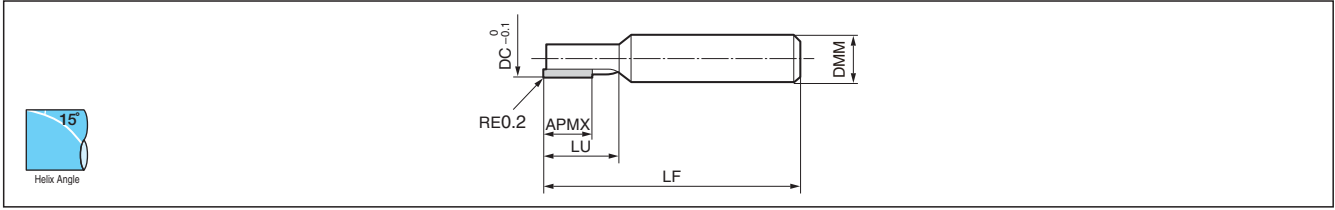




| | | | | | | | | | | | | |
|----------------|--------------|-------------|-------------------|----------------|----------------|-----------------|----------|-----------|----------------|--------------|----------|------|
| Coated Carbide | Carbon Steel | Alloy Steel | Prehardened Steel | Tempered Steel | Hardened Steel | Stainless Steel | Ti Alloy | Cast Iron | Aluminum Alloy | Copper Alloy | Graphite | CFRP |
| ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |



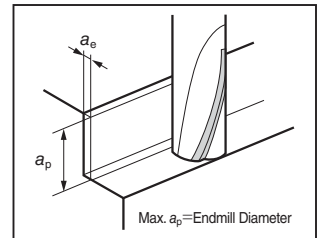
Body

| Cat. No. | Stock | Dimensions (mm) | | | | |
|------------------|-------|---------------------|-------------------|------------------------|-----------------|--------------------|
| | | Cutting diameter DC | Depth of cut APMX | Cutting Edge Length LU | Total Length LF | Shank diameter DMM |
| BNES 1060 | ● | 6.0 | 7.0 | 11.0 | 60 | 10 |
| 1080 | ● | 8.0 | 10.0 | 14.0 | 70 | 10 |
| 1100 | ● | 10.0 | 12.0 | 17.0 | 75 | 12 |
| 1120 | ● | 12.0 | 14.0 | 20.0 | 80 | 12 |
| 1140 | ● | 14.0 | 16.0 | 21.5 | 80 | 16 |
| BNES 1160 | ● | 16.0 | 18.0 | 24.0 | 80 | 16 |

Grade: BN350

General Purpose Machines

1. Use dry cutting (air blow) conditions.
2. Down cut recommended.
3. Make overhang as short as possible and, use a rigid machine.



Side Milling

| Hardness of Work Material | 50 to 57 HRC | | |
|---------------------------|------------------------------------|--------------------|----------------------------------|
| Cutting Conditions | Cutting Speed 100 to 170m/min | | |
| DC (mm) | Spindle Speed (min ⁻¹) | Feed Rate (mm/min) | Depth of Cut a _e (mm) |
| ø6 to 8 | 4,000 to 9,000 | 240 to 540 | Up to 0.1 |
| ø10 to 12 | 2,700 to 5,400 | 180 to 360 | Up to 0.15 |
| ø14 to 16 | 2,000 to 3,800 | 140 to 260 | Up to 0.2 |

| Hardness of Work Material | 58 to 65 HRC | | |
|---------------------------|------------------------------------|--------------------|----------------------------------|
| Cutting Conditions | Cutting Speed 80 to 150m/min | | |
| DC (mm) | Spindle Speed (min ⁻¹) | Feed Rate (mm/min) | Depth of Cut a _e (mm) |
| ø6 to 8 | 3,200 to 8,000 | 150 to 370 | Up to 0.08 |
| ø10 to 12 | 2,100 to 4,800 | 120 to 370 | Up to 0.12 |
| ø14 to 16 | 1,600 to 3,400 | 110 to 230 | Up to 0.15 |

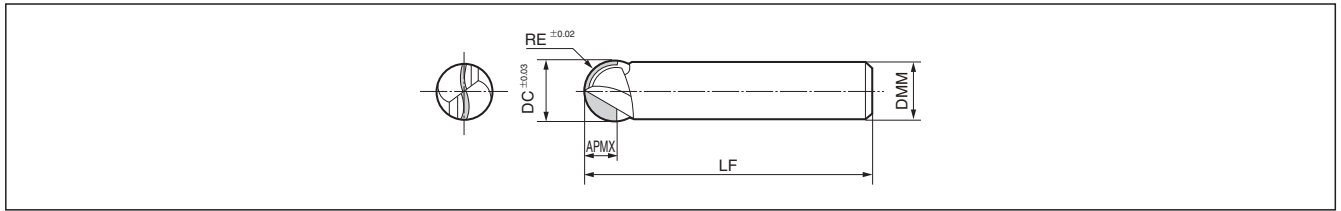
See L119 for details



SUMIBORON Ballnose Endmills **BNBS** Type



| | | | | | | | | | | | | |
|----------------|--------------|-------------|--------------------|---------------|----------------|-----------------|--------------|-----------|----------------|--------------|----------|------|
| Coated Carbide | Carbon Steel | Alloy Steel | Pre-hardened Steel | Impress/Steel | Hardened Steel | Stainless Steel | Ti Alloy | Cast Iron | Aluminum Alloy | Copper Alloy | Graphite | CFRP |
| | | | | | 45 to 55 HRC | 55 to 60 HRC | 60 to 65 HRC | | | × | × | |



Body

| Cat. No. | Stock | Dimensions (mm) | | | | |
|-------------------|-------|-----------------|---------------------|-------------------|-----------------|--------------------|
| | | Radius RE | Cutting diameter DC | Depth of cut APMX | Total Length LF | Shank diameter DMM |
| BNBS 2020S | ● | 1.0 | 2.0 | 1.5 | 50 | 4 |
| 2030S | ● | 1.5 | 3.0 | 2.0 | 60 | 6 |
| 2040S | ● | 2.0 | 4.0 | 3.0 | 70 | 6 |
| 2060S | ● | 3.0 | 6.0 | 4.5 | 80 | 6 |
| 2080S | ● | 4.0 | 8.0 | 5.5 | 90 | 8 |
| BNBS 2100S | ● | 5.0 | 10.0 | 6.5 | 100 | 10 |
| 2120S | ● | 6.0 | 12.0 | 7.5 | 110 | 12 |

Grade: BN350

General Purpose Machines

1. Use a rigid machine and select a high cutting speed with low feed rate.
2. Use dry cutting conditions.
3. Make overhang as short as possible.
4. If work material hardness is lower than HRC50, try a coated or uncoated carbide ballnose endmill instead. (→I106)

Radius Milling

| Work Material | Hardened Steel (50 to 57 HRC) | | Hardened Steel (58 to 65 HRC) | |
|---------------|------------------------------------|--------------------|------------------------------------|--------------------|
| | Spindle Speed (min ⁻¹) | Feed Rate (mm/min) | Spindle Speed (min ⁻¹) | Feed Rate (mm/min) |
| RE (mm) | | | | |
| 1.0 | 26,000 | 1,100 | 22,000 | 670 |
| 1.5 | 18,000 | 700 | 15,000 | 450 |
| 2.0 | 13,000 | 530 | 11,000 | 330 |
| 3.0 | 8,800 | 610 | 7,400 | 450 |
| 4.0 | 6,600 | 460 | 5,600 | 330 |
| 5.0 | 5,300 | 630 | 4,500 | 400 |
| 6.0 | 4,400 | 530 | 3,700 | 330 |
| Standard | 0.01DC | | 0.01DC | |
| Depth-of-cut | 0.02DC | | 0.02DC | |

See L125 for details

I

SUMIBORON
Endmills

Square

2 Flutes

3 Flutes

4 Flutes

6 Flutes
8 Flutes

Radius

Ballnose

DLC

SUMIDIA
Coat

Long
Neck

Uncoated

CBN
PCD