

THE NEW VALUE FRONTIER



METAL DIVISION

Countersinks
and reamers

Countersinks and reamers



High Performance

Sales number +44 0114 278 8787



Recommended cutting data

RECOMMENDED CUTTING DATA

The cutting data in this catalogue is only recommended cutting data and may vary depending on the specific machining situation. Below the general conditions are described on which the recommended cutting data in this catalogue is based.

The machine and tool clamping

The recommended cutting data for milling and drilling is based on a machining situation with a relatively stable machine. Also, total runout from the machine and the tool clamping must be under 0.04 mm for HSS end mills and under 0.02 mm for carbide end mills and carbide drills.

Tool projection

The recommended cutting data for milling assumes that tools with a short or standard overall length have a projection which is no more than three times the tool diameter. For tools with a long or extra long overall length the projection must be no more than five times the tool diameter. If vibrations occur the cutting speed should be reduced. If the tool projection is larger than described above, the cutting speed and feed should be reduced by approx. 50 percent.

Coolant and swarf removal

The recommended cutting data for milling and drilling assumes that the pressure from the coolant/lubricant or air used is high enough to remove chips from the machining zone and cool down the tool. When cutting hardened steel (>50 HRC) it is not necessary to cool down the tool as the heat generated disappears with the chips.

Clamping the workpiece

The recommended cutting data is based on a correctly clamped workpiece as vibrations can otherwise occur. Vibrations may cause the tool to break and will always reduce tool life. If the workpiece is badly clamped or thin we recommend that you reduce cutting speed and feed.

Professional advice

Correct choice of tool and cutting data always depends on the specific machining situation which means that insight into machine optimisation, workpiece properties and tooling technology is important when choosing the optimum cutting data.

Contact our technical sales engineers and specialists who offer professional advice to ensure high process security and the lowest unit costs.

Countersinks and reamers

HSS countersinks

Item no.

Page

269100, 269101



Z
3

HSS

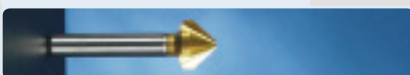


UNCOATED



05.05.10

269103, 269104, 269105



Z
3

HSS

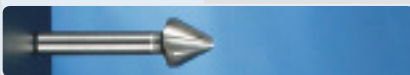


TIN
TiCN
TiAlN



05.05.11

269110, 269111



Z
3

HSS



UNCOATED



05.05.30

269113



Z
3

HSS



TiN



05.05.31

Carbide countersinks

Item no.

Page

269150, 269151



Z
3

HM
MG

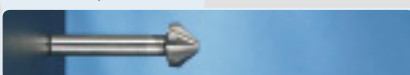


UNCOATED



05.07.10

269180, 269181



Z
5

HM
MG



UNCOATED



05.07.60

HSS-E machine reamers

Item no.

Page

280468, 280405, 280641, 280642



HSS-E
V3

Tolerance
H7

UNCOATED
or
TiN



λ 7°



05.55.10

Carbide machine reamers

Item no.

Page

281409, 281411



HM
MG

Tolerance
H7

UNCOA-
TED



λ 7°



05.75.10

Guide to symbols used

Countersinks

This page explains the symbols used.



HSS

Material

The symbol shows the tool material.

See 06.00.01 for detailed information on tool materials.



90°

Geometry

The symbol shows the point angle (90°) of the countersink.



TIN
TiCN
TiAlN

Coating

The symbol shows the type of coating used.



Z = 3

Number of flutes

The symbol shows the number of flutes on the countersink.



Total length

The symbol shows the total length of the countersink (short, standard, long and extra long).



Coolant

The symbol shows the recommended type of coolant for machining with the tool.



The tool should be used with emulsion.



DIN
335C/D

Production standard

The symbol shows which standard the countersink has been manufactured to.



DIN
335C/D

The countersink has been produced to DIN 335C/D.



Shank standard

The symbol shows which standard the shank has been manufactured to.



The countersink has a straight shank or Morse taper with tang.

Guide to symbols used

Reamers

This page explains the symbols used in chapter on reamers.

HSS-E
V3

Material

The symbol shows the tool material.
See chapter 15 for detailed information on tool materials.

Tolerance
H7

Hole tolerance

The symbol shows the hole tolerance (H7) which is made in the workpiece by the tool.

TIN

Coating

The symbol shows the type of coating used.
See chapter 15 for detailed information on surface treatment.

Standard

Total length

The symbol shows the total length of the tool.

λ 7°

Helix angle

The symbol shows the helix angle (7°) of the tool.

Emul./Oil

Coolant

The symbol shows the recommended type of coolant.



The tool should be used with emulsion or oil.



The tool should be used with emulsion.



The tool should be used with oil.

DIN
208/212

Production standard

The symbol shows which standard the reamer has been manufactured to.



The reamer has been produced to DIN 208/212.

Shank standard

The symbol shows which standard the shank has been manufactured to.



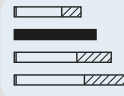
The reamer has a straight shank or Morse taper with tang.

HSS Countersinks 90°

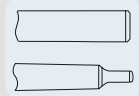
HSS

90°

Z = 3



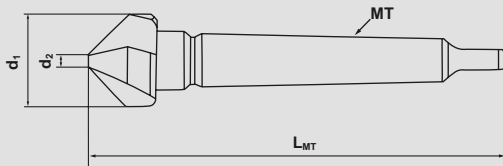
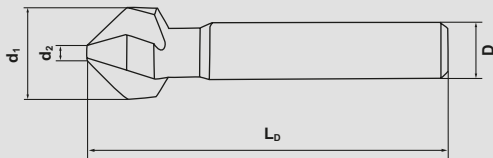
DIN 335 C/D



UM Countersinks™

269100 269101

Item no.	d ₁ (z9)	d ₂	D (h9)	L _D	MT	L _{MT}	D	MT
26910-.0430	4.3	1.3	4	40			▪	
26910-.0530	5.3	1.5	4	40			▪	
26910-.0600	6.0	1.5	5	45			▪	
26910-.0630	6.3	1.5	5	45			▪	
26910-.0730	7.3	1.8	6	50			▪	
26910-.0830	8.3	2.0	6	50			▪	
26910-.1000	10.0	2.5	6	50			▪	
26910-.1040	10.4	2.5	6	50			▪	
26910-.1150	11.5	2.8	8	56			▪	
26910-.1240	12.4	2.8	8	56			▪	
26910-.1500	15.0	3.2	10	60	1	85	▪	▪
26910-.1650	16.5	3.2	10	60	1	85	▪	▪
26910-.1900	19.0	3.5	10	63	2	100	▪	▪
26910-.2050	20.5	3.5	10	63	2	100	▪	▪
26910-.2300	23.0	3.8	10	67	2	106	▪	▪
26910-.2500	25.0	3.8	10	67	2	106	▪	▪
26910-.2600	26.0	3.8	10	67	2	106	▪	▪
26910-.2800	28.0	4.0	12	71	2	112	▪	▪
26910-.3000	30.0	4.2	12	71	2	112	▪	▪
26910-.3100	31.0	4.2	12	71	2	112	▪	▪
26910-.3400	34.0	4.5			2	118		▪
26910-.3700	37.0	4.8			2	118		▪
26910-.4000	40.0	10.0	12	75	3	140	▪	▪
26910-.5000	50.0	14.0			3	150		▪
26910-.6300	63.0	16.0			4	180		▪
26910-.8000	80.0	22.0			4	190		▪



UNIMERCO MATERIAL CLASS (UMC)

	01	02.1	02.2	02.3	03	04	05	06	07	08	09.1	09.2	09.3	10	11	12
	☺☺	☺☺☺	☺☺☺	☺	☺☺	☺☺	☺☺	☺☺	☺☺	☺☺	☺☺	☺	☺	☺☺	☺☺☺	☺
V _c (m/min.)	10 30	15	10	5	8 25	25 80	35 50	50 80	30 45	8 14	10	8	5	10 40	8 10	3 6
f _z (mm/z)	0.10 0.30	0.06 0.18	0.05 0.16	0.04 0.14	0.06 0.36	0.08 0.40	0.04 0.36	0.08 0.40	0.04 0.30	0.04 0.18	0.06 0.18	0.05 0.16	0.04 0.14	0.04 0.36	0.03 0.20	0.04 0.25

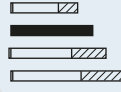
HSS Countersinks 90°

HSS

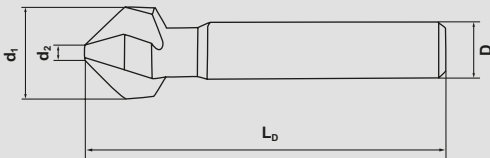


TiN
TiCN
TiAlN

Z = 3



DIN
335 C



UM Countersinks™

269103 269104 269105

TiN TiCN TiAlN

Item no.	d ₁ (z9)	d ₂	D (h9)	L _D	TiN	TiCN	TiAlN
26910-.0430	4.3	1.3	4	40	▪		
26910-.0500	5.0	1.5	4	40	▪		
26910-.0530	5.3	1.5	4	40	▪		
26910-.0580	5.8	1.5	5	45	▪		
26910-.0600	6.0	1.5	5	45	▪		
26910-.0630	6.3	1.5	5	45	▪	▪	▪
26910-.0700	7.0	1.8	6	50	▪		
26910-.0730	7.3	1.8	6	50	▪		
26910-.0800	8.0	2.0	6	50	▪		
26910-.0830	8.3	2.0	6	50	▪	▪	▪
26910-.0940	9.4	2.2	6	50	▪		
26910-.1000	10.0	2.5	6	50	▪		
26910-.1040	10.4	2.5	6	50	▪	▪	▪
26910-.1150	11.5	2.8	8	56	▪		
26910-.1240	12.4	2.8	8	56	▪	▪	▪
26910-.1340	13.4	2.9	8	56	▪		
26910-.1500	15.0	3.2	8	60	▪	▪	
26910-.1650	16.5	3.2	10	60	▪	▪	▪
26910-.1900	19.0	3.5	10	63	▪		
26910-.2050	20.5	3.5	10	63	▪	▪	▪
26910-.2300	23.0	3.8	10	67	▪		
26910-.2500	25.0	3.8	10	67	▪	▪	▪
26910-.2600	26.0	3.8	10	67	▪		
26910-.2800	28.0	4.0	12	71	▪		
26910-.3000	30.0	4.2	12	71	▪		
26910-.3100	31.0	4.2	12	71	▪	▪	▪

UNIMERCO MATERIAL CLASS (UMC)

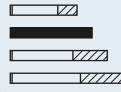
	01	02.1	02.2	02.3	03	04	05	06	07	08	09.1	09.2	09.3	10	11	12
	☺☺	☺☺	☺☺	☺	☺☺	☺☺	☺☺	☺☺	☺☺	☺☺	☺☺	☺	☺	☺☺	☺☺	☺
V _c (m/min.)	15 45	23	15	8	12 38	38 120	53 75	75 120	45 68	12 21	15	12	8	15 60	12 15	5 9
f _z (mm/z)	0.10 0.30	0.06 0.18	0.05 0.16	0.04 0.14	0.06 0.36	0.08 0.40	0.04 0.36	0.08 0.40	0.04 0.30	0.04 0.18	0.06 0.18	0.05 0.16	0.04 0.14	0.04 0.36	0.03 0.20	0.04 0.25

HSS Countersinks 60°

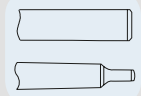
HSS



Z = 3



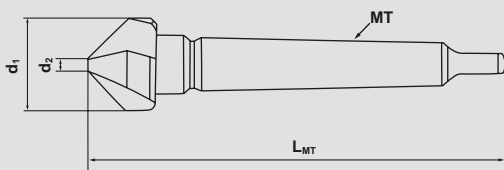
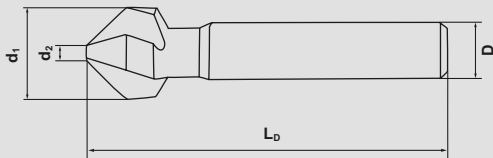
DIN 334 C/D



UM Countersinks™

269110 269111

Item no.	d ₁ (z9)	d ₂	D (h9)	L _D	MT	L _{MT}	D	MT
26911-.0630	6.3	1.6	5	45			▪	
26911-.0800	8.0	2.0	6	50			▪	
26911-.1000	10.0	2.5	6	50			▪	
26911-.1250	12.5	3.2	8	56			▪	
26911-.1600	16.0	4.0	10	63	1	90	▪	▪
26911-.2000	20.0	5.0	10	67	2	106	▪	▪
26911-.2500	25.0	6.3	10	71	2	112	▪	▪
26911-.3150	31.5	10.0			2	118		▪
26911-.4000	40.0	12.5			3	150		▪
26911-.5000	50.0	16.0			3	160		▪
26911-.6300	63.0	20.0			4	190		▪
26911-.8000	80.0	25.0			4	200		▪



UNIMERCO MATERIAL CLASS (UMC)

	01	02.1	02.2	02.3	03	04	05	06	07	08	09.1	09.2	09.3	10	11	12
	☺☺	☺☺☺	☺☺☺	☺	☺☺☺	☺☺☺	☺☺☺	☺☺☺	☺☺☺	☺☺☺	☺☺☺	☺	☺	☺☺☺	☺☺☺	☺
V _c (m/min.)	10 30	15	10	5	8 25	25 80	35 50	50 80	30 45	8 14	10	8	5	10 40	8 10	3 6
f _z (mm/z)	0.10 0.30	0.06 0.18	0.05 0.16	0.04 0.14	0.06 0.36	0.08 0.40	0.04 0.36	0.08 0.40	0.04 0.30	0.04 0.18	0.06 0.18	0.05 0.16	0.04 0.14	0.04 0.36	0.03 0.20	0.04 0.25

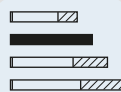
HSS Countersinks 60°

HSS

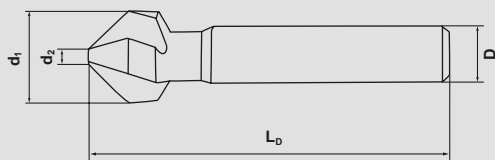


TiN

Z = 3



DIN 334 C



UM Countersinks™

269113

TiN TiCN TiAIN

Item no.	d ₁ (z9)	d ₂	D (h9)	L _D	
26911-.0630	6.3	1.6	5	45	▪
26911-.0800	8.0	2.0	6	50	▪
26911-.1000	10.0	2.5	6	50	▪
26911-.1250	12.5	3.2	8	56	▪
26911-.1600	16.0	4.0	10	63	▪
26911-.2000	20.0	5.0	10	67	▪
26911-.2500	25.0	6.3	10	71	▪

UNIMERCO MATERIAL CLASS (UMC)

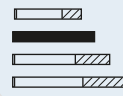
	01	02.1	02.2	02.3	03	04	05	06	07	08	09.1	09.2	09.3	10	11	12
	☺☺	☺☺	☺☺	☺	☺☺	☺☺	☺☺	☺☺	☺☺	☺☺	☺☺	☺	☺	☺☺	☺☺	☺
V _c (m/min.)	15 45	23	15	8	12 38	38 120	53 75	75 120	45 68	12 21	15	12	8	15 60	12 15	5 9
f _z (mm/z)	0.10 0.30	0.06 0.18	0.05 0.16	0.04 0.14	0.06 0.36	0.08 0.40	0.04 0.36	0.08 0.40	0.04 0.30	0.04 0.18	0.06 0.18	0.05 0.16	0.04 0.14	0.04 0.36	0.03 0.20	0.04 0.25

Carbide Countersinks 90°

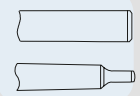
HM
MG



Z = 3



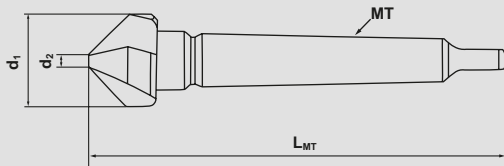
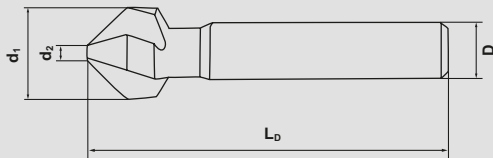
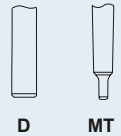
DIN
335 C/D



UM Countersinks™

269150 269151

Item no.	d ₁ (z9)	d ₂	D (h9)	L _D	MT	L _{MT}	D	MT
26915-.0600	6.0	2.0	5	40			▪	
26915-.0630	6.3	2.0	5	40			▪	
26955-.0800	8.0	2.0	6	45			▪	
26915-.0830	8.3	2.0	6	45			▪	
26915-.1000	10.0	2.5	8	46			▪	
26915-.1040	10.4	2.5	8	46			▪	
26915-.1150	11.5	2.8	8	56			▪	
26915-.1240	12.4	2.8	8	56			▪	
26915-.1500	15.0	3.2	10	60			▪	
26915-.1650	16.5	3.2	10	60			▪	
26915-.2050	20.5	3.5	10	63			▪	
26915-.2050	20.5	7.0			2	100		▪
26915-.2500	25.0	3.8	10	67			▪	
26915-.2500	25.0	9.0			2	103		▪
26915-.3100	31.0	4.2	12	71			▪	
26915-.3100	31.0	10.0			2	108		▪
26915-.3700	37.0	12.0			2	115		▪
26915-.4000	40.0	14.0			3	137		▪
26915-.5000	50.0	18.0			3	147		▪
26915-.6300	63.0	22.0			4	179		▪
26915-.8000	80.0	28.0			4	187		▪



UNIMERCO MATERIAL CLASS (UMC)

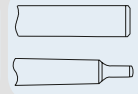
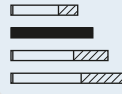
	01	02.1	02.2	02.3	03	04	05	06	07	08	09.1	09.2	09.3	10	11	12
	☺☺	☺☺☺	☺☺☺	☺	☺☺☺	☺☺☺	☺☺☺	☺☺☺	☺☺☺	☺☺☺	☺☺☺	☺	☺	☺☺☺	☺☺☺	☺
V _c (m/min.)	15 45	23	15	8	12 38	38 120	53 75	75 120	45 68	12 21	15	12	8	15 60	12 15	5 9
f _z (mm/z)	0.10 0.30	0.06 0.18	0.05 0.16	0.04 0.14	0.06 0.36	0.08 0.40	0.04 0.36	0.08 0.40	0.04 0.30	0.04 0.18	0.06 0.18	0.05 0.16	0.04 0.14	0.04 0.36	0.03 0.20	0.04 0.25

Carbide Countersinks 90°

HM
MG



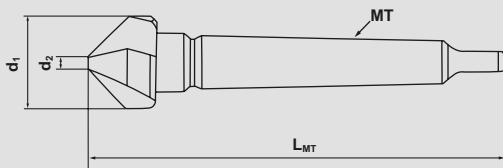
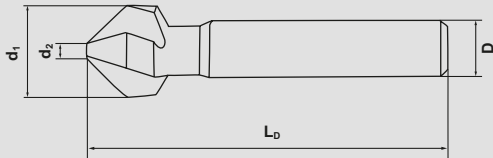
Z = 5



UM Countersinks™

269180 269181

Item no.	d ₁ (z9)	d ₂	D (h9)	L _D	MT	L _{MT}	269180 269181	
							D	MT
26918-.1040	10.4	4.0	8	46			▪	
26918-.1240	12.4	4.0	8	56			▪	
26918-.1650	16.5	4.5	10	60			▪	
26918-.2050	20.5	5.0	10	63			▪	
26918-.2500	25.0	5.5	10	67			▪	
26918-.3100	31.0	6.0	12	71	2	108	▪	▪
26918-.4000	40.0	14.0			3	137		▪
26918-.5000	50.0	18.0			3	147		▪
26918-.6300	63.0	22.0			4	179		▪



Especially recommended for materials as hardened steel, inconel and hastelloy

UNIMERCO MATERIAL CLASS (UMC)

	01	01.6	01.7	02.1	02.2	02.3	03	04	05	06	07	08	09.1	09.2	09.3
	☺☺	☺☺	☺☺	☺☺	☺☺	☺☺	☺☺	☺☺	☺☺	☺☺	☺☺	☺☺	☺☺	☺☺	☺☺
V _c (m/min.)	15 45	10 15	05 10	23	15	8	12 38	38 120	53 75	75 120	45 68	12 21	15	12	8
f _z (mm/z)	0.10 0.30	0.05 0.10	0.04 0.08	0.06 0.18	0.05 0.16	0.04 0.14	0.06 0.36	0.08 0.40	0.04 0.36	0.08 0.40	0.04 0.30	0.04 0.18	0.06 0.18	0.05 0.16	0.04 0.14

HSS machine reamer

HSS-E
V3

Tolerance
H7

Uncoated
or
TiN

Standard

λ 7°

Emul./Oil

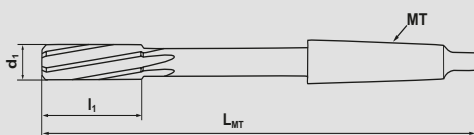
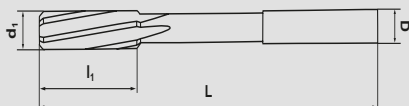
DIN
208/212



UM Reamers™

280468 280405 280641 280642

Item no.	d_1 (m7)	D (h9)	L	l_1	MT	L_{MT}				
									TiN	TiN
280---.0100	1.00	1.0	34	5.5			■			
280---.0120	1.20	1.2	38	7.5			■			
280---.0140	1.40	1.4	40	8			■			
280---.0150	1.50	1.5	40	8			■			
280---.0160	1.60	1.6	43	9			■			
280---.0180	1.80	1.8	46	10			■			
280---.0200	2.00	2.0	49	11			■			
280---.0220	2.20	2.2	53	12			■			
280---.0250	2.50	2.5	57	14			■			
280---.0280	2.80	2.8	61	15			■			
280---.0300	3.00	3.0	61	15	1	115	■	■		
280---.0320	3.20	3.2	65	16			■			
280---.0350	3.50	3.5	70	18			■			
280---.0400	4.00	4.0	75	19	1	125	■	■	■	
280---.0450	4.50	4.5	80	21			■			
280---.0500	5.00	5.0	86	23	1	133	■	■	■	
280---.0550	5.50	5.6	93	26			■			
280---.0560	5.60	5.6					■			
280---.0600	6.00	5.6	93	26	1	138	■	■	■	
280---.0650	6.50	6.3	101	28			■			
280---.0700	7.00	7.1	109	31	1	150	■	■	■	
280---.0800	8.00	8.0	117	33	1	156	■	■	■	■
280---.0900	9.00	9.0	125	36	1	162	■	■	■	■
280---.0920	9.20	9.0	125	36			■			
280---.1000	10.00	10.0	133	38	1	168	■	■	■	■
280---.1020	10.20	10.0					■			
280---.1040	10.40	10.0	133	38			■			
280---.1100	11.00	10.0	142	41	1	175	■	■		
280---.1200	12.00	10.0	151	44	1	182	■	■	■	■
280---.1300	13.00	10.0	151	44	1	182	■	■		



01.1	01.2	01.3	01.4	02.1	02.2	02.3	03	04	05	06	07.1	08	09	10
☺☺	☺☺	☺☺	☺	☺☺	☺☺	☺	☺☺	☺☺	☺☺	☺☺	☺☺	☺☺	☺☺	☺☺

RECOMMENDED CUTTING DATA

	V _c m/min.	Feed code	V _c m/min.	Feed code		V _c m/min.	Feed code	V _c m/min.	Feed code
	Uncoated	Uncoated	TiN Coated	TiN Coated		Uncoated	Uncoated	TiN Coated	TiN Coated
UMC					UMC				
01.1	14	4	18	4	04.1	20	7	26	7
01.2	10	4	14	4	04.2	18	6	22	6
01.3	7	3	9	3	05.1	16	6	20	6
01.4	5	3	7	3	05.2	14	5	18	5
02.1	6	3	6	4	06.1	20	6	26	6
02.2	5	3	8	4	07.1	18	6	25	6
02.3	4	3	6	3	08.1	5	5	6	5
03.1	14	5	16	5	09.1	5	4	7	4
03.2	12	5	14	5	09.2	4	4	5	4
03.3	10	4	12	4	10.1	12	8	14	8
					10.2	8	8	12	8

$$n = \frac{V_c \times 1000}{d_1 \times \pi} \quad V_f = f_n \times n$$

Feed (f_n) mm/revolution

d ₁ mm	Feed code								
	1	2	3	4	5	6	7	8	9
ø 20.00	0.020	0.025	0.032	0.040	0.050	0.063	0.080	0.100	0.125
ø 25.00	0.025	0.032	0.040	0.050	0.063	0.080	0.100	0.125	0.160
ø 31.50	0.032	0.040	0.050	0.063	0.080	0.100	0.125	0.160	0.160
ø 40.00	0.040	0.050	0.063	0.080	0.100	0.125	0.160	0.200	0.200
ø 50.00	0.040	0.050	0.063	0.080	0.100	0.125	0.160	0.200	0.250
ø 63.00	0.050	0.063	0.080	0.100	0.125	0.160	0.200	0.250	0.315
ø 80.00	0.063	0.080	0.100	0.125	0.160	0.200	0.250	0.315	0.315
ø 10.00	0.080	0.100	0.125	0.160	0.200	0.250	0.315	0.400	0.400
ø 12.50	0.080	0.100	0.125	0.160	0.200	0.250	0.315	0.400	0.500
ø 16.00	0.100	0.125	0.160	0.200	0.250	0.315	0.400	0.500	0.630
ø 20.00	0.125	0.160	0.200	0.250	0.315	0.400	0.500	0.630	0.630
ø 25.00	0.160	0.200	0.250	0.315	0.400	0.500	0.630	0.800	0.800
ø 31.50	0.160	0.200	0.250	0.315	0.400	0.500	0.630	0.800	1.000
ø 40.00	0.200	0.250	0.315	0.400	0.500	0.630	0.800	1.000	1.250
ø 50.00	0.250	0.315	0.400	0.500	0.630	0.800	1.000	1.250	1.250
ø 63.00	0.315	0.400	0.500	0.630	0.800	1.000	1.250	1.600	1.600
ø 80.00	0.400	0.500	0.630	0.800	1.000	1.250	1.600	1.600	2.000

HSS-E machine reamer

HSS-E
V3

Tolerance
H7

Uncoated
or
TiN

Standard

λ 7°

Emul./Oil

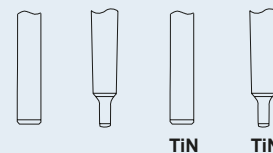
DIN
208/212



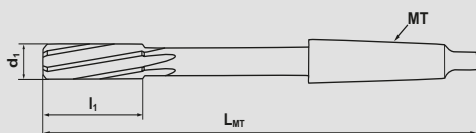
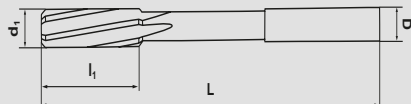
UM Reamers™

280468 280405 280641 280642

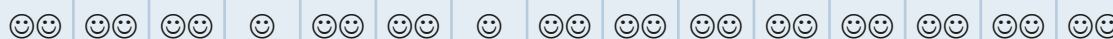
Item no. d_1 (m7) D (h9) L l_1 MT L_{MT}



Item no.	d_1 (m7)	D (h9)	L	l_1	MT	L_{MT}	280468	280405	280641	280642
280---.1400	14.0	12.5	160	47	1	189	▪	▪	▪	▪
280---.1500	15.0	12.5	162	50	2	204	▪	▪	▪	▪
280---.1600	16.0	12.5	170	52	2	210	▪	▪	▪	▪
280---.1700	17.0	14.0	175	54	2	214	▪	▪		▪
280---.1800	18.0	14.0	182	56	2	219	▪	▪	▪	▪
280---.1900	19.0	16.0	189	58	2	223	▪	▪	▪	▪
280---.2000	20.0	16.0	195	60	2	228	▪	▪	▪	▪
280---.2100	21.0			62	2	232		▪		
280---.2200	22.0			64	2	237		▪		
280---.2300	23.0			66	2	241		▪		
280---.2400	24.0			68	3	268		▪		
280---.2500	25.0			68	3	268		▪		
280---.2600	26.0			70	3	273		▪		
280---.2700	27.0			71	3	277		▪		
280---.2800	28.0			71	3	277		▪		
280---.2900	29.0			73	3	281		▪		
280---.3000	30.0			73	3	281		▪		
280---.3100	31.0			75	3	285		▪		
280---.3200	32.0			77	4	317		▪		
280---.3400	34.0			78	4	321		▪		
280---.3500	35.0			78	4	321		▪		
280---.3600	36.0			79	4	325		▪		
280---.3800	38.0			81	4	329		▪		
280---.4000	40.0			81	4	329		▪		
280---.4200	42.0			82	4	333		▪		
280---.4400	44.0			83	4	336		▪		
280---.4500	45.0			83	4	336		▪		
280---.4700	47.0			84	4	340		▪		
280---.4800	48.0			86	4	344		▪		
280---.5000	50.0			86	4	344		▪		



01.1 01.2 01.3 01.4 02.1 02.2 02.3 03 04 05 06 07.1 08 09 10



RECOMMENDED CUTTING DATA

	V _c m/min.	Feed code	V _c m/min.	Feed code		V _c m/min.	Feed code	V _c m/min.	Feed code
	Uncoated	Uncoated	TiN Coated	TiN Coated		Uncoated	Uncoated	TiN Coated	TiN Coated
UMC					UMC				
01.1	14	4	18	4	04.1	20	7	26	7
01.2	10	4	14	4	04.2	18	6	22	6
01.3	7	3	9	3	05.1	16	6	20	6
01.4	5	3	7	3	05.2	14	5	18	5
02.1	6	3	6	4	06.1	20	6	26	6
02.2	5	3	8	4	07.1	18	6	25	6
02.3	4	3	6	3	08.1	5	5	6	5
03.1	14	5	16	5	09.1	5	4	7	4
03.2	12	5	14	5	09.2	4	4	5	4
03.3	10	4	12	4	10.1	12	8	14	8
					10.2	8	8	12	8

$$n = \frac{V_c \times 1000}{d_1 \times \pi}$$

$$V_f = f_n \times n$$

Feed (f_n) mm/revolution

d ₁ mm	Feed code								
	1	2	3	4	5	6	7	8	9
ø 20.00	0.020	0.025	0.032	0.040	0.050	0.063	0.080	0.100	0.125
ø 22.50	0.025	0.032	0.040	0.050	0.063	0.080	0.100	0.125	0.160
ø 31.50	0.032	0.040	0.050	0.063	0.080	0.100	0.125	0.160	0.160
ø 40.00	0.040	0.050	0.063	0.080	0.100	0.125	0.160	0.200	0.200
ø 50.00	0.040	0.050	0.063	0.080	0.100	0.125	0.160	0.200	0.250
ø 63.00	0.050	0.063	0.080	0.100	0.125	0.160	0.200	0.250	0.315
ø 80.00	0.063	0.080	0.100	0.125	0.160	0.200	0.250	0.315	0.315
ø 100.00	0.080	0.100	0.125	0.160	0.200	0.250	0.315	0.400	0.400
ø 125.00	0.080	0.100	0.125	0.160	0.200	0.250	0.315	0.400	0.500
ø 160.00	0.100	0.125	0.160	0.200	0.250	0.315	0.400	0.500	0.630
ø 200.00	0.125	0.160	0.200	0.250	0.315	0.400	0.500	0.630	0.630
ø 250.00	0.160	0.200	0.250	0.315	0.400	0.500	0.630	0.800	0.800
ø 315.00	0.160	0.200	0.250	0.315	0.400	0.500	0.630	0.800	1.000
ø 400.00	0.200	0.250	0.315	0.400	0.500	0.630	0.800	1.000	1.250
ø 500.00	0.250	0.315	0.400	0.500	0.630	0.800	1.000	1.250	1.250
ø 630.00	0.315	0.400	0.500	0.630	0.800	1.000	1.250	1.600	1.600
ø 800.00	0.400	0.500	0.630	0.800	1.000	1.250	1.600	1.600	2.000

Carbide machine reamer

HM
MG

Tolerance
H7

Standard

$\lambda 7^\circ$

Emul./Oil

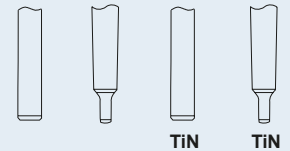
DIN
8093/8094



UM Reamers™

281409 281411

Item no. d_1 (m7) D (h9) L l_1 MT L_{MT}



Item no.	d_1 (m7)	D (h9)	L	l_1	MT	L_{MT}			TiN	TiN
281---.0100	1.00	1.0	34	5.5			▪			
281---.0120	1.20	1.2	38	7.5			▪			
281---.0140	1.40	1.4	40	8			▪			
281---.0150	1.50	1.5	40	8			▪			
281---.0160	1.60	1.6	49	11			▪			
281---.0180	1.80	1.8	49	11			▪			
281---.0200	2.00	2.0	49	11			▪			
281---.0220	2.20	2.2	53	12			▪			
281---.0250	2.50	2.5	57	14			▪			
281---.0280	2.80	2.8	61	15			▪			
281---.0300	3.00	3.0	61	15			▪			
281---.0320	3.20	3.2	65	16			▪			
281---.0350	3.50	3.5	70	18			▪			
281---.0400	4.00	4.0	75	19			▪			
281---.0450	4.50	4.5	80	21			▪			
281---.0500	5.00	5.0	86	23	1	133	▪	▪		
281---.0600	6.00	5.6	93	26	1	138	▪	▪		
281---.0700	7.00	7.1	109	31	1	150	▪	▪		
281---.0800	8.00	8.0	117	33	1	156	▪	▪		
281---.0900	9.00	9.0	125	36	1	162	▪	▪		
281---.1000	10.00	10.0	133	38	1	168	▪	▪		
281---.1100	11.00	10.0	142	41	1	175	▪	▪		
281---.1200	12.00	10.0	151	44	1	182	▪	▪		
281---.1300	13.00	10.0	151	44	1	182	▪	▪		
281---.1400	14.00	12.5	160	47	1	189	▪	▪		
281---.1500	15.00	12.5	162	50	2	204	▪	▪		
281---.1600	16.00	12.5	170	52	2	210	▪	▪		
281---.1700	17.00			54	2	214	▪	▪		

$d_1 \leq 3\text{mm}$ with odd pitch

01	02.1	02.2	02.3	03	04	05	06	07	08	09	10	11			
☺☺	☺☺	☺☺	☺	☺☺	☺☺	☺☺	☺☺	☺☺	☺☺	☺☺	☺☺	☺☺			

RECOMMENDED CUTTING DATA

	V _c m/min.	Feed code	V _c m/min.	Feed code		V _c m/min.	Feed code	V _c m/min.	Feed code
	Uncoated	Uncoated	TiN Coated	TiN Coated		Uncoated	Uncoated	TiN Coated	TiN Coated
UMC					UMC				
01.1	18	6			04.1	30	8		
01.2	14	5			04.2	28	8		
01.3	10	4			05.1	25	7		
01.4	9	4			05.2	22	6		
01.5	8	4			06.1	32	8		
02.1	10	3			07.1	30	8		
02.2	8	3			07.2	20	6		
02.3	6	3			08.1	10	5		
03.1	30	7			09.1	10	5		
03.2	25	7			09.2	8	5		
03.3	18	6			10.1	20	8		
					10.2	25	8		
					11.1	25	8		

$$n = \frac{V_c \times 1000}{d_1 \times \pi}$$

$$V_f = f_n \times n$$

Feed (f_n) mm/revolution

d ₁ mm	Feed code								
	1	2	3	4	5	6	7	8	9
ø 02.00	0.020	0.025	0.032	0.040	0.050	0.063	0.080	0.100	0.125
ø 02.50	0.025	0.032	0.040	0.050	0.063	0.080	0.100	0.125	0.160
ø 03.15	0.032	0.040	0.050	0.063	0.080	0.100	0.125	0.160	0.160
ø 04.00	0.040	0.050	0.063	0.080	0.100	0.125	0.160	0.200	0.200
ø 05.00	0.040	0.050	0.063	0.080	0.100	0.125	0.160	0.200	0.250
ø 06.30	0.050	0.063	0.080	0.100	0.125	0.160	0.200	0.250	0.315
ø 08.00	0.063	0.080	0.100	0.125	0.160	0.200	0.250	0.315	0.315
ø 10.00	0.080	0.100	0.125	0.160	0.200	0.250	0.315	0.400	0.400
ø 12.50	0.080	0.100	0.125	0.160	0.200	0.250	0.315	0.400	0.500
ø 16.00	0.100	0.125	0.160	0.200	0.250	0.315	0.400	0.500	0.630
ø 20.00	0.125	0.160	0.200	0.250	0.315	0.400	0.500	0.630	0.630
ø 25.00	0.160	0.200	0.250	0.315	0.400	0.500	0.630	0.800	0.800
ø 31.50	0.160	0.200	0.250	0.315	0.400	0.500	0.630	0.800	1.000
ø 40.00	0.200	0.250	0.315	0.400	0.500	0.630	0.800	1.000	1.250
ø 50.00	0.250	0.315	0.400	0.500	0.630	0.800	1.000	1.250	1.250
ø 63.00	0.315	0.400	0.500	0.630	0.800	1.000	1.250	1.600	1.600
ø 80.00	0.400	0.500	0.630	0.800	1.000	1.250	1.600	1.600	2.000

Carbide machine reamer

HM
MG

Tolerance
H7

Standard

$\lambda 7^\circ$

Emul./Oil

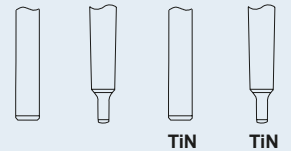
DIN
8093/8094



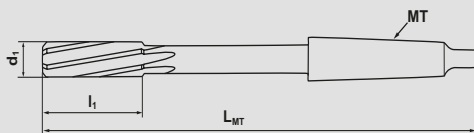
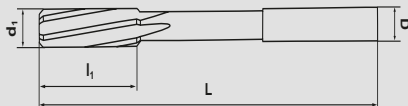
UM Reamers™

281409 281411

Item no. d_1 (m7) D (h9) L I_1 MT L_{MT}



Item no.	d_1 (m7)	D (h9)	L	I_1	MT	L_{MT}			TiN	TiN
281---.1900	19.00		56	2	223		▪			
281---.2000	20.00	16.0	60	5	228		▪	▪		
281---.2200	22.00		64	2	237		▪			
281---.2400	24.00		68	3	268		▪			
281---.2500	25.00		68	3	268		▪			
281---.2600	26.00		70	3	273		▪			
281---.2800	28.00		71	3	277		▪			
281---.3000	30.00		73	3	281		▪			
281---.4000	40.00		81	4	329		▪			



$d_1 \leq 3\text{mm}$ with odd pitch

01

02.1

02.2

02.3

03

04

05

06

07

08

09

10

11



RECOMMENDED CUTTING DATA

	V _c m/min.	Feed code	V _c m/min.	Feed code		V _c m/min.	Feed code	V _c m/min.	Feed code
	Uncoated	Uncoated	TiN Coated	TiN Coated		Uncoated	Uncoated	TiN Coated	TiN Coated
UMC					UMC				
01.1	18	6			04.1	30	8		
01.2	14	5			04.2	28	8		
01.3	10	4			05.1	25	7		
01.4	9	4			05.2	22	6		
01.5	8	4			06.1	32	8		
02.1	10	3			07.1	30	8		
02.2	8	3			07.2	20	6		
02.3	6	3			08.1	10	5		
03.1	30	7			09.1	10	5		
03.2	25	7			09.2	8	5		
03.3	18	6			10.1	20	8		
					10.2	25	8		
					11.1	25	8		

$$n = \frac{V_c \times 1000}{d_1 \times \pi} \qquad V_f = f_n \times n$$

Feed (f_n) mm/revolution

d ₁ mm	Feed code								
	1	2	3	4	5	6	7	8	9
ø 02.00	0.020	0.025	0.032	0.040	0.050	0.063	0.080	0.100	0.125
ø 02.50	0.025	0.032	0.040	0.050	0.063	0.080	0.100	0.125	0.160
ø 03.15	0.032	0.040	0.050	0.063	0.080	0.100	0.125	0.160	0.160
ø 04.00	0.040	0.050	0.063	0.080	0.100	0.125	0.160	0.200	0.200
ø 05.00	0.040	0.050	0.063	0.080	0.100	0.125	0.160	0.200	0.250
ø 06.30	0.050	0.063	0.080	0.100	0.125	0.160	0.200	0.250	0.315
ø 08.00	0.063	0.080	0.100	0.125	0.160	0.200	0.250	0.315	0.315
ø 10.00	0.080	0.100	0.125	0.160	0.200	0.250	0.315	0.400	0.400
ø 12.50	0.080	0.100	0.125	0.160	0.200	0.250	0.315	0.400	0.500
ø 16.00	0.100	0.125	0.160	0.200	0.250	0.315	0.400	0.500	0.630
ø 20.00	0.125	0.160	0.200	0.250	0.315	0.400	0.500	0.630	0.630
ø 25.00	0.160	0.200	0.250	0.315	0.400	0.500	0.630	0.800	0.800
ø 31.50	0.160	0.200	0.250	0.315	0.400	0.500	0.630	0.800	1.000
ø 40.00	0.200	0.250	0.315	0.400	0.500	0.630	0.800	1.000	1.250
ø 50.00	0.250	0.315	0.400	0.500	0.630	0.800	1.000	1.250	1.250
ø 63.00	0.315	0.400	0.500	0.630	0.800	1.000	1.250	1.600	1.600
ø 80.00	0.400	0.500	0.630	0.800	1.000	1.250	1.600	1.600	2.000

Kyocera Unimerco material class (UMC)

List of material classes

UNIMERCO material class (UMC) is a clear grouping of workpiece materials. The list shows the most common standards for each class.

Where relevant, the recommended UMC (material classes) are shown at the bottom of the page. The tool is suited for machining all the materials comprised in the material classes shown. This is indicated by ☺.

If the tool is highly suited, this is indicated by ☺☺.

01.1	01.2	01.3	01.4	02.1	02.2	03.1	03.2	03.3	04.1	04.2	05.1	06.1	10.1	10.2
☺☺	☺☺	☺☺	☺	☺☺	☺	☺☺	☺☺	☺	☺☺	☺	☺☺	☺☺	☺☺	☺

UMC 01.1 - steel

Examples of BS standards

Free-cutting steels	230 M 07	210 M 15	212 M 44	240 M 07
Non-alloy construction steels	4360-43 B	4360-50 B	4360-40 C	4360-SSE
Annealed spring steels	250 A 53	060 A 67	060 A 96	527 A 60
Case-hardening steels < 700 N/mm ²	045 M 10	045 M 10	080 M 15	523 M 15
Non-alloy heat treatable steels < 800 N/mm ²	070 M 26	080 M 46	070 M 26	080 M 40
Alloy heat treatable steels < 800 N/mm ²	120 M 19	640 A 35	530 A 30	530 A 32
Unalloy tool steels	BW 1A	BW 1B		

UMC 01.2 - steel

Examples of BS/DIN standards

Alloy construction steels < 500 N/mm ²	1501-620 Gr. 27	1501-622 Gr. 31;45		
Naturally hard spring steels	250 A 53	060 A 67	060 A 78	527 A 60
Case-hardening steels 700 - 850 N/mm ²	S 107	527 M 17		
Nitriding steels < 1000 N/mm ²	905 M 31	905 M 39		
Non-alloy heat treatable steels 800 - 1000 N/mm ²	070 M 55	080 A 62	080 A 62	
Alloy heat treatable steels < 800 N/mm ²	1717 CDS 110	708 M 40	735 A 50	
Alloy heat treatable steels 800 - 1000 N/mm ²	150 M 36	150 M 36	708 M 40	530 A 32
Low alloy cold work tool steels < 1000 N/mm ²	708 A 37	708 M 40	BO 1	BW 2
Low alloy hot work tool steels 800 - 1000 N/mm ²	40 CMD			
High alloy hot work tool steels, after annealing < 1100 N/mm ²	BH 13	BH 21		
Conventional steel castings	GS-60	GS-Ck 45	GS-42 CrMo 4	

UMC 01.3 - steel

Examples of BS standards

Alloy heat treatable steels 1000 - 1300 N/mm ²	817 M 40	708 M 40	735 A 50	
High alloy cold work tool steels	2260			
Treated hot work tool steels 1100 - 1350 N/mm ²	40 CMD			
High alloy hot work tool steels, after annealing < 1100 N/mm ²	BH 11	BH 21		
Conventional steel castings	Z 120 M 12			

Kyocera Unimerco material class (UMC)

UMC 01.4 - steel

Examples of BS standards

High alloy cold work tool steels	BA 2
Treated hot work tool steels 1100 - 1350 N/mm ²	
Conventional steel castings	Z 120 M 12

UMC 01.5 - steel

Examples of BS standards

Spring hard spring steels	250 A 53	060 A 78	060 A 96	735 A 50
Alloy construction steels 1300 - 1600 N/mm ²	823 M 30		722 M 24	
Treated hot work tool steels 1350 - 1600 N/mm ²	BH 13			

UMC 01.6 - steel

Hardened tool steels < 45 HRC

UMC 01.7 - steel

Hardened tool steels < 55 HRC

UMC 01.8 - steel

Hardened tool steels > 55 HRC

UMC 02.1 - stainless steel

Examples of BS standards

Stainless chromium steels (ferritic/martensitic)	403 S 17	416 S 21	420 S 37	431 S 29
Chromium steel castings (ferritic/martensitic)	420 C 29			

UMC 02.2 - stainless steel

Examples of BS/USA standards

Stainless chromium steels (ferritic/martensitic)	440 A	440 C		
Stainless chromium-nickel steels (austenitic)	304 S 15	304 S 62	316 S 16	316 S 11
Heat resisting steels (nickel-base alloys)	NiCu30Fe	NiCu30Al		
Heat resisting steels (Co-base alloys)	CoCr20W15Ni		CoCr28MoNi	
Chromium steel castings (ferritic/martensitic)	G-X 40 CrSi 17		G-X 3 CrNi 13 4	
Chromium steel castings (austenitic)	G-X 2 CrNi 18 9		G-X 5 CrNi 13 4	

UMC 02.3 - stainless steel

Examples of BS/AFOR standards

Treated aerospace material 280 - 450 HB	431 S 29			
Heat resisting steels	321 S 12	NA 17	430 S 15	
Heat resisting steels (nickel-base alloys)	Inconel	Hastelloy	Nimonic	Waspaloy
Chromium steel castings (ferritic/martensitic)				

Kyocera Unimerco material class (UMC)

UMC 03.1 - cast iron

Examples of BS standards

Non-alloy grey cast iron < 180 HB	Grade 150	Grade 220
Non-alloy nodular graphite cast iron < 180 HB	SNG 420/12	SNG 370/17

UMC 03.2 - cast iron

Examples of BS standards

Non-alloy grey cast iron (with lamellar graphite) > 180 HB	Grade 260	Grade 300	Grade 350	Grade 400
Alloy grey cast iron (with lamellar graphite)	L-NiMn 13 7	L-NiCr 20 2		
Non-alloy nodular graphite cast iron > 180 HB	SNG 500/7	SNG 600/3	SNG 700/2	
Alloy nodular graphite cast iron	S-NiCr 20 2	S-niCr 30 1		

UMC 03.3 - cast iron

Examples of BS standards

High alloy grey cast iron (with lamellar graphite)	Grade 2 A	Grade 3 D
--	-----------	-----------

UMC 04.1 - aluminium

Examples of DIN standards

Non-alloy aluminium 20 - 50 HB	Al99	Al99.5	Al99.8	Al99.9
Non-hardened wrought alloys 30 - 80 HB	AlMnCu	AlMn1Mg0.5	AlMg1	AlMg3
Hardened wrought alloys 75 - 150 HB	AlMgSi 1	AlCuMg2	AlZnMgCu0.5	
Cast material < 6% Si	G-AlCu4Ti	G-AlMg5Si	G-AlMg3	
Aluminium magnesium	MgMn2	MgAl8Zn	G-MgZn5Th2Zr1	

UMC 04.2 - aluminium

Examples of DIN standards

Cast material 6 - 12% Si	G-AlSi9Mg	G-AlSi12	G-AlSi10Mg (Cu)
Cast material > 12% Si	G-AlSi18		
Magnesium alloys (cast material)	GD-MgAl4sI1		GD-MgAl6Zn1

UMC 05.1 - copper

Examples of DIN standards

Non-alloy copper	E-Cu57	SE-Cu	SW-Cu	SF-Cu
Non-hardened wrought alloys	CuZn20	CuPb 1P	CuFe 2p	CuMn5

UMC 05.2 - copper

Examples of DIN standards

Hardened wrought alloys	CuNi2Si	CuBe1.7	CuCrZr	CuZr
CuNi alloys	CuNi25	CuNi9Sn2	CuNi30FeMn2	
CuNi alloys, short chips	CuNi12Zn24		CuNi12Zn30Pb1	

UMC 06.1 - brass

Examples of DIN standards

CuZn (brass), long chips	CuZn20	CuZn30	CuZn36	CuZn40
CuZn (brass), short chips	CuZn39Pb2		CuZn38Sn1	

Kyocera Unimerco material class (UMC)

UMC 07.1 - bronze

CuSn (bronze), long chips

Examples of DIN standards

CuSn4 CuSn8 CuSn6ZnNi

UMC 07.2 - bronze

CuAlFe (Ampco), long chips

Examples of DIN standards

CuAl8 CuAl8Fe3 CuAl11Fe4

UMC 08.1 - nickel

Non-alloy nickel

Examples of DIN standards

Ni99CSi Ni99.6 Ni99.4Fe NiAlBz

UMC 09.1 - titanium

Non-alloy titanium 110 - 270 HB

Examples of BS standards

TA 7 TA 6 TA 9

UMC 09.2 - titanium

Alloy titanium 300 - 340 HB

Examples of BS/DIN standards

TA 14 / 17 Ti6Al6V2Sn Ti7Al4Mo

UMC 09.3 - titanium

Hardened alloys 340 - 450 HB

Examples of BS standards

TA 40 TA 48 TA 28

UMC 10.1 - plastics

Thermoplastics
(PE, PP, PVC, PS, PMMA, PTFE, PA, PC, PI)

Examples of BS standards

Eraclene Viplast Sinvet Lacrilex

UMC 10.2 - plastics

Duroplastics
(PF, MF, UF, PUR, SI, PI, UP, EP)

Examples of BS standards

Formolo Melochem Puriplast Conapoxy

UMC 11.1 - plastics

Fibre reinforced plastics

Examples of DIN standards

Kevlar

UMC 12.1 - graphite

Graphite

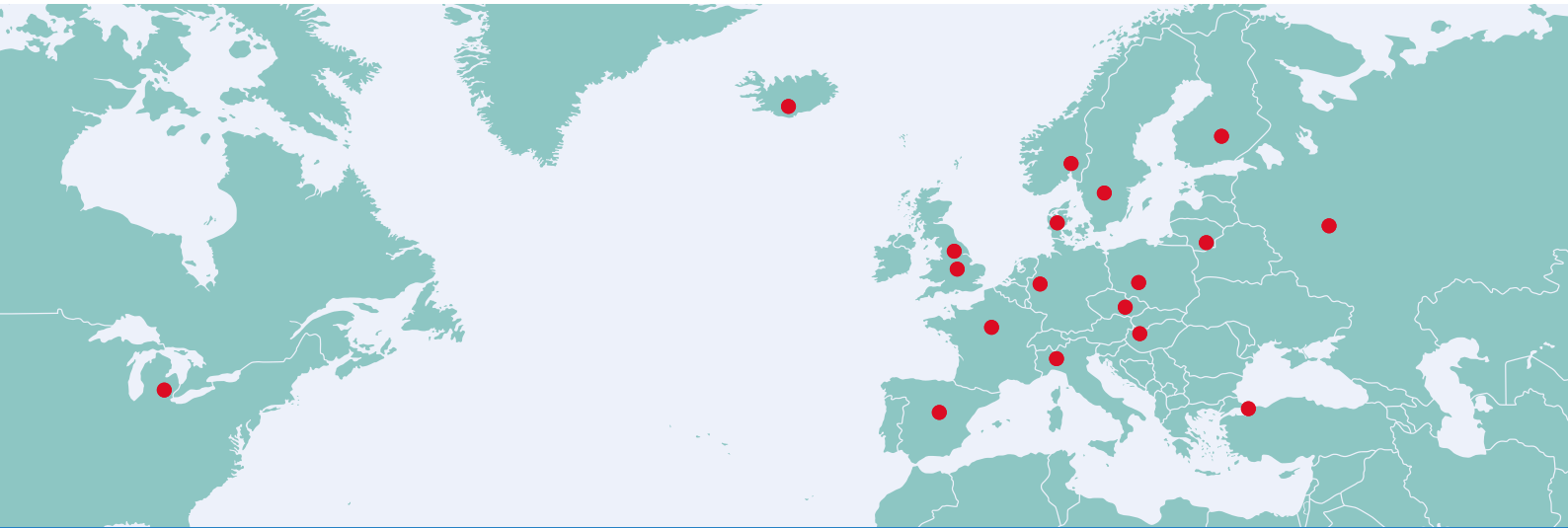
Industrial tooling solutions

Kyocera Unimerco is a global manufacturer and distributor, providing standard and customized cutting tool solutions as well as know-how and optimization guidance for the manufacturing industry.

The company was founded in 1964 and has since expanded into 17 countries, with more than 700 employees.

Today the company is part of the Japan-based Kyocera Corporation.

In 1998 the Sheffield branch was established. It is specialised in supplying the industrial market with inserts, standard tools and related tooling solutions.



www.kyocera-unimerco.co.uk

101 Attercliffe Road | UK-Sheffield S4 7WW | Tel. 01142 788787 | uksales@kyocera-unimerco.com