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# SOLID CARBIDE CUTTING TOOLS

## WORLDIA DESIGN

WORLDIA®

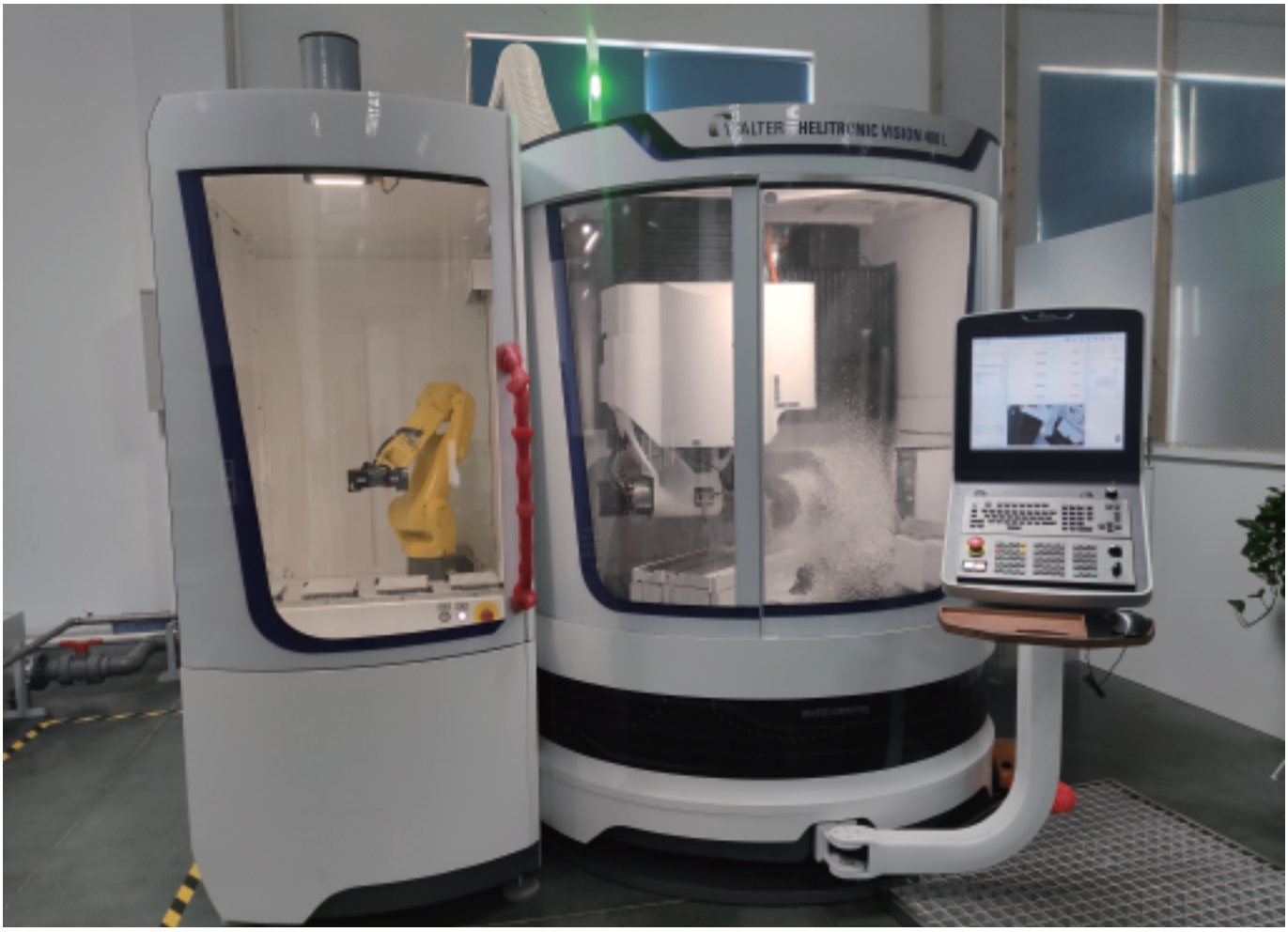
JIAXING WORLDIA DIAMOND TOOLS CO.,LTD.

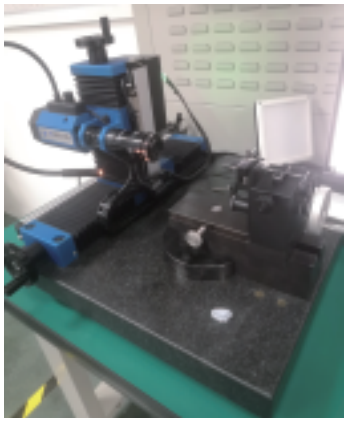

# About us

## ENTERPRISE

Jiaxing Worldia Diamond Tools Co., Ltd. was established in 2016 which is located in Jiaxing city, Zhejiang province. The registered capital is 46 million dollars and covers an area of about 40,000 square meters, Jiaxing WORLDIA is the wholly-owned subsidiary of BEIJING WORLDIA DIAMOND TOOLS CO.,LTD （Stock code：688028）

WORLDIA product catalogue mainly covers high-precision CBN/PCD/CVD cutting tools, solid carbide cutting tools，diamond scribing wheels & related accessories，CVD diamond materials & related product and high-end laser machines etc.





## Solid carbide cutting tools

We manufacturer solid carbide cutting tools with a number of five axis CNC linkage grinders, tool inspectors, HAIMER dynamical balancing machines, ZOLLER tool setting gauge, and other industrial high-end equipment and instruments.We specialized in providing professional services including R&D, manufacturing, regrinding and technical services.
Our purpose is to solve processing problems for customers and enhance their competitiveness.
The main product includes solid carbide drills,mills,reamers,profiling cutters,customized tools and related tools regrinding service.The products are mainly used in automotive, mold, 3C, medical and other precision manufacturing industries etc.

# INDEX



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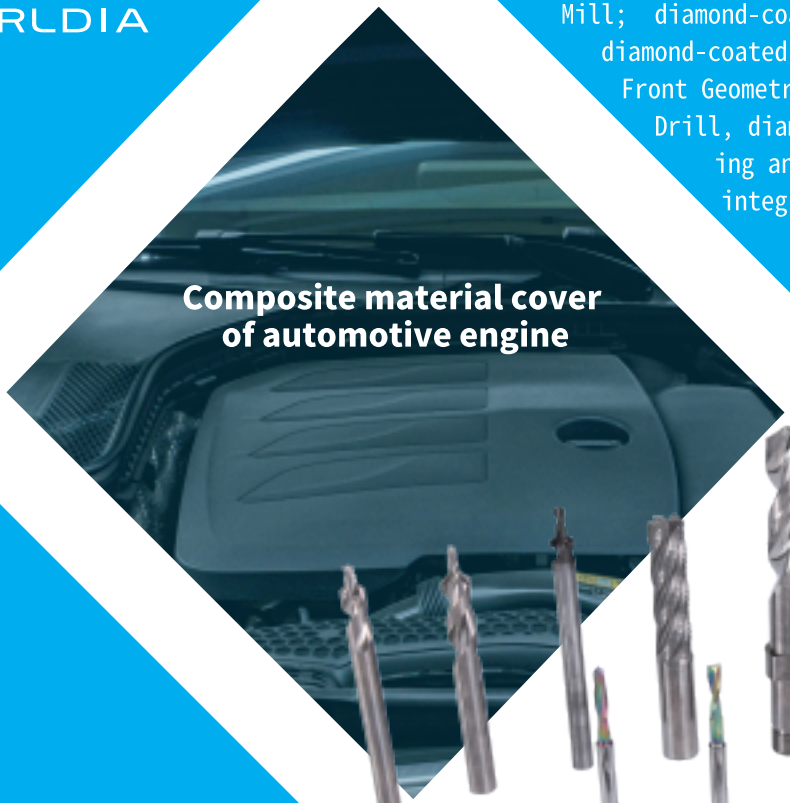
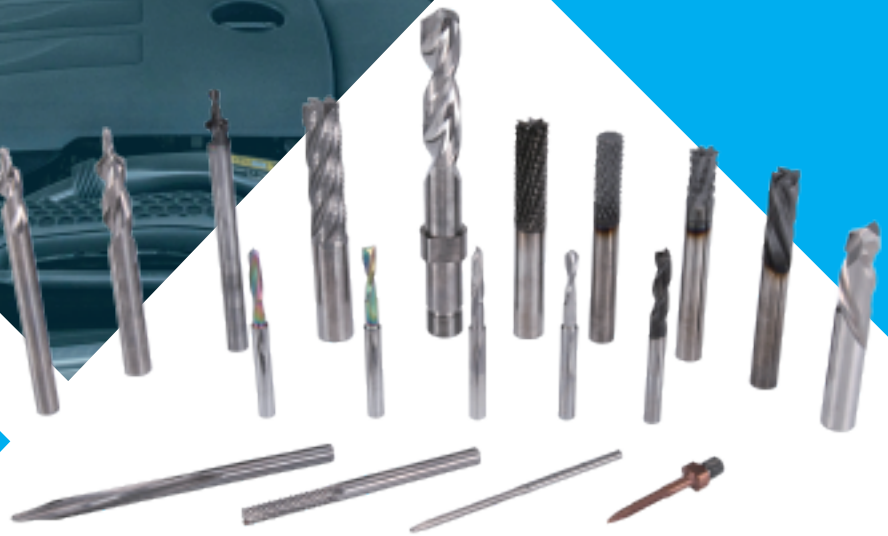
# 01

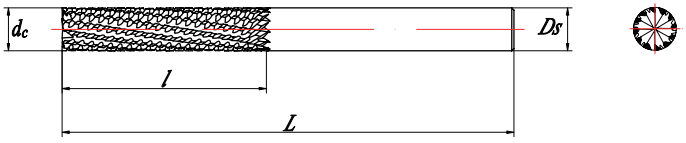
## Tools used to process composite materials

Mainly include diamond-coated Multi-flute End Mill; diamond-coated Cross-edge End mill; diamond-coated Herringbone End Mill, Front Geometry Drill, Three-point Drill, diamond-coated Drilling and Countersink integration tools, etc.



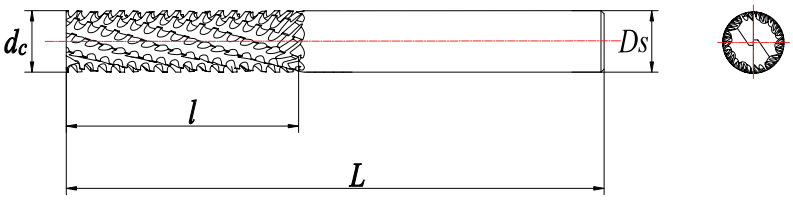
# Multi-flute End Mill




Unit: inch

| cutter diameter dc | cutter length l | length L | Shank diameter Ds | Cutter of number Z | Cutter type | Coating type |
|---|---|---|---|---|---|---|
| 0.157 | 0.47 | 1.57 | 0.16 | 6 | None/End Mill/Drill | None/Diamond |
| 0.236 | 0.708 | 2.440 | 0.236 | 8 | None/End Mill/Drill | None/Diamond |
| 0.25 | 0.708 | 2.440 | 0.25 | 8 | None/End Mill/Drill | None/Diamond |
| 0.315 | 0.984 | 2.440 | 0.315 | 10 | None/End Mill/Drill | None/Diamond |
| 0.375 | 0.984 | 2.440 | 0.375 | 12 | None/End Mill/Drill | None/Diamond |
| 0.393 | 0.984 | 2.440 | 0.393 | 12 | None/End Mill/Drill | None/Diamond |
| 0.472 | 0.984 | 3.070 | 0.472 | 14 | None/End Mill/Drill | None/Diamond |
| 0.50 | 0.984 | 3.070 | 0.50 | 14 | None/End Mill/Drill | None/Diamond |

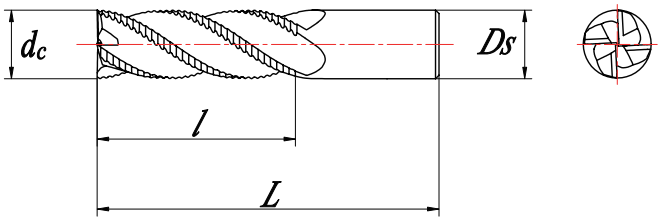
# Cross-edge End Mill




Unit: inch

| cutter diameter dc | cutter length l | length L | Shank diameter Ds | Cutter of number Z | Cutter type | Coating type |
|---|---|---|---|---|---|---|
| 0.157 | 0.472 | 1.574 | 0.157 | 6 | None/End Mill/Drill | None/Diamond |
| 0.236 | 0.708 | 2.440 | 0.236 | 8 | None/End Mill/Drill | None/Diamond |
| 0.25 | 0.708 | 2.440 | 0.250 | 8 | None/End Mill/Drill | None/Diamond |
| 0.315 | 0.984 | 2.440 | 0.315 | 10 | None/End Mill/Drill | None/Diamond |
| 0.375 | 0.984 | 2.440 | 0.375 | 12 | None/End Mill/Drill | None/Diamond |
| 0.393 | 0.984 | 2.440 | 0.393 | 12 | None/End Mill/Drill | None/Diamond |
| 0.472 | 0.984 | 3.070 | 0.472 | 14 | None/End Mill/Drill | None/Diamond |
| 0.500 | 0.984 | 3.070 | 0.500 | 14 | None/End Mill/Drill | None/Diamond |

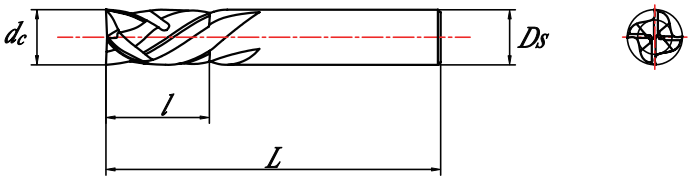
# Roughing End Mill




Unit: inch

| cutter diameter *dc* | cutter length *l* | length *L* | Shank diameter *Ds* | Cutter of number *Z* | Coating type |
|---|---|---|---|---|---|
| 0.157 | 0.472 | 1.574 | 0.157 | 6 | None/Diamond |
| 0.236 | 0.708 | 2.440 | 0.236 | 8 | None/Diamond |
| 0.25 | 0.708 | 2.440 | 0.250 | 8 | None/Diamond |
| 0.315 | 0.984 | 2.440 | 0.315 | 10 | None/Diamond |
| 0.375 | 0.984 | 2.440 | 0.375 | 12 | None/Diamond |
| 0.393 | 0.984 | 2.440 | 0.393 | 12 | None/Diamond |
| 0.472 | 0.984 | 3.070 | 0.472 | 14 | None/Diamond |
| 0.500 | 0.984 | 3.070 | 0.500 | 14 | None/Diamond |

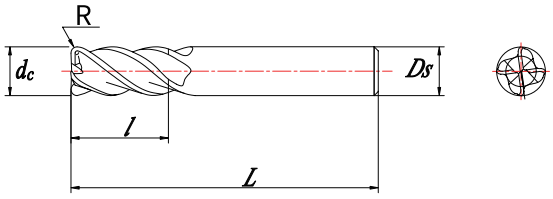
# Herringbone End Mill




Unit: inch

| Blade diameter *dc* | Blade length *l* | Blade length $l_1$ | Total length *L* | Shank diameter *Ds* | Blade length *l1(0.7d)* | Coating type |
|---|---|---|---|---|---|---|
| 0.236 | 0.708 | 0.165 | 2.440 | 0.236 | 8 | None/Diamond |
| 0.250 | 0.708 | 0.177 | 2.440 | 0.250 | 8 | None/Diamond |
| 0.315 | 0.984 | 0.220 | 2.440 | 0.315 | 10 | None/Diamond |
| 0.375 | 0.984 | 0.236 | 2.440 | 0.375 | 12 | None/Diamond |
| 0.393 | 0.984 | 0.275 | 2.440 | 0.393 | 12 | None/Diamond |
| 0.472 | 0.984 | 0.330 | 3.070 | 0.472 | 14 | None/Diamond |
| 0.500 | 0.984 | 0.350 | 3.070 | 0.500 | 14 | None/Diamond |

# Carbide End Mill-R




Unit: inch

| Blade diameter *dc* | Fillet *R* | Blade length *l* | Total length *L* | Shank diameter *Ds* | Cutter of number *Z* | Coating type |
|---|---|---|---|---|---|---|
| 0.157 | 0.016 | 0.472 | 1.575 | 0.157 | 4 | None/Diamond |
| 0.157 | 0.027 | 0.472 | 1.575 | 0.157 | 4 | None/Diamond |
| 0.236 | 0.016 | 0.708 | 2.440 | 2.236 | 8 | None/Diamond |
| 0.236 | 0.039 | 0.708 | 2.440 | 0.236 | 8 | None/Diamond |
| 0.250 | 0.016 | 0.708 | 2.440 | 0.250 | 8 | None/Diamond |
| 0.250 | 0.039 | 0.708 | 2.440 | 0.250 | 8 | None/Diamond |
| 0.315 | 0.016 | 0.708 | 2.440 | 0.315 | 10 | None/Diamond |
| 0.315 | 0.39 | 0.708 | 2.440 | 0.315 | 10 | None/Diamond |
| 0.375 | 0.016 | 0.984 | 2.440 | 0.375 | 12 | None/Diamond |
| 0.375 | 0.039 | 0.984 | 2.440 | 0.375 | 12 | None/Diamond |
| 0.393 | 0.016 | 0.984 | 2.440 | 0.393 | 12 | None/Diamond |
| 0.393 | 0.039 | 0.984 | 2.440 | 0.393 | 12 | None/Diamond |
| 0.472 | 0.016 | 0.984 | 3.071 | 0.472 | 14 | None/Diamond |
| 0.472 | 0.039 | 0.984 | 3.071 | 0.742 | 14 | None/Diamond |
| 0.500 | 0.016 | 0.984 | 3.071 | 0.500 | 14 | None/Diamond |
| 0.500 | 0.039 | 0.984 | 3.071 | 0.500 | 14 | None/Diamond |

# Cutting parameters

**CFRP**

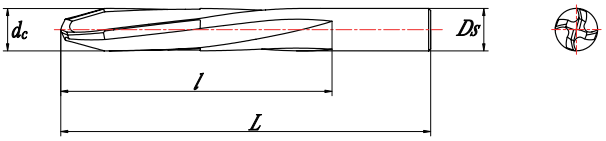
| CFRP、CFRP/Al、CFRP/Ti | | | | | | |
|---|---|---|---|---|---|---|
| Mill method | Mill Slot (ae=dc, ap≦dc) | | Copy Milling (ae≦0.5dc, ap≦1.5dc) | | | |
| | Vc=4724.4in/min | | Vc=5905.5in/min | | Vc=9842.5in/min | |
| dc | n(rpm) | Fr(in/r) | n(rpm) | Fr(in/r) | n(rpm) | Fr(in/r) |
| 0.039 | 38217 | 0.0014 | 47771 | 0.0014 | 79618 | 0.0030 |
| 0.047 | 31847 | 0.0016 | 39809 | 0.0016 | 66348 | 0.0035 |
| 0.059 | 25478 | 0.0017 | 31847 | 0.0017 | 53079 | 0.0038 |
| 0.071 | 21231 | 0.0017 | 26539 | 0.0017 | 44232 | 0.0038 |
| 0.079 | 19108 | 0.0018 | 23885 | 0.0018 | 39809 | 0.0039 |
| 0.098 | 15287 | 0.0020 | 19108 | 0.0020 | 31847 | 0.0043 |
| 0.118 | 12739 | 0.0024 | 15924 | 0.0024 | 26539 | 0.0052 |
| 0.154 | 9554 | 0.0031 | 11943 | 0.0031 | 19904 | 0.0069 |
| 0.236 | 6369 | 0.0043 | 7962 | 0.0043 | 13270 | 0.0095 |
| 0.250 | 6018 | 0.0047 | 7523 | 0.0047 | 12538 | 0.0104 |
| 0.315 | 4777 | 0.0091 | 5971 | 0.0091 | 9952 | 0.0199 |
| 0.375 | 4012 | 0.0122 | 5015 | 0.0122 | 8359 | 0.0269 |
| 0.394 | 3822 | 0.0138 | 4777 | 0.0138 | 7962 | 0.0303 |
| 0.472 | 3185 | 0.0173 | 3981 | 0.0173 | 6635 | 0.0381 |
| 0.500 | 3009 | 0.0189 | 3761 | 0.0189 | 6269 | 0.0416 |

**GFRP**

| GFRP、GFRP/Al、GFRP/Ti | | | | | | |
|---|---|---|---|---|---|---|
| Mill method | Mill Slot (ae=dc, ap≦dc) | | Copy Milling (ae≦0.5dc, ap≦1.5dc) | | High speed milling (ae≦0.05dc, ap≦2dc) | |
| | Vc=39374in/min | | Vc=4724.4/min | | Vc=7874in/min | |
| dc | n(rpm) | Fr(in/r) | n(rpm) | Fr(in/r) | n(rpm) | Fr(in/r) |
| 0.039 | 31847 | 0.0014 | 38217 | 0.0014 | 63694 | 0.0030 |
| 0.047 | 26539 | 0.0016 | 31847 | 0.0016 | 53079 | 0.0035 |
| 0.059 | 21231 | 0.0017 | 25478 | 0.0017 | 42463 | 0.0038 |
| 0.071 | 17693 | 0.0017 | 21231 | 0.0017 | 35386 | 0.0038 |
| 0.079 | 15924 | 0.0018 | 19108 | 0.0018 | 31847 | 0.0039 |
| 0.098 | 12739 | 0.0020 | 15287 | 0.0020 | 25478 | 0.0043 |
| 0.118 | 10616 | 0.0024 | 12739 | 0.0024 | 21231 | 0.0052 |
| 0.157 | 7962 | 0.0031 | 9554 | 0.0031 | 15924 | 0.0069 |
| 0.236 | 5308 | 0.0043 | 6369 | 0.0043 | 10616 | 0.0095 |
| 0.250 | 5015 | 0.0047 | 6018 | 0.0047 | 10031 | 0.0104 |
| 0.315 | 3981 | 0.0091 | 4777 | 0.0091 | 7962 | 0.0199 |
| 0.375 | 3344 | 0.0122 | 4012 | 0.0122 | 6687 | 0.0269 |
| 0.394 | 3185 | 0.0138 | 3822 | 0.0138 | 6369 | 0.0303 |
| 0.472 | 2654 | 0.0173 | 3185 | 0.0173 | 5308 | 0.0381 |
| 0.500 | 2508 | 0.0189 | 3009 | 0.0189 | 5015 | 0.0416 |

The above cutting parameter table is for reference only. The default is dry cutting conditions. If there is coolant, the cutting parameters can be appropriately increased.The types,structures and on-site cutting conditions of different composite materials require appropriate adjustments to the cutting parameters.Fine finishing usually requires a reduction in feed speed and depth of cut.When the cutting temperature is too high and the composite resin has melted or damaged, the speed should be reduced. When the material is stratified, the feed rate should be reduced.

# Front Geometry Drill

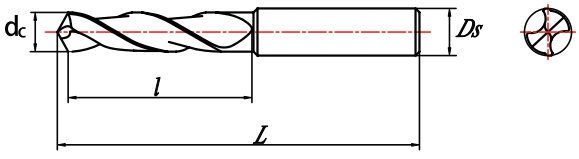



Unit: inch

| Blade diameter dc | Blade length l | Total length L | Shank diameter | Coating type |
|---|---|---|---|---|
| 0.128 | 1.417 | 3.00 | 0.128 | None/Diamond |
| 0.141 | 1.417 | 3.00 | 0.141 | None/Diamond |
| 0.156 | 1.417 | 3.00 | 0.156 | None/Diamond |
| 0.159 | 1.417 | 3.00 | 0.159 | None/Diamond |
| 0.187 | 1.417 | 3.00 | 0.187 | None/Diamond |
| 0.193 | 1.417 | 3.00 | 0.193 | None/Diamond |
| 0.201 | 1.417 | 3.00 | 0.201 | None/Diamond |

| Blade diameter dc | Blade length l | Total length L | Shank diameter Ds | Coating type |
|---|---|---|---|---|
| 0.219 | 1.417 | 3.00 | 0.219 | None/Diamond |
| 0.233 | 1.417 | 3.00 | 0.234 | None/Diamond |
| 0.250 | 1.417 | 3.00 | 0.250 | None/Diamond |
| 0.313 | 1.890 | 4.00 | 0.313 | None/Diamond |
| 0.397 | 1.890 | 4.00 | 0.375 | None/Diamond |

# General Twist Drill




Unit: inch

| Blade diameter | Blade length | Total length | Shank diameter | Coating type |
|---|---|---|---|---|
| 0.118 | 0.787 | 2.441 | 0.157 | None/Diamond |
| 0.122 | 0.787 | 2.441 | 0.157 | None/Diamond |
| 0.126 | 0.787 | 2.441 | 0.157 | None/Diamond |
| 0.130 | 0.787 | 2.598 | 0.157 | None/Diamond |
| 0.134 | 0.787 | 2.598 | 0.157 | None/Diamond |
| 0.138 | 0.787 | 2.598 | 0.157 | None/Diamond |
| 0.141 | 0.787 | 2.598 | 0.157 | None/Diamond |
| 0.146 | 0.787 | 2.598 | 0.157 | None/Diamond |
| 0.149 | 0.866 | 2.598 | 0.157 | None/Diamond |
| 0.153 | 0.866 | 2.598 | 0.157 | None/Diamond |
| 0.157 | 0.945 | 2.598 | 0.157 | None/Diamon d |

| Blade diameter dc | Blade length l | Total length L | Shank diameter Ds | Coating type |
|---|---|---|---|---|
| 0.161 | 0.945 | 2.598 | 0.197 | None/Diamond |
| 0.165 | 0.945 | 2.598 | 0.197 | None/Diamond |
| 0.169 | 0.945 | 2.756 | 0.197 | None/Diamond |
| 0.173 | 1.024 | 2.756 | 0.197 | None/Diamond |
| 0.177 | 1.024 | 2.756 | 0.197 | None/Diamond |
| 0.181 | 1.024 | 2.756 | 0.197 | None/Diamond |
| 0.185 | 1.102 | 3.150 | 0.197 | None/Diamond |
| 0.189 | 1.102 | 3.150 | 0.197 | None/Diamond |
| 0.193 | 1.102 | 3.150 | 0.197 | None/Diamond |
| 0.197 | 1.181 | 3.150 | 0.197 | None/Diamond |
| 0.201 | 1.181 | 3.150 | 0.236 | None/Diamond |

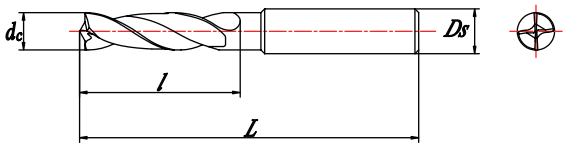
| Blade diameter | Blade length | Total length | Shank diameter | Coating type |
|---|---|---|---|---|
| 0.204 | 1.181 | 3.150 | 0.236 | None/Diamond |
| 0.209 | 1.181 | 3.150 | 0.236 | None/Diamond |
| 0.213 | 1.260 | 3.150 | 0.236 | None/Diamond |
| 0.216 | 1.260 | 3.150 | 0.236 | None/Diamond |
| 0.220 | 1.2598 | 3.1496 | 0.236 | None/Diamond |
| 0.224 | 1.3386 | 3.1496 | 0.236 | None/Diamond |
| 0.228 | 1.339 | 3.150 | 0.236 | None/Diamond |
| 0.232 | 1.339 | 3.150 | 0.236 | None/Diamond |
| 0.236 | 1.417 | 3.150 | 0.236 | None/Diamond |
| 0.240 | 1.417 | 3.150 | 0.275 | None/Diamond |
| 0.244 | 1.417 | 3.150 | 0.275 | None/Diamond |
| 0.248 | 1.417 | 3.150 | 0.275 | None/Diamond |
| 0.251 | 1.496 | 3.150 | 0.275 | None/Diamond |
| 0.256 | 1.496 | 3.150 | 0.275 | None/Diamond |
| 0.260 | 1.496 | 3.150 | 0.275 | None/Diamond |
| 0.263 | 1.575 | 3.150 | 0.275 | None/Diamond |
| 0.268 | 1.575 | 3.150 | 0.275 | None/Diamond |
| 0.271 | 1.575 | 3.150 | 0.275 | None/Diamond |
| 0.275 | 1.654 | 3.150 | 0.275 | None/Diamond |
| 0.279 | 1.654 | 3.780 | 0.315 | None/Diamond |
| 0.283 | 1.654 | 3.780 | 0.315 | None/Diamond |
| 0.287 | 1.654 | 3.780 | 0.315 | None/Diamond |
| 0.291 | 1.732 | 3.780 | 0.315 | None/Diamond |
| 0.295 | 1.732 | 3.780 | 0.315 | None/Diamond |
| 0.299 | 1.732 | 3.780 | 0.315 | None/Diamond |
| 0.303 | 1.811 | 3.780 | 0.315 | None/Diamond |
| 0.307 | 1.811 | 3.780 | 0.315 | None/Diamond |
| 0.311 | 1.811 | 3.780 | 0.315 | None/Diamond |
| 0.315 | 1.890 | 3.780 | 0.354 | None/Diamond |
| 0.319 | 1.890 | 3.780 | 0.354 | None/Diamond |
| 0.322 | 1.890 | 3.780 | 0.354 | None/Diamond |
| 0.327 | 1.890 | 3.780 | 0.354 | None/Diamond |
| 0.331 | 1.890 | 3.780 | 0.354 | None/Diamond |
| 0.335 | 1.890 | 3.780 | 0.354 | None/Diamond |
| 0.338 | 1.890 | 3.780 | 0.354 | None/Diamond |
| 0.342 | 1.890 | 3.780 | 0.354 | None/Diamond |

| Blade diameter *dc* | Blade length *l* | Total length *L* | Shank diameter *Ds* | Coating type |
|---|---|---|---|---|
| 0.346 | 1.890 | 3.780 | 0.354 | None/Diamond |
| 0.350 | 1.890 | 3.780 | 0.354 | None/Diamond |
| 0.354 | 1.890 | 3.780 | 0.354 | None/Diamond |
| 0.358 | 1.969 | 3.937 | 0.394 | None/Diamond |
| 0.362 | 1.969 | 3.937 | 0.394 | None/Diamond |
| 0.366 | 1.969 | 3.937 | 0.394 | None/Diamond |
| 0.370 | 1.969 | 3.937 | 0.394 | None/Diamond |
| 0.374 | 1.969 | 3.937 | 0.394 | None/Diamond |
| 0.378 | 1.969 | 3.937 | 0.394 | None/Diamond |
| 0.382 | 1.969 | 3.937 | 0.394 | None/Diamond |
| 0.386 | 1.969 | 3.937 | 0.394 | None/Diamond |
| 0.390 | 1.969 | 3.937 | 0.394 | None/Diamond |
| 0.393 | 1.969 | 3.937 | 0.394 | None/Diamond |
| 0.398 | 2.165 | 4.134 | 0.433 | None/Diamond |
| 0.401 | 2.165 | 4.134 | 0.433 | None/Diamond |
| 0.405 | 2.165 | 4.134 | 0.433 | None/Diamond |
| 0.409 | 2.165 | 4.134 | 0.433 | None/Diamond |
| 0.413 | 2.165 | 4.134 | 0.433 | None/Diamond |
| 0.417 | 2.165 | 4.134 | 0.433 | None/Diamond |
| 0.421 | 2.165 | 4.134 | 0.433 | None/Diamond |
| 0.425 | 2.165 | 4.134 | 0.433 | None/Diamond |
| 0.429 | 2.165 | 4.134 | 0.433 | None/Diamond |
| 0.433 | 2.165 | 4.134 | 0.433 | None/Diamond |
| 0.437 | 2.165 | 4.134 | 0.472 | None/Diamond |
| 0.441 | 2.165 | 4.134 | 0.472 | None/Diamond |
| 0.445 | 2.165 | 4.134 | 0.472 | None/Diamond |
| 0.449 | 2.165 | 4.134 | 0.472 | None/Diamond |
| 0.452 | 2.165 | 4.134 | 0.472 | None/Diamond |
| 0.453 | 2.165 | 4.134 | 0.472 | None/Diamond |
| 0.460 | 2.165 | 4.134 | 0.472 | None/Diamond |
| 0.464 | 2.165 | 4.134 | 0.472 | None/Diamond |
| 0.468 | 2.165 | 4.134 | 0.472 | None/Diamond |
| 0.472 | 2.165 | 4.134 | 0.472 | None/Diamond |
| 0.476 | 2.362 | 4.252 | 0.512 | None/Diamond |
| 0.480 | 2.362 | 4.252 | 0.512 | None/Diamond |
| 0.484 | 2.362 | 4.252 | 0.512 | None/Diamond |

| Blade diameter dc | Blade length l | Total length L | Shank diameter Ds | Coating type |
|---|---|---|---|---|
| 0.488 | 2.362 | 4.252 | 0.512 | None/Diamond |
| 0.492 | 2.362 | 4.252 | 0.512 | None/Diamond |
| 0.496 | 2.362 | 4.252 | 0.512 | None/Diamond |
| 0.500 | 2.362 | 4.252 | 0.512 | None/Diamond |

| Blade diameter dc | Blade length l | Total length L | Shank diameter Ds | Coating type |
|---|---|---|---|---|
| 0.503 | 2.362 | 4.252 | 0.512 | None/Diamond |
| 0.508 | 2.362 | 4.252 | 0.512 | None/Diamond |
| 0.512 | 2.362 | 4.252 | 0.512 | None/Diamond |

# Three-point Drill



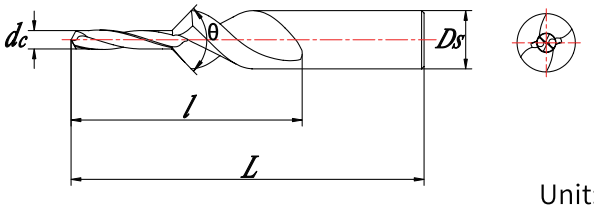

Unit: inch

| Blade diameter dc | Blade length l | Total length L | Shank diameter Ds | Coating type |
|---|---|---|---|---|
| 0.118 | 0.787 | 2.441 | 0.157 | None/Diamond |
| 0.122 | 0.787 | 2.441 | 0.157 | None/Diamond |
| 0.126 | 0.787 | 2.441 | 0.157 | None/Diamond |
| 0.130 | 0.787 | 2.598 | 0.157 | None/Diamond |
| 0.134 | 0.787 | 2.598 | 0.157 | None/Diamond |
| 0.138 | 0.787 | 2.598 | 0.157 | None/Diamond |
| 0.141 | 0.787 | 2.598 | 0.157 | None/Diamond |
| 0.145 | 0.787 | 2.598 | 0.157 | None/Diamond |
| 0.150 | 0.787 | 2.598 | 0.157 | None/Diamond |
| 0.153 | 0.787 | 2.598 | 0.157 | None/Diamond |
| 0.157 | 0.945 | 2.598 | 0.157 | None/Diamond |
| 0.161 | 0.945 | 2.598 | 0.197 | None/Diamond |
| 0.165 | 0.945 | 2.598 | 0.197 | None/Diamond |
| 0.169 | 0.945 | 2.756 | 0.197 | None/Diamond |
| 0.173 | 0.945 | 2.756 | 0.197 | None/Diamond |
| 0.177 | 1.024 | 2.756 | 0.197 | None/Diamond |
| 0.181 | 1.024 | 2.756 | 0.197 | None/Diamond |
| 0.185 | 1.024 | 2.756 | 0.197 | None/Diamond |
| 0.189 | 1.102 | 2.756 | 0.197 | None/Diamond |
| 0.192 | 1.102 | 2.756 | 0.197 | None/Diamond |
| 0.197 | 1.181 | 3.150 | 0.197 | None/Diamond |
| 0.201 | 1.181 | 3.150 | 0.157 | None/Diamond |

| Blade diameter dc | Blade length l | Total length L | Shank diameter Ds | Coating type |
|---|---|---|---|---|
| 0.205 | 1.181 | 3.150 | 0.157 | None/Diamond |
| 0.209 | 1.575 | 3.150 | 0.157 | None/Diamond |
| 0.213 | 1.181 | 3.150 | 0.157 | None/Diamond |
| 0.216 | 1.181 | 3.150 | 0.157 | None/Diamond |
| 0.220 | 1.181 | 3.150 | 0.157 | None/Diamond |
| 0.224 | 1.260 | 3.150 | 0.157 | None/Diamond |
| 0.228 | 1.260 | 3.150 | 0.157 | None/Diamond |
| 0.232 | 1.260 | 3.150 | 0.157 | None/Diamond |
| 0.236 | 1.339 | 3.150 | 0.236 | None/Diamond |
| 0.240 | 1.339 | 3.150 | 0.276 | None/Diamond |
| 0.244 | 1.339 | 3.150 | 0.276 | None/Diamond |
| 0.248 | 1.339 | 3.150 | 0.276 | None/Diamond |
| 0.252 | 1.417 | 3.150 | 0.276 | None/Diamond |
| 0.256 | 1.417 | 3.150 | 0.276 | None/Diamond |
| 0.260 | 1.417 | 3.150 | 0.276 | None/Diamond |
| 0.264 | 1.417 | 3.150 | 0.276 | None/Diamond |
| 0.268 | 1.417 | 3.150 | 0.276 | None/Diamond |
| 0.272 | 1.417 | 3.150 | 0.276 | None/Diamond |
| 0.275 | 1.496 | 3.150 | 0.276 | None/Diamond |
| 0.279 | 1.496 | 3.780 | 0.315 | None/Diamond |
| 0.283 | 1.496 | 3.780 | 0.315 | None/Diamond |
| 0.287 | 1.496 | 3.780 | 0.315 | None/Diamond |

| Blade diameter *dc* | Blade length *l* | Total length *L* | Shank diameter *Ds* | Coating type |
|---|---|---|---|---|
| 0.291 | 1.496 | 3.780 | 0.315 | None/Diamond |
| 0.295 | 1.575 | 3.780 | 0.315 | None/Diamond |
| 0.299 | 1.575 | 3.780 | 0.315 | None/Diamond |
| 0.303 | 1.575 | 3.780 | 0.315 | None/Diamond |
| 0.307 | 1.575 | 3.780 | 0.315 | None/Diamond |
| 0.311 | 1.575 | 3.780 | 0.315 | None/Diamond |
| 0.315 | 1.732 | 3.780 | 0.354 | None/Diamond |
| 0.319 | 1.732 | 3.780 | 0.354 | None/Diamond |
| 0.323 | 1.732 | 3.780 | 0.354 | None/Diamond |
| 0.327 | 1.732 | 3.780 | 0.354 | None/Diamond |
| 0.331 | 1.811 | 3.780 | 0.354 | None/Diamond |
| 0.335 | 1.811 | 3.780 | 0.354 | None/Diamond |
| 0.338 | 1.811 | 3.780 | 0.354 | None/Diamond |
| 0.342 | 1.890 | 3.780 | 0.354 | None/Diamond |
| 0.346 | 1.890 | 3.780 | 0.354 | None/Diamond |
| 0.350 | 1.890 | 3.780 | 0.354 | None/Diamond |
| 0.354 | 1.890 | 3.780 | 0.354 | None/Diamond |
| 0.358 | 1.969 | 3.937 | 0.394 | None/Diamond |
| 0.362 | 1.969 | 3.937 | 0.394 | None/Diamond |
| 0.366 | 1.969 | 3.937 | 0.394 | None/Diamond |
| 0.370 | 1.969 | 3.937 | 0.394 | None/Diamond |
| 0.374 | 1.969 | 3.937 | 0.394 | None/Diamond |
| 0.378 | 1.969 | 3.937 | 0.394 | None/Diamond |
| 0.382 | 1.969 | 3.937 | 0.394 | None/Diamond |
| 0.386 | 1.969 | 3.937 | 0.394 | None/Diamond |
| 0.390 | 1.969 | 3.937 | 0.394 | None/Diamond |
| 0.394 | 1.969 | 3.937 | 0.394 | None/Diamond |
| 0.397 | 2.165 | 4.134 | 0.433 | None/Diamond |
| 0.402 | 2.165 | 4.134 | 0.433 | None/Diamond |
| 0.405 | 2.165 | 4.134 | 0.433 | None/Diamond |
| 0.409 | 2.165 | 4.134 | 0.433 | None/Diamond |
| 0.413 | 2.165 | 4.134 | 0.433 | None/Diamond |
| 0.417 | 2.165 | 4.134 | 0.433 | None/Diamond |
| 0.421 | 2.165 | 4.134 | 0.433 | None/Diamond |
| 0.425 | 2.165 | 4.134 | 0.433 | None/Diamond |
| 0.429 | 2.165 | 4.134 | 0.433 | None/Diamond |
| 0.433 | 2.165 | 4.134 | 0.433 | None/Diamond |
| 0.437 | 2.165 | 4.134 | 0.472 | None/Diamond |
| 0.441 | 2.165 | 4.134 | 0.472 | None/Diamond |
| 0.445 | 2.165 | 4.134 | 0.472 | None/Diamond |
| 0.449 | 2.165 | 4.134 | 0.472 | None/Diamond |
| 0.453 | 2.165 | 4.134 | 0.472 | None/Diamond |
| 0.456 | 2.165 | 4.134 | 0.472 | None/Diamond |
| 0.461 | 2.165 | 4.134 | 0.472 | None/Diamond |
| 0.464 | 2.165 | 4.134 | 0.472 | None/Diamond |
| 0.468 | 2.165 | 4.134 | 0.472 | None/Diamond |
| 0.472 | 2.165 | 4.134 | 0.472 | None/Diamond |
| 0.476 | 2.362 | 4.252 | 0.512 | None/Diamond |
| 0.480 | 2.362 | 4.252 | 0.512 | None/Diamond |
| 0.484 | 2.362 | 4.252 | 0.512 | None/Diamond |
| 0.488 | 2.362 | 4.252 | 0.512 | None/Diamond |
| 0.492 | 2.362 | 4.252 | 0.512 | None/Diamond |
| 0.496 | 2.362 | 4.252 | 0.512 | None/Diamond |
| 0.500 | 2.362 | 4.252 | 0.512 | None/Diamond |
| 0.504 | 2.362 | 4.252 | 0.512 | None/Diamond |
| 0.508 | 2.362 | 4.252 | 0.512 | None/Diamond |
| 0.512 | 2.362 | 4.252 | 0.512 | None/Diamond |

# Drilling and Countersink integration




Unit: inch

| Blade diameter dc | Angle θ | Blade length l | Total length L | Shank diameter Ds | Coating type |
|---|---|---|---|---|---|
| 0.142 | 90° | 0.551 | 3.740 | 0.315 | None/Diamond |
| 0.142 | 120° | 0.197 | 3.110 | 0.394 | None/Diamond |
| 0.161 | 90° | 0.197 | 3.110 | 0.394 | None/Diamond |
| 0.161 | 90° | 0.315 | 3.110 | 0.394 | None/Diamond |
| 0.161 | 90° | 0.394 | 3.110 | 0.394 | None/Diamond |
| 0.161 | 100° | 0.236 | 3.110 | 0.394 | None/Diamond |
| 0.161 | 100° | 0.709 | 3.740 | 0.315 | None/Diamond |
| 0.161 | 120° | 0.276 | 3.110 | 0.394 | None/Diamond |
| 0.163 | 100° | 0.433 | 3.937 | 0.394 | None/Diamond |
| 0.165 | 100° | 0.236 | 3.110 | 0.394 | None/Diamond |
| 0.165 | 100° | 0.276 | 3.110 | 0.394 | None/Diamond |
| 0.165 | 130° | 0.236 | 3.110 | 0.394 | None/Diamond |
| 0.191 | 100° | 0.709 | 3.937 | 0.394 | None/Diamond |
| 0.197 | 100° | 0.315 | 3.110 | 0.394 | None/Diamond |
| 0.197 | 100° | 0.394 | 3.110 | 0.394 | None/Diamond |
| 0.197 | 100° | 0.984 | 3.543 | 0.394 | None/Diamond |
| 0.197 | 120° | 0.315 | 3.110 | 0.394 | None/Diamond |
| 0.199 | 100° | 0.709 | 3.346 | 0.394 | None/Diamond |
| 0.201 | 100° | 0.709 | 3.740 | 0.315 | None/Diamond |
| 0.201 | 130° | 0.236 | 3.110 | 0.394 | None/Diamond |
| 0.240 | 100° | 0.669 | 4.016 | 0.394 | None/Diamond |

Special size and British system Drill can be customized according to customer needs;
Drilling and countersinking are completed at one time, greatly improving the efficiency of hole making;
Can be used for hole making equipment such as ADU, CNC, robotic drilling and riveting systems;
Straight shank or threaded shank can be used;
The grooves of the drill and countersink can be designed with internal cooling for air cooling or minimal lubrication;
It can be used to process aluminum, composite materials or composite/aluminum, composite/composite, aluminum/aluminum, composite/titanium alloy and other laminated holes.

# Cutting Parameters

| Work Material | CFRP、CFRP/Al | | |
|---|---|---|---|
| Outside Diameter dc | Cutting Speed Vc/ (in/min) | Rotating Speed n/ (rpm) | Feed Rate Fr/ (in/r) |
| 0.118 | 2362.2～4724.4 | 9600 | 0.0012～0.0020 |
| 0.157 | | 7300 | |
| 0.197 | | 5800 | 0.0020～0.004 |
| 0.236 | | 4900 | |
| 0.276 | | 4200 | |
| 0.315 | | 3700 | |
| 0.354 | | 3300 | |
| 0.394 | | 3000 | |
| 0.433 | | 2700 | |
| 0.472 | | 2500 | |
| 0.512 | | 2300 | |

# Other Special Tools

Threaded Shank Front Geometry Drill

Threaded Shank General Drill

According to customer needs, we can use our proprietary tool research and development technology experience to carry out unique research and development in terms of tool material selection, tool geometry design, passivation polishing technology, coating technology, etc. Develop special composite material processing tools that meet customer requirements.

Blades/Impellers/Casings

# AVIATION PARTS AND COMPONENTS

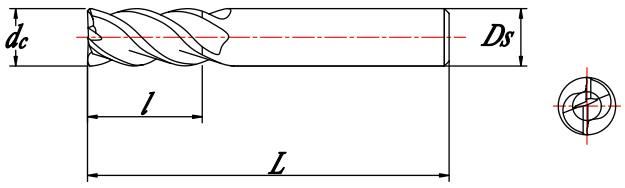
02

## Tools for aeroengine parts

It mainly includes parts such as blades, impellers, casings, and seals on aero engines.The materials are mainly titanium alloy, high temperature alloy, stainless steel, aluminum alloy, etc.

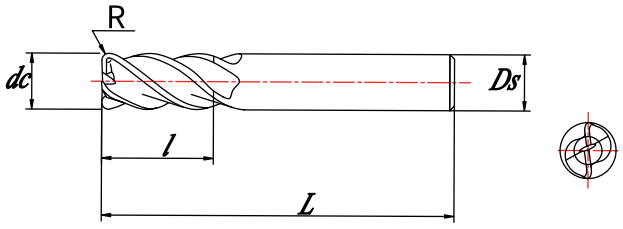
Processing tools mainly include flat-end milling cutters, round-nose milling cutters, ball-end milling cutters, taper ball-end milling cutters, and other drills and reamers.

# 2 Flute Carbide End Mill




| Blade diameter<br>*dc* | Blade length<br>*l* | Total length<br>*L* | Shank diameter<br>*Ds* | *NOTE* |
|---|---|---|---|---|
| 0.118 | 0.236 | 1.969 | 0.118 | |
| 0.118 | 0.354 | 2.362 | 0.236 | |
| 0.118 | 0.472 | 1.969 | 0.118 | |
| 0.118 | 0.984 | 3.150 | 0.118 | |
| 0.157 | 0.315 | 1.969 | 0.157 | |
| 0.157 | 0.472 | 2.756 | 0.236 | |
| 0.157 | 0.551 | 1.969 | 0.157 | |
| 0.157 | 0.984 | 2.953 | 0.157 | |
| 0.197 | 0.394 | 1.969 | 0.236 | |
| 0.197 | 0.630 | 1.969 | 0.236 | |
| 0.197 | 0.984 | 2.953 | 0.236 | |
| 0.236 | 0.472 | 1.969 | 0.236 | |
| 0.236 | 0.591 | 3.150 | 0.236 | |
| 0.236 | 0.748 | 2.362 | 0.236 | |
| 0.236 | 0.984 | 2.480 | 0.236 | |
| 0.315 | 0.472 | 1.969 | 0.315 | |
| 0.315 | 0.787 | 2.480 | 0.315 | |
| 0.315 | 0.787 | 3.504 | 0.315 | |
| 0.315 | 0.984 | 2.953 | 0.315 | |
| 0.394 | 0.630 | 2.362 | 0.394 | |
| 0.394 | 0.866 | 2.953 | 0.394 | |
| 0.394 | 0.984 | 4.134 | 0.394 | |
| 0.394 | 1.496 | 3.937 | 0.394 | |
| 0.472 | 0.748 | 2.480 | 0.472 | |
| 0.472 | 0.984 | 2.953 | 0.472 | |
| 0.472 | 1.181 | 4.331 | 0.472 | |
| 0.472 | 1.969 | 3.937 | 0.472 | |
| 0.472 | 2.953 | 5.906 | 0.472 | |

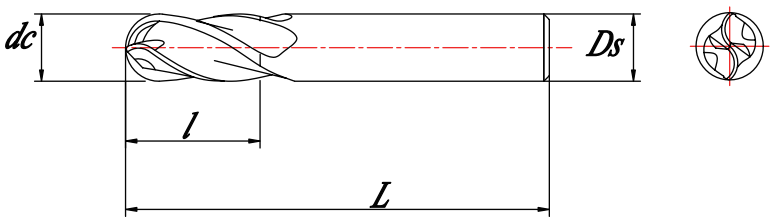
# 2 Flute Carbide End Mill-R




Unit: inch

| Blade diameter *dc* | Fillet *R* | Blade length *l* | Total length *L* | Shank diameter *Ds* | *NOTE* |
|---|---|---|---|---|---|
| 0.236 | 0.010 | 0.748 | 2.480 | 0.236 | |
| 0.236 | 0.020 | 0.748 | 2.480 | 0.236 | |
| 0.236 | 0.030 | 0.748 | 2.480 | 0.236 | |
| 0.236 | 0.039 | 0.748 | 2.480 | 0.236 | |
| 0.315 | 0.020 | 0.787 | 2.480 | 0.315 | |
| 0.315 | 0.030 | 0.787 | 2.480 | 0.315 | |
| 0.315 | 0.039 | 0.787 | 2.480 | 0.315 | |
| 0.315 | 0.059 | 0.787 | 2.480 | 0.315 | |
| 0.315 | 0.079 | 0.787 | 2.480 | 0.315 | |
| 0.394 | 0.020 | 0.866 | 3.150 | 0.315 | |
| 0.394 | 0.039 | 0.866 | 3.150 | 0.354 | |
| 0.394 | 0.059 | 0.866 | 3.150 | 0.394 | |
| 0.394 | 0.079 | 0.866 | 3.150 | 0.394 | |
| 0.472 | 0.020 | 0.984 | 3.150 | 0.394 | |
| 0.472 | 0.039 | 0.984 | 3.150 | 0.394 | |
| 0.472 | 0.059 | 0.984 | 3.150 | 0.394 | |
| 0.472 | 0.079 | 0.984 | 3.150 | 0.472 | |

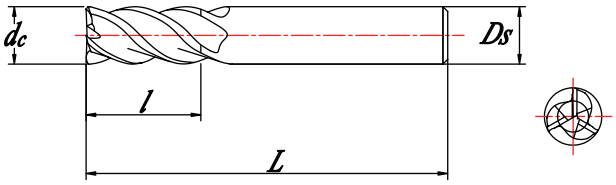
# 2 Flute Carbide Ball End Mill




Unit: inch

| Blade diameter *dc* | Blade length *l* | Total length *L* | Shank diameter *Ds* | *NOTE* |
|---|---|---|---|---|
| 0.118 | 0.236 | 1.969 | 0.118 | |
| 0.118 | 0.354 | 2.362 | 0.236 | |
| 0.118 | 0.472 | 1.969 | 0.118 | |
| 0.118 | 0.984 | 3.150 | 0.118 | |
| 0.157 | 0.315 | 1.969 | 0.157 | |
| 0.157 | 0.472 | 2.756 | 0.236 | |
| 0.157 | 0.551 | 1.969 | 0.157 | |
| 0.157 | 0.984 | 2.953 | 0.157 | |
| 0.197 | 0.394 | 1.969 | 0.236 | |
| 0.197 | 0.630 | 1.969 | 0.236 | |
| 0.197 | 0.984 | 2.953 | 0.236 | |
| 0.236 | 0.472 | 1.969 | 0.236 | |
| 0.236 | 0.591 | 3.150 | 0.236 | |
| 0.236 | 0.748 | 2.362 | 0.236 | |
| 0.236 | 0.984 | 2.480 | 0.236 | |
| 0.315 | 0.472 | 1.969 | 0.315 | |
| 0.315 | 0.787 | 2.480 | 0.315 | |
| 0.315 | 0.787 | 3.504 | 0.315 | |
| 0.315 | 0.984 | 2.953 | 0.315 | |
| 0.394 | 0.630 | 2.362 | 0.394 | |
| 0.394 | 0.866 | 2.953 | 0.394 | |
| 0.394 | 0.984 | 4.134 | 0.394 | |
| 0.394 | 1.496 | 3.937 | 0.394 | |
| 0.472 | 0.748 | 2.480 | 0.472 | |
| 0.472 | 0.984 | 2.953 | 0.472 | |
| 0.472 | 1.181 | 4.331 | 0.472 | |
| 0.472 | 1.969 | 3.937 | 0.472 | |
| 0.472 | 2.953 | 5.906 | 0.472 | |

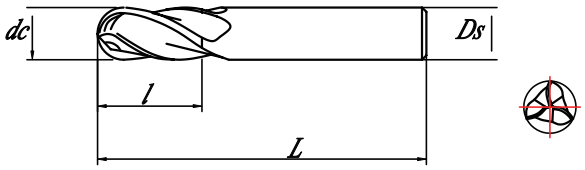
# 3 Flute Carbide End Mill




Unit: inch

| Blade diameter *dc* | Blade length *l* | Total length *L* | Shank diameter *Ds* | *NOTE* |
|---|---|---|---|---|
| 0.118 | 0.236 | 1.969 | 0.118 | |
| 0.118 | 0.354 | 2.362 | 0.236 | |
| 0.118 | 0.472 | 1.969 | 0.118 | |
| 0.118 | 0.984 | 3.150 | 0.118 | |
| 0.157 | 0.315 | 1.969 | 0.157 | |
| 0.157 | 0.472 | 2.756 | 0.236 | |
| 0.157 | 0.551 | 1.969 | 0.157 | |
| 0.157 | 0.984 | 2.953 | 0.157 | |
| 0.197 | 0.394 | 1.969 | 0.236 | |
| 0.197 | 0.630 | 1.969 | 0.236 | |
| 0.197 | 0.984 | 2.953 | 0.236 | |
| 0.236 | 0.472 | 1.969 | 0.236 | |
| 0.236 | 0.591 | 3.150 | 0.236 | |
| 0.236 | 0.748 | 2.362 | 0.236 | |
| 0.236 | 0.984 | 2.480 | 0.236 | |
| 0.315 | 0.472 | 1.969 | 0.315 | |
| 0.315 | 0.787 | 2.480 | 0.315 | |
| 0.315 | 0.787 | 3.504 | 0.315 | |
| 0.315 | 0.984 | 2.953 | 0.315 | |
| 0.394 | 0.630 | 2.362 | 0.394 | |
| 0.394 | 0.866 | 2.953 | 0.394 | |
| 0.394 | 0.984 | 4.134 | 0.394 | |
| 0.394 | 1.496 | 3.937 | 0.394 | |
| 0.472 | 0.748 | 2.480 | 0.472 | |
| 0.472 | 0.984 | 2.953 | 0.472 | |
| 0.472 | 1.181 | 4.331 | 0.472 | |
| 0.472 | 1.969 | 3.937 | 0.472 | |
| 0.472 | 2.953 | 5.906 | 0.472 | |

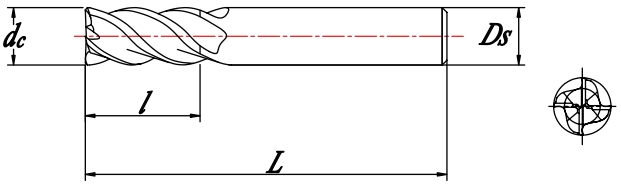
# 3 Flute Carbide Ball End Mill




Unit: inch

| Blade diameter<br>*dc* | Blade length<br>*l* | Total length<br>*L* | Shank diameter<br>*Ds* | *NOTE* |
|---|---|---|---|---|
| 0.118 | 0.236 | 1.969 | 0.118 | |
| 0.118 | 0.354 | 2.362 | 0.236 | |
| 0.118 | 0.472 | 1.969 | 0.118 | |
| 0.118 | 0.984 | 3.150 | 0.118 | |
| 0.157 | 0.315 | 1.969 | 0.157 | |
| 0.157 | 0.472 | 2.756 | 0.236 | |
| 0.157 | 0.551 | 1.969 | 0.157 | |
| 0.157 | 0.984 | 2.953 | 0.157 | |
| 0.197 | 0.394 | 1.969 | 0.236 | |
| 0.197 | 0.630 | 1.969 | 0.236 | |
| 0.197 | 0.984 | 2.953 | 0.236 | |
| 0.236 | 0.472 | 1.969 | 0.236 | |
| 0.236 | 0.591 | 3.150 | 0.236 | |
| 0.236 | 0.748 | 2.362 | 0.236 | |
| 0.236 | 0.984 | 2.480 | 0.236 | |
| 0.315 | 0.472 | 1.969 | 0.315 | |
| 0.315 | 0.787 | 2.480 | 0.315 | |
| 0.315 | 0.787 | 3.504 | 0.315 | |
| 0.315 | 0.984 | 2.953 | 0.315 | |
| 0.394 | 0.630 | 2.362 | 0.394 | |
| 0.394 | 0.866 | 2.953 | 0.394 | |
| 0.394 | 0.984 | 4.134 | 0.394 | |
| 0.394 | 1.496 | 3.937 | 0.394 | |
| 0.472 | 0.748 | 2.480 | 0.472 | |
| 0.472 | 0.984 | 2.953 | 0.472 | |
| 0.472 | 1.181 | 4.331 | 0.472 | |
| 0.472 | 1.969 | 3.937 | 0.472 | |
| 0.472 | 2.953 | 5.906 | 0.472 | |

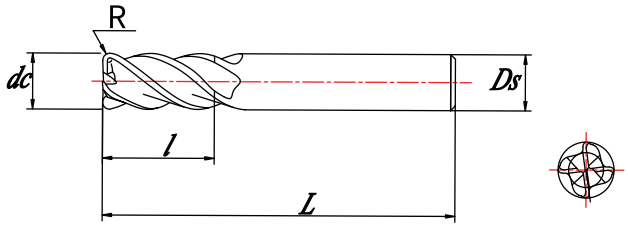
# 4 Flute Carbide End Mill




Unit: inch

| Blade diameter *dc* | Blade length *l* | Total length *L* | Shank diameter *Ds* | *NOTE* |
|---|---|---|---|---|
| 0.118 | 0.236 | 1.969 | 0.118 | |
| 0.118 | 0.354 | 2.362 | 0.236 | |
| 0.118 | 0.472 | 1.969 | 0.118 | |
| 0.118 | 0.984 | 3.150 | 0.118 | |
| 0.157 | 0.315 | 1.969 | 0.157 | |
| 0.157 | 0.472 | 2.756 | 0.236 | |
| 0.157 | 0.551 | 1.969 | 0.157 | |
| 0.157 | 0.984 | 2.953 | 0.157 | |
| 0.197 | 0.394 | 1.969 | 0.236 | |
| 0.197 | 0.630 | 1.969 | 0.236 | |
| 0.197 | 0.984 | 2.953 | 0.236 | |
| 0.236 | 0.472 | 1.969 | 0.236 | |
| 0.236 | 0.591 | 3.150 | 0.236 | |
| 0.236 | 0.748 | 2.362 | 0.236 | |
| 0.236 | 0.984 | 2.480 | 0.236 | |
| 0.315 | 0.472 | 1.969 | 0.315 | |
| 0.315 | 0.787 | 2.480 | 0.315 | |
| 0.315 | 0.787 | 3.504 | 0.315 | |
| 0.315 | 0.984 | 2.953 | 0.315 | |
| 0.394 | 0.630 | 2.362 | 0.394 | |
| 0.394 | 0.866 | 2.953 | 0.394 | |
| 0.394 | 0.984 | 4.134 | 0.394 | |
| 0.394 | 1.496 | 3.937 | 0.394 | |
| 0.472 | 0.748 | 2.480 | 0.472 | |
| 0.472 | 0.984 | 2.953 | 0.472 | |
| 0.472 | 1.181 | 4.331 | 0.472 | |
| 0.472 | 1.969 | 3.937 | 0.472 | |
| 0.472 | 2.953 | 5.906 | 0.472 | |

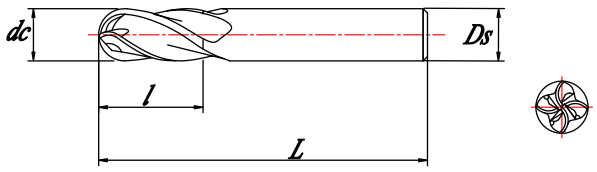
# 4 Flute Carbide End Mill-R




Unit: inch

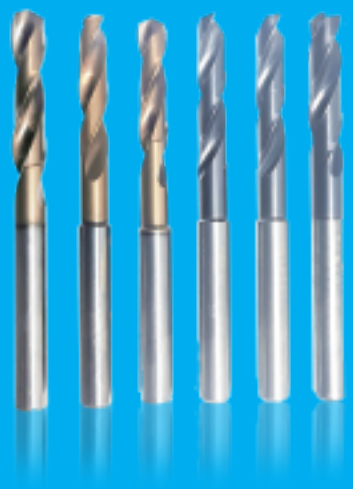
| Blade diameter<br>dc | Fillet<br>R | Blade length<br>l | Total length<br>L | Shank diameter<br>Ds | NOTE |
|---|---|---|---|---|---|
| 0.236 | 0.010 | 0.748 | 2.480 | 0.236 | |
| 0.236 | 0.020 | 0.748 | 2.480 | 0.236 | |
| 0.236 | 0.030 | 0.748 | 2.480 | 0.236 | |
| 0.236 | 0.039 | 0.748 | 2.480 | 0.236 | |
| 0.315 | 0.020 | 0.787 | 2.480 | 0.315 | |
| 0.315 | 0.030 | 0.787 | 2.480 | 0.315 | |
| 0.315 | 0.039 | 0.787 | 2.480 | 0.315 | |
| 0.315 | 0.059 | 0.787 | 2.480 | 0.315 | |
| 0.315 | 0.079 | 0.787 | 2.480 | 0.315 | |
| 0.394 | 0.020 | 0.866 | 3.150 | 0.315 | |
| 0.394 | 0.039 | 0.866 | 3.150 | 0.354 | |
| 0.394 | 0.059 | 0.866 | 3.150 | 0.394 | |
| 0.394 | 0.079 | 0.866 | 3.150 | 0.394 | |
| 0.472 | 0.020 | 0.984 | 3.150 | 0.394 | |
| 0.472 | 0.039 | 0.984 | 3.150 | 0.394 | |
| 0.472 | 0.059 | 0.984 | 3.150 | 0.394 | |
| 0.472 | 0.079 | 0.984 | 3.150 | 0.472 | |

# 4 Flute Carbide Ball End Mill




Unit: inch

| Blade diameter *dc* | Blade length *l* | Total length *L* | Shank diameter *Ds* | *NOTE* |
|---|---|---|---|---|
| 0.118 | 0.236 | 1.969 | 0.118 | |
| 0.118 | 0.354 | 2.362 | 0.236 | |
| 0.118 | 0.472 | 1.969 | 0.118 | |
| 0.118 | 0.984 | 3.150 | 0.118 | |
| 0.157 | 0.315 | 1.969 | 0.157 | |
| 0.157 | 0.472 | 2.756 | 0.236 | |
| 0.157 | 0.551 | 1.969 | 0.157 | |
| 0.157 | 0.984 | 2.953 | 0.157 | |
| 0.197 | 0.394 | 1.969 | 0.236 | |
| 0.197 | 0.630 | 1.969 | 0.236 | |
| 0.197 | 0.984 | 2.953 | 0.236 | |
| 0.236 | 0.472 | 1.969 | 0.236 | |
| 0.236 | 0.591 | 3.150 | 0.236 | |
| 0.236 | 0.748 | 2.362 | 0.236 | |
| 0.236 | 0.984 | 2.480 | 0.236 | |
| 0.315 | 0.472 | 1.969 | 0.315 | |
| 0.315 | 0.787 | 2.480 | 0.315 | |
| 0.315 | 0.787 | 3.504 | 0.315 | |
| 0.315 | 0.984 | 2.953 | 0.315 | |
| 0.394 | 0.630 | 2.362 | 0.394 | |
| 0.394 | 0.866 | 2.953 | 0.394 | |
| 0.394 | 0.984 | 4.134 | 0.394 | |
| 0.394 | 1.496 | 3.937 | 0.394 | |
| 0.472 | 0.748 | 2.480 | 0.472 | |
| 0.472 | 0.984 | 2.953 | 0.472 | |
| 0.472 | 1.181 | 4.331 | 0.472 | |
| 0.472 | 1.969 | 3.937 | 0.472 | |
| 0.472 | 2.953 | 5.906 | 0.472 | |



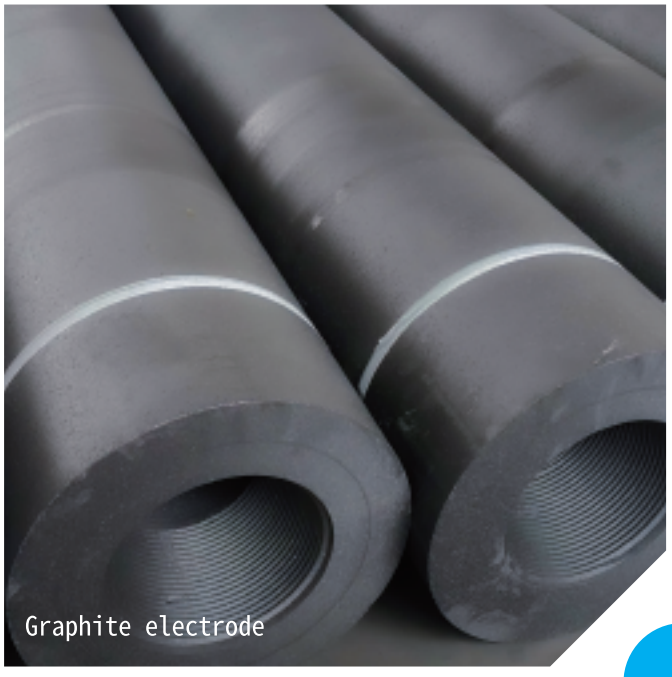
Including automobile engine cylinder blocks, cylinder heads, steering gears, connecting rods, steering knuckles and other parts. The materials involve ductile iron, gray cast iron, steel, aluminum alloy, etc.
According to customer needs, we can use our proprietary tool development technology experience to develop special tools that meet customer requirements in terms of tool material selection, tool geometric design, passivation and polishing technology, coating technology, etc.
The main processing tools include ordinary twist drills, shaped step drills, shaped reamers, corresponding drills and reamers with internal cooling function and other flat end milling cutters, round end milling cutters and ball end milling cutters. Please refer to page 36-40 for details.

# 03

## Special tools for automotive parts

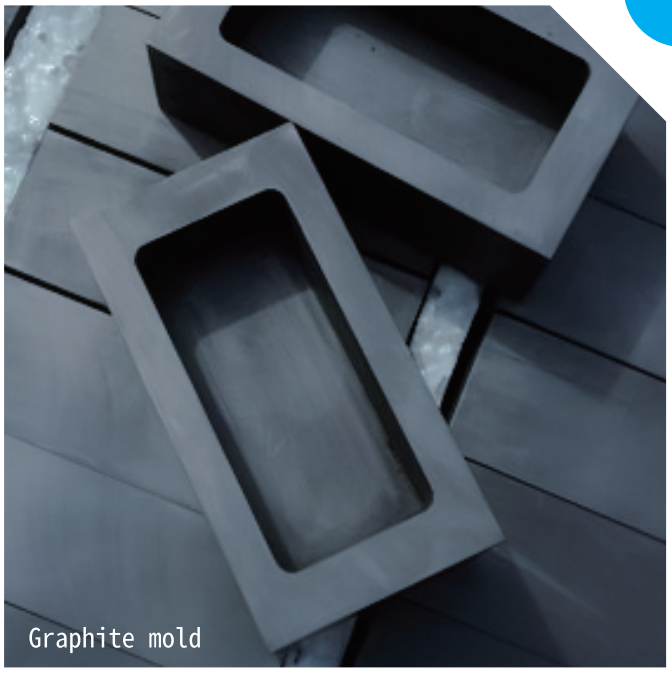
# 04 Tools for graphite

Mainly include diamond coated tools for processing graphite molds and graphite electrodes.

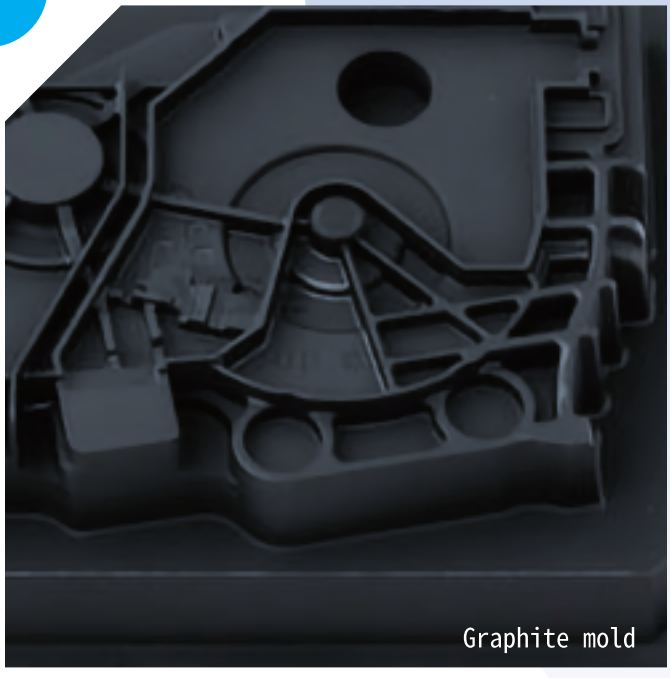


Graphite electrode

Diamond coated tools

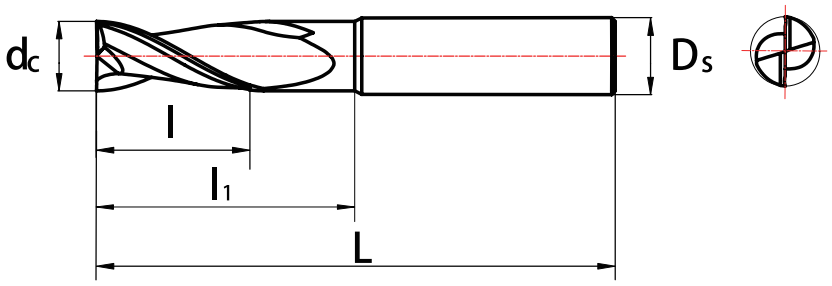


Graphite mold



Graphite mold

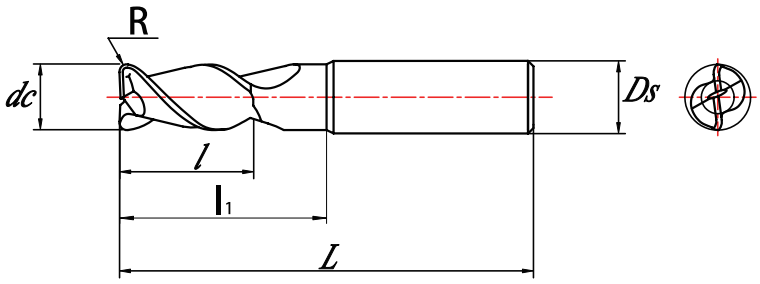
# 2 Flute Carbide End Mill




Unit: inch

| Blade diameter *dc* | Blade length *l* | Effective length *l1* | Total length *L* | Shank diameter *Ds* | Coating type |
|---|---|---|---|---|---|
| 0.118 | 0.354 | / | 1.969 | 0.236 | Diamond |
| 0.118 | 0.472 | / | 3.150 | 0.157 | Diamond |
| 0.118 | 0.472 | 0.787 | 3.150 | 0.157 | Diamond |
| 0.118 | 0.472 | 0.984 | 3.150 | 0.157 | Diamond |
| 0.118 | 0.472 | 1.181 | 3.150 | 0.157 | Diamond |
| 0.118 | 0.472 | 1.575 | 3.150 | 0.157 | Diamond |
| 0.157 | 0.472 | / | 1.969 | 0.236 | Diamond |
| 0.157 | 0.630 | / | 3.150 | 0.157 | Diamond |
| 0.197 | 0.591 | / | 2.520 | 0.236 | Diamond |
| 0.197 | 0.787 | / | 4.134 | 0.236 | Diamond |
| 0.236 | 0.709 | / | 2.520 | 0.236 | Diamond |
| 0.236 | 0.984 | / | 4.134 | 0.236 | Diamond |
| 0.236 | 0.984 | / | 5.906 | 0.236 | Diamond |
| 0.315 | 0.945 | / | 2.953 | 0.315 | Diamond |
| 0.315 | 0.984 | 1.575 | 5.906 | 0.315 | Diamond |
| 0.394 | 0.984 | / | 3.189 | 0.394 | Diamond |
| 0.394 | 0.984 | 1.969 | 6.299 | 0.394 | Diamond |
| 0.472 | 0.984 | / | 3.189 | 0.472 | Diamond |
| 0.118 | 0.984 | 2.362 | 6.299 | 0.472 | Diamond |

# 2 Flute Carbide End Mill

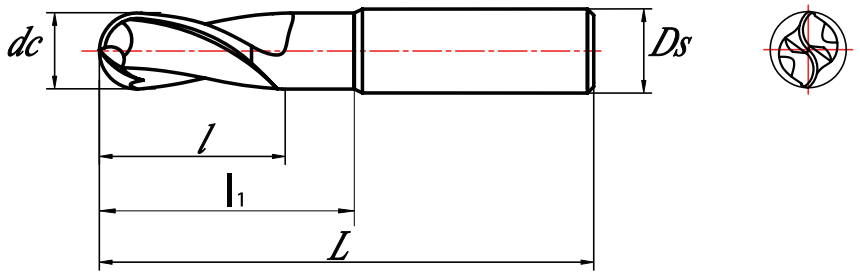



Unit: inch

| Blade diameter *dc* | Fillet radius *R* | Blade length *l* | Effective length $l_1$ | Total length *L* | Shank diameter *Ds* | Coating type |
|---|---|---|---|---|---|---|
| 0.118 | 0.3 | 0.157 | / | 3.228 | 0.157 | Diamond |
| 0.118 | 0.3 | 0.157 | 0.394 | 3.228 | 0.157 | Diamond |
| 0.118 | 0.3 | 0.157 | 0.787 | 3.228 | 0.157 | Diamond |
| 0.118 | 0.3 | 0.157 | 1.181 | 3.228 | 0.157 | Diamond |
| 0.118 | 0.3 | 0.157 | 1.575 | 3.228 | 0.157 | Diamond |
| 0.118 | 0.5 | 0.157 | / | 3.228 | 0.157 | Diamond |
| 0.118 | 0.5 | 0.157 | 0.394 | 3.228 | 0.157 | Diamond |
| 0.118 | 0.5 | 0.157 | 0.787 | 3.228 | 0.157 | Diamond |
| 0.118 | 0.5 | 0.157 | 1.181 | 3.228 | 0.157 | Diamond |
| 0.118 | 0.5 | 0.157 | 1.575 | 3.228 | 0.157 | Diamond |
| 0.118 | 1 | 0.157 | / | 3.228 | 0.157 | Diamond |
| 0.118 | 1 | 0.157 | 0.394 | 3.228 | 0.157 | Diamond |
| 0.118 | 1 | 0.157 | 0.787 | 3.228 | 0.157 | Diamond |
| 0.118 | 1 | 0.157 | 1.181 | 3.228 | 0.157 | Diamond |
| 0.118 | 1 | 0.157 | 1.575 | 3.228 | 0.157 | Diamond |
| 0.157 | 0.2 | 0.197 | / | 3.228 | 0.157 | Diamond |
| 0.157 | 0.2 | 0.197 | 0.591 | 3.228 | 0.157 | Diamond |
| 0.157 | 0.2 | 0.197 | 0.984 | 3.228 | 0.157 | Diamond |
| 0.157 | 0.2 | 0.197 | 1.575 | 3.228 | 0.157 | Diamond |
| 0.157 | 0.5 | 0.197 | / | 3.228 | 0.157 | Diamond |
| 0.157 | 0.5 | 0.197 | 0.591 | 3.228 | 0.157 | Diamond |
| 0.157 | 0.5 | 0.197 | 0.984 | 3.228 | 0.157 | Diamond |
| 0.157 | 0.5 | 0.197 | 1.575 | 3.228 | 0.157 | Diamond |
| 0.157 | 1 | 0.197 | / | 3.228 | 0.157 | Diamond |
| 0.157 | 1 | 0.197 | 0.591 | 3.228 | 0.157 | Diamond |
| 0.157 | 1 | 0.197 | 0.984 | 3.228 | 0.157 | Diamond |
| 0.157 | 1 | 0.197 | 1.575 | 3.228 | 0.157 | Diamond |
| 0.197 | 0.2 | 0.236 | / | 4.134 | 0.236 | Diamond |

| Blade diameter *dc* | Fillet radius *R* | Blade length *l* | Effective length $l_1$ | Total length *L* | Shank diameter *Ds* | Coating type |
|---|---|---|---|---|---|---|
| 0.197 | 0.2 | 0.236 | 0.591 | 3.228 | 0.236 | Diamond |
| 0.197 | 0.008 | 0.236 | 1.181 | 4.134 | 0.236 | Diamond |
| 0.197 | 0.008 | 0.236 | 1.969 | 4.134 | 0.236 | Diamond |
| 0.197 | 0.020 | 0.236 | / | 4.134 | 0.236 | Diamond |
| 0.197 | 0.020 | 0.236 | 0.591 | 4.134 | 0.236 | Diamond |
| 0.197 | 0.020 | 0.236 | 1.181 | 4.134 | 0.236 | Diamond |
| 0.197 | 0.020 | 0.236 | 1.969 | 4.134 | 0.236 | Diamond |
| 0.236 | 0.008 | 0.276 | / | 4.134 | 0.236 | Diamond |
| 0.236 | 0.008 | 0.276 | 0.787 | 4.134 | 0.236 | Diamond |
| 0.236 | 0.008 | 0.276 | 1.181 | 4.134 | 0.236 | Diamond |
| 0.236 | 0.008 | 0.276 | 1.969 | 4.134 | 0.236 | Diamond |
| 0.236 | 0.020 | 0.276 | / | 4.134 | 0.236 | Diamond |
| 0.236 | 0.020 | 0.276 | 0.787 | 4.134 | 0.236 | Diamond |
| 0.236 | 0.020 | 0.276 | 1.181 | 4.134 | 0.236 | Diamond |
| 0.236 | 0.020 | 0.276 | 1.969 | 4.134 | 0.236 | Diamond |
| 0.236 | 0.039 | 0.276 | / | 4.134 | 0.236 | Diamond |
| 0.236 | 0.039 | 0.276 | 0.787 | 4.134 | 0.236 | Diamond |
| 0.236 | 0.039 | 0.276 | 1.181 | 4.134 | 0.236 | Diamond |
| 0.236 | 0.039 | 0.276 | 1.969 | 4.134 | 0.236 | Diamond |

## 2 Flute Carbide Ball End Mill

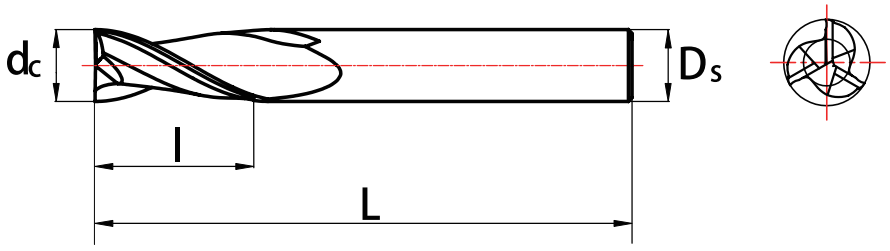



Unit: inch

| Blade diameter *dc* | Blade length *l* | Effective length $l_1$ | Total length *L* | Shank diameter *Ds* | Coating type |
|---|---|---|---|---|---|
| 0.118 | 0.315 | 0.591 | 4.134 | 0.118 | Diamond |
| 0.118 | 0.315 | / | 2.441 | 0.157 | Diamond |
| 0.118 | 0.315 | 0.591 | 4.134 | 0.157 | Diamond |
| 0.118 | 0.315 | 0.787 | 4.134 | 0.157 | Diamond |
| 0.118 | 0.315 | 0.984 | 4.134 | 0.157 | Diamond |
| 0.118 | 0.315 | 1.181 | 4.134 | 0.157 | Diamond |

| Blade diameter *dc* | Blade length *l* | Effective length $l_1$ | Total length *L* | Shank diameter *Ds* | Coating type |
|---|---|---|---|---|---|
| 0.118 | 0.315 | 1.378 | 4.134 | 0.157 | Diamond |
| 0.118 | 0.315 | 1.575 | 4.134 | 0.157 | Diamond |
| 0.118 | 0.315 | 1.969 | 4.134 | 0.157 | Diamond |
| 0.118 | 0.315 | 2.362 | 4.134 | 0.157 | Diamond |
| 0.157 | 0.630 | / | 2.441 | 0.157 | Diamond |
| 0.157 | 0.630 | / | 3.228 | 0.157 | Diamond |
| 0.157 | 0.630 | 1.181 | 3.228 | 0.157 | Diamond |
| 0.157 | 0.630 | / | 4.134 | 0.157 | Diamond |
| 0.157 | 0.630 | 1.575 | 4.134 | 0.157 | Diamond |
| 0.157 | 0.630 | / | 5.315 | 0.157 | Diamond |
| 0.157 | 0.630 | 1.575 | 5.315 | 0.157 | Diamond |
| 0.157 | 0.630 | / | 6.299 | 0.157 | Diamond |
| 0.157 | 0.630 | 1.969 | 6.299 | 0.157 | Diamond |
| 0.197 | 0.630 | 0.787 | 4.134 | 0.236 | Diamond |
| 0.236 | 0.630 | 0.984 | 3.228 | 0.236 | Diamond |
| 0.236 | 0.630 | 0.984 | 4.134 | 0.236 | Diamond |
| 0.236 | 0.630 | 1.575 | 4.134 | 0.236 | Diamond |
| 0.236 | 0.630 | 1.181 | 6.299 | 0.236 | Diamond |
| 0.236 | 0.630 | 1.969 | 6.299 | 0.236 | Diamond |
| 0.315 | 0.787 | 1.181 | 3.228 | 0.315 | Diamond |
| 0.315 | 0.787 | 1.181 | 4.134 | 0.315 | Diamond |
| 0.315 | 0.787 | 1.575 | 4.134 | 0.315 | Diamond |
| 0.315 | 0.787 | 1.969 | 6.299 | 0.315 | Diamond |
| 0.315 | 0.787 | 1.575 | 8.071 | 0.315 | Diamond |
| 0.394 | 0.866 | 1.575 | 3.228 | 0.394 | Diamond |
| 0.394 | 0.866 | 1.378 | 4.134 | 0.394 | Diamond |
| 0.394 | 0.866 | 1.969 | 4.134 | 0.394 | Diamond |
| 0.394 | 0.866 | 2.362 | 6.299 | 0.394 | Diamond |
| 0.394 | 0.866 | 1.969 | 7.874 | 0.394 | Diamond |
| 0.472 | 0.984 | 1.969 | 4.134 | 0.472 | Diamond |
| 0.472 | 0.984 | 1.969 | 6.299 | 0.472 | Diamond |
| 0.472 | 0.984 | 2.362 | 8.071 | 0.472 | Diamond |

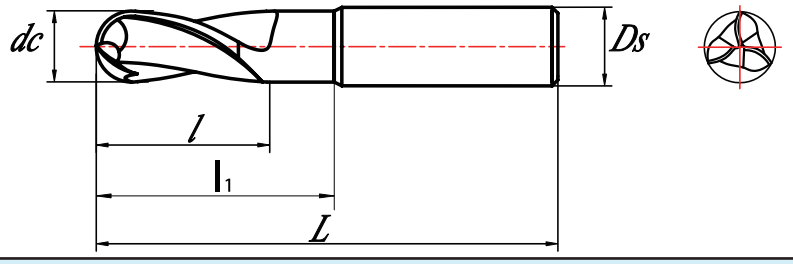
# 3 Flute Carbide End Mill




Unit: inch

| Blade diameter *dc* | Blade length *l* | Total length *L* | Shank diameter *Ds* | Coating type |
|---|---|---|---|---|
| 0.118 | 0.354 | 2.126 | 0.236 | Diamond |
| 0.118 | 0.591 | 2.520 | 0.118 | Diamond |
| 0.118 | 0.591 | 2.520 | 0.157 | Diamond |
| 0.157 | 0.472 | 2.126 | 0.236 | Diamond |
| 0.157 | 0.787 | 3.228 | 0.157 | Diamond |
| 0.236 | 0.709 | 2.520 | 0.236 | Diamond |
| 0.236 | 0.984 | 4.134 | 0.236 | Diamond |
| 0.236 | 0.984 | 5.906 | 0.236 | Diamond |
| 0.315 | 0.945 | 2.953 | 0.315 | Diamond |
| 0.315 | 1.378 | 4.134 | 0.315 | Diamond |
| 0.315 | 1.378 | 6.378 | 0.315 | Diamond |
| 0.394 | 0.984 | 3.189 | 0.394 | Diamond |
| 0.394 | 1.575 | 4.134 | 0.394 | Diamond |
| 0.394 | 1.969 | 6.378 | 0.394 | Diamond |
| 0.472 | 0.984 | 3.189 | 0.472 | Diamond |
| 0.472 | 1.772 | 4.134 | 0.472 | Diamond |
| 0.472 | 2.165 | 6.378 | 0.472 | Diamond |

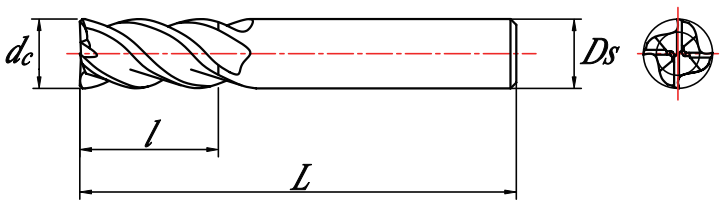
# 3 Flute Carbide Ball End Mill




Unit: inch

| Blade diameter *dc* | Blade length *l* | Effective length $l_1$ | Total length *L* | Shank diameter *Ds* | Coating type |
|---|---|---|---|---|---|
| 0.118 | 0.315 | 0.591 | 4.134 | 0.118 | Diamond |
| 0.118 | 0.315 | / | 2.441 | 0.157 | Diamond |
| 0.118 | 0.315 | 0.591 | 4.134 | 0.157 | Diamond |
| 0.118 | 0.315 | 0.787 | 4.134 | 0.157 | Diamond |
| 0.118 | 0.315 | 1.181 | 4.134 | 0.157 | Diamond |
| 0.118 | 0.315 | 1.575 | 4.134 | 0.157 | Diamond |
| 0.118 | 0.315 | 1.969 | 4.134 | 0.157 | Diamond |
| 0.157 | 0.630 | / | 3.228 | 0.157 | Diamond |
| 0.157 | 0.630 | 1.181 | 3.228 | 0.157 | Diamond |
| 0.157 | 0.630 | / | 4.134 | 0.157 | Diamond |
| 0.157 | 0.630 | 1.575 | 4.134 | 0.157 | Diamond |
| 0.157 | 0.630 | / | 5.315 | 0.157 | Diamond |
| 0.157 | 0.630 | 1.575 | 5.315 | 0.157 | Diamond |
| 0.236 | 0.630 | 0.984 | 4.134 | 0.236 | Diamond |
| 0.236 | 0.630 | 1.575 | 4.134 | 0.236 | Diamond |
| 0.236 | 0.630 | 1.181 | 6.299 | 0.236 | Diamond |
| 0.236 | 0.630 | 1.969 | 6.299 | 0.236 | Diamond |
| 0.315 | 0.787 | 1.181 | 3.228 | 0.315 | Diamond |
| 0.315 | 0.787 | 1.181 | 4.134 | 0.315 | Diamond |
| 0.315 | 0.787 | 1.575 | 4.134 | 0.315 | Diamond |
| 0.315 | 0.787 | 1.969 | 6.299 | 0.315 | Diamond |
| 0.315 | 0.787 | 1.575 | 8.071 | 0.315 | Diamond |
| 0.394 | 0.866 | 1.575 | 3.228 | 0.394 | Diamond |
| 0.394 | 0.866 | 1.378 | 4.134 | 0.394 | Diamond |
| 0.394 | 0.866 | 1.969 | 4.134 | 0.394 | Diamond |
| 0.394 | 0.866 | 2.362 | 6.299 | 0.394 | Diamond |
| 0.394 | 0.866 | 1.969 | 7.874 | 0.394 | Diamond |
| 0.472 | 0.984 | 1.969 | 4.134 | 0.472 | Diamond |
| 0.472 | 0.984 | 1.969 | 6.299 | 0.472 | Diamond |
| 0.472 | 0.984 | 2.362 | 8.071 | 0.472 | Diamond |

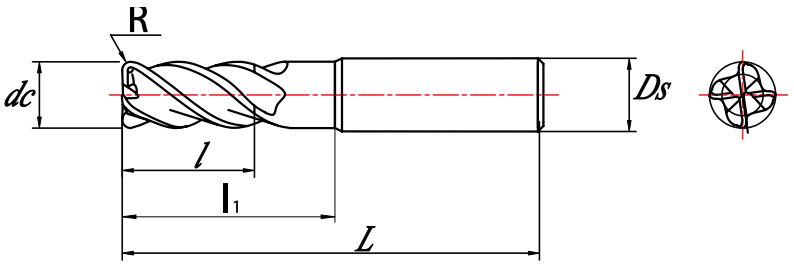
# 4 Flute Carbide End Mill




Unit: inch

| Blade diameter *dc* | Blade length *l* | Total length *L* | Shank diameter *Ds* | Coating type |
|---|---|---|---|---|
| 0.118 | 0.354 | 2.126 | 0.236 | Diamond |
| 0.118 | 0.591 | 2.520 | 0.118 | Diamond |
| 0.118 | 0.591 | 2.520 | 0.157 | Diamond |
| 0.157 | 0.472 | 2.126 | 0.236 | Diamond |
| 0.157 | 0.787 | 3.228 | 0.157 | Diamond |
| 0.236 | 0.709 | 2.520 | 0.236 | Diamond |
| 0.236 | 0.984 | 4.134 | 0.236 | Diamond |
| 0.236 | 0.984 | 5.906 | 0.236 | Diamond |
| 0.315 | 0.945 | 2.953 | 0.315 | Diamond |
| 0.315 | 1.378 | 4.134 | 0.315 | Diamond |
| 0.315 | 1.378 | 6.378 | 0.315 | Diamond |
| 0.394 | 0.984 | 3.189 | 0.394 | Diamond |
| 0.394 | 1.575 | 4.134 | 0.394 | Diamond |
| 0.394 | 1.969 | 6.378 | 0.394 | Diamond |
| 0.472 | 0.984 | 3.189 | 0.472 | Diamond |
| 0.472 | 1.772 | 4.134 | 0.472 | Diamond |
| 0.472 | 2.165 | 6.378 | 0.472 | Diamond |

# 4 Flute Carbide End Mill-R

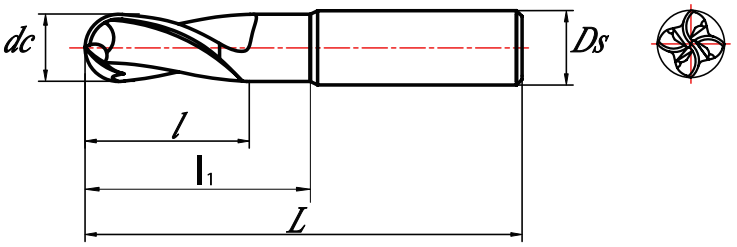



Unit: inch

| Blade diameter dc | Fillet radius R | Blade length l | Effective length $l_1$ | Total length L | Shank diameter Ds | Coating type |
|---|---|---|---|---|---|---|
| 0.118 | 0.012 | 0.157 | / | 3.228 | 0.157 | Diamond |
| 0.118 | 0.012 | 0.157 | 0.394 | 3.228 | 0.157 | Diamond |
| 0.118 | 0.012 | 0.157 | 0.787 | 3.228 | 0.157 | Diamond |
| 0.118 | 0.012 | 0.157 | 1.181 | 3.228 | 0.157 | Diamond |
| 0.118 | 0.012 | 0.157 | 1.575 | 3.228 | 0.157 | Diamond |
| 0.118 | 0.020 | 0.157 | / | 3.228 | 0.157 | Diamond |
| 0.118 | 0.020 | 0.157 | 0.394 | 3.228 | 0.157 | Diamond |
| 0.118 | 0.020 | 0.157 | 0.787 | 3.228 | 0.157 | Diamond |
| 0.118 | 0.020 | 0.157 | 1.181 | 3.228 | 0.157 | Diamond |
| 0.118 | 0.020 | 0.157 | 1.575 | 3.228 | 0.157 | Diamond |
| 0.118 | 0.039 | 0.157 | / | 3.228 | 0.157 | Diamond |
| 0.118 | 0.039 | 0.157 | 0.394 | 3.228 | 0.157 | Diamond |
| 0.118 | 0.039 | 0.157 | 0.787 | 3.228 | 0.157 | Diamond |
| 0.118 | 0.039 | 0.157 | 1.181 | 3.228 | 0.157 | Diamond |
| 0.118 | 0.039 | 0.157 | 1.575 | 3.228 | 0.157 | Diamond |
| 0.157 | 0.012 | 0.236 | 0.787 | 4.134 | 0.157 | Diamond |
| 0.157 | 0.020 | 0.236 | 0.787 | 4.134 | 0.157 | Diamond |
| 0.157 | 0.039 | 0.236 | 0.787 | 4.134 | 0.157 | Diamond |
| 0.236 | 0.012 | 0.354 | 0.984 | 4.134 | 0.236 | Diamond |
| 0.236 | 0.020 | 0.354 | 0.984 | 4.134 | 0.236 | Diamond |
| 0.236 | 0.020 | 0.354 | 1.181 | 5.906 | 0.236 | Diamond |
| 0.236 | 0.039 | 0.354 | 0.984 | 4.134 | 0.236 | Diamond |
| 0.236 | 0.039 | 0.354 | 1.181 | 5.906 | 0.236 | Diamond |
| 0.315 | 0.012 | 0.472 | 1.181 | 4.134 | 0.315 | Diamond |
| 0.315 | 0.020 | 0.472 | 1.181 | 4.134 | 0.315 | Diamond |
| 0.315 | 0.020 | 0.472 | 1.575 | 5.906 | 0.315 | Diamond |
| 0.315 | 0.039 | 0.472 | 1.181 | 4.134 | 0.315 | Diamond |
| 0.315 | 0.039 | 0.472 | 1.575 | 5.906 | 0.315 | Diamond |

| Blade diameter *dc* | Fillet radius *R* | Blade length *l* | Effective length $l_1$ | Total length *L* | Shank diameter *Ds* | Coating type |
|---|---|---|---|---|---|---|
| 0.394 | 0.020 | 0.591 | 1.378 | 4.134 | 0.394 | Diamond |
| 0.394 | 0.020 | 0.591 | 1.772 | 6.378 | 0.394 | Diamond |
| 0.394 | 0.039 | 0.591 | 1.378 | 4.134 | 0.394 | Diamond |
| 0.394 | 0.039 | 0.591 | 1.772 | 6.378 | 0.394 | Diamond |
| 0.472 | 0.020 | 0.709 | 1.575 | 4.134 | 0.472 | Diamond |
| 0.472 | 0.020 | 0.709 | 1.772 | 6.378 | 0.472 | Diamond |
| 0.472 | 0.039 | 0.709 | 1.575 | 4.134 | 0.472 | Diamond |
| 0.472 | 0.039 | 0.709 | 1.772 | 6.378 | 0.472 | Diamond |

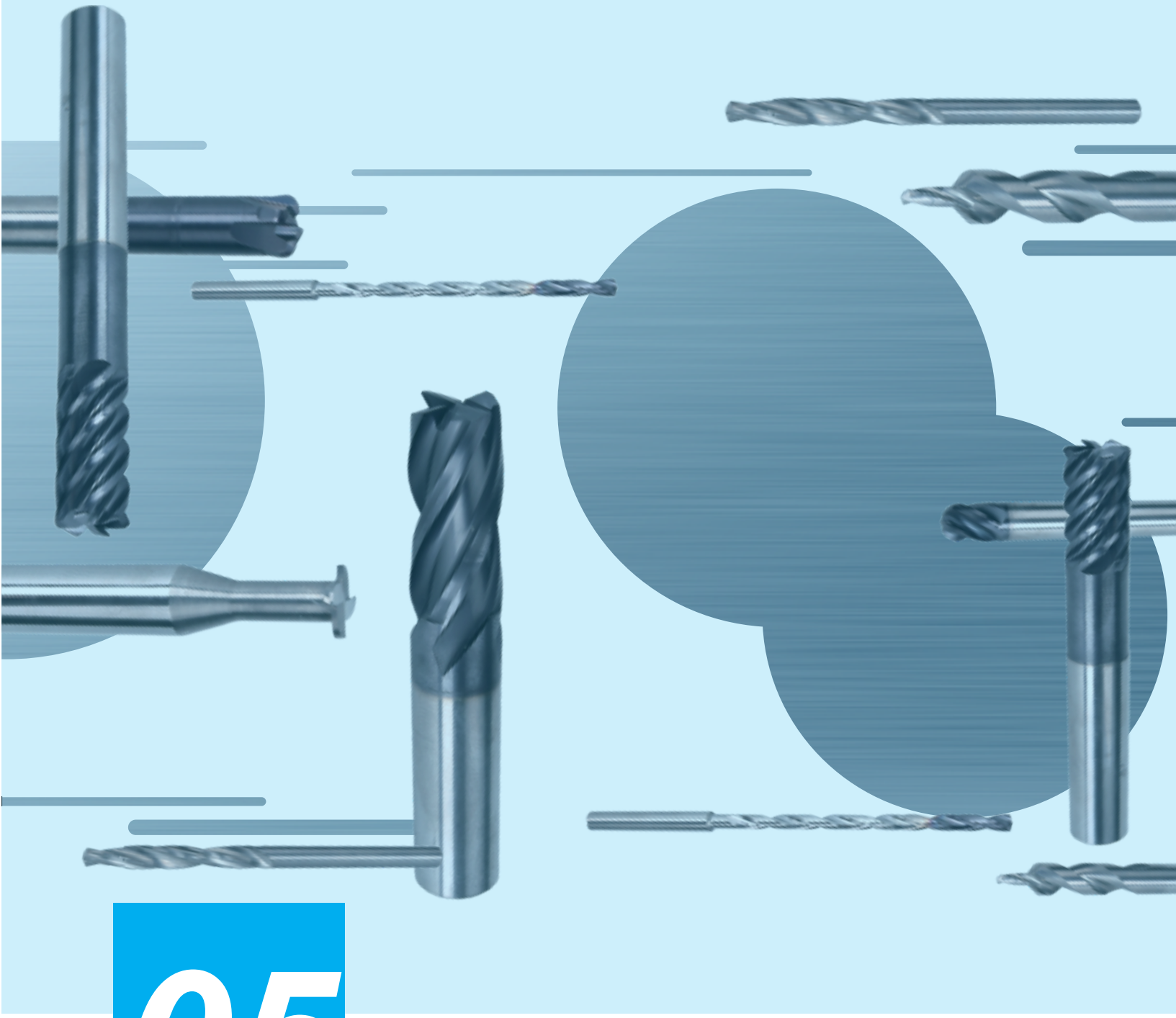
# 4 Flute Carbide Ball End Mill




Unit: inch

| Blade diameter *dc* | Blade length *l* | Effective length $l_1$ | Total length *L* | Shank diameter *Ds* | Coating type |
|---|---|---|---|---|---|
| 0.118 | 0.315 | 0.591 | 4.134 | 0.118 | Diamond |
| 0.118 | 0.315 | / | 2.441 | 0.157 | Diamond |
| 0.118 | 0.315 | 0.591 | 4.134 | 0.157 | Diamond |
| 0.118 | 0.315 | 0.787 | 4.134 | 0.157 | Diamond |
| 0.118 | 0.315 | 1.181 | 4.134 | 0.157 | Diamond |
| 0.118 | 0.315 | 1.575 | 4.134 | 0.157 | Diamond |
| 0.118 | 0.315 | 1.969 | 4.134 | 0.157 | Diamond |
| 0.157 | 0.630 | / | 3.228 | 0.157 | Diamond |
| 0.157 | 0.630 | 1.181 | 3.228 | 0.157 | Diamond |
| 0.157 | 0.630 | / | 4.134 | 0.157 | Diamond |
| 0.157 | 0.630 | 1.575 | 4.134 | 0.157 | Diamond |
| 0.157 | 0.630 | / | 5.315 | 0.157 | Diamond |
| 0.157 | 0.630 | 1.575 | 5.315 | 0.157 | Diamond |
| 0.236 | 0.630 | 0.984 | 4.134 | 0.236 | Diamond |
| 0.236 | 0.630 | 1.575 | 4.134 | 0.236 | Diamond |
| 0.236 | 0.630 | 1.181 | 6.299 | 0.236 | Diamond |
| 0.236 | 0.630 | 1.969 | 6.299 | 0.236 | Diamond |

| Blade diameter *dc* | Blade length *l* | Effective length $l_1$ | Total length *L* | Shank diameter *Ds* | Coating type |
|---|---|---|---|---|---|
| 0.315 | 0.787 | 1.181 | 3.228 | 0.315 | Diamond |
| 0.315 | 0.787 | 1.181 | 4.134 | 0.315 | Diamond |
| 0.315 | 0.787 | 1.575 | 4.134 | 0.315 | Diamond |
| 0.315 | 0.787 | 1.969 | 6.299 | 0.315 | Diamond |
| 0.315 | 0.787 | 1.575 | 8.071 | 0.315 | Diamond |
| 0.394 | 0.866 | 1.575 | 3.228 | 0.394 | Diamond |
| 0.394 | 0.866 | 1.378 | 4.134 | 0.394 | Diamond |
| 0.394 | 0.866 | 1.969 | 4.134 | 0.394 | Diamond |
| 0.394 | 0.866 | 2.362 | 6.299 | 0.394 | Diamond |
| 0.394 | 0.866 | 1.969 | 7.874 | 0.394 | Diamond |
| 0.472 | 0.984 | 1.969 | 4.134 | 0.472 | Diamond |
| 0.472 | 0.984 | 1.969 | 6.299 | 0.472 | Diamond |
| 0.472 | 0.984 | 2.362 | 8.071 | 0.472 | Diamond |

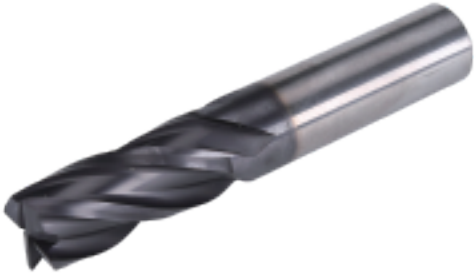


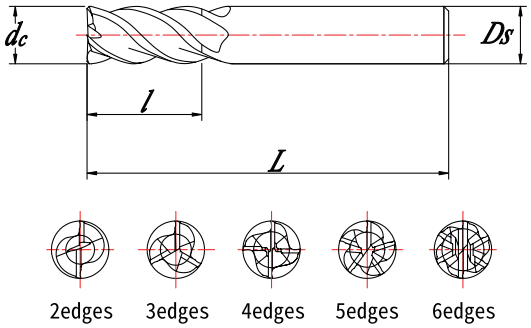
05

# Other types of special tools

According to customer needs, we can use our proprietary tool research and development technology experience to conduct unique research and development in terms of tool material selection, tool geometry design, passivation polishing technology, coating technology, etc. Developed solid carbide non-standard tools that meet customer requirements, including flat-end milling cutters, round-nose milling cutters, ball-end milling cutters, taper ball-end milling cutters, rough milling cutters, drills, reamers, etc.

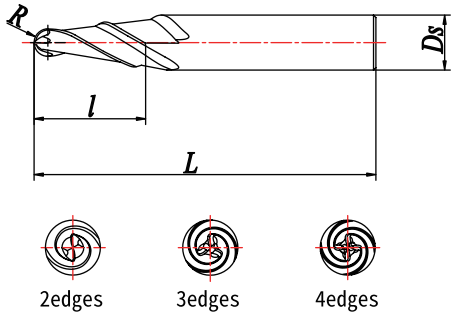
# Carbide End Mill





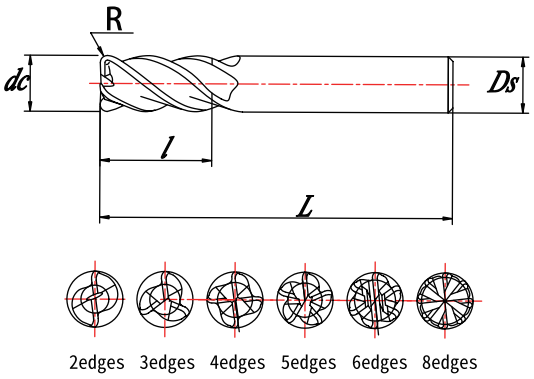

| | |
|---|---|
| materials suitable for processing | Carbon steel, stainless steel, cast iron, titanium alloy, aluminum alloy, high temperature alloy, non-metallic materials, etc. |
| Milling form | Side milling, shoulder milling, cavity milling, etc. |
| Blade diameter dc | 0.118-1.260 |
| Blade length (l ) | 0.197-3.937 |
| Total length L | 1.496-7.874 |
| Shank diameter Ds | 0.157-1.260 |
| Handle form | Cylindrical shank, side fixed shank |
| Number of blades | 2 edge, 3 edge, 4 edge, 5 edge, 6 edge, 8 edge |
| coating | TiN, TiAlN, AlCrN, AlTiN-based, DLC, diamond coating, etc. |
| other | The blade can be designed to shrink, avoid air, taper, etc. |

# Taper ball end mill



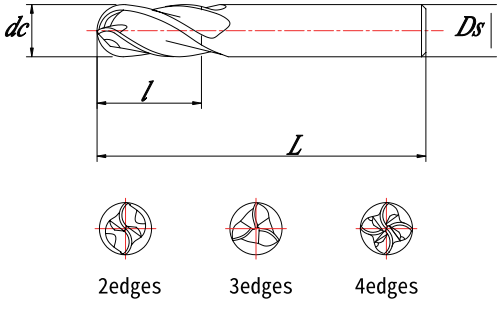

| | |
|---|---|
| Materials suitable for processing | Stainless steel, titanium alloy, aluminum alloy, high temperature alloy |
| Milling form | Side milling, end milling, etc. |
| R value | 0.0314-0.236 |
| Taper (half side) | 1°～9° |
| Blade length (l) | 0.394-3.937 |
| Total length L | 1.968-5.906 |
| Shank diameter Ds | 0.236-0.787 |
| Handle form | Cylindrical shank |
| Number of blades | 2-edge, 3-edge, 4-edge |
| coating | TiN, TiAlN, AlCrN, AlTiN-based, DLC, diamond coating, etc. |
| other | |

# Carbide End Mill-R



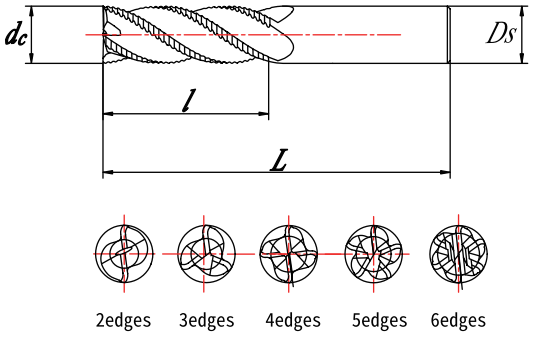

| | |
|---|---|
| Materials suitable for processing | Carbon steel, stainless steel, cast iron, titanium alloy, aluminum alloy, high temperature alloy, non-metallic materials, etc. |
| Milling form | Side milling, slot milling, ramp milling, cavity milling, etc. |
| Blade diameter dc | 0.118-1.260 |
| R value | 0.0078-0.236 |
| Blade length (l ) | 0.197-3.937 |
| Total length L | 1.496-7.874 |
| Shank diameter Ds | 0.157-1.260 |
| Handle form | Cylindrical shank, side fixed shank |
| Number of blades | 2 edge, 3 edge, 4 edge, 5 edge, 6 edge, 8 edge |
| coating | TiN, TiAlN, AlCrN, AlTiN-based, DLC, diamond coating, etc. |
| other | The blade can be designed to shrink, avoid air, taper, etc. |

# Carbide Ball End Mill



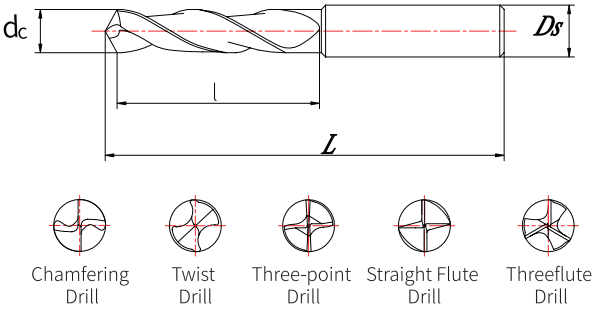

| | |
|---|---|
| Materials suitable for processing | Carbon steel, stainless steel, cast iron, titanium alloy, aluminum alloy, high temperature alloy, non-metallic materials, etc. |
| Milling form | Face milling, profile milling, etc. |
| Blade diameter dc | 0.118-1.260 |
| Blade length (l ) | 0.197-3.937 |
| Total length L | 1.496-7.874 |
| Shank diameter Ds | 0.157-1.260 |
| Handle form | Cylindrical shank, side fixed shank |
| Number of blades | 2-edge, 3-edge, 4-edge |
| coating | TiN, TiAlN, AlCrN, AlTiN-based, DLC, diamond coating, etc. |
| other | The blade can be designed to shrink, avoid air, taper, etc. |

# Roughing End Mill



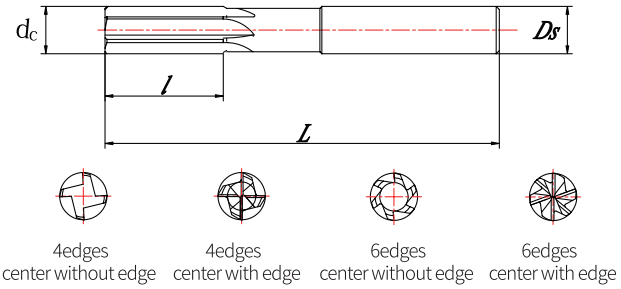

| | |
|---|---|
| Materials suitable for processing | Carbon steel, stainless steel, cast iron, titanium alloy, aluminum alloy, high temperature alloy, non-metallic materials, etc. |
| Milling form | Side milling, slot milling, etc. |
| Blade diameter dc | 0.236-1.260 |
| Blade length (l ) | 0.197-3.937 |
| Total length L | 1.967-7.874 |
| Shank diameter Ds | 0.236-1.260 |
| Handle form | Cylindrical shank, side fixed shank |
| Number of blades | 2 edge, 3 edge, 4 edge, 5 edge, 6 edge |
| coating | TiN, TiAlN, AlCrN, AlTiN-based, DLC, diamond coating, etc. |
| other | The blade can be designed to shrink, avoid air, taper, etc. |

# Drill




| | |
|---|---|
| Materials suitable for processing | Carbon steel, stainless steel, cast iron, titanium alloy, aluminum alloy, high temperature alloy, non-metallic materials, etc. |
| Blade diameter dc | 0.118-1.260 |
| Slot length (l) | 0.394-3.937 |
| Total length L | 2.362-7.874 |
| Shank diameter Ds | 0.157-1.260 |
| Cooling form | Internal cooling, external cooling |
| Handle form | Cylindrical shank, side fixed shank |
| Drill bit form | Chamfer drill, twist drill, three-point drill, straight flute drill, three-edge drill |
| coating | TiN, TiAlN, AlCrN, AlTiN-based, DLC, diamond coating, etc. |
| other | The blade can be designed to shrink, avoid air, etc. |

# Reamer






4edges center without edge | 4edges center with edge | 6edges center without edge | 6edges center with edge

| | |
|---|---|
| Materials suitable for processing | Carbon steel, stainless steel, cast iron, titanium alloy, aluminum alloy, high temperature alloy, non-metallic materials, etc. |
| Blade diameter dc | 0.118-0.787 |
| Slot length (l ) | 0.197-1.181 |
| Total length L | 2.362-5.905 |
| Shank diameter Ds | 0.157-0.787 |
| Cooling form | Internal cooling, external cooling |
| Handle form | Cylindrical shank |
| Reamer form | 4 blades, 6 blades, etc. |
| coating | TiAlN, AlCrN-based, AlTiN-based, DLC |
| other | The blade can be designed to shrink, avoid air, etc. |

# Ceramic Tools

Compared with cemented carbide tools, ceramic tools are more resistant to high temperatures and can achieve dry cutting, which not only saves costs but also is environmentally friendly;Good oxidation resistance makes it possible to realize high-speed cutting and improve production efficiency; Ceramic tools do not need coating, and can be used directly after CNC grinding.

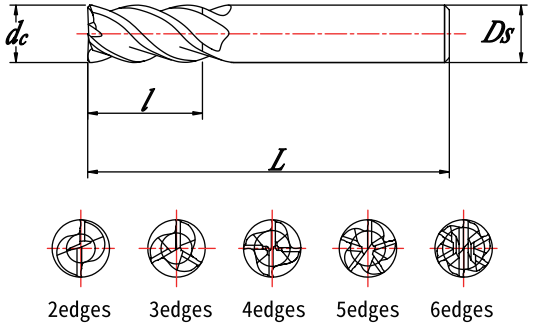
### Cermet End Mill

The friction coefficient of the cermet end mill is small, and it is easier to achieve higher surface quality when cutting steel parts.

### Sialon ceramic End Mill

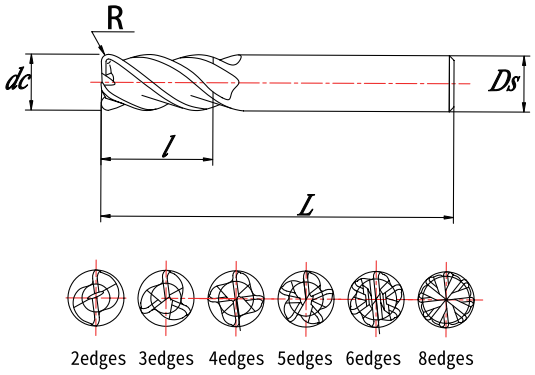
The excellent Sialon ceramic materials, special groove and edge design ensure that Sialon ceramic end mill have extremely high wear resistance and can maintain high-strength continuous cutting under high temperature conditions.The cutting tool has good red and hard performance and is suitable for efficient rough machining of high-temperature alloy materials. Compared with cemented carbide tools, the cutting efficiency of Sialon ceramic end mill can be increased by more than 10 times.

## Cermet End Mill



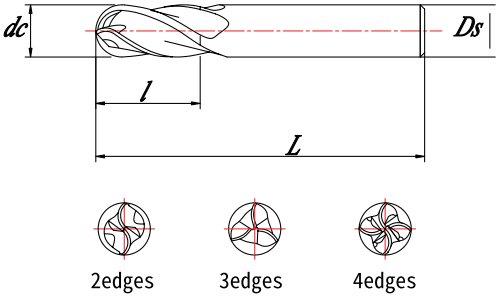

| | |
|---|---|
| Materials suitable for processing | Carbon steel, stainless steel |
| Milling form | Side milling, shoulder milling, cavity milling, etc. |
| Blade diameter dc | 0.118-1.260 |
| Blade length (l ) | 0.197-3.937 |
| Total length L | 1.496-7.874 |
| Shank diameter Ds | 0.157-1.260 |
| Handle form | Cylindrical shank |
| Number of blades | 2 edge, 3 edge, 4 edge, 5 edge, 6 edge |
| other | The blade can be designed to shrink, avoid air, taper, etc. |

## Cermet End Mill-R




| | |
|---|---|
| Materials suitable for processing | Carbon steel, stainless steel |
| Milling form | Side milling, shoulder milling, cavity milling, etc. |
| Blade diameter dc | 0.118-1.260 |
| R value | 0.0078-0.236 |
| Blade length (l) | 0.197-3.937 |
| Total length L | 1.496-7.874 |
| Shank diameter Ds | 0.157-1.260 |
| Handle form | Cylindrical shank |
| Number of blades | 2 edge, 3 edge, 4 edge, 5 edge, 6 edge, 8 edge |
| other | The blade can be designed to shrink, avoid air, taper, etc. |

## Cermet Ball End Mill

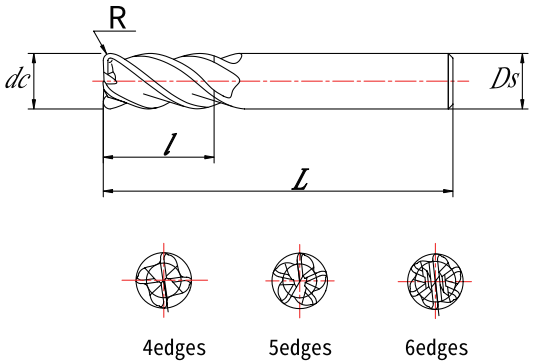



| | |
|---|---|
| Materials suitable for processing | Carbon steel, stainless steel |
| Milling form | Side milling, shoulder milling, cavity milling, etc. |
| Blade diameter dc | 0.118-1.260 |
| Blade length (l ) | 0.197-3.937 |
| Total length L | 1.496-7.874 |
| Shank diameter Ds | 0.157-1.260 |
| Handle form | Cylindrical shank |
| Number of blades | 2-edge, 3-edge, 4-edge |
| other | The blade can be designed to shrink, avoid air, taper, etc. |

# Sialon ceramic End Mill

The excellent Sialon ceramic materials, special groove and edge design ensure that Sialon ceramic end mill have extremely high wear resistance and can maintain high-strength continuous cutting under high temperature conditions.The cutting tool has good red and hard performance and is suitable for efficient rough machining of high-temperature alloy materials. Compared with cemented carbide tools, the cutting efficiency of Sialon ceramic end mill can be increased by more than 10 times.

## Sialon ceramic End Mill-R




| | |
|---|---|
| Materials suitable for processing | Superalloy |
| Milling form | Side milling, shoulder milling, cavity milling, etc. |
| Blade diameter dc | 0.315-0.787 |
| R value | 0.0197-0.236 |
| Blade length (l ) | 0.197-0.787 |
| Total length L | 2.392-4.724 |
| Shank diameter Ds | 0.315-0.787 |
| Number of blades | 4-edge, 5-edge, 6-edge |
| other | The blade can be designed to shrink, avoid air, taper, etc. |

## Other

T type end mill

Fast feed end mill

Step drill

Drill reamer

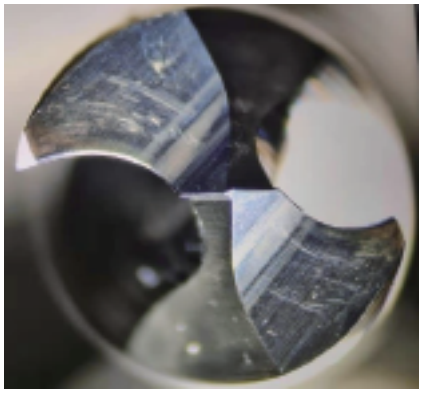
Deep hole drill

# 06

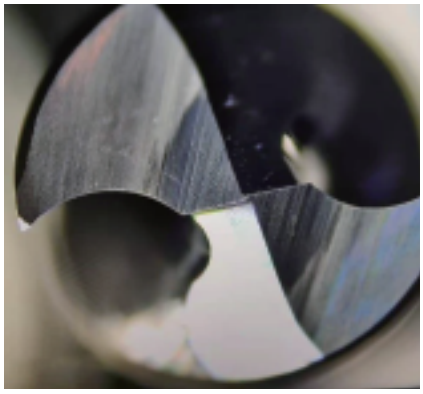
# Tool grinding

We imported five-axis CNC tool grinder, universal tool grinder, tool post-processing equipment, Zoller tool detector and other equipment,

According to different customer cutting conditions and tools, a complete tool grinding standard has been established, which can realize the re-grinding and repairing of standard and special carbide end mill, drills, and reamers.The performance of the original new tool can be achieved at the first grinding, and the delivery time is usually about 3 to 5 working days.



Before grinding



After grinding

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