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🌐 WWW.SAMHOTOOl.COM
☎ 0755-8450 7348
🕒 AM9:00~PM17:30

1004EM12-07.53KA

SAMHOTOOl

Cutting Tools For Die & Mold Industry

For Graphite Materials

GRAS2-000/4-000 GRALS 2-000/4-000	Square D 0.2-D12mm
GRAR2-000 GRALR2-000	Ball R0.1-R6mm
GRASR4-000 GRALSR2-000/4-000	Radius D0.5R0.05-D12R1



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Product Application Field

SAMHO series diamond-coated milling cutters use unique multi-layer nano-diamond coating technology. It has high hardness, lowest friction coefficient, highest thermal conductivity, and lowest chemical reaction characteristics. It is coated with a 6-10um thickened coating to ensure strong wear resistance.



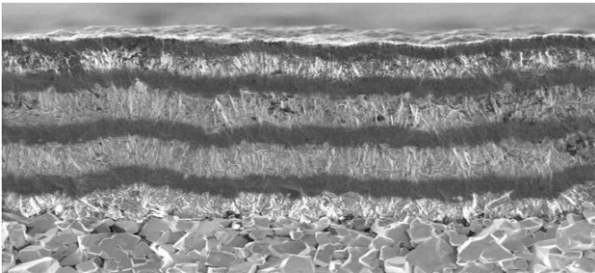
Undertake High-precision Tool Customization



*High-precision version can be ordered;
*Diameter and Ball R accuracy measurement are printed on the label.

Coating

Layer surface is smooth, multi-layer diamond Coating.



CONTENTS



【Square】

GRAS2-000 【Flutes) Φ 0.2-6】		01
GRAS4-000 【4 Flutes) Φ 1-12】		03
GRALS2-000 【2 Flutes Long Neck Square Φ 0.2-3】		05
GRALS4-000 【4 Flutes Long Neck Square Φ 1-3】		08

【Ball】

GRAR2-000 【2 Flutes R0.5-R6】		10
GRALR2-000 【2 Flutes Long Neck Ball R0.1-R2】		12

【Radius】

GRASR4-000 【4 Flutes Φ 3-12】		16
GRALSR2-000/4-000 【2/4 Flutes Long Neck Φ 0.5-3】		19



MG

DIA Coating

30

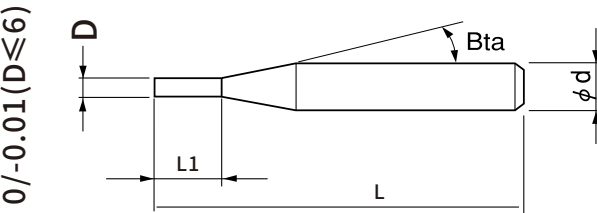
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Highly recommend/Recommend/Suggest ★○○

DIE STEEL	Grade
Carbon steels (S45C/S55C)	
Alloy steels (SK/SCM/SUS)	
Prehardened steels (NAK/HPM)	
Hardened steels (~55/~60/~70HRC)	
SPECIAL MATERIAL	
Aluminum alloys	
Graphite	★
Copper	
Plastics	
Carbon fiber	
Titanium alloys	
Heat resistant alloys	
Cemented carbide	
Hard brittle (non-metallic)material	

Specialty

*2 Flute square end mills for milling graphite;
*New diamond coating offers excellent wear resistance.



The shank taper angle shown is not an exact value and to avoid contact with the workpiece, we recommend the user controls the precise value of this angle. Shank taper angle should not make contact with the workpiece.

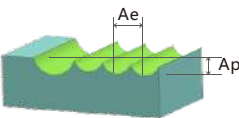
Total 8 models

Unit(mm)

Model Number	D Outside Diameter	L1 Length of Cut	L2 Effective Length	Bta Shank Taper Angle	L Overall Length	T Number of Flutes	d Shank Diameter	In Stock
GRAS2-0020060	0.2	0.6	—	15°	50	2	4	○
GRAS2-0050150	0.5	1.5	—	15°	50	2	4	○
GRAS2-0100300	1	3	—	15°	50	2	4	○
GRAS2-0150450	1.5	4.5	—	15°	50	2	4	○
GRAS2-0200600	2	6	—	15°	50	2	4	○
GRAS2-0300900	3	9	—	15°	50	2	4	○
GRAS2-0401200	4	12	—	-	50	2	4	○
GRAS2-0601800	6	18	—	-	60	2	6	○

*New size added from this series.

*Stocked items.



Work Material		Graphite					
(mm) Diameter	(mm) Overhang	(min-1) Speed	(mm/min) Feed	Side Milling		Slotting	
				Ap(mm)	Ae(mm)	Ap(mm)	Ae(mm)
D 0.2	4D	28000	800	1D	0.05D	0.05D	--
D 0.2	15D	28000	800	0.5D	0.05D	0.05D	--
D 0.2	25D	26000	800	0.5D	0.05D	0.05D	--
D 0.5	4D	28000	1000	1D	0.05D	0.1D	--
D 0.5	15D	26000	1000	0.5D	0.05D	0.1D	--
D 0.5	25D	24000	1000	0.5D	0.05D	0.1D	--
D 1	4D	24000	1200	1D	0.05D	0.3D	--
D 1	15D	24000	1200	0.4D	0.04D	0.2D	--
D 1	25D	20000	1200	0.2D	0.03D	0.15D	--
D 1.5	4D	22000	1500	1D	0.05D	0.3D	--
D 1.5	10D	22000	1500	0.5D	0.05D	0.2D	--
D 1.5	15D	18000	1500	0.5D	0.05D	0.15D	--
D 2	4D	20000	1800	1D	0.05D	0.3D	--
D 2	10D	20000	1800	0.5D	0.05D	0.2D	--
D 2	15D	16000	1200	0.2D	0.04D	0.2D	--
D 3	4D	20000	3000	1D	0.05D	0.3D	--
D 3	10D	20000	2400	0.5D	0.05D	0.2D	--
D 3	15D	18000	2000	0.3D	0.05D	0.2D	--
D 4	4D	18000	2200	1.5D	0.05D	0.3D	--
D 4	8D	15000	2000	0.7D	0.05D	0.2D	--
D 4	12D	12000	1600	0.4D	0.05D	0.2D	--
D 6	4D	13000	3000	2D	0.05D	0.3D	--
D 6	8D	13000	3000	1D	0.05D	0.2D	--
D 6	12D	8000	2000	0.6D	0.03D	0.2D	--

Notes:
*Use a milling machine dedicated for graphite;
*Recommend air blow for graphite.



MG

DIA
Coating

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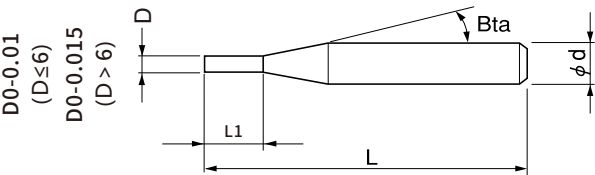
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Highly recommend/Recommend/Suggest ★○○

DIE STEEL	Grade
Carbon steels (S45C/S55C)	
Alloy steels (SK/SCM/SUS)	
Prehardened steels (NAK/HPM)	
Hardened steels (~55/~60/~70HRC)	
SPECIAL MATERIAL	
Aluminum alloys	
Graphite	★
Copper	
Plastics	
Carbon fiber	
Titanium alloys	
Heat resistant alloys	
Cemented carbide	
Hard brittle (non-metallic)material	

Specialty

*4 Flute square end mills for milling graphite;
*New diamond coating offers excellent wear resistance.



The shank taper angle shown is not an exact value and to avoid contact with the workpiece, we recommend the user controls the precise value of this angle. Shank taper angle should not make contact with the workpiece.

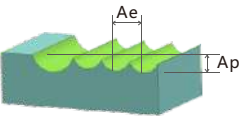
Total 20 models

Unit (mm)

Model Number	D Outside Diameter	L1 Length of Cut	L2 Effective Length	Bta Shank Taper Angle	L Overall Length	T Number of Flutes	d Shank Diameter	In Stock
GRAS4-0100300	1	3	–	15°	50	4	4	○
GRAS4-0150450	1.5	4.5	–	15°	50	4	4	○
GRAS4-0200600	2	6	–	15°	50	4	4	○
GRAS4-0300900-3	3	9	–	15°	60	4	3	○
GRAS4-0300900	3	9	–	15°	50	4	4	○
GRAS4-0301200	3	12	–	15°	75	4	4	○
GRAS4-0401200	4	12	–	15°	60	4	4	○
GRAS4-0401600	4	16	–	15°	75	4	4	○
GRAS4-0602000	6	20	–	-	60	4	6	○
GRAS4-0602500	6	25	–	-	75	4	6	○
GRAS4-0603000	6	30	–	-	100	4	6	○
GRAS4-0802500	8	25	–	-	75	4	8	○
GRAS4-0803000	8	30	–	-	100	4	8	○
GRAS4-0803500	8	35	–	-	150	4	8	○
GRAS4-1003000	10	30	–	-	75	4	10	○
GRAS4-1003000-100	10	30	–	-	100	4	10	○
GRAS4-1004000-150	10	40	–	-	150	4	10	○
GRAS4-1204000-100	12	40	–	-	100	4	12	○
GRAS4-1205000-150	12	50	–	-	150	4	12	○
GRAS4-1205000-180	12	50	–	-	180	4	12	○

*New size added from this series.

*Stocked items.



Work Material		Graphite					
(mm) Diameter	(mm) Overhang	(min-1) Speed	(mm/min) Feed	Side Milling		Slotting	
				Ap(mm)	Ae(mm)	Ap(mm)	Ae(mm)
D1	4D	24000	1200	1D	0.05D	0.3D	--
D1	15D	24000	1200	0.5D	0.05D	0.2D	--
D1	25D	20000	1200	0.5D	0.05D	0.2D	--
D1.5	4D	22000	1500	1D	0.05D	0.3D	--
D1.5	10D	22000	1500	0.5D	0.05D	0.2D	--
D1.5	15D	18000	1500	0.5D	0.05D	0.2D	--
D2	4D	20000	1800	1D	0.05D	0.3D	--
D2	10D	20000	1800	0.5D	0.05D	0.2D	--
D2	15D	16000	1200	0.3D	0.05D	0.2D	--
D3	4D	20000	3000	1D	0.05D	0.3D	--
D3	10D	20000	2400	0.5D	0.05D	0.2D	--
D3	15D	18000	2000	0.3D	0.05D	0.2D	--
D4	4D	18000	2200	1.5D	0.05D	0.3D	--
D4	8D	15000	2000	0.7D	0.05D	0.2D	--
D4	12D	12000	1600	0.4D	0.05D	0.2D	--
D6	4D	13000	3000	2D	0.05D	0.3D	--
D6	8D	13000	3000	1D	0.05D	0.2D	--
D6	12D	8000	2000	0.6D	0.03D	0.2D	--
D8	4D	10000	3000	2D	0.05D	0.5D	--
D8	8D	10000	3000	1D	0.05D	0.3D	--
D8	12D	6000	2000	0.6D	0.03D	0.2D	--
D10	4D	8500	1600	2D	0.05D	0.5D	--
D10	8D	8500	1600	1D	0.05D	0.3D	--
D10	12D	6000	1200	0.6D	0.03D	0.2D	--
D12	4D	7500	1600	2D	0.05D	0.5D	--
D12	8D	7000	1600	1D	0.05D	0.3D	--
D12	12D	6000	1200	0.6D	0.03D	0.2D	--

Notes:
*Use a milling machine dedicated for graphite;
*Recommend air blow for graphite.



MG

DIA
Coating

30

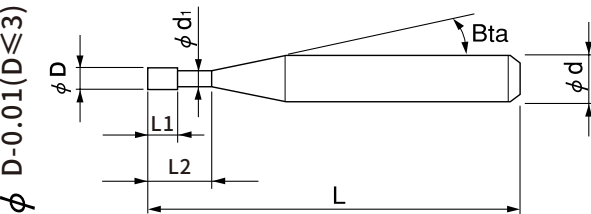
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Highly recommend/Recommend/Suggest ★○○○

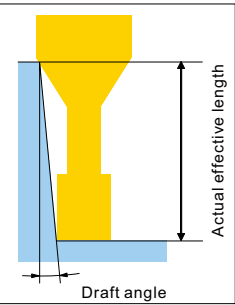
DIE STEEL	Grade
Carbon steels (S45C/S55C)	
Alloy steels (SK/SCM/SUS)	
Prehardened steels (NAK/HPM)	
Hardened steels (~55/~60/~70HRC)	
SPECIAL MATERIAL	
Aluminum alloys	
Graphite	★
Copper	
Plastics	
Carbon fiber	
Titanium alloys	
Heat resistant alloys	
Cemented carbide	
Hard brittle (non-metallic) material	

Specialty

*2 flutes long neck square end mills for milling graphite;
*New diamond coating offers excellent wear resistance.



The shank taper angle shown is not an exact value and to avoid contact with the workpiece, we recommend the user controls the precise value of this angle. Shank taper angle should not make contact with the workpiece.



Total 30 models

Unit(mm)

Model Number	D Outside Diameter	L1 Length of Cut	L2 Effective Length	Bta Shank Taper Angle	L Overall Length	T Number of Flutes	d Shank Diameter	In Stock
GRALS2-002010	0.2	0.4	1	15°	50	2	4	○
GRALS2-003020	0.3	0.6	2	15°	50	2	4	○
GRALS2-004020	0.4	0.8	2	15°	50	2	4	○
GRALS2-004040	0.4	0.8	4	15°	50	2	4	○
GRALS2-004060	0.4	0.8	6	15°	50	2	4	○
GRALS2-005020	0.5	1	2	15°	50	2	4	○
GRALS2-005040	0.5	1	4	15°	50	2	4	○
GRALS2-005060	0.5	1	6	15°	50	2	4	○
GRALS2-006020	0.6	1.2	2	15°	50	2	4	○
GRALS2-006040	0.6	1.2	4	15°	50	2	4	○

*New size added from this series.

*Stocked items.

Next page ➡

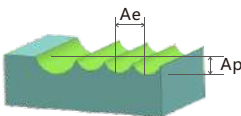
Total 30 models

Unit(mm)

Model Number	D Outside Diameter	L1 Length of Cut	L2 Effective Length	Bta Shank Taper Angle	L Overall Length	T Number of Flutes	d Shank Diameter	In Stock
GRALS2-006060	0.6	1.2	6	15°	50	2	4	○
GRALS2-006080	0.6	1.2	8	15°	50	2	4	○
GRALS2-006100	0.6	1.2	10	15°	50	2	4	○
GRALS2-010040	1	2	4	15°	50	2	4	○
GRALS2-010060	1	2	6	15°	50	2	4	○
GRALS2-010080	1	2	8	15°	50	2	4	○
GRALS2-010100	1	2	10	15°	50	2	4	○
GRALS2-010160	1	2	16	15°	50	2	4	○
GRALS2-010210	1	2	21	15°	55	2	4	○
GRALS2-015060	1.5	3	6	15°	50	2	4	○
GRALS2-015100	1.5	3	10	15°	50	2	4	○
GRALS2-015160	1.5	3	16	15°	50	2	4	○
GRALS2-015210	1.5	3	21	15°	55	2	4	○
GRALS2-020060	2	4	6	15°	50	2	4	○
GRALS2-020100	2	4	10	15°	50	2	4	○
GRALS2-020160	2	4	16	15°	50	2	4	○
GRALS2-020210	2	4	21	15°	55	2	4	○
GRALS2-020260	2	4	26	15°	55	2	4	○
GRALS2-030160	3	6	16	15°	70	2	3/4	○
GRALS2-030320	3	6	32	15°	80	2	3/4	○

*New size added from this series.

*Stocked items.



2 Flutes

4 Flutes

Square

Long Neck Square

Ball

Long Neck Ball

Radius

Long Neck Radius

Work Material		Graphite					
(mm) Diameter	(mm) Effective Length	(min-1) Speed	(mm/min) Feed	Side Milling		Slotting	
				Ap(mm)	Ae(mm)	Ap(mm)	Ae(mm)
D0.2	1	32000	300	0.2	0.01	0.006	--
D0.3	2	32000	300	0.3	0.015	0.01	--
D0.4	2	32000	350	0.4	0.02	0.02	--
D0.4	4	32000	200	0.4	0.02	0.02	--
D0.4	6	32000	150	0.4	0.02	0.02	--
D0.5	2	32000	600	0.5	0.02	0.02	--
D0.5	4	32000	450	0.5	0.02	0.02	--
D0.5	6	32000	300	0.5	0.02	0.02	--
D0.6	2	32000	700	0.6	0.03	0.03	--
D0.6	4	32000	600	0.6	0.03	0.03	--
D0.6	6	32000	400	0.6	0.03	0.03	--
D0.6	8	26000	200	0.6	0.03	0.03	--
D0.6	10	24000	100	0.6	0.03	0.03	--
D1	4	32000	1000	1	0.05	0.05	--
D1	6	26000	800	1	0.05	0.05	--
D1	8	20000	600	1	0.05	0.05	--
D1	10	20000	400	1	0.05	0.05	--
D1	16	15000	300	1	0.05	0.05	--
D1	21	12000	150	1	0.05	0.05	--
D1.5	6	22000	1500	1.5	0.075	0.1	--
D1.5	10	18000	1200	1.5	0.075	0.1	--
D1.5	16	15000	600	1.5	0.075	0.075	--
D1.5	21	10000	300	1.5	0.075	0.075	--
D2	6	24000	1800	2	0.1	0.15	--
D2	10	20000	1800	2	0.1	0.15	--
D2	16	18000	1200	2	0.1	0.15	--
D2	21	15000	600	2	0.1	0.1	--
D2	26	12000	400	2	0.1	0.1	--
D3	16	22000	2000	3	0.15	0.3	--
D3	32	15000	1000	3	0.15	0.2	--

Notes:
*Use a milling machine dedicated for graphite;
*Recommend air blow for graphite.



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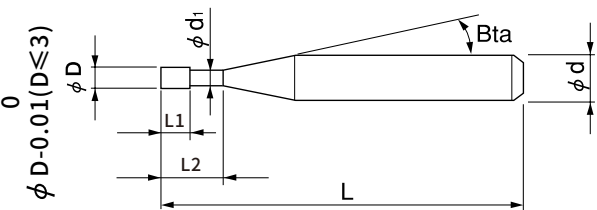
DIA Coating

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SD 0-0.005

Specialty

*Special blade design + newly developed diamond coating;
*Superior performance in deep cavity processing.



The shank taper angle shown is not an exact value and to avoid contact with the workpiece, we recommend the user controls the precise value of this angle. Shank taper angle should not make contact with the workpiece.

Highly recommend/Recommend/Suggest ★○○

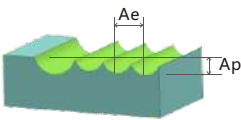
DIE STEEL	Grade
Carbon steels (S45C/S55C)	
Alloy steels (SK/SCM/SUS)	
Prehardened steels (NAK/HPM)	
Hardened steels (~55/~60/~70HRC)	
SPECIAL MATERIAL	
Aluminum alloys	
Graphite	★
Copper	
Plastics	
Carbon fiber	
Titanium alloys	
Heat resistant alloys	
Cemented carbide	
Hard brittle (non-metallic) material	

Total 23 models

Unit (mm)

Model Number	D Outside Diameter	L1 Length of Cut	L2 Effective Length	Bta Shank Taper Angle	L Overall Length	T Number of Flutes	d Shank Diameter	In Stock
GRALS4-010040	1	3	4	15°	50	4	4	○
GRALS4-010060	1	3	6	15°	50	4	4	○
GRALS4-010100	1	3	10	15°	50	4	4	○
GRALS4-010150	1	3	15	15°	50	4	4	○
GRALS4-010200	1	3	20	15°	60	4	4	○
GRALS4-010060	1	3	6	15°	60	4	4	○
GRALS4-010100	1	3	10	15°	60	4	4	○
GRALS4-010150	1	3	15	15°	60	4	4	○
GRALS4-010100	1	3	10	15°	75	4	4	○
GRALS4-010150	1	3	15	15°	75	4	4	○
GRALS4-010200	1	3	20	15°	75	4	4	○
GRALS4-015060	1.5	4	6	15°	50	4	4	○
GRALS4-015100	1.5	4	10	15°	50	4	4	○
GRALS4-015150	1.5	4	15	15°	50	4	4	○
GRALS4-015200	1.5	4	20	15°	50	4	4	○
GRALS4-020080	2	6	8	15°	50	4	4	○
GRALS4-020100	2	6	10	15°	50	4	4	○
GRALS4-020150	2	6	15	15°	50	4	4	○
GRALS4-020200	2	6	20	15°	60	4	4	○
GRALS4-020250	2	6	25	15°	60	4	4	○
GRALS4-030150	3	9	15	15°	50	4	3/4	○
GRALS4-030200	3	9	20	15°	60	4	3/4	○
GRALS4-030300	3	9	30	15°	75	4	3/4	○

*New size added from this series. *Stocked items.



Work Material		Graphite					
(mm) Diameter	(mm) Effective Length	(min-1) Speed	(mm/min) Feed	Side Milling		Slotting	
				Ap(mm)	Ae(mm)	Ap(mm)	Ae(mm)
D1	4	26000	1200	1.5	0.05	0.075	--
	6	24000	1000	1	0.05	0.075	--
D1	10	20000	600	1	0.05	0.05	--
	15	15000	400	1	0.05	0.05	--
D1	20	12000	150	1	0.05	0.05	--
	6	24000	1000	1	0.05	0.075	--
D1	10	20000	600	1	0.05	0.05	--
	15	15000	400	1	0.05	0.05	--
D1	10	18000	500	1	0.05	0.05	--
	15	15000	300	1	0.05	0.05	--
D1	20	10000	150	1	0.05	0.05	--
	6	22000	1500	2	0.075	0.15	--
D1.5	10	18000	1200	1.5	0.075	0.1	--
	15	15000	600	1.5	0.075	0.1	--
D1.5	20	10000	300	1.5	0.075	0.1	--
	8	20000	1800	3	0.1	0.2	--
D2	10	20000	1800	2	0.1	0.15	--
	15	18000	1200	2	0.1	0.15	--
D2	20	12000	600	2	0.1	0.1	--
	25	10000	400	2	0.1	0.1	--
D3	15	20000	2000	3	0.15	0.3	--
	20	18000	1600	3	0.15	0.2	--
D3	30	15000	1000	3	0.15	0.2	--

Notes:
*Use a milling machine dedicated for graphite;
*Recommend air blow for graphite.



MG

DIA Coating

30

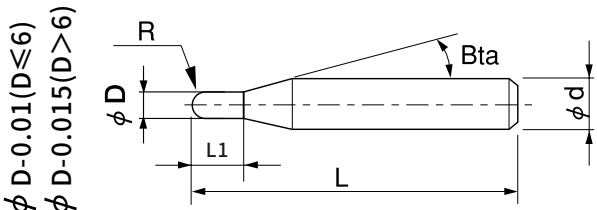
SD 0-0.005

R ±0.005 D≤6

R ±0.007 D8~12

Specialty

- *2 flutes ball type for graphite machining;
- *New diamond coating offers excellent resistance to wear and abrasion;
- *Ultra-fine diamond coating particles.



The shank taper angle shown is not an exact value and to avoid contact with the workpiece, we recommend the user controls the precise value of this angle. Shank taper angle should not make contact with the workpiece.

Highly recommend/Recommend/Suggest ★○○

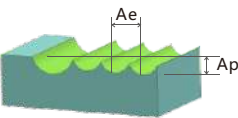
DIE STEEL	Grade
Carbon steels (S45C/S55C)	
Alloy steels (SK/SCM/SUS)	
Prehardened steels (NAK/HPM)	
Hardened steels (~55/~60/~70HRC)	
SPECIAL MATERIAL	
Aluminum alloys	
Graphite	★
Copper	
Plastics	
Carbon fiber	
Titanium alloys	
Heat resistant alloys	
Cemented carbide	
Hard brittle (non-metallic)material	

Total 20 models

Unit (mm)

Model Number	D Radius of Ball Nose	L1 Length of Cut	L2 Effective Length	Bta Shank Taper Angle	L Overall Length	T Number of flutes	d Shank Diameter	In Stock
GRAR2-0100300	R0.5	3	-	15°	50	2	4	○
GRAR2-0150500	R0.75	5	-	15°	50	2	4	○
GRAR2-0200600	R1	6	-	15°	50	2	4	○
GRAR2-0300600	R1.5	6	-	15°	60	2	3/4	○
GRAR2-0301000	R1.5	10	-	15°	75	2	3/4	○
GRAR2-0301500	R1.5	15	-	15°	100	2	3/4	○
GRAR2-0400800	R2	8	-	-	60	2	4	○
GRAR2-0401000	R2	10	-	-	75	2	4	○
GRAR2-0401500	R2	15	-	-	100	2	4	○
GRAR2-0601200	R3	12	-	-	75	2	6	○
GRAR2-0601500	R3	15	-	-	100	2	6	○
GRAR2-0801800	R4	18	-	-	75	2	6	○
GRAR2-0801800L	R4	18	-	-	100	2	8	○
GRAR2-0802500	R4	25	-	-	150	2	8	○
GRAR2-1002000	R5	20	-	-	100	2	10	○
GRAR2-1003000	R5	30	-	-	150	2	10	○
GRAR2-1003000L	R5	30	-	-	180	2	10	○
GRAR2-1203000	R6	30	-	-	100	2	12	○
GRAR2-1203000L	R6	30	-	-	150	2	12	○
GRAR2-1203000LL	R6	30	-	-	180	2	12	○

*New size added from this series. *Stocked items.



Work Material		Graphite							
(mm) Diameter /Radius	(mm) Overhang	Roughing				Finishing			
		(min-1) Speed	(mm/min) Feed	Ap(mm)	Ae(mm)	(min-1) Speed	(mm/min) Feed	Ap(mm)	Ae(mm)
R0.5	3	22000	800	0.07	0.2	22000	1500	0.1	0.06
R0.75	5	22000	1200	0.15	0.4	22000	1800	0.1	0.06
R1	6	18000	2500↔1800	0.15	0.5	18000	2000	0.1	0.08
R1.5	16↔40	18000↔10000	3500↔2000	0.3	0.9	18000↔10000	3500↔2000	0.1	0.1
R1.5	16↔40	18000↔10000	3500↔2000	0.3	0.9	18000↔10000	3500↔2000	0.1	0.1
R1.5	40↔70	10000↔5500	2000↔1200	0.2	0.7	10000↔5500	2000↔1200	0.1	0.1
R2	16↔40	18000↔10000	3500↔2000	0.4	1.2	18000↔10000	3500↔2000	0.1	0.1
R2	16↔40	18000↔10000	3500↔2000	0.4	1.2	18000↔10000	3500↔2000	0.1	0.1
R2	40↔70	10000↔5500	2000↔1200	0.25	0.8	10000↔5500	2000↔1200	0.1	0.1
R3	24↔36	17000↔10000	3500↔3000	0.6	1.8	17000↔10000	3500↔3000	0.15	0.12
R3	36↔70	10000↔5500	3000↔1600	0.4	1.5	9000↔5500	3000↔1600	0.15	0.12
R4	20↔40	15000↔12000	4000↔3000	0.8	2.5	15000↔12000	4000↔3000	0.18	0.15
R4	40↔70	12000↔6000	3000↔2500	0.8	2.5	12000↔6000	3500↔2500	0.18	0.15
R4	70↔110	6000↔4000	2500↔1200	0.4	1.2	6000↔4000	2500↔1200	0.18	0.15
R5	40↔60	12000↔6000	3500↔2500	1	3	12000↔6000	4000↔2500	0.2	0.2
R5	60↔110	6000↔4000	2500↔1800	0.8	2.5	6000↔4000	2500↔1800	0.2	0.2
R5	110↔150	4000↔2000	1500↔450	0.6	1.9	4000↔2000	1800↔900	0.2	0.2
R6	48↔72	10000↔6000	3500↔2500	1.2	3.6	10000↔6000	4000↔2500	0.2	0.24
R6	72↔110	6000↔4000	2500↔1800	1.2	3.6	6000↔4000	2500↔1800	0.2	0.24
R6	110↔150	4000↔2000	1800↔450	0.9	2.8	4000↔2000	2000↔1000	0.2	0.24

Remark:
*Decrease both spindle speed and feed rate proprotionally when the milling parameters exceed the machine's maximum spindle speed;
*Decrease feed rate by 50% when slot machining;
*Recommend air blow.



MG

DIA Coating

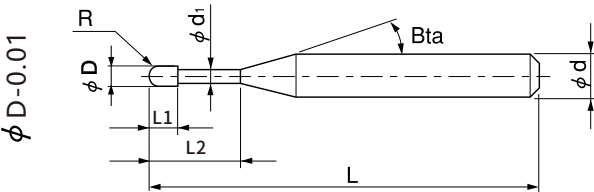
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SD 0-0.005

R ±0.005

Specialty

- *2 flutes long neck ball type for graphite machining
- *New diamond coating offers excellent resistance to wear and abrasion;
- *Ultra-fine diamond coating particles.



The shank taper angle shown is not an exact value and to avoid contact with the workpiece, we recommend the user controls the precise value of this angle. Shank taper angle should not make contact with the workpiece.

Total 52 models

Unit (mm)

Model Number	D Radius of Ball Nose	L1 Length of Cut	L2 Effective Length	Bta Shank Taper Angle	L Overall Length	T Number of Flutes	d Shank Diameter	In Stock
GRALR2-002020	R0.1	0.15	2	15°	50	2	4	○
GRALR2-003020	R0.15	0.2	2	15°	50	2	4	○
GRALR2-004020	R0.2	0.32	2	15°	50	2	4	○
GRALR2-004030	R0.2	0.32	3	15°	50	2	4	○
GRALR2-004040	R0.2	0.32	4	15°	50	2	4	○
GRALR2-004050	R0.2	0.32	5	15°	50	2	4	○
GRALR2-005020	R0.25	0.4	2	15°	50	2	4	○
GRALR2-005030	R0.25	0.4	3	15°	50	2	4	○
GRALR2-005060	R0.25	0.4	6	15°	50	2	4	○
GRALR2-005100	R0.25	0.4	10	15°	50	2	4	○
GRALR2-006020	R0.3	0.48	2	15°	50	2	4	○
GRALR2-006030	R0.3	0.48	3	15°	50	2	4	○
GRALR2-006040	R0.3	0.48	4	15°	50	2	4	○
GRALR2-006060	R0.3	0.48	6	15°	50	2	4	○
GRALR2-006100	R0.3	0.48	10	15°	50	2	4	○
GRALR2-006120	R0.3	0.48	12	15°	50	2	4	○
GRALR2-008100	R0.4	0.64	10	15°	50	2	4	○
GRALR2-008120	R0.4	0.64	12	15°	50	2	4	○
GRALR2-008160	R0.4	0.64	16	15°	50	2	4	○
GRALR2-010030	R0.5	0.8	3	15°	50	2	4	○

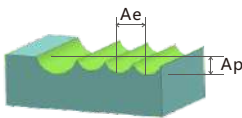
Total 52 models

Unit (mm)

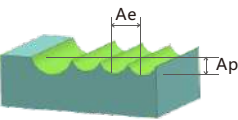
Model Number	D Radius of Ball Nose	L1 Length of Cut	L2 Effective Length	Bta Shank Taper Angle	L Overall Length	T Number of Flutes	d Shank Diameter	In Stock
GRALR2-010050	R0.5	0.8	5	15°	50	2	4	○
GRALR2-010060	R0.5	0.8	6	15°	50	2	4	○
GRALR2-010080	R0.5	0.8	8	15°	50	2	4	○
GRALR2-010100	R0.5	0.8	10	15°	60	2	4	○
GRALR2-010120	R0.5	0.8	12	15°	50	2	4	○
GRALR2-010160	R0.5	0.8	16	15°	50	2	4	○
GRALR2-010200	R0.5	1.5	20	15°	60	2	4	○
GRALR2-015060	R0.75	1.2	6	15°	50	2	4	○
GRALR2-015100	R0.75	1.2	10	15°	50	2	4	○
GRALR2-015160	R0.75	1.2	16	15°	50	2	4	○
GRALR2-020040	R1	1.6	4	15°	50	2	4	○
GRALR2-020080	R1	1.6	8	15°	50	2	4	○
GRALR2-020100	R1	1.6	10	15°	50	2	4	○
GRALR2-020120	R1	1.6	12	15°	50	2	4	○
GRALR2-020160	R1	1.6	16	15°	50	2	4	○
GRALR2-020200	R1	3	20	15°	70	2	4	○
GRALR2-020250	R1	1.6	25	15°	65	2	4	○
GRALR2-020300	R1	3	30	15°	70	2	4	○
GRALR2-020350	R1	3	35	15°	70	2	4	○
GRALR2-020400	R1	1.6	40	15°	80	2	4	○
GRALR2-030160	R1.5	2.4	16	15°	60	2	4	○
GRALR2-030200	R1.5	2.4	20	15°	60	2	4	○
GRALR2-030250	R1.5	2.4	25	15°	70	2	4	○
GRALR2-030300	R1.5	4.5	30	15°	80	2	4	○
GRALR2-030400	R1.5	4.5	40	15°	80	2	4	○
GRALR2-040160	R2	3.2	16	15°	70	2	4	○
GRALR2-040200	R2	3.2	20	15°	70	2	4	○
GRALR2-040250	R2	3.2	25	15°	70	2	4	○
GRALR2-040300	R2	3.2	30	15°	70	2	4	○
GRALR2-040400	R2	6	40	15°	100	2	4	○
GRALR2-040500	R2	6	50	-	100	2	4	○
GRALR2-040600	R2	6	60	-	100	2	4	○

*New size added from this series.

*Stocked items.



Work Material		Graphite							
(mm) Diameter /Radius	(mm) Effective Length	Roughing				Finishing			
		(min-1) Speed	(mm/min) Feed	Ap(mm)	Ae(mm)	(min-1) Speed	(mm/min) Feed	Ap(mm)	Ae(mm)
R0.1	2	26000	300	0.02	0.05	28000	500	0.015	0.015
R0.15	2	26000	300	0.02	0.05	28000	500	0.02	0.02
R0.2	2	26000	400	0.03	0.08	28000	600	0.04	0.03
R0.2	3	26000	400	0.03	0.06	28000	600	0.03	0.03
R0.2	4	26000	400	0.03	0.06	28000	600	0.02	0.03
R0.2	5	26000	400	0.03	0.06	28000	600	0.02	0.03
R0.25	2	26000	400	0.03	0.1	28000	800	0.05	0.04
R0.25	3	26000	400	0.03	0.1	28000	800	0.05	0.04
R0.25	6	26000	400	0.03	0.08	28000	800	0.03	0.04
R0.25	10	24000	400	0.03	0.06	28000	800	0.02	0.04
R0.3	2	26000	600	0.03	0.1	28000	800	0.06	0.04
R0.3	3	26000	400	0.03	0.1	28000	800	0.06	0.04
R0.3	4	26000	400	0.03	0.1	28000	800	0.04	0.04
R0.3	6	26000	400	0.03	0.1	28000	800	0.03	0.04
R0.3	10	24000	400	0.03	0.08	28000	800	0.02	0.04
R0.3	12	22000	400	0.03	0.08	28000	800	0.02	0.04
R0.4	10	24000	600	0.07	0.15	28000	1000	0.05	0.06
R0.4	12	22000	400	0.05	0.12	28000	1000	0.05	0.06
R0.4	16	20000	500	0.03	0.1	28000	1000	0.03	0.06
R0.5	3	26000	1200	0.1	0.3	28000	1500	0.1	0.06
R0.5	5	26000	1200	0.1	0.3	28000	1500	0.08	0.06
R0.5	6	26000	1000	0.1	0.3	28000	1200	0.05	0.06
R0.5	8	24000	1000	0.1	0.2	28000	1200	0.05	0.06
R0.5	10	24000	800	0.1	0.2	28000	1200	0.05	0.06
R0.5	12	22000	600	0.07	0.2	28000	1000	0.05	0.06
R0.5	16	20000	500	0.07	0.18	28000	1000	0.05	0.06
R0.5	20	18000	500	0.07	0.15	28000	1000	0.03	0.06
R0.75	6	26000	1800	0.15	0.45	26000	1800	0.08	0.08
R0.75	10	26000	1500	0.15	0.45	26000	1800	0.08	0.08
R0.75	16	26000	1200	0.15	0.45	26000	1800	0.06	0.08
R1	4	24000	2000	0.2	0.6	24000	2000	0.1	0.08
R1	8	24000	2000	0.2	0.6	24000	2000	0.1	0.08
R1	10	24000	2000	0.2	0.6	24000	2000	0.1	0.08
R1	12	24000	2000	0.2	0.6	24000	2000	0.08	0.08



Work Material		Graphite							
(mm) Diameter /Radius	(mm) Effective Length	Roughing				Finishing			
		(min-1) Speed	(mm/min) Feed	Ap(mm)	Ae(mm)	(min-1) Speed	(mm/min) Feed	Ap(mm)	Ae(mm)
R1	16	22000	1800	0.2	0.6	24000	2000	0.08	0.08
R1	20	18000	1300	0.2	0.6	24000	1800	0.06	0.08
R1	25	15000	1200	0.15	0.5	24000	1800	0.06	0.08
R1	30	15000	1000	0.15	0.5	24000	1500	0.06	0.08
R1	35	9000	1000	0.1	0.3	24000	1500	0.06	0.08
R1	40	7000	800	0.1	0.3	24000	1200	0.04	0.08
R1.5	16	18000	2000	0.3	0.9	22000	2500	0.12	0.1
R1.5	20	18000	2000	0.3	0.9	22000	2500	0.1	0.1
R1.5	25	15000	1700	0.2	0.7	20000	2200	0.07	0.1
R1.5	30	15000	1700	0.2	0.7	18000	2200	0.07	0.1
R1.5	40	12000	1500	0.2	0.7	18000	2200	0.05	0.1
R2	16	18000	2500	0.4	1.2	18000	2500	0.12	0.1
R2	20	18000	2500	0.4	1.2	18000	2500	0.1	0.1
R2	25	15000	2500	0.4	1.2	18000	2500	0.1	0.1
R2	30	15000	2500	0.4	1.2	18000	2500	0.1	0.1
R2	40	10000	1700	0.3	1	15000	2200	0.08	0.1
R2	50	9000	1500	0.25	0.8	15000	2200	0.08	0.1
R2	60	8000	1500	0.25	0.8	15000	2000	0.08	0.1

Remark:
*Decrease both spindle speed and feed rate proprotionally when the milling parameters exceed the machine's maximum spindle speed;
*Decrease feed rate by 50% when slot machining;
*Recommend air blow.



MG

DIA Coating

30

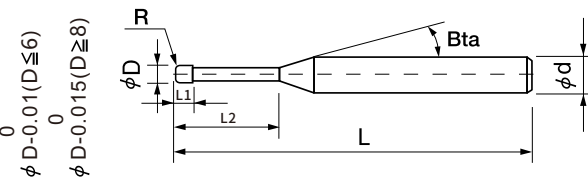
SD
0-0.005

R
±0.005
D≤6

R
±0.01
D8~12

Specialty

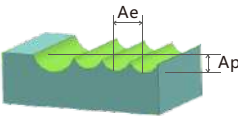
- *4 flutes radius type end mills for graphite machining;
- *New diamond coating offers excellent resistance to wear and abrasion;
- *Ultra-fine diamond coating particles.



The shank taper angle shown is not an exact value and to avoid contact with the workpiece, we recommend the user controls the precise value of this angle. Shank taper angle should not make contact with the workpiece.

Total 42 models

Unit (mm)									
Model Number	D Outside Diameter	L1 Length of Cut	L2 Effective Length	Radius	Bta Shank Taper Angle	L Overall Length	T Number of Flutes	d Shank Diameter	In Stock
GRASR4-0302100-60	3	10	–	0.2	15°	60	4	3/4	○
GRASR4-0302100-75	3	10	–	0.2	15°	75	4	3/4	○
GRASR4-0302100-100	3	10	–	0.2	15°	100	4	3/4	○
GRASR4-0305100-60	3	10	–	0.5	15°	60	4	3/4	○
GRASR4-0305100-75	3	10	–	0.5	15°	75	4	3/4	○
GRASR4-0305100-100	3	10	–	0.5	15°	100	4	3/4	○
GRASR4-04001120-60	4	12	–	0	–	60	4	4	○
GRASR4-04001120-75	4	12	–	0	–	75	4	4	○
GRASR4-04001120-100	4	12	–	0	–	100	4	4	○
GRASR4-04002120-60	4	12	–	0.2	–	60	4	4	○
GRASR4-04002120-75	4	12	–	0.2	–	75	4	4	○
GRASR4-04002120-100	4	12	–	0.2	–	100	4	4	○
GRASR4-04005120-60	4	12	–	0.5	–	60	4	4	○
GRASR4-04005120-75	4	12	–	0.5	–	75	4	4	○
GRASR4-04005120-100	4	12	–	0.5	–	100	4	4	○
GRASR4-06002200-60	6	20	–	0.2	–	60	4	6	○
GRASR4-06002200-75	6	20	–	0.2	–	75	4	6	○
GRASR4-06002250-100	6	25	–	0.2	–	100	4	6	○
GRASR4-06003200-60	6	20	–	0.3	–	60	4	6	○
GRASR4-06003200-75	6	20	–	0.3	–	75	4	6	○



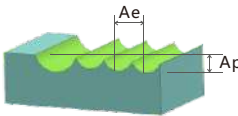
Total 42 models

Unit (mm)

	Model Number	D Outside Diameter	L1 Length of Cut	L2 Effective Length	Radius	Bta Shank Taper Angle	L Overall Length	T Number of Flutes	d Shank Diameter	In Stock
2 Flutes	GRASR4-06003250-100	6	25	-	0.3	-	100	4	6	○
	GRASR4-06005200-60	6	20	-	0.5	-	60	4	6	○
	GRASR4-06005200-75	6	20	-	0.5	-	75	4	6	○
4 Flutes	GRASR4-06005250-100	6	25	-	0.5	-	100	4	6	○
	GRASR4-08005250-75	8	25	-	0.5	-	75	4	8	○
	GRASR4-08005300-100	8	30	-	0.5	-	100	4	8	○
	GRASR4-08005350-150	8	35	-	0.5	-	150	4	8	○
	GRASR4-08010250-75	8	30	-	1	-	75	4	8	○
	GRASR4-08010300-100	8	30	-	1	-	100	4	8	○
	GRASR4-08010350-150	8	35	-	1	-	150	4	8	○
	GRASR4-10005250-75	10	25	-	0.5	-	75	4	10	○
	GRASR4-10005300-100	10	30	-	0.5	-	100	4	10	○
Square	GRASR4-10005400-150	10	40	-	0.5	-	150	4	10	○
	GRASR4-10010250-75	10	25	-	1	-	75	4	10	○
	GRASR4-10010300-100	10	30	-	1	-	100	4	10	○
Long Neck Square	GRASR4-10010400-150	10	40	-	1	-	150	4	10	○
	GRASR4-12005400-100	12	40	-	0.5	-	100	4	12	○
	GRASR4-12005500-150	12	50	-	0.5	-	150	4	12	○
Ball	GRASR4-12005500-180	12	50	-	0.5	-	180	4	12	○
	GRASR4-12010400-100	12	40	-	1	-	100	4	12	○
	GRASR4-12010500-150	12	50	-	1	-	150	4	12	○
Long Neck Ball	GRASR4-12010500-180	12	50	-	1	-	180	4	12	○

*New size added from this series.

*Stocked items.



Work Material		Graphite							
(mm) Diameter /Radius	(mm) Overhang	Roughing				Finishing			
		(min-1) Speed	(mm/min) Feed	Ap(mm)	Ae(mm)	(min-1) Speed	(mm/min) Feed	Ap(mm)	Ae(mm)
3R0.2	12~24	15000~12000	3000~2500	0.3	1.8	15000~12000	3000~2500	0.12	0.12
3R0.2	24~42	12000~6000	2500~1500	0.2	1.8	12000~6000	2500~1500	0.12	0.12
3R0.2	42~70	6000~4000	1500~1000	0.15	1.8	6000~4000	1500~1000	0.12	0.12
3R0.5	12~24	15000~12000	3000~2500	0.3	1.8	15000~12000	3000~2500	0.12	0.12
3R0.5	24~42	12000~6000	2500~1500	0.2	1.8	12000~6000	2500~1500	0.12	0.12
3R0.5	42~70	6000~4000	1500~1000	0.15	1.8	6000~4000	1500~1000	0.12	0.12
4R0.1	18~24	14000~12000	3000~2500	0.3	2	14000~12000	3000~2500	0.08	0.12
4R0.1	24~42	12000~6000	2500~1500	0.3	2	12000~6000	2500~1500	0.08	0.12
4R0.1	42~70	6000~4000	1500~1000	0.2	2	6000~4000	1500~1000	0.08	0.12
4R0.2	18~24	14000~12000	3000~2500	0.3	2	14000~12000	3000~2500	0.12	0.12
4R0.2	24~42	12000~6000	2500~1500	0.3	2	12000~6000	2500~1500	0.12	0.12
4R0.2	42~70	6000~4000	1500~1000	0.2	2	6000~4000	1500~1000	0.12	0.12
6R0.5	18~24	14000~12000	3000~2500	0.3	2	14000~12000	3000~2500	0.12	0.12
6R0.5	24~42	12000~6000	2500~1500	0.3	2	12000~6000	2500~1500	0.12	0.12
6R0.5	42~70	6000~4000	1500~1000	0.2	2	6000~4000	1500~1000	0.12	0.12
6R0.2	18~30	12000~9000	4000~3500	1	2.4	12000~9000	4000~3500	0.1	0.12
6R0.2	30~42	9000~7000	3500~2500	1	2.4	9000~7000	3500~2500	0.1	0.12
6R0.2	42~70	7000~4000	25000~1500	0.6	2.4	7000~4000	25000~1500	0.1	0.12
6R0.3	18~30	12000~9000	4000~3500	1	2.4	12000~9000	4000~3500	0.12	0.12
6R0.3	30~42	9000~7000	3500~2500	1	2.4	9000~7000	3500~2500	0.12	0.12
6R0.3	42~70	7000~4000	25000~1500	0.6	2.4	7000~4000	25000~1500	0.12	0.12
8R0.5	18~30	12000~9000	4000~3500	1.5	3.6	12000~9000	4000~3500	0.15	0.12
8R0.5	30~42	9000~7000	3500~2500	1.2	3.6	9000~7000	3500~2500	0.15	0.12
8R0.5	42~70	7000~4000	25000~1500	1.2	3.6	7000~4000	25000~1500	0.15	0.12
8R0.5	24~32	10000~8000	4000~3500	1.8	4.8	10000~8000	4000~3500	0.18	0.12
8R0.5	32~56	8000~5000	3500~2000	1.8	4.8	8000~5000	3500~2000	0.18	0.12
8R0.5	56~110	5000~2000	2000~1000	1.8	4.8	5000~2000	2000~1000	0.18	0.12
10R1	24~32	10000~8000	4000~3500	1.8	4.8	10000~8000	4000~3500	0.18	0.12
10R1	32~56	8000~5000	3500~2000	1.8	4.8	8000~5000	3500~2000	0.18	0.12
10R1	56~110	5000~2000	2000~1000	1.8	4.8	5000~2000	2000~1000	0.18	0.12
10R0.5	24~40	10000~8000	4000~3500	2	6	10000~8000	4000~3500	0.18	0.12
10R0.5	40~70	8000~5000	3500~2000	2	6	8000~5000	3500~2000	0.18	0.12
10R0.5	70~110	5000~2000	2000~1000	2	6	5000~2000	2000~1200	0.18	0.12
R1	24~40	10000~8000	4000~3500	2	6	10000~8000	4000~3500	0.18	0.12
R1	40~70	8000~5000	3500~2000	2	6	8000~5000	3500~2000	0.18	0.12
10R1	70~110	5000~2000	2000~1000	2	6	5000~2000	2000~1000	0.18	0.12
12R0.5	48~72	7000~5000	3500~2500	3	8	7000~5000	3500~2500	0.18	0.12
12R0.5	72~110	5000~4000	2500~1800	3	8	5000~4000	2500~1800	0.18	0.12
12R0.5	110~150	4000~2000	1800~450	3	8	4000~2000	1800~1200	0.18	0.12
12R1	48~72	7000~5000	3500~2500	3	8	7000~5000	3500~2500	0.18	0.12
12R1	72~110	5000~4000	2500~1800	3	8	5000~4000	2500~1800	0.18	0.12
12R1	110~150	4000~2000	1800~450	3	8	4000~2000	1800~1200	0.18	0.12



MG

DIA
Coating

30

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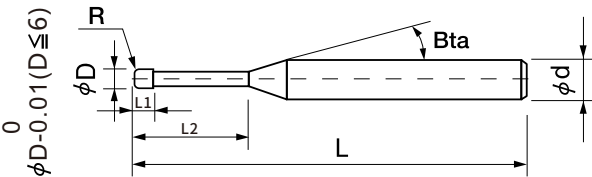
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Highly recommend/Recommend/Suggest ★○○

DIE STEEL	Grade
Carbon steels (S45C/S55C)	
Alloy steels (SK/SCM/SUS)	
Prehardened steels (NAK/HPM)	
Hardened steels (~55/~60/~70HRC)	
SPECIAL MATERIAL	
Aluminum alloys	
Graphite	★
Copper	
Plastics	
Carbon fiber	
Titanium alloys	
Heat resistant alloys	
Cemented carbide	
Hard brittle (non-metallic) material	

Specialty

- *2/4 flutes long neck radius end mills for graphite machining;
- *New diamond coating offers excellent resistance to wear and abrasion;
- *Ultra-fine diamond coating particles.



The shank taper angle shown is not an exact value and to avoid contact with the workpiece, we recommend the user controls the precise value of this angle. Shank taper angle should not make contact with the workpiece.

Total 39 models

Unit (mm)

Model Number	D Outside Diameter	L1 Length of Cut	L2 Effective Length	Radius	Bta Shank Taper Angle	L Overall Length	T Number of Flutes	d Shank Diameter	In Stock
GRALSR2-005005040	0.5	1	4	0.05	15°	50	2	4	○
GRALSR4-010005060	1	3	6	0.05	15°	60	4	4	○
GRALSR4-010005100	1	3	10	0.05	15°	60	4	4	○
GRALSR4-010005150	1	3	15	0.05	15°	60	4	4	○
GRALSR4-010005200	1	3	20	0.05	15°	50	4	4	○
GRALSR4-01001060	1	3	6	0.1	15°	60	4	4	○
GRALSR4-01001100	1	3	10	0.1	15°	60	4	4	○
GRALSR4-01001150	1	3	15	0.1	15°	60	4	4	○
GRALSR4-01001200	1	3	20	0.1	15°	50	4	4	○
GRALSR4-01501100	1.5	3	10	0.1	15°	60	4	4	○
GRALSR4-01501150	1.5	3	15	0.1	15°	60	4	4	○
GRALSR4-01501200	1.5	3	20	0.1	15°	50	4	4	○
GRALSR4-01502100	1.5	3	10	0.2	15°	60	4	4	○
GRALSR4-01502150	1.5	3	15	0.2	15°	60	4	4	○
GRALSR4-01502200	1.5	3	20	0.2	15°	50	4	4	○
GRALSR4-02001100	2	6	10	0.1	15°	50	4	4	○
GRALSR4-02001150	2	6	15	0.1	15°	60	4	4	○
GRALSR4-02001200	2	6	20	0.1	15°	60	4	4	○
GRALSR4-02001250	2	6	25	0.1	15°	80	4	4	○
GRALSR4-02002100	2	6	10	0.2	15°	50	4	4	○

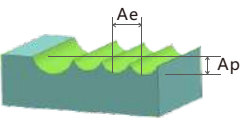
*New size added from this series. *Stocked items. Next page ➡

Total 39 models

Unit (mm)

Model Number	D Outside Diameter	L1 Length of Cut	L2 Effective Length	Radius	Bta Shank Taper Angle	L Overall Length	T Number of Flutes	d Shank Diameter	In Stock
GRALSR4-02002150	2	6	15	0.2	15°	60	4	4	○
GRALSR4-02002200	2	6	20	0.2	15°	60	4	4	○
GRALSR4-02002250	2	6	25	0.2	15°	80	4	4	○
GRALSR4-02005100	2	6	10	0.5	15°	50	4	4	○
GRALSR4-02005150	2	6	15	0.5	15°	60	4	4	○
GRALSR4-02005200	2	6	20	0.5	15°	60	4	4	○
GRALSR4-02005250	2	6	25	0.5	15°	80	4	4	○
GRALSR4-03001150	3	9	15	0.1	15°	60	4	4	○
GRALSR4-03001200	3	9	20	0.1	15°	60	4	4	○
GRALSR4-03001250	3	9	25	0.1	15°	80	4	4	○
GRALSR4-03001300	3	9	30	0.1	15°	80	4	4	○
GRALSR4-03002150	3	9	15	0.2	15°	60	4	4	○
GRALSR4-03002200	3	9	20	0.2	15°	60	4	4	○
GRALSR4-03002250	3	9	25	0.2	15°	80	4	4	○
GRALSR4-03002300	3	9	30	0.2	15°	80	4	4	○
GRALSR4-03005150	3	9	15	0.5	15°	60	4	4	○
GRALSR4-03005200	3	9	20	0.5	15°	60	4	4	○
GRALSR4-03005250	3	9	25	0.5	15°	80	4	4	○
GRALSR4-03005300	3	9	30	0.5	15°	80	4	4	○

*New size added from this series. *Stocked items.



	Work Material		Graphite							
	(mm) Diameter /Radius	(mm) Effective Length	Roughing				Finishing			
			(min-1) Speed	(mm/min) Feed	Ap(mm)	Ae(mm)	(min-1) Speed	(mm/min) Feed	Ap(mm)	Ae(mm)
2 Flutes	0.5R0.5	4	24000	800	0.05	0.3	24000	800	0.03	0.1
	1R0.05	6	20000	1500	0.1	0.4	20000	1500	0.04	0.12
	1R0.05	10	20000	1200	0.1	0.4	20000	1200	0.04	0.12
4 Flutes	1R0.05	15	14000	1000	0.08	0.4	14000	1000	0.04	0.12
	1R0.05	20	12000	800	0.06	0.4	12000	800	0.02	0.12
	1R0.1	6	20000	1500	0.1	0.4	20000	1500	0.04	0.12
	1R0.1	10	20000	1200	0.1	0.4	20000	1200	0.04	0.12
	1R0.1	15	14000	1000	0.08	0.4	14000	1000	0.04	0.12
	1R0.1	20	12000	800	0.06	0.4	12000	800	0.02	0.12
Square	1.5R0.1	10	16000	1500	0.12	0.6	16000	1500	0.06	0.12
	1.5R0.1	15	14000	1500	0.12	0.6	14000	1500	0.06	0.12
	1.5R0.1	20	14000	1200	0.1	0.6	14000	1200	0.04	0.12
	1.5R0.2	10	16000	1500	0.12	0.6	16000	1500	0.06	0.12
	1.5R0.2	15	14000	1500	0.12	0.6	14000	1500	0.06	0.12
	1.5R0.2	20	14000	1200	0.1	0.6	14000	1200	0.04	0.12
	2R0.1	10	16000	2000	0.2	1.2	16000	2000	0.08	0.12
	2R0.1	15	14000	1600	0.15	1.2	14000	1600	0.08	0.12
	2R0.1	20	10000	1200	0.12	0.8	10000	1200	0.08	0.12
	2R0.1	25	10000	1000	0.1	0.8	10000	1000	0.06	0.12
Long Neck Square	2R0.2	10	16000	2000	0.2	1.2	16000	2000	0.08	0.12
	2R0.2	15	14000	1600	0.15	1.2	14000	1600	0.08	0.12
	2R0.2	20	10000	1200	0.12	0.8	10000	1200	0.08	0.12
	2R0.2	25	10000	1000	0.1	0.8	10000	1000	0.06	0.12
Ball	2R0.5	10	16000	2000	0.2	1.2	16000	2000	0.08	0.12
	2R0.5	15	14000	1600	0.15	1.2	14000	1600	0.08	0.12
	2R0.5	20	10000	1200	0.12	0.8	10000	1200	0.08	0.12
	2R0.5	25	10000	1000	0.1	0.8	10000	1000	0.06	0.12
Long Neck Ball	3R0.1	15	16000	3000	0.3	1.8	16000	3000	0.08	0.12
	3R0.1	20	12000	2500	0.2	1.8	12000	2500	0.08	0.12
	3R0.1	25	12000	2500	0.2	1.2	12000	2500	0.08	0.12
	3R0.1	30	10000	2000	0.12	1.2	10000	2000	0.06	0.12
Radius	3R0.2	15	16000	3000	0.3	1.8	16000	3000	0.08	0.12
	3R0.2	20	12000	2500	0.2	1.8	12000	2500	0.08	0.12
	3R0.2	25	12000	2500	0.2	1.2	12000	2500	0.08	0.12
	3R0.2	30	10000	2000	0.12	1.2	10000	2000	0.06	0.12
Long Neck Radius	3R0.5	15	16000	3000	0.3	1.8	16000	3000	0.08	0.12
	3R0.5	20	12000	2500	0.2	1.8	12000	2500	0.08	0.12
	3R0.5	25	12000	2500	0.2	1.2	12000	2500	0.08	0.12
	3R0.5	30	10000	2000	0.12	1.2	10000	2000	0.06	0.12

Remark:
*Decrease both spindle speed and feed rate proportionally when the milling parameters exceed the machine's maximum spindle speed;
*Decrease feed rate by 50% when slot machining;
*Recommend air blow.

Calculation of milling condition

①.Velocity : V_c (m/min)

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

$\pi = 3.14$ (Circular constant)
 D =Outside diameter (mm)
 n =Spindle speed (min^{-1})

②.Spindle speed: n (m/min^{-1})

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

V_c =Velocity (m/min)
 $\pi = 3.14$ (Circular constant)
 D =Outside diameter (mm)

③.Feed rate : V_f (mm/min)

$$V_f = n \times z \times f_z$$

n =Spindle speed (min^{-1})
 z =Number of flutes
 f_z =Feed per tooth (mm/t)

④.Feed per tooth: f_z (mm/t)

$$f_z = \frac{V_f}{n \times z}$$

V_f =Feed rate (mm/min)
 n =Spindle speed (min^{-1})
 z =Number of flutes

Explanation of terms used in parameters

①.Velocity V_c 【unit: m/min】 : the milling distance of an optional point on the circumference per unit (1 minute)

Related value	Diameter ϕD (mm)	Twice the distance from the center of a circle (radius)	
	π	Circular constant =3.14(unit:no)	
	n =Spindle Speed (min^{-1})	Revolutions per minute 【min(1Minute)】	【 min^{-1} 】 = 【rpm ; revolutions per minute】

*Length of circumference = diameter X Circular Constant: πD (mm)
*Velocity V_c : Milling length per minute = Length of circumference X Spindle rotation speed

$V_c = \pi \times D \text{ (mm)} \times n \text{ (min}^{-1}\text{)}$

$$V_c = \frac{\pi \times D \text{ (mm)} \times n \text{ (min}^{-1}\text{)}}{1000} \text{ (m/min)}$$

Unit conversion : 1mm = 1/1000m
 $D \text{ (mm)} = D/1000 \text{ (m)}$

②.Feed per tooth f_z 【Unit mm/t】

Related Value	Feed rate V_f (mm/min)	Amount of feed per minute	
	Spindle speed n (min^{-1})	Revolutions per minute (min^{-1})	【 min^{-1} 】 = 【rpm ; revolutions per minute】
	Number of flutes Z	Number of flutes	

*The amount of feed per rotation is discribed below 【rev = revolution】

*In case of 2 flutes

$$f = \frac{V_f \text{ (mm/min)}}{n \text{ (rev/min)}} = \frac{V_f}{n} \left(\frac{\text{mm}}{\text{min}} \right) \times \left(\frac{\text{min}}{\text{rev}} \right)$$
$$= \frac{V_f}{n} \text{ (mm/rev)}$$

* (min^{-1}) = (rev/min)

*The amount of feed per flute is calculated by using the feed rate divided by the number of flutes

$$f_z = \frac{f \text{ (mm/rev)}}{z} = \frac{V_f}{n \times z} \text{ (mm/t)}$$