

ITEM PAGE STRUCTURE

Product Name 1

Item Code 2

Working Material 3

Icons 4

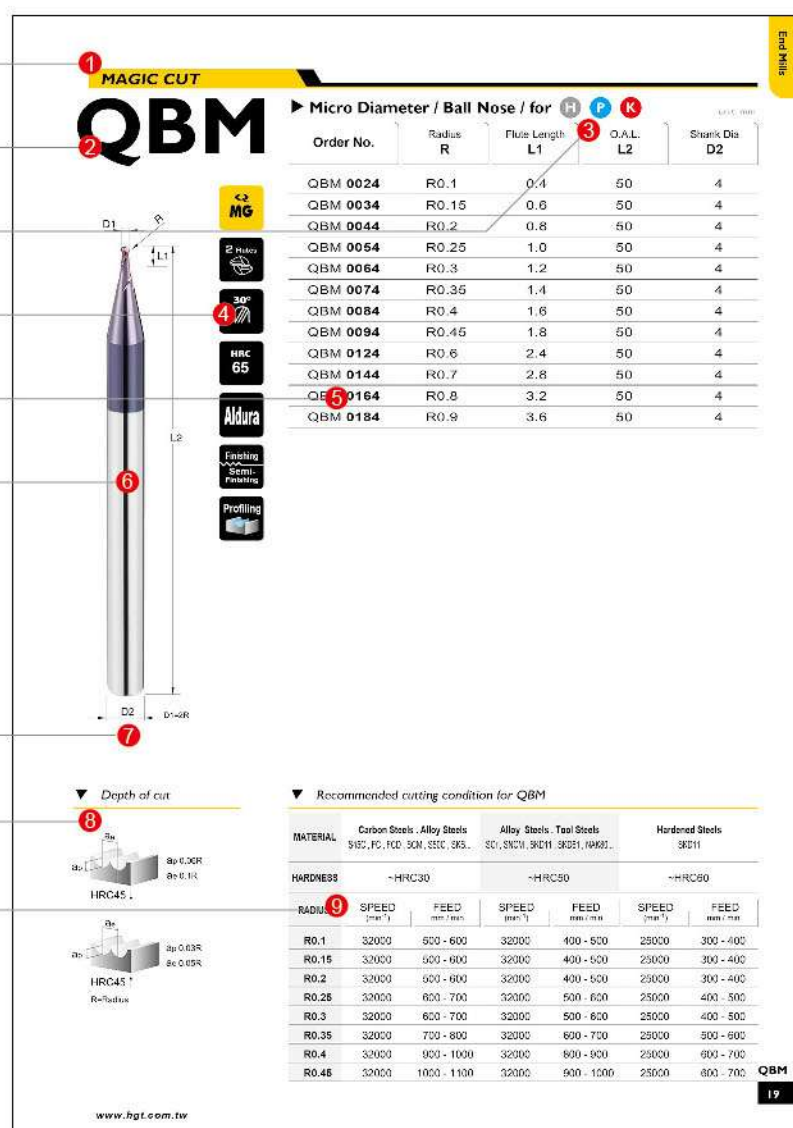
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Depth of cut **8**

Recommended cutting condition **9**



THE SYSTEM CODE INTRODUCES

V	V70	Hardened Steels HRC70 series	14
Q	MAGIC CUT	Magic cutting series	18
S	SUPER MILL	HSC & HHC series	45
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G	G.pro	Graphite cutting series	138
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V

V70

p. 14



V70B NEW

p. 15

3~12

i-plus

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Q

MAGIC CUT

p. 18



QBM

p. 19

0.2~1.8

Aldura

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QB

p. 20

1~16

ALTIN

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QBG

p. 21

4~12

Aldura

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QBN

p. 22

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nAcoB

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QBX

p. 23

1~16

i8

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QBHN

p. 24

1~12

nAcoB

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QBHX

p. 25

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QBLS/M/L

p. 26

2~20

ALTIN

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QBLSX/MX/LX

p. 27

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i8

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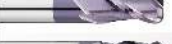

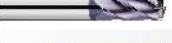















QBP

p. 28

1~12


































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	Page	Mill Dia.	Coating	HRC 45-55	HRC 55-60	HRC 60-65	Hardened Steels HRC 65-70	Cast Iron	Titanium Alloy	Stainless Steels	Aluminum Alloy	Copper Alloy	Graphite	Superalloy, Heat-resistant Steels
 BA	p. 88	1~20	TiaLN	☉				○				○		
 BB	p. 89	1~12	TiaLN	☉				○				○		
 BLS/M/L	p. 90	1~20	TiaLN	☉				○				○		
 EM	p. 91	0.4~1.8	TiaLN	☉				○				○		
 ES	p. 92	1~4	TiaLN	☉				○				○		
 EA	p. 93	1~20	TiaLN	☉				○				○		
 EB	p. 94	1~20	TiaLN	☉				○				○		
 EC/EP	p. 95	3~20	TiaLN	☉				○				○		
 ED	p. 96	3~16	TiaLN	☉				○	○	○		○		
 ELA	p. 97	6~12	TiaLN	☉				○				○		
 ELB	p. 98	3~16	TiaLN	☉				○				○		
 ELC	p. 99	2~12	TiaLN	☉				○				○		
 ELD	p. 100	2~20	TiaLN	☉				○				○		
 EH	p. 101	6~20	TiaLN	☉				○				○		
 EHL	p. 102	6~20	TiaLN	☉				○				○		
 EG	p. 103	6~20	TiaLN	☉				○				○		
 EGA	p. 104	6~20	TiaLN	☉				○				○		
 ETL	p. 105	1~4	TiaLN	☉				○				○		
 ET	p. 106	0.5~10	TiaLN	☉				○				○		
 ERA	p. 108	3~12	TiaLN	☉				○				○		
 ERB	p. 109	3~12	TiaLN	☉				○				○		
 ERC	p. 110	6~12	TiaLN	☉				○				○		
 BF	p. 111	1~4	TiaLN	☉				○				○		
 EFA	p. 112	1~3	TiaLN	☉				○				○		
I.pro														
 SBBI	p. 114	3~12	G300	○					☉	☉				☉
 SEI	p. 115	3~20	G300	○					☉	☉				☉
 SEPS	p. 116	3~20	HELICA	○					☉	☉				☉
 SEPI	p. 117	3~20	G300	○					☉	☉				☉
 SIB	p. 118	3~20	G300	○					☉	☉				☉
 SHAI	p. 119	6~16	G300	○					☉	☉				☉
 SEGI	p. 120	6~20	G300	○					☉	☉				☉
 SRIP	p. 121	3~12	G300	○					☉	☉				☉
 SIW	p. 122	3~20	G-plus	○					☉	☉				☉
 SIRW	p. 123	3~12	G-plus	○					☉	☉				☉
D MILL														
 DB	p. 125	1~12									☉			

I

D

CONTENTS

	Page	Mill Dia.	Coating	HRC 45-55	HRC 55-60	HRC 60-65	Hardened Steels HRC 65-70	Cast Iron	Titanium Alloy	Stainless Steels	Aluminum Alloy	Copper Alloy	Graphite	Superalloy, Heat-resistant Steels
 DEA	p. 126	1~16									☉			
 DEB	p. 127	1~16									☉			
 DEC	p. 128	2~20									☉			
 DED	p. 129	2~20									☉			
 DEDP	p. 130	2~20	DLC								☉			
 DEL	p. 131	2~20									☉			
 DEPW	p. 132	3~20									☉			
 DEG	p. 133	6~16									☉			
 DFR	p. 134	6~20									☉			
 DRC	p. 135	3~16									☉			
 DBX	p. 136	1~12	CRN								☉	☉		
 DEDX	p. 137	2~20	CRN								☉	☉		
G.pro														
 SGBB	p. 139	4~12	Diamond										☉	
 SGBF	p. 140	4~12	Diamond										☉	
 SGEB	p. 141	4~12	Diamond										☉	
 SGRD	p. 142	4~12	Diamond										☉	
 SGRB	p. 143	4~12	Diamond										☉	
 SGBS	p. 144	1.0~4.0	Diamond										☉	
 SGES	p. 145	1.0~4.0	Diamond										☉	
 SGRS	p. 146	1.0~4.0	Diamond										☉	
DEN.pro														
 TOBF	p. 148	0.6~3.0	Diamond											
 TTBF	p. 149	0.8~3.0	G300											
 TTFA	p. 150	0.5~2.5	G300											
 TTRA	p. 151	1.0~2.5	G300											
 TTRB	p. 151	2.0~4.0	G300											
 TCBF	p. 152	0.8~3.0	Diamond											
 TWBF	p. 153	0.8~3.0												
COM.pro														
 CFPA	p. 155	6~12	Diamond											
 CFRA	p. 156	6~12	Diamond											
MAGIC SHANK														
 EX2CS	p. 158	10~20												
 EX2SB	p. 158	10~20	i8	☉	☉				○			○		
 EX2SRD	p. 159	10~20	i8	☉	☉				○			○		
 EX2SEB	p. 159	10~20	i8	☉	☉				○			○		
















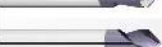


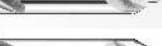








G

DT

COM

EX

CONTENTS

		Page	Mill Dia.	Coating	HRC 45-55	HRC 55-60	HRC 60-65	Hardened Steels HRC 65-70	Cast Iron	Titanium Alloy	Stainless Steels	Aluminum Alloy	Copper Alloy	Graphite	Superalloy. Heat-resistant Steels
	 EX2DPW NEW	p. 160	10~20									◎			
	 EX2SIW NEW	p. 160	10~20	G-plus						◎	◎				◎
T	T.pro	p. 162													
	 EMT	p. 163	P0.5-P2.5	G100	◎				○	○	○	○	○	○	○
	 EMTW	p. 164	P0.5-P2.5	G100	◎				○	○	○	○	○	○	○
	 EMTH	p. 165	P0.7-P2.5	G100	◎				○	○	○	○	○	○	○
	 EMTS	p. 166	P0.5-P1.25	i8	◎				○	○	○	○	○	○	○
	 EMTF	p. 167	P0.5-P1.75	G100	◎				○	○	○	○	○	○	○
C	C.pro	p. 168													
	 ECM	p. 169	4~12	TiAlN	◎				○	○	○	○	○	○	○
	 ECMP NEW	p. 170	4~12	i8	◎				○	○	○	○	○	○	○
	 ECMV NEW	p. 171	4~12	i8	◎				○	○	○	○	○	○	○
	 ECR/EMCR	p. 172	1~12		◎				○	○	○	○	○	○	○
CD	CD	p. 173													
	 ESD	p. 174	3~20		◎				◎	○	○	○	◎	○	○
	 ESD2	p. 174	3~20		◎				◎	○	○	○	◎	○	○
	 ESDC	p. 175	3~20	TiAlN	◎				◎	○	○	○	◎	○	○
	 ESDA	p. 175	3~20	TiAlN	◎				◎	○	○	○	◎	○	○
	 ESDS	p. 176	6~20	TiAlN	◎				◎	○	○	○	◎	○	○
	 ESDL	p. 176	6~20	TiAlN	◎				◎	○	○	○	◎	○	○
	 CCD	p. 177	0.5~5		◎				◎	○	○	○	◎	○	○
	 CCDA	p. 177	0.5~5		◎				◎	○	○	○	◎	○	○
	 CD	p. 178	2~13	TiAlN	◎				◎				◎		
	 CDA	p. 179	3~20	TiAlN	◎				◎				◎		
	 CDB	p. 180	3~20	TiAlN	◎				◎				◎		
	 CDC	p. 181	3~12	TiAlN	◎				◎				◎		
	 CDAC	p. 182	3~20	i8	◎				◎				◎		
	 CDBC	p. 183	3~20	i8	◎				◎				◎		
	 CDCC	p. 184	3~10	i8	◎				◎				◎		
CR	CR	p. 185													
	 CRA	p. 186	2~12		◎				◎				◎		

TOLERANCE

Square End Mills (mm)

Flute Dia.	Dia. Tolerance
1.0	0~-0.015
1.5	0~-0.015
2.0	0~-0.015
2.5	0~-0.015
3.0	0~-0.015
4.0	0~-0.015
5.0	0~-0.015
6.0	0~-0.015
8.0	0~-0.020
10.0	0~-0.020
12.0	0~-0.020
16.0	0~-0.020
20.0	0~-0.020

Ball Nose End Mills (mm)

Flute Dia.	R Tolerance
R0.5	±0.01
R1	±0.01
R1.5	±0.01
R2	±0.01
R2.5	±0.01
R3	±0.01
R4	±0.01
R5	±0.01
R6	±0.01
R8	±0.02
R10	±0.02

Corner Radius End Mills (mm)

Flute Dia.	R Tolerance
1.0	±0.01
2.0	±0.01
3.0	±0.01
4.0	±0.01
6.0	±0.01
8.0	±0.01
10.0	±0.01
12.0	±0.01
16.0	±0.015

Shank (mm)

Shank Dia. (h6)	Shank Tolerance
ø 3	0~-0.008
ø 4	0~-0.008
ø 6	0~-0.008
ø 8	0~-0.009
ø 10	0~-0.009
ø 12	0~-0.011
ø 16	0~-0.011
ø 20	0~-0.013

Recommended Cutting Instructions

1. In order to enhance processing efficiency and extend life of cutters, please use the balanced chucks with high rigidity and high accuracy.
2. Make overhang enough for processing. If it's necessary to extend the milling cutter, please be sure to reduce spindle speed and feed speed.
3. If there's abnormal sound or vibration during processing, please adjust cutting data to prevent cutters from being influenced or broken.
4. Please choose correct cutting oil to maximize efficiency.
5. The result of cutting data depends on working materials, machines, work clips, programming and etc. Cutting data are for reference. You may increase cutting data starting from 50%.

ICONS

Flutes	
Helix Angle (0°, 5°, 7°, 25°, 30°, 35°, 45°, 55°, 40°/43°)	
Work Material Hardness (40, 55, 60, 65, 70)	
Coating	
Roughing Pitch	
Corner Radius (0.1, 0.2, 0.3, 0.5, 1, 1.5, 2)	
Tip Angle (60°, 90°, 120°)	
Applications	
Statistics For Drills	
	Drills Type Drills Type Drills Type DIN Code DIN Code Shank Diameter Tolerance Cutting Flute Tolerance Helix Angle Tip Angle

DEPTH OF CUT

SIDE MILLING	SLOTTING	RADIUS	PROFILING
<p>HRC45 ↓</p> <p>D1 6mm ↓ ap=1.5D ae=0.02D D1 6mm ↑ ap=1.5D ae=0.05D</p>	<p>HRC45 ↓</p> <p>ap 0.2D ae=D1</p>	<p>HRC45 ↓</p> <p>ap 0.04R ae 0.06R</p>	<p>HRC45 ↓</p> <p>ap 0.02R ae 0.02R</p>

SOLID CARBIDE

QMG	SMG	MG
ISO-Classification	ISO-Classification	ISO-Classification
K10-K30	K40-K50	K40-K50
Diameter (mm)	Diameter (mm)	Diameter (mm)
1.2-32.2	1.2-42.2	1.2-42.2
Co (%)	Co (%)	Co (%)
9.0	12.0	10.0
W/C+cr ₃ c ₂ +vc (%)	W/C+cr ₃ c ₂ +vc (%)	W/C+cr ₃ c ₂ +vc (%)
91.0	88.0	90.0
Density (g/cm ³)	Density (g/cm ³)	Density (g/cm ³)
14.40	14.05	14.5
HV ₃₀ (kg/mm ²)	HV ₃₀ (kg/mm ²)	HV ₃₀ (kg/mm ²)
1920	1680	1610
HRA (ISO3738)	HRA (ISO3738)	HRA (ISO3738)
93.9	92.5	92.3
K _{IC} (MNm ^{-3/2})	K _{IC} (MNm ^{-3/2})	K _{IC} (MNm ^{-3/2})
9.3	10.0	10.5
TRS (N/mm ²)	TRS (N/mm ²)	TRS (N/mm ²)
> 4000	> 4000	> 4000
A	A	A
02	02	02
Porosity	Porosity	Porosity
B	B	B
00	00	00
C	C	C
00	00	00
WC-grain size (μm)	WC-grain size (μm)	WC-grain size (μm)
0.2-0.5	0.5	0.6
Co %	Co %	Co %
9	12	10
WC incl. Doping (%)	WC incl. Doping (%)	WC incl. Doping (%)
89.83	88	90
Tungsten Carbide α	Tungsten Carbide α	Tungsten Carbide α
ø0.2μm	ø0.4μm	ø0.6μm

WORK MATERIAL

ISO	H	P	K	M	S	N
MATERIAL	Hardened steel	Low alloy steel	Cast iron	Stainless steel	High temp. alloys	Aluminum alloy
		High alloy steel, cast steel, tool steel			Titanium and Ti alloys	Copper alloys
						Non-metallic

HARD COATING PROPERTIES

Coating Type	Symbol Color	Nanohardness(GPa)	Thickness (μm)	Friction Coefficient	Max usage Temp(°C)	Coating Temp(°C)
TIALN	BLACK	30	1 - 4	0.4	800	450 ↑
AlTiN	BLACK	38	1 - 4	0.6	900	450 ↑
nACoB	BLUE	45	1 - 4	0.45	1200	400 ↑
HELICA	COPPER	30	1 - 4	0.25	1000	480 ↑
CrN	METAL-SILVER	18	1 - 7	0.4	700	200 - 400
DLC	BLACK	20	1 - 3	0.15	400	150 - 250
G100	BURGUNDY-VIOLET	33	1 - 4	0.3	500	
G300	SOFT GOLD	35	1 - 4	0.4	800	
i8	GOLD-BRASS	47	1 - 4	0.45	900	
Aldura	BLACK	32	1 - 4	0.35	1100	
G-plus	WHITE GOLD		1 - 4	0.25	550	
i-plus	COPPER		1 - 3	0.3	1200	



COATING APPLICATIONS

Coating Type	Symbol Color	Introduce coating on different materials
TIALN	BLACK	General steel for wet cutting (HRC35-45)
AlTiN	BLACK	High Hard steel for Dry cutting (HRC45-65)
nACoB	BLUE	High Hard steel for Dry cutting (HRC55-65)
HELICA	COPPER	General steel, Cast iron, with special flute design and work on Stainless steel(EX: SEPS)
CrN	METAL-SILVER	Copper Alloy
DLC	BLACK	Aluminum Alloy
G100	BURGUNDY-VIOLET	General steel for wet cutting (HRC35-45)
G300	SOFT GOLD	Tough material, ex: Titanium Alloy, Nickel Alloy, Stainless steel and Heat-resistant alloy
i8	GOLD-BRASS	High Hard steel for Dry and wet cutting(HRC55-65)
Aldura	BLACK	High Hard steel for Dry cutting (HRC55-65)
Diamond	BLACK GRAY	Graphite, Zirconium Oxide
G-plus	WHITE GOLD	Tough material, ex: Titanium Alloy, Nickel Alloy, Stainless steel and Heat-resistant alloy
i-plus	COPPER	High Hard steel for Dry and wet cutting(HRC70)

