 CrVMo 12 1		X 155 CrVMo 12 1	BD 2	Z 100 CDV 5	SKD 11		
	1.2601			X 165 CrMoV 12		Z 100 CD 17			
	1.2709			X 2 NiCoMoTi 18 9 5		Z 160 CDV 12			
	1.2080	X 210 Cr 12	1.2080	X 210 Cr 12	BD 3		SKD 1		
1.2436	X 210 CrW 12			X 210 CrW 12		Z 2 NKD 19-09	SKD 2		
1.2706	X 3 NiCrMo 18 8 5			X 3 NiCrMo 18 8 5		Z 200 C 12			
1.2567	X 30 WCrV 5 3			X 30 WCrV 5 3			SKD 4		
1.2581	X 30 WCrV 9 3			X 30 WCrV 9 3	BH 21	E-Z 2 NKD 18	SKD 5		
1.2885	X 32 CrMoCoV 3 3 3			X 32 CrMoCoV 3 3 3		Z 32 WCV 5			
1.2365	X 32 CrMoV 3 3			X 32 CrMoV 3 3	BH 10	Z 30 WCV 9	SKD 7		
1.2343	X 38 CrMoV 5 1			X 38 CrMoV 5 1	BH 11		SKD 6		
1.2367	X 38 CrMoV 5 3			X 38 CrMoV 5 3		32 DCV 28			
1.2344	X 40 CrMoV 5 1		1.2344	X 40 CrMoV 5 1	BH 13	Z 38 CDV 5	SKD61		
					Z 40 CDV 5				
Hardened steel									
7	1.3401	X 120 Mn 12	1.3401	X 120 Mn 12	BW 10	Z 120 M 12	SC MnH 1		
Stainless steel									
8	1.4305	X 8 CrNiS 18 9	1.4305	X 10 CrNiS 18 9	303 S 31	Z 10 CNF 18.09	SUS 303		
	1.4310	X 9 CrNi 18 8	1.4310	X 12 CrNi 17 7	301 S 21	Z 12 CN 17.07	SUS 301		
	1.4300	X 12 CrNi 18 8	1.4300	X 12 CrNi 18 8	302 S 25	Z 12 CN 18	SUS 302		
	1.4546	X 5 CrNiNb 18 10	1.4546	X 5 CrNiNb 18 10	347 S 31				
	1.4301	X 5 CrNi 18 9	1.4301	X 6 CrNi 18 10	304 S 31	Z 6 CN 18.09	SUS 304		
	1.4948	X 6 CrNi 18 11	1.4948	X 6 CrNi 18 11	304 S 51	Z 6 CN 18.09	SUS 304 H		
	1.4303	X 4 CrNi 18 11	1.4303	X 6 CrNi 18 12	305 S 19	Z 8 CN 18.11 FF	SUS 305		
1.4550	X 6 CrNiNb 18 10	1.4550	X 6 CrNiNb 18 10	347 S 31	Z 6 CnNb 18.10	SUS 347			
9	1.4583	X 5 CrNiMoNb 19 11 2	1.4583	X 10 CrNiMoNb 18 12	318 C 17	Z 6 CNDNb 17.13	SCS 22		
	1.4335		1.4335		310 S 24	Z 12 CN 25.20	SUH 310; SUS 310 S		
	1.4541	X 12 CrNi 25 21	1.4878	X 12 CrNi 25 21	321 S 51	Z 6 CNT 18.12	SUS 321		
	1.4962	X 6 CrNiTi 18 10	1.4962	X 12 CrNiTi 18 9		Z 6 CnNb 18.10			
	1.4828	X 12 CrNiWTi 16 3	1.4828	X 12 CrNiWTi 16 3	309 S 24	Z 17 CNS 20.12	SUH 309		
	1.4306	X 15 CrNiSi 20 12	1.4306	X 15 CrNiSi 20 12	304 S 12	Z 2 CN 18.10	SUS 304 L		
	1.4404	X 2 CrNi 19 11	1.4404	X 2 CrNi 19 11	316 S 11	Z 2 CND 17.12.02	SUS 316 L		
	1.4435	X 2 CrNiMo 17 12 2	1.4435	X 2 CrNiMo 17 13 2	316 S 12	Z 2 CND 17.13	SCS 16; SUS 316 L		
	1.4438	X 3 CrNiMo 18 14 3	1.4438	X 2 CrNiMo 18 14 3	317 S 12	Z 2 CND 19.15.4	SUS 317 L		
		X 2 CrNiMo 18 15 4		X 2 CrNiMo 18 16 4					

• Steel

The material group of workpieces							
UNI	SS	AISI/ASTM	UNS	Condition	Misc. Brands	Structure	Form
X 45 CrNiW 18 9 42 NiCrMo 15 7	[2304]	- SAE HNV 3 6F7				Martensite Martensite	
X 80 CrSiNi 20 X CrTi 12	2327	440 A SAE HNV 6 440 B	S44002 S65006 S44003	sol. treated		Martensite PH Martensite	
HS 10-4-3-10		6F2 L6	T61206				
HS 18-0-1 HS 18-1-2-10		T15 T1 T5	T12015 T12001 T12005				
HS 18-1-1-5 HS 2-9-1-8 HS 1-8-1 HS 2-9-2	2782	T4 M42 H41; M1 M7 M33;M34	T12004 T11342 T11301 T11307 T11333				
HS 3-3-2 HS 6-5-2 HS 6-5-2-5 HS 6-5-3	2722 2723	M2 M35 M3 Cl.2 M3 M41	T11302 T11323 T11323 T11341			Martensite	
HS 7-4-2-5 X 100 CrMoV 5 1 KU X 105 CrMo 17 X 155 CrVMo 12 1 KU X 166 CrMoW 12 KU	2260 2310	A2 440 C D2	T30102 S44004 T30402				
X 210 Cr 13 KU X 215 CrW 12 1 KU	2312	18 MAR 300 D3	T30403 K 93120				
X30 WCrV 5 3 KU X30 WCrV 9 3 KU		H21	T20821				
30 CrMoV 12 12 KU X37 CrMoV 5 1 KU		H10 H11	T20810 T20811				
X 40 CrMo 5 1 1 KU	2242	H13	T20813				
Hardened steel							
	2183	A128 Grade A					
Stainless steel							
X 10 CrNi 18 09 X 12 CrNi 17 07	2346 (2331) 2331	303 301 302 348	S30300 S30100 S30200 S34800			Austenite Austenite Austenite Austenite	
X 6 CrNiNb 18 11 X 5 CrNi 18 11 X 5 CrNi 18 10 KW X 7 CrNi 18 10 X 6 CrNiNb 18 11	2333 2333 2333 2338	304; 304 H 304 H 308; 305 347	S30400 S30480 S30500 S34700			Austenite Austenite Austenite Austenite	
X 6 CrNiMoNb 17 13 X 6 CrNi 26 20 X 6 CrNiTi 18 11	2361 2337	318 310 S 321; 321H 347 H 309	S31008 S32100 S34700 S30900 S30403			Austenite Austenite Austenite Austenite Austenite	
X 3 Cr Ni 18 11 X 2 CrNiMo 17 12 2 X 2 CrNiMo 17 13 2 X 2 CrNiMo 18 16	2352 2348 2353 2367	304 L 316 L 316 L 317 L	S31603 S31603 S31703			Austenite Austenite Austenite Austenite	

• Stainless steel

mat. group	The material group of workpieces						
	W.-Nr	EN	EN-Nr	DIN	BS	AFNOR	JIS
9	1.4311	X 2 CrNiN 18 10	1.4311	X 2 CrNiN 19 11	304 S 62	Z 2 CN 18. 10 Az	SUS 304 LN
	1.4436	X 5 CrNiMo 17 13 3	1.4436	X 5 CrNiMo 17 13 3	316 S 33	Z 6 CND 18.12.03	SUS 316
	1.4308	X 5 CrNi 19 10	1.4308	X 6 CrNi 18 9	304 C 15	Z 6 CN 18.10M	SUS 13
	1.4580	X 6 CrNiMoNb 17 12 2	1.4580	X 6 CrNiMoNb 17 12 2	318 S 17	Z 6 CNDNb 17.12	
	1.4571	X 6 CrNiMoTi 17 12 2	1.4571	X 6 CrNiMoTi 17 12 2	320 S 31	Z 6 CNDT 17.12	SUS 316 Ti
10	1.4841	X 15 CrNiSi 25 20	1.4841	X 15 CrNiSi 25 20	314 S 25	Z 15 CNS 25.20	SUH 310
	1.4401	X 5 CrNiMo 17 12 2	1.4401	X 5 CrNiMo 18 10	316 S 31	Z 3 CND 17.11.1	SUS 316
11	1.4547	X 1 CrNiMoN 20 18 7	1.4547	X 1 CrNiMoN 20 18 7	X1CrNiMoN2018	Incoloy 800 Z 20 NCS 33.16 Z 3 CHD 25.07 Az Z 3 CND 25.06 Az Z 3 CND 17.12 Az Z 3 CND 17.13 Az Z 3 CHD 18.14.05Az Z 2 CHD 22.05 Az Z 2 CHD 22.05 Az Z 2 NCDU 25 20 Z 4 CNUNb 16.4 M Z 3 CND 25.7 Az Z 6 CNU 17.4	NCF 800 SUH 330 SUS 316 LN SUS 316 LN (SUS 316LN) SUS 329 J 3L SUS 329 J 1 SUS 24;SUS 630
	1.4563	X 1 NiCrMoCuN 31 27 4	1.4563	X 1 NiCrMoCuN 31 27 4	X1NiCrMoCuN31274		
	1.4876	X 10 NiCrAlTi 32 20	1.4876	X 10 NiCrAlTi 32 20			
	1.4864	X 12 NiCrSi 35 16	1.4864	X 12 NiCrSi 36 16	Z 10 NC 32 21		
	1.4410	X 2 CrNiMoN 25 7 4	1.4410	X 2 CrNiMoN 25 7 4	NA 17		
	1.4507	X 2 CrMoNiCuN 25 6 3	1.4507	X 2 CrMoNiCuN 25 6 3			
	1.4501	X 2 CrNiMoCuWN 25 7 4	1.4501	X 2 CrNiMoCuWN 25 7 4			
	1.4406	X 2 CrNiMoN 17 11 2	1.4406	X 2 CrNiMoN 17 12 2			
	1.4429	X 2 CrNiMoN 17 13 3	1.4429	X 2 CrNiMoN 17 13 3	316 S 61		
	1.4439	X 2 CrNiMoN 17 13 5	1.4439	X 2 CrNiMoN 17 13 3	316 S 62		
	1.4462	X 2 CrNiMoN 22 5 3	1.4462	X 2 CrNiMoN 17 13 3	(316 S 63)		
	1.4462	X 2 CrNiMoN 22 5	1.4462	X 2 CrNiMoN 22 5	332 S 15		
	1.4652	X 1 CrNiMoN 25 22 8	1.4652	X 2 CrNiMoN 22 5	318 S 13		
	1.4362	X 2 CrNiN 23 4	1.4362	X 2 CrNiMoN 25 22 7			
	1.4539	X 2 NiCrMoCu 25 20 5	1.4539	X 2 CrNiN 23 4	904 S 13		
	1.4539	X 1 NiCrMoCu 25 20 5	1.4539	X 2 NiCrMoCu 25 20 5			
	1.4540	X 4 CrNiCuNb 16 4	1.4540	X 2 NiCrMoCu 25 20 5			
1.4460	X 3 CrNiMo 27 5 2	1.4460	X 4 CrNiCuNb 16 4				
1.4542	X 5 CrNiCuNb 16 4	1.4548	X 4 CrNiMo 27 5 2				
			X 5 CrNiCuNb 17 4				
Cast iron							
12	0.6100	EN-GJL-100	0.6100	GG-10	Grade 100	Ft 10 D	FC 100
	0.6150	EN-GJL-150	0.6150	GG-15	Grade 150	Ft 15 D	FC 150
	0.7033	EN-GJS-350-22	0.7033	GGG-35.3	Grade 350/22	FGS 370-17	FCD 350-22L
	0.7040	EN-GJS-400-15	0.7040	GGG-40	Grade 420/12	FGS 400-12	FCD 400-18L
	0.7043	EN-GJS-400-18	0.7043	GGG-40.3	Grade 370/17	FGS -370-17	
13	0.6200	EN-GJL-200	0.6200	GG-20	Grade 220	Ft 20 D	FC 200
	0.6250	EN-GJL-250	0.6250	GG-25	Grade 260	Ft 25 D	FC 250
	0.7050	EN-GJS-500-7	0.7050	GGG-50	Grade 500/7	FGS 500-7	FCD 500-7
	0.7060	EN-GJS-600-3	0.7060	GGG-60	Grade 600/3	FGS 600-3	FCD 600-3
	0.7660	EN-GJSA-XNiCr20-2	0.7660	GGG-NiCr 20 2	Grade S2	FGS Ni20 Cr2	
	0.7661	EN-GJSA-XNiCr20-3	0.7661	GGG-NiCr 20 3	Grade S2B	FGS Ni20 Cr3	
	0.7652	EN-GJLA-XNiMn 13-7	0.7652	GGG-NiMn 13 7	Grade S6	FGS Ni13 Mn7	
	0.6660	EN-GJLA-XNiCr 20-2	0.6660	GGL-NiCr 20 2	Grade F2	FGL Ni20 Cr2	
	0.6661	EN-GJLA-XNiCr 20-3	0.6661	GGL-NiCr 20 3		FGL Ni20 Cr3	
		EN-GJMB-600-3	0.8165	GTS-65-02	P 570/3	P 570/3	PCMP60-03
14	0.6300	EN-GJL-300	0.6300	GG-30	Grade 300	Ft 30 D	FC 300
	0.7070	EN-GJS-700-2	0.7070	GGG-70	Grade 700/2	FGS 700-2	FCD 700-2
	0.6655	EN-GJLA-XNiCuCr15-6-2	0.6655	GGL-NiCuCr 15 6 2	Grade F1	FGL Ni15 Cu6 Cr2	
	0.6657	EN-GJLA-XNiCuCr15-6-3	0.6656	GGL-NiCuCr 15 6 3		FGL Ni15 Cu6 Cr3	
		EN-GJLA-XNiCuCr15-6-3	0.8170	GTS-70-02	P 690/2	P 690/2	PCMP70-02
15	0.6350	EN-GJL-350	0.6350	GG-35	Grade 350	Ft 35 D	FC 350
	0.6040	-	0.6040	GG-40	Grade 400	Fgl 400	
	0.7080	EN-GJS-800-2	0.7080	GGG-80		FGS 800-2	FCD 800-2
	0.7670	EN-GJSA-XNi22	0.7670	GGG-Ni 22		FGS Ni22	
	0.7683	EN-GJSA-XNi35	0.7683	GGG-Ni 35		FGS Ni35	
	0.7677	-	0.7677	GGG-NiCr 30 1		FGS Ni30 Cr1	
	0.7676	EN-GJSA-XNiCr30-3	0.7676	GGG-NiCr 30 3	Grade S3	FGS Ni30 Cr3	
	0.7683	EN-GJSA-XNiCr35-3	0.7683	GGG-NiCr 35 3		FGS Ni35 Cr3	
	0.7673	EN-GJSA-XNiMn23-4	0.7673	GGG-NiMn 23 4	Grade S2M	FGS Ni23 Mn4	
	0.7665	EN-GJSA-XNiSiCr20-5-2	0.7665	GGG-NiSiCr 20 5 2		FGS Ni20 Si5 Cr2	
	0.7680	EN-GJSA-XNiSiCr30-5-5	0.7680	GGG-NiSiCr 30 5 5		FGS Ni30 Si5 Cr5	
	0.6676	EN-GJSA-XNiCr30-3	0.6676	GGL-NiCr 30 3	Grade F3	FGL Ni30 Cr3	
0.6667	EN-GJSA-XNiSiCr20-5-3	0.6667	GGL-NiSiCr 20 5 3		FGL Ni20 Si5 Cr3	A1200	
0.6680	-	0.6680	GGL-NiSiCr 30 5 5		FGL Ni30 Si5 Cr5	(A1050)	

• Stainless steel

The material group of workpieces							
UNI	SS	AISI/ASTM	UNS	Condition	Misc.Brands	Structure	Form
X 2 CrNiN 18 11	2371	304 LN	S30453			Austenite	
X 5 CrNiMo 17 13 2	2343 2333	316 CF8	S31600			Austenite	
X 6 CrNiMoNb 17 12		316 Cb	S31640			Austenite	
X 6 CrNiMoTi 17 12	2350	316 Ti				Austenite	
X 16 CrNiSi 25 20		314; 310	S31000	314 S 25		Austenite	
X 5 CrNiMo 17 12	2347	316	S31600	316 S 31		Austenite	
X 1 CrNiMoN 20 18 7	2778		S31254 N08028 N08800 N08330	Sol. treated	254 SMO Sanicro 28 Alloy 800 Incoloy DS	Super austenite Super austenite PH	
X 2 CrNiMoN 25 7 4	2328	330 F 53 255 F 55	S32750 S32550 S32760		SAF 2507 Ferralum Zeron 100	Austenite Super duplex Super duplex Super duplex	
X 2 CrNiMoN 17 12		316 LN	S 31653			Austenite	
X 2 CrNiMoN 17 13 3	2375	316 LN (316 LN)	S31653 (S31653)			Austenite	
X 2 CrNiMoN 22 5	2377	329 LN	S31803		SAF 2205	Duplex	
X 2 CrNiMoN 22 5	2377	318	S32205		SAF 2205	Duplex	
	2327	-	S32654		654 SMO	Super austenite	
	2562	904L	S32304		SAF 2304	Duplex	
	2564	CN7M	N08904			Super austenite	
X 3 CrNiMo 27 5 2	2324	XM-12	S15500	Sol. treated	15-5-PH	PH	
		329	S32900			Duplex	
		630	S17400	Sol. treated	17-4-PH	Super austenite	

Cast iron							
G10	01 10-00	A18 20 B	F11401			GCI	
G15	01 15-00 07 17-15	A48 25 B	F11601			GCI DCI	
GS 400-12	07 17-02	60-40-18	F32800			DCI	
GSO 42/17	07 17-12	60-40-18	F32800			DCI	
B 35-12	08 15-00	A47 32510	F22200			Martensite	
P 45-06	08 52-00	A220 45008	F23130			Martensite	
P 55-04	08 54-00	A220 60004	F24130			Martensite	
G20	01 20-00	A48 30 B	F12101			GCI	
G25	01 25-00	A48 35 B	F12401			GCI	
GS 500-7	07 27-02	A536 80-55-6	F33800			DCI	
GS 600-3	07 32-03	A476 80-60-03	F34100			DCI	
		A436 Type D-2	F43000			Austenite	
		A436 Type D-2B	F43001			Austenite	
	07 72-00	-	-			Austenite	
	05 23-00	A436 Type 2	F41002			Austenite	
		A436Type 2b	F41003			Austenite	
P65-02	08 56-00	A220 70003	F24830			Martensite	
G30	01 30-00	A48 45 B	F13101			GCI	
GS 700-2	07 37-01	A536 100-70-03	F34800			DCI	
		A436 Type 1	F41000			Austenite	
		A436 Type 1b	F41001			Austenite	
P 70-02	08 62-00	A220 90001	F26230			Martensite	
G35	01 35-00	A48 50 B	F13502			GCI	
	01 40-00	A278 60 B	F14102			GCI	
GS 800-2		A536 120-90-02	F36200			Martensite	
		A439 Type D-2B				Austenite	
		A439 Type D-5	F43006			Austenite	
		A436 Type D-3A	F43004			Austenite	
		A436 Type D-3	F43003			Austenite	
		A436 Type D-5B	F43007			Austenite	
		A439 Type D-2M	F43010			Austenite	
		Nicrosilal Spheronic	-			Austenite	
		A439 Type D-4	F43005			Austenite	
		A436 Type 3	F41001			Austenite	
		Nicrosilal				Austenite	
		A436 Type D-4				Austenite	

• Non-Ferrous metal

mat. group	The material group of workpieces						
	W.- Nr	EN	EN-Nr	DIN	BS	AFNOR	JIS
16	3.0205	AW-1200	Al99	Al99	1C/1200	A-4/1200	A1200
	3.0255	AW-1050A	Al99.5	Al99.5	1B/1050A	A-5/1050A	(A1050)
	3.0275	AW-1070	Al99.7	Al99.7		A-7/1070	
	3.0285	AW-1080	Al99.8	Al99.8	1A	A-8/1080	
	3.1305			AlCu2.5Mg0.5	2L69	A-U2G	
	3.1655	AW-2011	AlCuBiPb	AlCuBiPb	FC1/2011	A-U5PbBi/2011	A2011
	3.1325	AW-2024	AlCuMg1	AlCuMg1	H14	A-U4G/2024	A2017
	3.1355			AlCuMg2	2L97/98	A-U4G1	
	3.1255	AW-2014	AlCuSiMn	AlCuSiMn	H15/2014	A-U4SG/2014	
	3.3315	AW-5005A	AlMg1	AlMg1	N41/5005	A-G0.6	
	3.3316			AlMg1.5		A-G1.5	
	3.3211	AW-6061	AlMg1SiCu	AlMg1SiCu	H20	(6061)	A6061
	3.3523	AW-5052	AlMg2.5	AlMg2.5	(N4)	A-G2.5C/5052	A5052
	3.3537	AW-5454	AlMg2.7Mn	AlMg2.7Mn	N51/5454	A-G2.5MC/5454	A5454
	3.3525	AW-5251	AlMg2Mn0.3	AlMg2Mn0.3	N4 /5251	A-G2M	
	3.3527	AW-5049	AlMg2Mn0.8	AlMg2Mn0.8		A-G2Mn0.8	
	3.3535	AW-5754	AlMg3	AlMg3		A-G3M	
	3.3345			AlMg4.5			A5082
	3.3547	AW-5083	AlMg4.5Mn	AlMg4.5Mn	N8/5083	A-G4.5MC	
	3.3545	AW-5086	AlMg4Mn	AlMg4Mn	(N5/6)	A-G4MC-5086	
	3.3206	AW-6060	AlMgSi0.5	AlMgSi0.5	(H9)/(6060)	A-GS/6060	
	3.3210	AW-6063	AlMgSi0.7	AlMgSi0.7	(H10)	A-GSUC/6061	(A6063)
	3.2315	AW-6082	AlMgSi1	AlMgSi1	H30/6082	A-SGM0.7/6082	
	3.0615			AlMgSiPb		A-SGPb	
	3.0505	AW-3105	AlMn0.5Mg0.5	AlMn0.5Mg0.5	N31		
	3.0525	AW-3005	AlMn0.5Mg0.5	AlMn0.5Mg0.5		A-MG0.5/3005	-
	3.0515	AW-3103	AlMn1	AlMn1	N3/3103		
	3.0517	AW-3003	AlMn1Cu	AlMn1Cu		A-M1/3003	A3003
	3.0526	AW-3004	AlMn1Mg1	AlMn1Mg1		A-M1G/3004	-
	3.4335	AW-7020	AlZn4.5Mg1	AlZn4.5Mg1	H17/7020	A-Z5G/7020	
	3.4345			AlZnMgCu0.5		A-Z4GU	
	3.4365	AW-7075		AlZnMgCu1.5	2L95/96	A-Z5GU/7075	A7075
	3.1841	AC-21100	AlCu4Ti	G-AlCu4Ti			
	3.1371	AC-21000	AlCu4TiMg	G-AlCu4TiMg	2L91/92	A-U5GT	
	3.3541	AC-51100	AlMg3	G-AlMg3		A-G3T	
	3.3241			G-AlMg3Si			
	3.3261	AC-51400	AlMg5(Si)	G-AlMg5			
	3.3555	AC-51400	AlMg5	G-AlMg5	LM5		
	3.3292	AC-51200	AlMg9	G-AlMg9			
	3.2381	AC-43400	AlSi10Mg(Fe)	G-AlSi10Mg	LM9	A-S10G	
	3.2341	AC-42000		G-AlSi5Mg	LM25	A-S7G	
	3.2151	AC-45000	AlSi6Cu4	G-AlSi6Cu4			
	3.2371	AC-42100	AlSi7Mg	G-AlSi7Mg	2L99	A-S7GO3	
	3.2161	AC-46200	AlSi8Cu3(Si)	G-AlSi8Cu3			
	3.2373	AC-43200	AlSi9Mg	G-AlSi9Mg		A-S10G	
	3.5106			G-MgAg3Se2Zr1			
	3.5314	MG-P-62	MgAl3Zn	G-MgAl3Zn	MAG-E-111	G-A3-Z1	
	3.5662	MC 21230	MgAl6Mn	G-MgAl6Mn			
	3.5612	MG-P-63	MgAl6Zn	G-MgAl6Zn	MAG-E-121	G-A6-Z1	
	3.5812	MG-P-61	MgAl8Zn	G-MgAl8Zn	MAG1-M	G-A9	
	3.5812	MC 21110	MgAl8Zn1	G-MgAl8Zn1	A82	G-A92	
	3.5912	MC 21120	MgAl9Zn	G-MgAl9Zn1	MAG3	G-A92	
	3.5200			G-MgMn2	MAG-E-101	G-M2	
3.5103	MB 65110	MgSe3Zn2Zr1	G-MgSe3Zn2Zr1	MAG6-TE	ZRE1		
3.5105			G-MgTh3Zn2Zr1				
17	3.2383	AC-43200	AlSi10Mg(Cu)	G-AlSi10Mg(Cu)			
	3.2382	AC-44200	AlSi12	GD-AlSi12			
		AC-46100	AlSi11Cu2(Fe)		LM9		ADC12
		AC-47100	AlSi12Cu1(Fe)				ADC14
18	2.1203	CW004A		Cu			
	2.0940.01	CW013A	CuAg0.1	CuAg0.1	Cu-Ag-4		
		CC331G		CuAl10Fe	AB1	CuAl10Fe	
		CC333G-GZ		CuAl10Fe5Ni5			
	2.0975.01	CC333G		CuAl10Ni	AB2	CuAl10Ni5Fe5	

• Non-Ferrous metal

The material group of workpieces							
UNI	SS	AISI/ASTM	UNS	Condition	Misc. Brands	Structure	Form
4010			AA1200				
4007			AA1050A				
4005			AA1070A				
4004			AA1080A				
4355			AA2117				
			AA2011				
			AA2017A				
			AA2024				
4338			AA2014				
4106			AA5005A				
			AA5050B				
			AA6061				
4120			AA5052				
			AA5454				
			AA5251				
4115			AA5049				
4125			AA5754				
			AA5082				
4140			AA5083				
			AA5086				
4103			AA6060				
4104,4107			AA6005				
4212			AA6082				
			AA6012				
			AA3105				
4054			AA3005				
			AA3103				
			AA3003				
			AA3004				
4425			AA7020				
			AA7022				
			AA7075				
4337		204	A02040				
		5140	A05140				
		5056A					
4163							
4253		B85	A13600				
4244		B26					
4245			A13560				
4251		A380					
		359,2					
		4418					
4633			AZ31B				
			AM60A				
			AZ61A				
			AZ80A				
4637		4437	AZ81A				
4635		4442	AZ91A/B				
			M1A				
			B80				
			B80				
		A413.2					
		A384.0	AA384				
		B390.0					
5015			C11600				
5030			C95200				
5710		CA952					
5716		CA955	C95500				

• Non-Ferrous metal

mat. group	The material group of workpieces						
	W.- Nr	EN	EN-Nr	DIN	BS	AFNOR	JIS
18	2.0966	CW307G	CuAl10Ni5Fe4	CuAl10Ni5Fe4	Ca104	CuAl10Ni	C6301
	2.0978	CW308G	CuAl11Ni6Fe6	CuAl11Ni6Fe5			
	2.0916			CuAl5			
	2.0918	CW300G	CuAl5As	CuAl5As			C6140
	2.0932			CuAl8 Fe3			
	2.1291			CuCr			
	2.1310	CW107C	CuFe2P	CuFe2P			
	2.0853	CW109C	CuNi1Si	CuNi1.5Si			
	2.0872		CuNi10Fe1Mn	CuNi10Fe1Mn	CZ102	CuNi10Fe1Mn	
				CuNi10Zn45			
	2.0780	CW406J	CuNi12Zn30Pb1	CuNi12Zn30Pb1			CuNi18Zn19Pb1
	2.0790		CW408J	CuNi18Zn19Pb1			CuNi18Zn19Pb1
	2.0790	CW408J	CuNi18Zn19Pb1	CuNi18Zn19Pb1			CuNi18Zn19Pb1
	2.0740	CW409J	CuNi18Zn20	CuNi18Zn20	Ns106		C7451
	2.0742	CW410J	CuNi18Zn27	CuNi18Zn27	NS107		
	2.0822			CuNi20			
	2.0830			CuNi25	CN105	CuNi25	
	2.0835			CuNi30			
	2.0883			CuNi30Fe2Mn2			
				CuNi30FeMn			
	2.0882	CW354H	CuNi30Mn1Fe	CuNi30Mn1Fe	CN107	CuNi30Mn1Fe	
	2.0857	CW112C	CuNi3Si	CuNi3Si			
	2.0842			CuNi44Mn1		CuNi44Mn	
				CuNi5Fe1Mn		CuNi5Fe1Mn	
	2.0875	CW351H	CuNi9Sn2	CuNi9Sn2			
	2.1176	CW352H		CuPb10Sn	LB2	CuSn10Pb10	
	2.1183	CC496K-GZ		CuPb15Sn			
	2.1160	CW113C	Cupb1p	CuPb1P			
	2.1189			CuPb20Sn			
	2.1050.01	CC480K		CuSn10	CT1	CuSn10	
	2.1087			CuSn10Zn			
	2.1051.01	CC483K		CuSn12	PB2	CuSn12	
				CuSn14		CuSn14	
	2.1016	CW450K	CuSn4	CuSn4	PB101	CuSn4p	C5111
			CW451K	CuSn5			
	2.1020	CW452K	CuSn6	CuSn6	PB103	CuSn6	C5191
	2.1080			CuSn6Zn6			
				CuSn7			
	2.1090.03	CC493K-GZ		CuSn7ZnPb			
	2.1030	CW453K	CuSn8	CuSn8	PB104	CuSn8P	C5210
	2.0230	CW501L	CuZn10	CuZn10	CZ101	CuZn10	C2200
	2.0240	CW502L	CuZn15	CuZn15	CZ102	CuZn15	C2300
	2.0250	CW503L	CuZn20	CuZn20	CZ103		C2400
	2.0460	CW702R	CuZn20Al2	CuZn20Al2	CZ110	CuZn22Al2	
				CuZn25Al15			
	2.0261	CW504L	CuZn28	CuZn28	CZ105		C4430
	2.0470	CW706R	CuZn28Sn1	CuZn28Sn1		CuZn29Sn1	
	2.0265	CW505L	CuZn30	CuZn30	CZ106	CuZn30	C2600
				CuZn30AlFeMn		CuZn30AlFeMn	
	2.0490	CW708R	CuZn31Si1	CuZn31Si1			
2.0280	CW506L	CuZn33	CuZn33	CZ107		C2680	
2.0592.01	CC765S		CuZn35Al1	HTB1	CuZn30AlFeMn		
2.0540	CW710R	CuZn35Ni2	CuZn35Ni2				
2.0335	CW507L	CuZn36	CuZn36	CZ108	CuZn36	C2720	
2.0331	CW601N	CuZn35Pb2	CuZn36Pb1.5	CZ131	CuZn35Pb2		
2.0375	CW602N	CuZn36Pb3	CuZn36Pb3	CZ124	CuZn36Pb3		
2.0321	CW508L	CuZn37	CuZn37	CZ108	CuZn37		
2.0332	CW604N	CuZn37Pb0.5	CuZn37Pb0.5	CZ118			
2.0371	CW607N	CuZn38Pb1.5	CuZn38Pb1.5	CZ119	(CuZn38Pb2)		
2.0530	CW717R	CuZn38Sn1	CuZn38Sn1				
2.0525	CW715R	CuZn38SnAl	CuZn38SnAl				
			CuZn39AlFeMn				
2.0372	CW610N	CuZn39Pb0.5	CuZn39Pb0.5	CZ123	CuZn39Pb0.8		
2.0380	CW612N	CuZn39Pb2	CuZn39Pb2	CZ128			
2.0401	CW614N	CuZn39Pb3	CuZn39Pb3	CZ121	CuZn39Pb3		
2.0360	CW509	CuZn40	CuZn40	CZ109	CuZn40	C2800	
2.0550	CW713R		CuZn40A12				

• Non-Ferrous metal

The material group of workpieces										
UNI	SS	AISI/ASTM	UNS	Condition	Misc. Brands	Structure	Form			
CuNi30	5667		C62730							
			C60800							
			C18400							
			C19400							
			C70600							
			C79300							
			C76300							
			C76300							
			C75200							
			C77000							
CuNi30	5682		C71300							
			C71580							
			C70600							
			C70250							
			C72150							
			C72500							
			C93700							
			C93800							
			C19000							
			C94100							
CuSn7	5443 5458 5465 5475	CA937	C90700							
			C90500							
			C91000							
			C51100							
			C51000							
			C51900							
			CuSn7	5428	CA907	C93200				
						C83600				
						C52100				
						C22000				
C23000										
C24000										
C68700										
C86300										
C25600										
C44300										
CuSn7	5220 5122	CA907	C26000							
			C26800							
			C96500							
			C27200							
			C34200							
			C36000							
			C27200							
			C33500							
			C35300							
			C46400							
CuSn7	5256	CA865	C36500							
			C37700							
			C38500							
			C28000							
			C67410							
			CuSn7	5150 5165		C27200				
						C33500				
						C35300				
						C46400				
						C47000				
CuSn7	5170					C36500				
						C37700				
						C38500				
						C28000				
						C67410				

• Non-Ferrous metal

mat. group	The material group of workpieces						
	W.- Nr	EN	EN-Nr	DIN	BS	AFNOR	JIS
18	2.0572	CW723R	CuZn40Mn1	CuZn40Mn1			
	2.0580	CW720R	CuZn40Mn1Pb	CuZn40Mn1Pb	CZ136	CuZn39Pb2	
	2.0402	CW612N	CuZn40Pb2	CuZn40Pb2	CZ120		
	2.0410	CW622N	CuZn44Pb2	CuZn44Pb2	CZ104		
	2.0220	CW500L	CuZn5	CuZn5	CZ125		
							C2100
Heat resistant super alloys / Titanium alloys							
19							
	X2NiCrAlTi3220		1.4876				
20							
21	NiMo30		2.4810				
	NiMo30		2.4810				
	NiMo16Cr15W		2.4602				
	NiMo16Cr16Ti		2.4819 2.4610				
			2.4619				
	NiCr21Fe18Mo9		2.4665				

• Non-Ferrous metal

The material group of workpieces							
UNI	SS	AISI/ASTM	UNS	Condition	Misc.Brands	Structure	Form
	5168 5272		C37800 C68700 C21000		AMPCO 15 AMPCO 18 AMPCO 18.136 AMPCO 18.22 AMPCO 18.23 AMPCO 21 AMPCO 22 AMPCO 25 AMPCO 26 AMPCO 45 AMPCO 483 AMPCO 642 AMPCO 673 AMPCO 674 AMPCO 8 AMPCO 863 AMPCO M4		
Heat resistant super alloys / Titanium alloys							
			S66286 S35000 S35000 S35500 S45500 N08800 N19909 R30155 R30155	Precip.hardened heat treated	A286 AM350 AM350 AM355 Custom 455 Discalloy Incoloy 800 Incoloy 801 Incoloy 909 Lapelloy M-308 N-155 N-155		cast bar, forge, ring
			R30195		Air Resist 13 FSX-414 H531 Haynes 188 Haynes 188 Haynes 25 Mar-M-302 Mar-M-509 MP159 MP35N Stellite 21 Stellite 30 Stellite 31 W152 W162		bar, forge, ring tube
			N10665 N10002 N10002 N10276 N06455 N06007 N06985 N10003 N10003 N06635 N10004 N06002		Astroloy GTD222 Hastelloy B-2 Hastelloy C Hastelloy C Hastelloy C-22 Hastelloy C-276 Hastelloy C-4 Hastelloy G Hastelloy G-3 Hastelloy N Hastelloy N Hastelloy S Hastelloy W Hastelloy X		all forms plate cast bar, sforge, ring cast all forms all forms

• Heat resistant super alloys / Titanium alloys

mat. group	The material group of workpieces						
	W.- Nr	EN	EN-Nr	DIN	BS	AFNOR	JIS
21	2.4816	NiCr15Fe					
	2.4851						
	2.4856	NiCr22Mo9Nb					
	2.4856	NiCr22Mo9Nb					
	2.4856	NiCr22Mo9Nb					
		NiFe38Cr16Nb					
	2.4668	NiCr19Fe19Nb5Mo3					
	2.4668	NiCr19Fe19Nb5Mo3					
	2.4668	NiCr19Fe19Nb5Mo3					
	2.4669						
	2.4669						
	2.4061	Ni99.6					
	2.4634						
2.4636							
2.4650							
2.4631	NiCr20TiAl						
2.4632							
2.4662							
ppm	NiCr19Co18Mo4Ti3Al3						
2.4654	NiCr20Co13Mo4Ti3Al						
2.4654	NiCr20Co13Mo4Ti3Al						
22	3.7024			TiV10Fe2Al3			
	3.7024						
	3.7124	TiCu2					
		TiAl5Sn2.5					
		TiAl5Sn2.5					
		TiAl5Sn2.5					
	3.7164	TiAl6V4					
3.7164	TiAl6V4						
3.7164	TiAl6V4						
3.7164	TiAl6V4						

• Heat resistant super alloys / Titanium alloys

The material group of workpieces							
UNI	SS	AISI/ASTM	UNS	Condition	Misc.Brands	Structure	Form
			N06600 N06601 N06625 N06625 N06625 N09706 N07713 N07718 N07718 N07718 N07750 N07750 N02205 N07263 N07080 N07090 N09901 N03260 N07500 N07001 N07001		Inconel 600 Inconel 601 Inconel 625 Inconel 625 Inconel 625 Inconel 706 Inconel 708 Inconel 713 Inconel 713LC Inconel 718 Inconel 718 Inconel 718 Inconel 901 Inconel X-750 Inconel X-750 Mar-M-200 Mar-M-247 Mod.IN 100 Mod.IN 792 Nickel 201 Nimonic 101 Nimonic 105 Nimonic 115 Nimonic 263 Nimonic 80A Nimonic 81 Nimonic 86 Nimonic 90 Nimonic 901 Nimonic 91 René 95 TD Nickel Udimet 500 Udimet 520 Udimet 700 Udimet 720 Waspalloy Waspalloy		IN 100 all forms all forms bar, forge, ring tube cast bar, forge, ring bar, forge, ring tube cast all forms bar, forge cast
		AMS 4900, -01, -21 AMS 4986 ASTM Grade 21 AMS 4995 AMS 4943 AMS 4943 AMS 4910 AMS 4909 AMS 4910 AMS 4919 AMS 4919 AMS 4981 AMS 4981 AMS 4920 AMS 4920, Grd 5 AMS 4981 AMS 4920 AMS 4920	R58210 R58650 R56320 R56320 R54520 R54521 R54520 R54620 R54621 R56260 R56260 R56400 R56400 R56401 R5640 R56400		Ti (pure) Ti (pure) (grd 1-4) Ti 10V-2Fe-3Al Ti 15Mo-3Nb-3Al-0.2Si Ti 17 Ti 2Cu Ti 3Al-2.5V Ti 3Al-2.5V Ti 5Al-2.5Sn Ti 5Al-2.5Sn Ti 5Al-2.5Sn Ti 6-2-4-2 Ti 6-2-4-2 Ti 6-2-4-6 Ti 6-2-4-6 Ti 6-2-4-6 Ti 6Al-4V Ti 6Al-4V Ti 6Al-4V Ti 6Al-4V	Ti (α) Ti (α) Ti (β) Ti (β) Ti (α+β) Ti (α) Ti (α+β) Ti (α+β) Ti (α) Ti (α) Ti (α) Ti (α) Ti (α) Ti (α) Ti (α+β) Ti (α+β) Ti (α+β) Ti (α+β) Ti (α+β) Ti (α+β) Ti (α+β) Ti (α+β) Ti (α+β)	pure - tube pure - plate, bar, forge tube bar, forge EL1 extrusion