
DC

DIAMOND COATED END MILL SERIES
FOR HARD BRITTLE MATERIALS



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LONG RELIABLE TOOL LIFE FOR STABLE MACHINING



IDEAL EDGE GEOMETRY - COMBINING SHARPNESS AND HIGH EDGE STRENGTH

Straight flute rake angle has improved sharpness. As a result chips are discharged upwards and outwards, restricting sudden damage near the centre.

NEWLY DEVELOPED DIAMOND COATING

Uniquely developed coating. New technologies improves both adhesion and structure. The significant increase in wear resistance achieved provides long and reliable tool life when machining hard, brittle materials such as carbide and aluminum.



Direction of chip discharge

DC2SB

DC ball end mill for carbide and other hard brittle materials milling.



DC2XLB

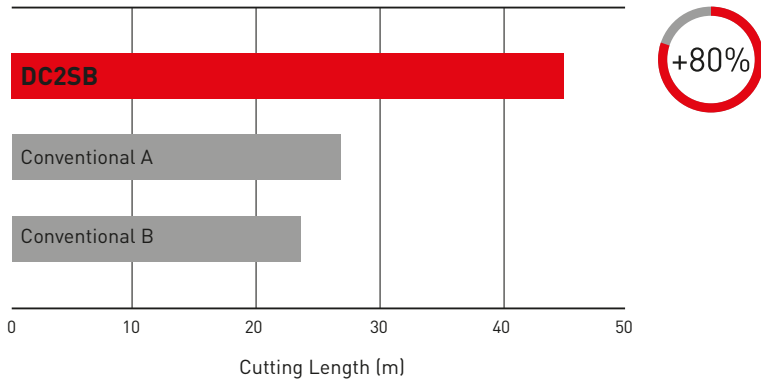
DC long neck ball end mill for carbide and other hard brittle materials milling.



APPLICATION EXAMPLES

Double tool life compared with conventional products

Material	Ultra micro-particle carbide / HRA91.0
Tool	DC2SBR0100
n (min^{-1})	30.000
V_c (m/min)	82
f (mm/min)	300
f_z (mm/t.)	0.005
a_p (mm)	0.1
a_e (mm)	0.3
Cutting Mode	Dry
Machine	HSK-E25



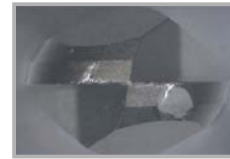
Cutting edge wear

DC2SB



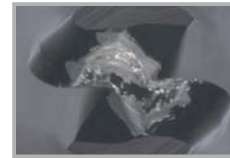
After 26 m machining

Conventional A



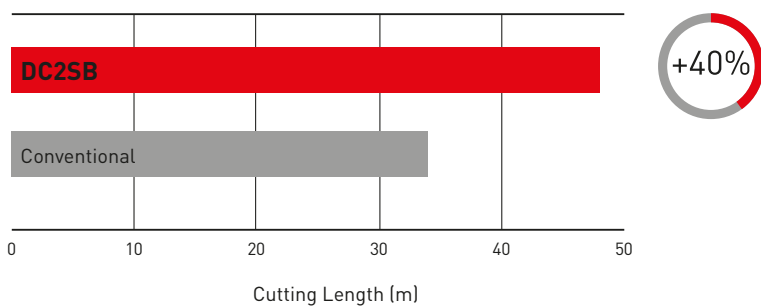
After 26 m machining

Conventional B



After 23 m machining

Material	Ultra micro-particle carbide / HRA91.0
Tool	DC2SBR0300
n (min^{-1})	20.000
V_c (m/min)	135
f (mm/min)	200
f_z (mm/t.)	0.005
a_p (mm)	0.2
a_e (mm)	0.4
Cutting Mode	Dry
Machine	MC (RS20)



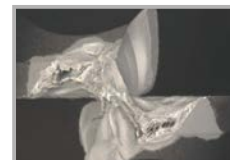
Cutting edge wear

DC2SB



After 40 m machining

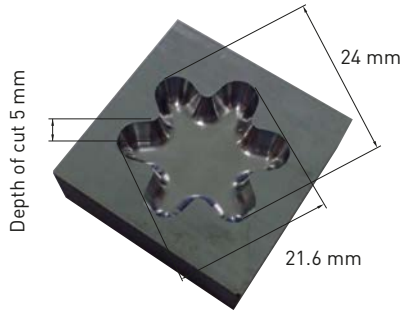
Conventional



After 34 m machining

CASE STUDY

CARBIDE MOULD



Model size	24 × 21.6 × 5 mm
Material	CIS VM-20 (92 HRA)
Tool	DC2SB
Cutting mode	Air blow
Machine	MC (RS20)

Cutting time : 219 min

Tools used : 4

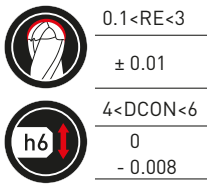
Process	Size	n	Vf	ap	ae	Finishing allowance	Cutting time h : m : s	Number of tools
Rough cutting	R2	24.000	240	0.2	0.4	0.1	2 : 12 : 24	2
Medium cutting	R1	30.000	300	0.1	0.3	0.05	0 : 49 : 20	1
Finish cutting	R1	30.000	300	0.1	0.1	0	0 : 37 : 30	1

DC2SB



BALL NOSE, SHORT CUT LENGTH, 2 FLUTE, FOR HARD BRITTLE MATERIALS

X



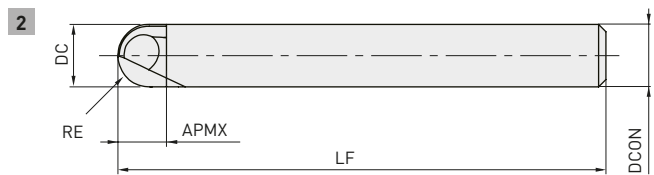
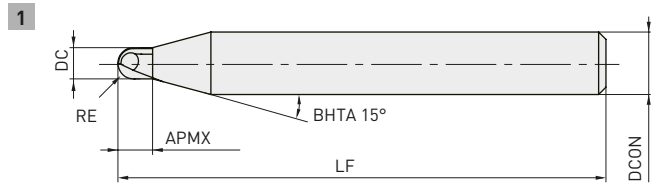
$0.1 < RE < 3$

± 0.01

$4 < DCON < 6$

0

- 0.008



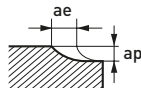
- DC ball nose end mill for carbide and other hard brittle materials.

Order number	Stock	DC	RE	APMX	LF	DCON	ZEFP	Type
DC2SBR0010	●	0.2	0.1	0.12	50	4	2	1
DC2SBR0020	●	0.4	0.2	0.24	50	4	2	1
DC2SBR0030	●	0.6	0.3	0.42	50	4	2	1
DC2SBR0040	●	0.8	0.4	0.56	50	4	2	1
DC2SBR0050	●	1	0.5	0.7	50	4	2	1
DC2SBR0075	●	1.5	0.75	1	50	4	2	1
DC2SBR0100	●	2	1	1.4	50	4	2	1
DC2SBR0150	●	3	1.5	2.1	60	6	2	1
DC2SBR0200	●	4	2	2.8	60	6	2	1
DC2SBR0250	●	5	2.5	3.5	60	6	2	1
DC2SBR0300	●	6	3	4.2	60	6	2	2



RECOMMENDED CUTTING CONDITIONS

Material	DC	RE	n	Vf	ap	ae
Carbide	0.2	0.1	30.000	100	0.01	0.01
	0.4	0.2	30.000	150	0.02	0.08
	0.6	0.3	30.000	200	0.03	0.14
	0.8	0.4	30.000	250	0.04	0.19
	1	0.5	30.000	300	0.05	0.25
	1.5	0.75	30.000	300	0.075	0.275
	2	1	30.000	300	0.1	0.3
	3	1.5	27.500	275	0.125	0.33
	4	2	24.000	240	0.15	0.35
	5	2.5	22.000	220	0.175	0.37
Alumina-Zirconia	0.2	0.1	30.000	100	0.01	0.01
	0.4	0.2	30.000	150	0.02	0.08
	0.6	0.3	30.000	200	0.03	0.14
	0.8	0.4	30.000	250	0.04	0.19
	1	0.5	30.000	300	0.05	0.25
	1.5	0.75	30.000	300	0.075	0.275
	2	1	30.000	300	0.1	0.3
	3	1.5	27.500	275	0.125	0.33
	4	2	24.000	240	0.15	0.35
	5	2.5	22.000	220	0.175	0.37
Silicon carbide Silicon nitride	0.2	0.1	30.000	50	0.005	0.005
	0.4	0.2	30.000	75	0.01	0.04
	0.6	0.3	30.000	100	0.015	0.07
	0.8	0.4	30.000	125	0.02	0.095
	1	0.5	30.000	150	0.025	0.125
	1.5	0.75	30.000	150	0.038	0.138
	2	1	30.000	150	0.05	0.15
	3	1.5	27.500	138	0.063	0.165
	4	2	24.000	120	0.075	0.175
	5	2.5	22.000	110	0.088	0.185
Quartz glass	0.2	0.1	30.000	150	0.015	0.015
	0.4	0.2	30.000	225	0.03	0.12
	0.6	0.3	30.000	300	0.045	0.21
	0.8	0.4	30.000	375	0.06	0.285
	1	0.5	30.000	450	0.075	0.375
	1.5	0.75	30.000	450	0.113	0.413
	2	1	30.000	450	0.15	0.45
	3	1.5	27.500	413	0.188	0.495
	4	2	24.000	360	0.225	0.525
	5	2.5	22.000	330	0.263	0.555
	6	3	20.000	300	0.3	0.6



1. The carbide material in the cutting conditions table above is based on CIS standard VM-40(90HRA).
2. Air blow or dry processing is recommended for milling carbide material. Note: Using coolant or oil mist may decrease tool longevity.
3. The use of a water soluble cutting oil is recommended with the processing of hard brittle materials other than the carbide mentioned in the above table. Be sure to remove any chip discharge that adheres to the tool.
4. Cutting conditions may need adjusting depending on the type of material.
5. If the rigidity of the machine or work clamping is low, or chattering or noise is generated, reduce the feed and speed proportionately.
6. Implementation of special countermeasures is recommended since fine chip discharge may penetrate the machine tool mechanism.

DC2XLB

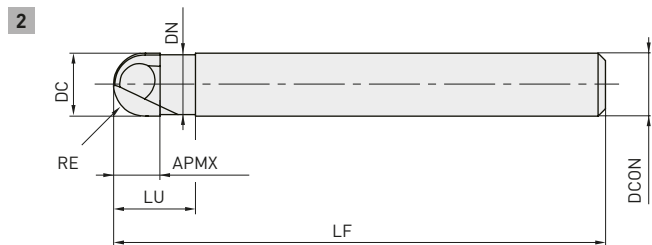
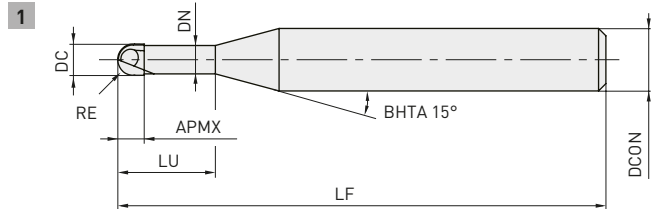


**BALL NOSE, SHORT CUT LENGTH, 2 FLUTE,
LONG NECK, FOR HARD BRITTLE MATERIALS**

X



	$0.1 < RE < 3$
	± 0.01
	$4 < DCON < 6$
	0 $- 0.008$



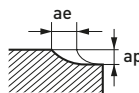
- DC long neck ball nose end mill for carbide and other hard brittle materials.

Order number	Stock	DC	RE	APMX	LF	LU	DN	DCON	ZEFP	Type
DC2XLB0010N005	★	0.2	0.1	0.12	50	0.5	0.18	4	2	1
DC2XLB0020N010	●	0.4	0.2	0.24	50	1	0.36	4	2	1
DC2XLB0030N015	★	0.6	0.3	0.36	50	1.5	0.56	4	2	1
DC2XLB0040N020	★	0.8	0.4	0.48	50	2	0.76	4	2	1
DC2XLB0050N025	●	1	0.5	0.6	50	2.5	0.96	4	2	1
DC2XLB0050N050	★	1	0.5	0.6	50	5	0.96	4	2	1
DC2XLB0075N038	★	1.5	0.75	0.9	50	3.8	1.44	4	2	1
DC2XLB0100N060	●	2	1	1.2	50	6	1.94	4	2	1
DC2XLB0100N100	★	2	1	1.2	50	10	1.94	4	2	1
DC2XLB0150N080	★	3	1.5	1.8	60	8	2.9	6	2	1
DC2XLB0200N100	★	4	2	2.4	60	10	3.9	6	2	1
DC2XLB0250N100	★	5	2.5	3	60	10	4.9	6	2	1
DC2XLB0300N100	★	6	3	3.6	60	10	5.85	6	2	2



RECOMMENDED CUTTING CONDITIONS

Material	DC	RE	LU	n	Vf	ap	ae
Carbide	0.2	0.1	0.5	30.000	30	0.005	0.01
	0.4	0.2	1	30.000	100	0.015	0.08
	0.6	0.3	1.5	30.000	200	0.03	0.14
	0.8	0.4	2	30.000	250	0.04	0.19
	1	0.5	2.5	30.000	300	0.05	0.25
	1	0.5	5	30.000	300	0.05	0.25
	1.5	0.75	3.8	30.000	300	0.075	0.275
	2	1	6	30.000	300	0.1	0.3
	2	1	10	30.000	300	0.1	0.3
	3	1.5	8	27.500	275	0.125	0.33
	4	2	10	24.000	240	0.15	0.35
	5	2.5	10	22.000	220	0.175	0.37
	6	3	10	20.000	200	0.2	0.4
	Alumina-Zirconia	0.2	0.1	0.5	30.000	30	0.005
0.4		0.2	1	30.000	100	0.015	0.08
0.6		0.3	1.5	30.000	200	0.03	0.14
0.8		0.4	2	30.000	250	0.04	0.19
1		0.5	2.5	30.000	300	0.05	0.25
1		0.5	5	30.000	300	0.05	0.25
1.5		0.75	3.8	30.000	300	0.075	0.275
2		1	6	30.000	300	0.1	0.3
2		1	10	30.000	300	0.1	0.3
3		1.5	8	27.500	275	0.125	0.33
4		2	10	24.000	240	0.15	0.35
5		2.5	10	22.000	220	0.175	0.37
6		3	10	20.000	200	0.2	0.4
Silicon carbide Silicon nitride		0.2	0.1	0.5	30.000	15	0.003
	0.4	0.2	1	30.000	50	0.008	0.04
	0.6	0.3	1.5	30.000	100	0.015	0.07
	0.8	0.4	2	30.000	125	0.02	0.095
	1	0.5	2.5	30.000	150	0.025	0.125
	1	0.5	5	30.000	150	0.025	0.125
	1.5	0.75	3.8	30.000	150	0.038	0.138
	2	1	6	30.000	150	0.05	0.15
	2	1	10	30.000	150	0.05	0.15
	3	1.5	8	27.500	138	0.063	0.165
	4	2	10	24.000	120	0.075	0.175
	5	2.5	10	22.000	110	0.088	0.185
	6	3	10	20.000	100	0.1	0.2
	Quartz glass	0.2	0.1	0.5	30.000	45	0.008
0.4		0.2	1	30.000	150	0.023	0.12
0.6		0.3	1.5	30.000	300	0.045	0.21
0.8		0.4	2	30.000	375	0.06	0.285
1		0.5	2.5	30.000	450	0.075	0.375
1		0.5	5	30.000	450	0.075	0.375
1.5		0.75	3.8	30.000	450	0.113	0.413
2		1	6	30.000	450	0.15	0.45
2		1	10	30.000	450	0.15	0.45
3		1.5	8	27.500	413	0.188	0.495
4		2	10	24.000	360	0.225	0.525
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