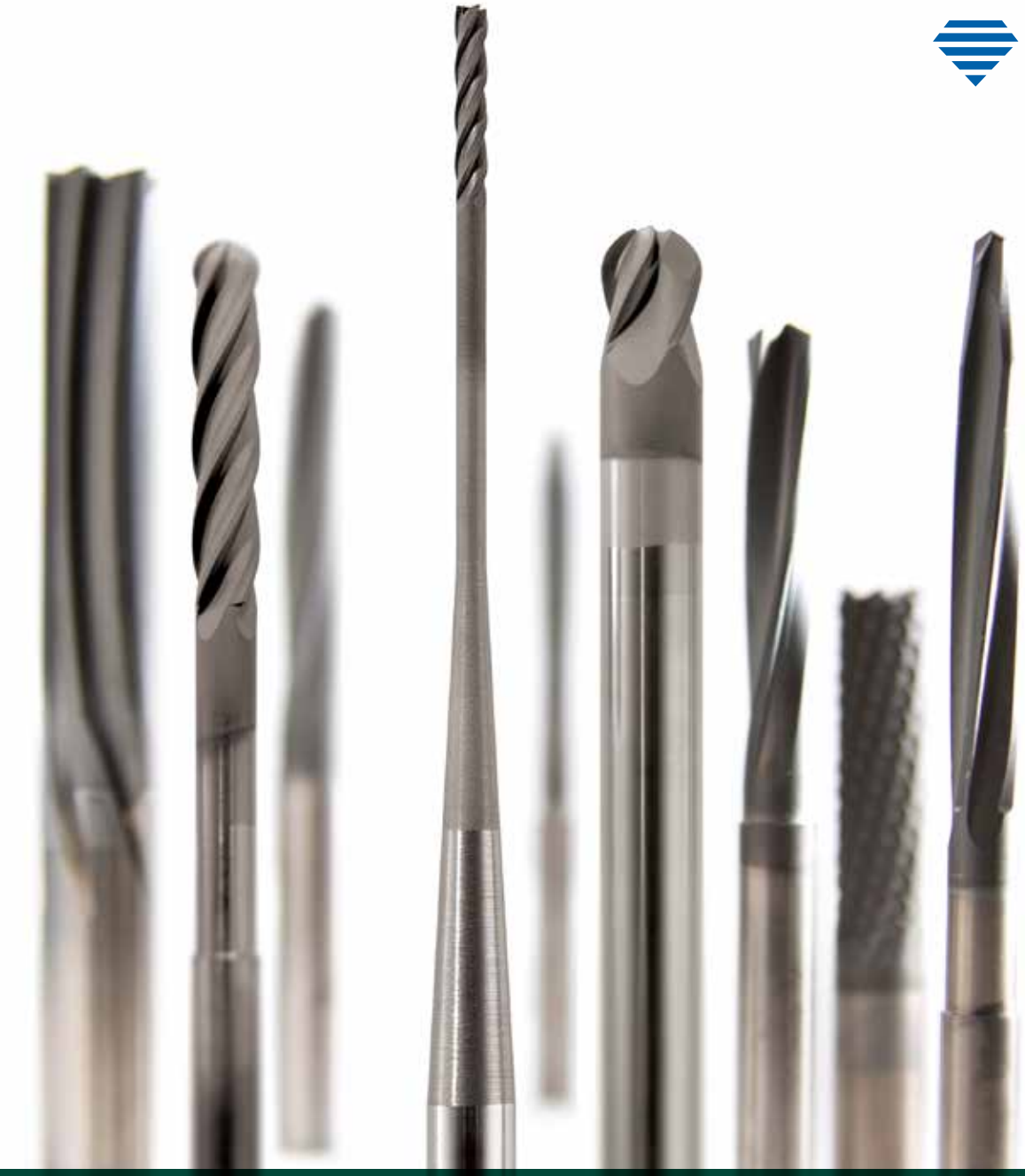
Crystallume
A DIVISION OF ROBBJACK CORPORATION



Diamond Done Right

2023 Catalog

Graphite Machining

General Purpose Tools

Aircraft Tools

Coating Services

Crystallume
A DIVISION OF ROBBJACK CORPORATION

Founded in 1984, Crystallume pioneered the development and application of Chemical Vapor Deposition (CVD) diamond technology. Crystallume has been shipping diamond products since 1988 and diamond has always been the technology that is Crystallume's specialty. The company's strength is its ability to apply its technology, coating and application experience to solve customer problems.

crystallume.com

Stealth Series

The sharpest cutting edge available in a diamond coated tool.

The performance of real diamond, along with the edge sharpness of a thin coating, gives unheard of performance in the finishing of graphite. It is also the perfect tool for rib machining on graphite electrodes.

4 Flute Stealth Series End Mills*

Cutting Diameter	Flute Length	Overall Length	Reach Length	End Style	Shank Diameter	Part Number Coated
1/32"	3/32"	1.5"		SE	1/8"	B2-200219-1
1/32"	3/32"	1.5"		BN	1/8"	B2-200202-1
1/16"	1/4"	1.5"		SE	1/8"	B2-200492-1
1/16"	1/4"	1.5"		BN	1/8"	B2-200646-1
3/32"	3/8"	1.5"		SE	1/8"	B2-200002-1
3/32"	3/8"	1.5"		BN	1/8"	B2-200004-1
1/8"	1/2"	1.5"		SE	1/8"	B2-200006-1
1/8"	1/2"	1.5"		BN	1/8"	B2-200008-1
1/8"	1"	3.0"		SE	1/8"	B2-200010-1
1/8"	1"	3.0"		BN	1/8"	B2-200012-1
3/16"	5/8"	2.0"		SE	3/16"	B2-200014-1
3/16"	5/8"	2.0"		BN	3/16"	B2-200016-1
1/4"	3/4"	2.5"		SE	1/4"	B2-200022-1
1/4"	3/4"	2.5"		BN	1/4"	B2-200024-1

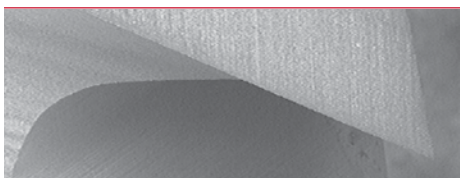
4 Flute Stealth Series Extended Shank End Mills*

(Replaces P47 Thunderbolt Series)

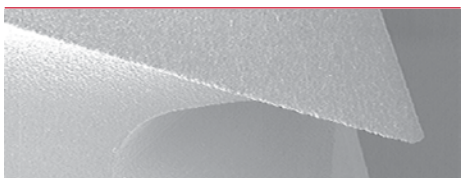
Cutting Diameter	Flute Length	Overall Length	Reach Length	End Style	Shank Diameter	Part Number Coated
1/16"	1/16"	3.0"	5/16”	BN	1/16"	B2-200105-1
1/16"	1/16"	3.0"	5/16”	SE	1/16"	B2-200209-1
3/32"	3/32"	3.0"	11/32”	BN	3/32"	B2-200106-1
3/32"	3/32"	3.0"	11/32”	SE	3/32"	B2-200582-1
1/8"	1/8"	3.0"	5/8”	BN	1/8"	B2-200107-1
1/8"	1/8"	3.0"	5/8”	SE	1/8"	B2-200210-1
1/8"	1/8"	3.0"	5/8”	SE, .015”CR	1/8"	B2-200241-1
1/8"	1/8"	3.0"	5/8”	SE, .031”CR	1/8"	B2-200628-1
3/16"	3/16"	3.0"	11/16”	BN	3/16"	B2-200108-1
3/16"	3/16"	3.0"	11/16”	SE	3/16"	B2-200237-1
3/16"	3/16"	3.0"	11/16”	SE, .062”CR	3/16"	B2-200627-1
1/4"	1/4"	4.0"	3/4”	BN	1/4"	B2-200109-1
1/4"	1/4"	4.0"	3/4”	SE	1/4"	B2-200211-1
1/4”	1/4”	4.0”	3/4”	SE, .015”CR	1/4”	B2-200242-1
1/4”	1/4”	4.0”	3/4”	SE, .031”CR	1/4”	B2-200279-1
1/4”	1/4”	4.0”	3/4”	SE, .062”CR	1/4”	B2-200626-1

Standard Tolerance

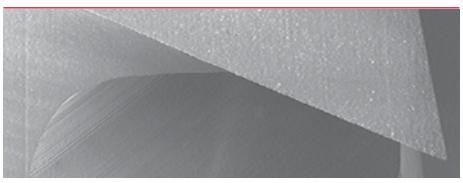
Cutting Diameter = +0.001/–0.001"
Shank Tolerance h6
Flute Length = ±0.060"
Overall Length = ±0.060"



Standard uncoated carbide tool



Standard diamond coated carbide tool



Stealth coated carbide tool

Don’t see what you need?

Call us at 1.800.789.4322. It might be a stocked special.

Lightning Series — Metric

The Lightning series of tools offer a cost-effective solution for the machining of graphite electrodes. By reducing the coating thickness the edge sharpness is increased and cost is reduced. These tools offer a cost-effective solution for most medium lot size jobs.

Lightning Diamond Coated Series End Mills*

METRIC

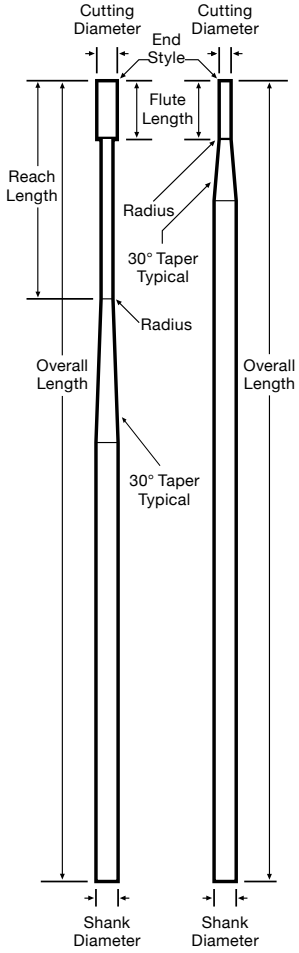
Cutting Diameter	Shank Diameter	Flute Length	End Style	Reach Length	Overall Length	Number of Flutes	Part Number Diamond Coated
0.2	3	0.30	SE		40	2	P38-00M037-1
0.2	3	0.30	BN		40	2	P38-00M055-1
0.3	3	0.45	SE		40	2	P38-00M038-1
0.3	3	0.45	BN		40	2	P38-00M056-1
0.4	3	0.60	SE		40	2	P38-00M039-1
0.4	3	0.60	BN		40	2	P38-00M057-1
0.5	3	1.50	SE		40	2	P38-00M040-1
0.5	3	1.50	BN		40	2	P38-00M058-1
0.5	3	1.50	SE	4	40	2	P38-00M041-1
0.5	3	1.50	BN	4	40	2	P38-00M059-1
0.6	3	1.80	SE		40	2	P38-00M042-1
0.6	3	1.80	BN		40	2	P38-00M060-1
0.6	3	1.80	SE	5	40	2	P38-00M043-1
0.6	3	1.80	BN	5	40	2	P38-00M061-1
0.8	3	2.40	SE		40	2	P38-00M044-1
0.8	3	2.40	BN		40	2	P38-00M062-1
0.8	3	2.40	SE	7	40	2	P38-00M045-1
0.8	3	2.40	BN	7	40	2	P38-00M063-1
1	3	3	SE		40	2	P38-00M046-1
1	3	3	BN		40	2	P38-00M064-1
1	3	3	0.2R		50	4	P38-00M073-1
1	3	3	SE	6	40	2	P38-00M047-1
1	3	3	BN	6	40	2	P38-00M065-1
1	3	3	0.2R	6	50	4	P38-00M074-1
1	3	3	SE	10	40	2	P38-00M048-1
1	3	3	BN	10	40	2	P38-00M066-1
1	3	3	0.2R	10	50	4	P38-00M075-1
1	3	3	SE	16	40	2	P38-00M049-1
1	3	3	BN	16	40	2	P38-00M067-1
1	3	3	0.2R	16	50	4	P38-00M076-1
1	3	3	SE	20	40	2	P38-00M050-1
1	3	3	BN	20	40	2	P38-00M068-1
1	3	3	0.2R	20	50	4	P38-00M077-1
2	3	6	SE		40	4	P38-00M051-1
2	3	6	BN		40	4	P38-00M069-1
2	3	6	0.5R		50	4	P38-00M078-1
2	3	6	SE	10	40	4	P38-00M052-1
2	3	6	BN	10	40	4	P38-00M070-1
2	3	6	0.5R	10	50	4	P38-00M079-1
2	3	6	SE	16	40	4	P38-00M053-1
2	3	6	BN	16	40	4	P38-00M071-1
2	3	6	0.5R	16	50	4	P38-00M080-1
2	3	6	SE	20	40	4	P38-00M054-1
2	3	6	BN	20	40	4	P38-00M072-1
2	3	6	0.5R	20	50	4	P38-00M081-1

Lightning Series—Metric

Lightning Diamond Coated Series End Mills*

METRIC

Cutting Diameter	Shank Diameter	Flute Length	End Style	Reach Length	Overall Length	Number of Flutes	Part Number Diamond Coated
3	3	12	SE	15	75	4	P38-00M001-1
3	3	12	BN	15	75	4	P38-00M013-1
3	3	12	0.5R	15	75	4	P38-00M025-1
4	4	15	SE	20	75	4	P38-00M002-1
4	4	15	BN	20	75	4	P38-00M014-1
4	4	15	0.5R	20	75	4	P38-00M026-1
4	4	15	SE	20	100	4	P38-00M003-1
4	4	15	BN	20	100	4	P38-00M015-1
4	4	15	0.5R	20	100	4	P38-00M027-1
6	6	20	SE	25	60	4	P38-00M004-1
6	6	20	BN	25	60	4	P38-00M016-1
6	6	20	0.5R	25	60	4	P38-00M028-1
6	6	20	SE	25	100	4	P38-00M005-1
6	6	20	BN	25	100	4	P38-00M017-1
6	6	20	0.5R	25	100	4	P38-00M029-1
6	6	20	SE	25	150	4	P38-00M006-1
6	6	20	BN	25	150	4	P38-00M018-1
6	6	20	0.5R	25	150	4	P38-00M030-1
8	8	25	SE	35	100	4	P38-00M007-1
8	8	25	BN	35	100	4	P38-00M019-1
8	8	25	0.5R	35	100	4	P38-00M031-1
8	8	25	SE	35	150	4	P38-00M008-1
8	8	25	BN	35	150	4	P38-00M020-1
8	8	25	0.5R	35	150	4	P38-00M032-1
10	10	25	SE	35	100	4	P38-00M009-1
10	10	25	BN	35	100	4	P38-00M021-1
10	10	25	1.0R	35	100	4	P38-00M033-1
10	10	25	SE	35	150	4	P38-00M010-1
10	10	25	BN	35	150	4	P38-00M022-1
10	10	25	1.0R	35	150	4	P38-00M034-1
12	12	25	SE	35	100	4	P38-00M011-1
12	12	25	BN	35	100	4	P38-00M023-1
12	12	25	1.0R	35	100	4	P38-00M035-1
12	12	25	SE	35	150	4	P38-00M012-1
12	12	25	BN	35	150	4	P38-00M024-1
12	12	25	1.0R	35	150	4	P38-00M036-1



	6MM AND SMALLER	LARGER THAN 6MM
FG DIA	+.000/-.013MM	+.000/-.025MM
REACH DIA TOL	+.000/-.013MM	+.000/-.025MM
RADIUS TOL	+.000/-.0127	+.000/-.0127
OAL	+1.5MM/-1.5MM	+1.5MM/-1.5MM

	2MM AND SMALLER	LARGER THAN 2MM
LOC	+1X DIA/-0.00MM	+1.5MM/-0.00MM
REACH	+1X DIA/-0.00MM	+1.5MM/-0.00MM

Lightning Series

The Lightning series of tools offer a cost-effective solution for the machining of graphite electrodes. By reducing the coating thickness the edge sharpness is increased and cost is reduced. These tools offer a cost-effective solution for most medium lot size jobs.

Standard Tolerance

Cutting Diameter = +0.001/–0.001”
Shank Tolerance h6
Flute Length = ±0.060”
Overall Length = ±0.060”

4 Flute Lightning Series Extended Shank End Mills*

Cutting Diameter	Flute Length	Overall Length	Reach Length	End Style	Shank Diameter	Part Number Coated
1/16"	0.0625"	3.0"	0.313"	BN	1/16"	P38-005155-1
1/16"	0.0625"	3.0"	0.313"	SE	1/16"	P38-005156-1
3/32"	0.0938"	3.0"	0.344"	BN	3/32"	P38-005157-1
3/32"	0.0938"	3.0"	0.344"	SE	3/32"	P38-005158-1
1/8"	0.1250"	3.0"	0.625"	BN	1/8"	P38-005159-1
1/8"	0.1250"	3.0"	0.625"	SE	1/8"	P38-005160-1
1/8"	0.1250"	3.0"	0.625"	SE,.015"CR	1/8"	P38-005161-1
1/8"	0.1250"	3.0"	0.625"	SE,.031"CR	1/8"	P38-005162-1
3/16"	0.1875"	3.0"	0.688"	BN	3/16"	P38-005163-1
3/16"	0.1875"	3.0"	0.688"	SE	3/16"	P38-005164-1
3/16"	0.1875"	3.0"	0.688"	SE,.062"CR	3/16"	P38-005165-1
1/4"	0.2500"	4.0"	0.750"	BN	1/4"	P38-005166-1
1/4"	0.2500"	4.0"	0.750"	SE	1/4"	P38-005167-1
1/4"	0.2500"	4.0"	0.750"	SE,.015"CR	1/4"	P38-005168-1
1/4"	0.2500"	4.0"	0.750"	SE,.030"CR	1/4"	P38-005169-1
1/4"	0.2500"	4.0"	0.750"	SE,.062"CR	1/4"	P38-005170-1

4 Flute Lightning Series General Purpose End Mills*

Cutting Diameter	Flute Length	Overall Length	End Style	Shank Diameter	Part Number Coated
1/32"	0.094"	1.5"	BN	1/8"	P38-200202-1
1/32"	0.094"	1.5"	SE	1/8"	P38-200219-1
1/16"	0.188"	1.5"	BN	1/8"	P38-200175-1
1/16"	0.188"	1.5"	SE	1/8"	P38-200477-1
3/32"	0.375"	1.5"	BN	1/8"	P38-200004-1
3/32"	0.375"	1.5"	SE	1/8"	P38-200002-1
1/8"	0.500"	1.5"	BN	1/8"	P38-200008-1
1/8"	0.500"	1.5"	SE	1/8"	P38-200006-1
1/8"	1.000"	3.0"	BN	1/8"	P38-200012-1
1/8"	1.000"	3.0"	SE	1/8"	P38-200010-1
3/16"	0.625"	2.0"	BN	3/16"	P38-200016-1
3/16"	0.625"	2.0"	SE	3/16"	P38-200014-1
1/4"	0.750"	2.5"	BN	1/4"	P38-200024-1
1/4"	0.750"	2.5"	SE	1/4"	P38-200022-1
1/4"	1.250"	3.0"	BN	1/4"	P38-200028-1
1/4"	1.250"	3.0"	SE	1/4"	P38-200026-1
3/8"	0.875"	2.5"	BN	3/8"	P38-200040-1
3/8"	0.875"	2.5"	SE	3/8"	P38-200038-1
1/2"	1.000"	3.0"	BN	1/2"	P38-200056-1
1/2"	1.000"	3.0"	SE	1/2"	P38-200054-1
1/2"	2.000"	4.0"	BN	1/2"	P38-200060-1
1/2"	2.000"	4.0"	SE	1/2"	P38-200058-1

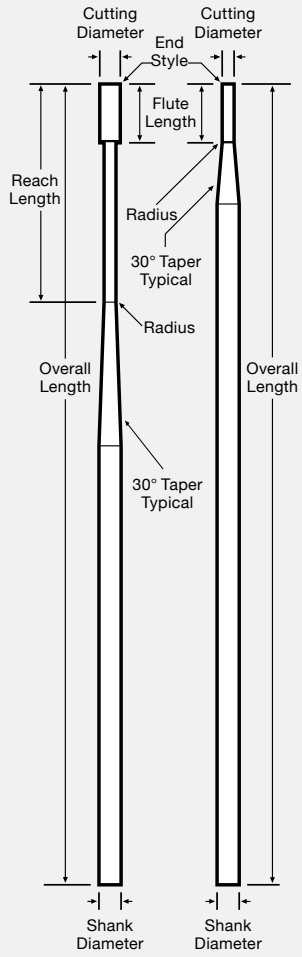
Lightning Series—Long Reach

2 Flute Lightning Series End Mills—Long Reach*

Cutting Diameter	Flute Length	Overall Length	Reach Length	End Style	Shank Diameter	Part Number Coated
1/64"	0.047"	3.0"		BN	1/8"	P38-005101-1
1/64"	0.047"	3.0"		SE	1/8"	P38-005102-1
1/64"	0.047"	3.0"	0.250"	BN	1/8"	P38-005103-1
1/64"	0.047"	3.0"	0.250"	SE	1/8"	P38-005104-1
1/64"	0.047"	3.0"	0.500"	BN	1/8"	P38-005105-1
1/64"	0.047"	3.0"	0.500"	SE	1/8"	P38-005106-1

4 Flute Lightning Series End Mills—Long Reach*

Cutting Diameter	Flute Length	Overall Length	Reach Length	End Style	Shank Diameter	Part Number Coated
1/32"	0.094"	3.0"		BN	1/8"	P38-005107-1
1/32"	0.094"	3.0"		SE	1/8"	P38-005108-1
1/32"	0.094"	3.0"		SE,.005"CR	1/8"	P38-005109-1
1/32"	0.094"	3.0"	0.400"	BN	1/8"	P38-005110-1
1/32"	0.094"	3.0"	0.400"	SE	1/8"	P38-005111-1
1/32"	0.094"	3.0"	0.400"	SE,.005"CR	1/8"	P38-005112-1
1/32"	0.094"	3.0"	0.625"	BN	1/8"	P38-005113-1
1/32"	0.094"	3.0"	0.625"	SE	1/8"	P38-005114-1
1/32"	0.094"	3.0"	0.625"	SE,.005"CR	1/8"	P38-005115-1
1/32"	0.094"	3.0"	0.900"	BN	1/8"	P38-005116-1
1/32"	0.094"	3.0"	0.900"	SE	1/8"	P38-005117-1
1/32"	0.094"	3.0"	0.900"	SE,.005"CR	1/8"	P38-005118-1
3/64"	0.141"	3.0"		BN	1/8"	P38-005119-1
3/64"	0.141"	3.0"		SE	1/8"	P38-005120-1
3/64"	0.141"	3.0"		SE,.010"CR	1/8"	P38-005121-1
3/64"	0.141"	3.0"	0.563"	BN	1/8"	P38-005122-1
3/64"	0.141"	3.0"	0.563"	SE	1/8"	P38-005123-1
3/64"	0.141"	3.0"	0.563"	SE,.010"CR	1/8"	P38-005124-1
3/64"	0.141"	3.0"	0.750"	BN	1/8"	P38-005125-1
3/64"	0.141"	3.0"	0.750"	SE	1/8"	P38-005126-1
3/64"	0.141"	3.0"	0.750"	SE,.010"CR	1/8"	P38-005127-1
1/16"	0.188"	3.0"		BN	1/8"	P38-005128-1
1/16"	0.188"	3.0"		SE	1/8"	P38-005129-1
1/16"	0.188"	3.0"		SE,.010"CR	1/8"	P38-005130-1
1/16"	0.188"	3.0"	0.750"	BN	1/8"	P38-005131-1
1/16"	0.188"	3.0"	0.750"	SE	1/8"	P38-005132-1
1/16"	0.188"	3.0"	0.750"	SE,.010"CR	1/8"	P38-005133-1
1/16"	0.188"	3.0"	1.000"	BN	1/8"	P38-005134-1
1/16"	0.188"	3.0"	1.000"	SE	1/8"	P38-005135-1
1/16"	0.188"	3.0"	1.000"	SE,.010"CR	1/8"	P38-005136-1
3/32"	0.281"	3.0"		BN	1/8"	P38-005137-1
3/32"	0.281"	3.0"		SE	1/8"	P38-005138-1
3/32"	0.281"	3.0"		SE,.010"CR	1/8"	P38-005139-1
3/32"	0.281"	3.0"	1.000"	BN	1/8"	P38-005140-1
3/32"	0.281"	3.0"	1.000"	SE	1/8"	P38-005141-1
3/32"	0.281"	3.0"	1.000"	SE,.010"CR	1/8"	P38-005142-1
3/32"	0.281"	3.0"	1.500"	BN	1/8"	P38-005143-1
3/32"	0.281"	3.0"	1.500"	SE	1/8"	P38-005144-1
3/32"	0.281"	3.0"	1.500"	SE,.010"CR	1/8"	P38-005145-1
1/8"	0.375"	3.0"		BN	1/8"	P38-005146-1
1/8"	0.375"	3.0"		SE	1/8"	P38-005147-1
1/8"	0.375"	3.0"		SE,.010"CR	1/8"	P38-005148-1
1/8"	0.375"	3.0"	1.000"	BN	1/8"	P38-005149-1
1/8"	0.375"	3.0"	1.000"	SE	1/8"	P38-005150-1
1/8"	0.375"	3.0"	1.000"	SE,.010"CR	1/8"	P38-005151-1
1/8"	0.375"	3.0"	2.000"	BN	1/8"	P38-005152-1
1/8"	0.375"	3.0"	2.000"	SE	1/8"	P38-005153-1
1/8"	0.375"	3.0"	2.000"	SE,.010"CR	1/8"	P38-005154-1



Standard Tolerance

Cutting Diameter = +0.001/−0.001"
Shank Tolerance h6
Flute Length = ±0.060"
Overall Length = ±0.060"

Mold Maker End Mills—With Reach

Crystallume's Mold Maker tools offer features specifically for electrode and mold manufacturing. The Mold Maker tools have a 5× diameter flute length with an extended shank. The big difference is the tolerance of the tools. With a cutting diameter up to 1/8" and 3 mm the tolerance is +0.0000/−0.0005" and for tools larger than this the tolerance is +0.0000/−0.0010".

All shanks are held to a tolerance of a shank diameter tolerance h6 to assure consistent and concentric gripping in shrink-fit holders. Mold Maker tools are available in sizes from 1/64 to 1/2" and from .5 to 6 mm in diameter with tools below 1/4" and 6 mm available with and without extended reach. Crystallume Mold Maker tools are the most precise diamond coated tools available off the shelf.

Standard Tolerance

Cutting Diameter
(up to 0.1250") = +0.0000/−0.0005"
(0.1875 to 0.5000") = +0.0000/−0.0010"
Shank Diameter h6
Flute Length = ±0.060"
Overall Length = ±0.060"

2 Flute Mold Maker End Mills—With Reach

Cutting Diameter	Flute Length	Overall Length	Reach Length	End Style	Shank Diameter	Part Number Coated
1/64"	0.075"	2-1/2"	1/8"	BN	1/8"	P820-200404-1
1/64"	0.075"	2-1/2"	1/8"	SE	1/8"	P820-200403-1

4 Flute Mold Maker End Mills—With Reach

Cutting Diameter	Flute Length	Overall Length	Reach Length	End Style	Shank Diameter	Part Number Coated
1/32"	5/32"	2-1/2"	1/4"	BN	1/8"	P820-200406-1
1/32"	5/32"	2-1/2"	1/4"	SE	1/8"	P820-200405-1
1/32"	5/32"	2-1/2"	1/4"	SE,.005"CR	1/8"	P820-200407-1
3/64"	15/64"	2-1/2"	1/2"	BN	1/8"	P820-200409-1
3/64"	15/64"	2-1/2"	1/2"	SE	1/8"	P820-200408-1
3/64"	15/64"	2-1/2"	1/2"	SE,.010"CR	1/8"	P820-200410-1
1/16"	5/16"	2-1/2"	1"	BN	1/8"	P820-200412-1
1/16"	5/16"	2-1/2"	1"	SE	1/8"	P820-200411-1
1/16"	5/16"	2-1/2"	1"	SE,.010"CR	1/8"	P820-200413-1
3/32"	15/32"	2-1/2"	1"	BN	1/8"	P820-200415-1
3/32"	15/32"	2-1/2"	1"	SE	1/8"	P820-200414-1
3/32"	15/32"	2-1/2"	1"	SE,.015"CR	1/8"	P820-200416-1
3/32"	15/32"	2-1/2"	1"	SE,.020"CR	1/8"	P820-200417-1
1/8"	5/8"	3"	1-1/4"	BN	1/8"	P820-200419-1
1/8"	5/8"	3"	1-1/4"	SE	1/8"	P820-200418-1
1/8"	5/8"	3"	1-1/4"	SE,.015"CR	1/8"	P820-200420-1
1/8"	5/8"	3"	1-1/4"	SE,.020"CR	1/8"	P820-200421-1
1/8"	5/8"	3"	1-1/4"	SE,.030"CR	1/8"	P820-200422-1
3/16"	15/16"	3"	1-1/2"	BN	3/16"	P820-200424-1
3/16"	15/16"	3"	1-1/2"	SE	3/16"	P820-200423-1
3/16"	15/16"	3"	1-1/2"	SE,.030"CR	3/16"	P820-200425-1
1/4"	1-1/4"	4"	2-1/2"	BN	1/4"	P820-200427-1
1/4"	1-1/4"	4"	2-1/2"	SE	1/4"	P820-200426-1
1/4"	1-1/4"	4"	2-1/2"	SE,.015"CR	1/4"	P820-200428-1
1/4"	1-1/4"	4"	2-1/2"	SE,.020"CR	1/4"	P820-200429-1
1/4"	1-1/4"	4"	2-1/2"	SE,.030"CR	1/4"	P820-200430-1
1/4"	1-1/4"	4"	2-1/2"	SE,.060"CR	1/4"	P820-200431-1

Mold Maker End Mills—With Reach

2 Flute Mold Maker End Mills—With Reach

METRIC

Cutting Diameter	Flute Length	Overall Length	Reach Length	End Style	Shank Diameter	Part Number Coated
0.5mm	2.5mm	62mm	3mm	BN	3mm	P820-200338-1
0.5mm	2.5mm	62mm	3mm	SE	3mm	P820-200337-1

4 Flute Mold Maker End Mills—With Reach

METRIC

Cutting Diameter	Flute Length	Overall Length	Reach Length	End Style	Shank Diameter	Part Number Coated
1mm	5mm	62mm	12mm	BN	3mm	P820-200340-1
1mm	5mm	62mm	12mm	SE	3mm	P820-200339-1
1.5mm	7.5mm	62mm	25mm	BN	3mm	P820-200342-1
1.5mm	7.5mm	62mm	25mm	SE	3mm	P820-200341-1
2mm	10mm	62mm	25mm	BN	3mm	P820-200344-1
2mm	10mm	62mm	25mm	SE	3mm	P820-200343-1
3mm	15mm	62mm	30mm	BN	3mm	P820-200346-1
3mm	15mm	62mm	30mm	SE	3mm	P820-200345-1
4mm	20mm	75mm	40mm	BN	4mm	P820-200348-1
4mm	20mm	75mm	40mm	SE	4mm	P820-200347-1
6mm	24mm	75mm	50mm	BN	6mm	P820-200350-1
6mm	24mm	75mm	50mm	SE	6mm	P820-200349-1

Don't see what you need? Call us at 1.800.789.4322.
It might be a stocked special.

Metric Tolerance

Cutting Diameter
(up to 3.000mm) = +0.000/−0.013mm
(3mm to 6mm) = +0.000/−0.025mm
Shank Diameter h6
Flute Length = ±1.000mm
Overall Length = +0.500/−1.500mm

Mold Maker End Mills—Without Reach

2 Flute Mold Maker End Mills—Without Reach

Cutting Diameter	Flute Length	Overall Length	End Style	Shank Diameter	Part Number Coated
1/64"	0.075"	2-1/2"	BN	1/8"	P820-200684-1
1/64"	0.075"	2-1/2"	SE	1/8"	P820-200683-1

4 Flute Mold Maker End Mills—Without Reach

Cutting Diameter	Flute Length	Overall Length	End Style	Shank Diameter	Part Number Coated
1/32"	5/32"	2-1/2"	BN	1/8"	P820-200686-1
1/32"	5/32"	2-1/2"	SE	1/8"	P820-200685-1
1/32"	5/32"	2-1/2"	SE,.005"CR	1/8"	P820-200687-1
3/64"	15/64"	2-1/2"	BN	1/8"	P820-200689-1
3/64"	15/64"	2-1/2"	SE	1/8"	P820-200688-1
3/64"	15/64"	2-1/2"	SE,.010"CR	1/8"	P820-200690-1
1/16"	5/16"	2-1/2"	BN	1/8"	P820-200692-1
1/16"	5/16"	2-1/2"	SE	1/8"	P820-200691-1
1/16"	5/16"	2-1/2"	SE,.010"CR	1/8"	P820-200693-1
3/32"	15/32"	2-1/2"	BN	1/8"	P820-200695-1
3/32"	15/32"	2-1/2"	SE	1/8"	P820-200694-1
3/32"	15/32"	2-1/2"	SE,.015"CR	1/8"	P820-200696-1
3/32"	15/32"	2-1/2"	SE,.020"CR	1/8"	P820-200697-1
1/8"	5/8"	3"	BN	1/8"	P820-200699-1
1/8"	5/8"	3"	SE	1/8"	P820-200698-1
1/8"	5/8"	3"	SE,.015"CR	1/8"	P820-200700-1
1/8"	5/8"	3"	SE,.020"CR	1/8"	P820-200701-1
1/8"	5/8"	3"	SE,.030"CR	1/8"	P820-200702-1
3/16"	15/16"	3"	BN	3/16"	P820-200704-1
3/16"	15/16"	3"	SE	3/16"	P820-200703-1
3/16"	15/16"	3"	SE,.030"CR	3/16"	P820-200705-1
1/4"	1-1/4"	4"	BN	1/4"	P820-200707-1
1/4"	1-1/4"	4"	SE	1/4"	P820-200706-1
1/4"	1-1/4"	4"	SE,.015"CR	1/4"	P820-200708-1
1/4"	1-1/4"	4"	SE,.020"CR	1/4"	P820-200709-1
1/4"	1-1/4"	4"	SE,.030"CR	1/4"	P820-200710-1
1/4"	1-1/4"	4"	SE,.060"CR	1/4"	P820-200711-1
3/8"	1-1/2"	6"	BN	3/8"	P820-200713-1
3/8"	1-1/2"	6"	SE	3/8"	P820-200712-1
3/8"	1-1/2"	6"	SE,.015"CR	3/8"	P820-200714-1
3/8"	1-1/2"	6"	SE,.030"CR	3/8"	P820-200715-1
3/8"	1-1/2"	6"	SE,.060"CR	3/8"	P820-200716-1
1/2"	1-1/2"	6"	BN	1/2"	P820-200718-1
1/2"	1-1/2"	6"	SE	1/2"	P820-200717-1
1/2"	1-1/2"	6"	SE,.015"CR	1/2"	P820-200719-1
1/2"	1-1/2"	6"	SE,.030"CR	1/2"	P820-200720-1
1/2"	1-1/2"	6"	SE,.060"CR	1/2"	P820-200721-1

Standard Tolerance

Cutting Diameter
(up to 0.1250") = +0.0000/−0.0005"
(0.1875 to 0.5000") = +0.0000/−0.0010"
Shank Diameter h6
Flute Length = ±0.060"
Overall Length = ±0.060"

Mold Maker End Mills—Without Reach

2 Flute Mold Maker End Mills—Without Reach

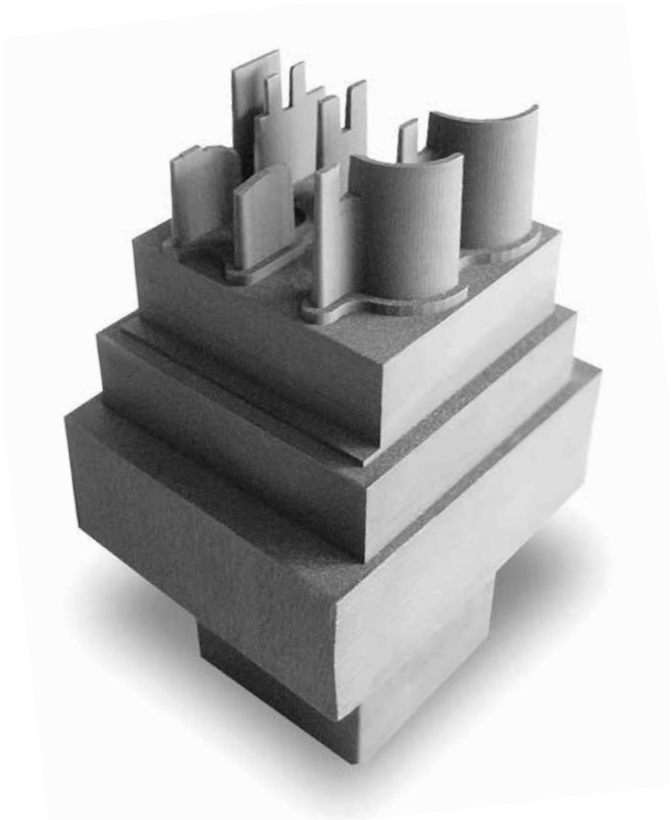
METRIC

Cutting Diameter	Flute Length	Overall Length	End Style	Shank Diameter	Part Number Coated
0.5mm	2.5mm	62mm	BN	3mm	P820-200670-1
0.5mm	2.5mm	62mm	SE	3mm	P820-200669-1

4 Flute Mold Maker End Mills—Without Reach

METRIC

Cutting Diameter	Flute Length	Overall Length	End Style	Shank Diameter	Part Number Coated
1mm	5mm	62mm	BN	3mm	P820-200672-1
1mm	5mm	62mm	SE	3mm	P820-200671-1
1.5mm	7.5mm	62mm	BN	3mm	P820-200674-1
1.5mm	7.5mm	62mm	SE	3mm	P820-200673-1
2mm	10mm	62mm	BN	3mm	P820-200676-1
2mm	10mm	62mm	SE	3mm	P820-200675-1
3mm	15mm	62mm	BN	3mm	P820-200678-1
3mm	15mm	62mm	SE	3mm	P820-200677-1
4mm	20mm	75mm	BN	4mm	P820-200680-1
4mm	20mm	75mm	SE	4mm	P820-200679-1
6mm	24mm	75mm	BN	6mm	P820-200682-1
6mm	24mm	75mm	SE	6mm	P820-200681-1



Metric Tolerance

Cutting Diameter
(up to 3.000mm) = +0.000/−0.013mm
(3mm to 6mm) = +0.000/−0.025mm
Shank Diameter h6
Flute Length = ±1.000mm
Overall Length = +0.500/−1.500mm

Extended Shank End Mills

The Extended Shank tools combine a short flute length for maximum rigidity with a long shank for reaching into deep cavities. When the extended shank is not required, you can choke up on the tool to make it extremely rigid as a stub tool. This is a great all-around tool that will become the workhorse for your shop.

Standard Tolerance

Cutting Diameter = +0.001/–0.001”
Shank Tolerance h6
Flute Length = ±0.060”
Overall Length = ±0.060”

4 Flute Extended Shank End Mills

Cutting Diameter	Flute Length	Overall Length	Reach Length	End Style	Shank Diameter	Part Number Coated
1/16"	1/16"	3"	5/16"	BN	1/16"	P820-200105-1
1/16"	1/16"	3"	5/16"	SE	1/16"	P820-200209-1
3/32"	3/32"	3"	11/32"	BN	3/32"	P820-200106-1
3/32"	3/32"	3"	11/32"	SE	3/32"	P820-200582-1
1/8"	1/8"	3"	5/8"	BN	1/8"	P820-200107-1
1/8"	1/8"	3"	5/8"	SE	1/8"	P820-200210-1
1/8"	1/8"	3"	5/8"	SE,.015"CR	1/8"	P820-200241-1
1/8"	1/8"	3"	5/8"	SE,.031"CR	1/8"	P820-200628-1
3/16"	3/16"	3"	11/16"	BN	3/16"	P820-200108-1
3/16"	3/16"	3"	11/16"	SE	3/16"	P820-200237-1
3/16"	3/16"	3"	11/16"	SE,.062"CR	3/16"	P820-200627-1
1/4"	1/4"	4"	3/4"	BN	1/4"	P820-200109-1
1/4"	1/4"	4"	3/4"	SE	1/4"	P820-200211-1
1/4"	1/4"	4"	3/4"	SE,.015"CR	1/4"	P820-200242-1
1/4"	1/4"	4"	3/4"	SE,.030"CR	1/4"	P820-200279-1
1/4"	1/4"	4"	3/4"	SE,.062"CR	1/4"	P820-200626-1
5/16"	5/16"	4"	13/16"	BN	5/16"	P820-200110-1
5/16"	5/16"	4"	13/16"	SE	5/16"	P820-200581-1
3/8"	3/8"	4"	1-1/8"	BN	3/8"	P820-200111-1
3/8"	3/8"	4"	1-1/8"	SE	3/8"	P820-200512-1
3/8"	3/8"	4"	1-1/8"	SE,.015"CR	3/8"	P820-200309-1
1/2"	1/2"	6"	1-1/4"	BN	1/2"	P820-200602-1
1/2"	1/2"	6"	1-1/4"	SE	1/2"	P820-200603-1
1/2"	1/2"	6"	1-1/4"	SE,.015"CR	1/2"	P820-200310-1

Crystallume can design and build a tool to your specifications.

Customs and specials are a large part of Crystallume’s business, so contact one of our engineers with your requirements.

Typical Requests

- Tighter tolerances
- Special corner radius
- Special angle
- Reduced shank
- Multistep tools

Replaceable Tip End Mills

Crystallume is proud to introduce our latest diamond coated product to enhance your productivity: **The 0.500” Replaceable Tip End Mill.**

This tool is intended to be held in a heat shrink holder and give you 4 and 6 flute productivity as compared to the 2 flutes available from insert end mills this size. Depending on your application several configurations are currently available from stock.

4 and 6 Flute 1/2" Replaceable Tip End Mill (with 1/4" h6 shank)

Cutting Diameter	Flute Length	Overall Length	Flute Number	End Style	Shank Diameter	Part Number Coated
1/2"	.500"	1-1/2"	6	SE	1/4"	P820-201143-1
1/2"	.500”	1-1/2"	4	SE	1/4"	P820-201142-1
1/2"	.500”	1-1/2"	4	SE, .030"CR	1/4"	P820-201206-1
1/2"	.500”	1-1/2"	4	BN	1/4"	P820-201145-1

Universal Shank Extension*

Crystallume now supplies the missing link in using our REPLACEABLE TIP END MILLS. A specially designed heat shrink extension with a 4.00” reach to allow deep milling.

Shank Diameter	Inside Diameter	Overall Length	Reach Length	Reach Diameter	Part Number
0.625	0.250	6.30	4.0	0.472	USE-250-1

Threaded Tip End Mills

4 Flute Threaded Tip End Mill

Cutting Diameter	Flute Length	Thread	End Style	Part Number Coated
3/8"	.270"	T06	SE	P820-201324-1
3/8"	.270”	T06	BN	P820-201325-1
1/2"	.375"	T08	SE	P820-201326-1
1/2"	.375"	T08	BN	P820-201327-1
3/4"	.750"	T12	SE	P820-201328-1
3/4"	.750"	T12	BN	P820-201329-1
1"	1.000"	T15	SE	P820-201330-1
1"	1.000"	T15	BN	P820-201331-1

Compatible with Ingersoll Tool Holders.

Graphite Roughing End Mill

Diameter	Fractional	LOC	OAL	Shank Diameter	End Style	Part Number
0.5000"	1/2"	1 3/4"	4"	1/2"	SE	P820-201485-1
0.3750”	3/8	1 1/4”	4”	3/8”	SE	P820-201628-1
0.2500”	1/4”	1 3/8”	3”	1/4”	SE	P820-201629-1

Deep Cavity End Mills

2 Flute Deep Cavity Mold Maker End Mills

Cutting Diameter	Flute Length	Overall Length	Reach Length	End Style	Shank Diameter	Part Number Coated
1/64"	0.075"	2.50"	0.575"	SE	1/8"	P820-200919-1
1/64"	0.075"	2.50"	0.575"	BN	1/8"	P820-200920-1

2 Flute Deep Cavity Mold Maker End Mills METRIC

Cutting Diameter	Flute Length	Overall Length	Reach Length	End Style	Shank Diameter	Part Number Coated
0.5mm	0.098"	2.50"	0.590"	SE	1/8"	P820-200921-1
0.5mm	0.098"	2.50"	0.590"	BN	1/8"	P820-200922-1

4 Flute Deep Cavity Mold Maker End Mills

Cutting Diameter	Flute Length	Overall Length	Reach Length	End Style	Shank Diameter	Part Number Coated
1/32"	0.150"	2.50"	0.650"	SE	1/8"	P820-200923-1
1/32"	0.150"	2.50"	0.650"	BN	1/8"	P820-200924-1
1/32"	0.250"	2.50"	0.750"	SE	1/8"	P820-200925-1
1/32"	0.250"	2.50"	0.750"	BN	1/8"	P820-200926-1
3/64"	0.250"	2.50"	0.750"	SE	1/8"	P820-200929-1
3/64"	0.250"	2.50"	0.750"	BN	1/8"	P820-200930-1

4 Flute Deep Cavity Mold Maker End Mills METRIC

Cutting Diameter	Flute Length	Overall Length	Reach Length	End Style	Shank Diameter	Part Number Coated
1mm	0.248"	2.50"	0.750"	SE	1/8"	P820-200927-1
1mm	0.248"	2.50"	0.750"	BN	1/8"	P820-200928-1

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It might be a stocked special.

Standard Tolerance

Cutting Diameter
(up to 0.1250") = +0.0000/−0.0005"
(0.1875 to 0.5000") = +0.0000/−0.0010"
Shank Diameter h6
Flute Length = ±0.060"
Overall Length = ±0.060"

Metric Tolerance

Cutting Diameter
(up to 3.000 mm) = +0.000/−0.013mm
(3 mm to 6mm) = +0.000/−0.025mm
Shank Diameter h6
Flute Length = ±1.000 mm
Overall Length = +0.500/−1.500 mm

Speeds and Feeds for Graphite

Cutting Feeds

Tool Diameter	Soft Graphite Chipload		Medium Graphite Chipload		Hard Graphite Chipload	
	Roughing (ipt)	Finishing (ipt)	Roughing (ipt)	Finishing (ipt)	Roughing (ipt)	Finishing (ipt)
1/32"	0.0006–0.0008	0.0005–0.0006	0.0005–0.0006	0.0004–0.0005	0.0004–0.0005	0.0003-0.0004
1/16"	0.0013–0.0015	0.0010–0.0013	0.0010–0.0013	0.0008–0.0010	0.0008–0.0010	0.0005-0.0008
3/32"	0.0019–0.0023	0.0015–0.0019	0.0015–0.0019	0.0011–0.0015	0.0011–0.0015	0.0008-0.0011
1/8"	0.0025–0.0030	0.0020–0.0025	0.0020–0.0025	0.0015–0.0020	0.0015–0.0020	0.0010-0.0015
3/16"	0.0038–0.0045	0.0030–0.0038	0.0030–0.0038	0.0023–0.0030	0.0023–0.0030	0.0015-0.0023
1/4"	0.0050–0.0060	0.0040–0.0050	0.0040–0.0050	0.0030–0.0040	0.0030–0.0040	0.0020-0.0030
5/16"	0.0063–0.0075	0.0050–0.0063	0.0050–0.0063	0.0038–0.0050	0.0038–0.0050	0.0025-0.0038
3/8"	0.0075–0.0090	0.0060–0.0075	0.0060–0.0075	0.0045–0.0060	0.0045–0.0060	0.0030-0.0045
7/16"	0.0088–0.0105	0.0070–0.0088	0.0070–0.0088	0.0053–0.0070	0.0053–0.0070	0.0035-0.0053
1/2"	0.0100–0.0120	0.0080–0.0100	0.0080–0.0100	0.0060–0.0080	0.0060–0.0080	0.0040-0.0060

Speeds and Feeds are only general starting points and may vary depending on specific applications.

Cutting Speeds

Graphite Hardness	Cutting Speed Square ft./min
Soft Graphite	1000–2000 sfm
Medium Graphite	750–1500 sfm
Hard Graphite	500–1250 sfm

Standard End Mills

4 Flute Standard Tolerance

Cutting Diameter = +0.0005/−0.0010”
Shank Tolerance h6
Flute Length = ±0.060”
Overall Length = ±0.060”

4 Flute Standard End Mills

Cutting Diameter	Flute Length	Overall Length	End Style	Shank Diameter	Part Number Coated
1/32"	3/32"	1-1/2"	SE	1/8"	P820-200219-1
1/32"	3/32"	1-1/2"	BN	1/8"	P820-200202-1
1/16"	1/4"	1-1/2"	SE	1/8"	P820-200492-1
1/16"	1/4"	1-1/2"	BN	1/8"	P820-200646-1
3/32"	3/8"	1-1/2"	SE	1/8"	P820-200002-1
3/32"	3/8"	1-1/2"	BN	1/8"	P820-200004-1
1/8"	1/2"	1-1/2"	SE	1/8"	P820-200006-1
1/8"	1/2"	1-1/2"	BN	1/8"	P820-200008-1
3/16"	5/8"	2"	SE	3/16"	P820-200014-1
3/16"	5/8"	2"	BN	3/16"	P820-200016-1
1/4"	3/4"	2-1/2"	SE	1/4"	P820-200022-1
1/4"	3/4"	2-1/2"	BN	1/4"	P820-200024-1
5/16"	13/16"	2-1/2"	SE	5/16"	P820-200030-1
5/16"	13/16"	2-1/2"	BN	5/16"	P820-200032-1
3/8"	7/8"	2-1/2"	SE	3/8"	P820-200038-1
3/8"	7/8"	2-1/2"	BN	3/8"	P820-200040-1
7/16"	1"	2-3/4"	SE	7/16"	P820-200046-1
7/16"	1"	2-3/4"	BN	7/16"	P820-200048-1
1/2"	1"	3"	SE	1/2"	P820-200054-1
1/2"	1"	3"	BN	1/2"	P820-200056-1

Long and Extra Long Standard End Mills

4 Flute Long Standard End Mills

Cutting Diameter	Flute Length	Overall Length	End Style	Shank Diameter	Part Number Coated
1/8"	1"	3"	SE	1/8"	P820-200010-1
1/8"	1"	3"	BN	1/8"	P820-200012-1
3/16"	1-1/8"	3"	SE	3/16"	P820-200018-1
3/16"	1-1/8"	3"	BN	3/16"	P820-200020-1
1/4"	1-1/4"	3"	SE	1/4"	P820-200026-1
1/4"	1-1/4"	3"	BN	1/4"	P820-200028-1
5/16"	1-3/8"	3-1/8"	SE	5/16"	P820-200034-1
5/16"	1-3/8"	3-1/8"	BN	5/16"	P820-200036-1
3/8"	1-1/2"	4"	SE	3/8"	P820-200722-1
3/8"	1-1/2"	4"	BN	3/8"	P820-200094-1
1/2"	2"	4"	SE	1/2"	P820-200058-1
1/2"	2"	4"	BN	1/2"	P820-200060-1

4 Flute Extra Long Standard End Mills

Cutting Diameter	Flute Length	Overall Length	End Style	Shank Diameter	Part Number Coated
1/4"	2"	4"	BN	1/4"	P820-200539-1
1/4"	2"	4"	SE	1/4"	P820-200277-1
1/2"	3"	6"	BN	1/2"	P820-200205-1
1/2"	3"	6"	SE	1/2"	P820-200195-1

Standard Drills

General Purpose Jobber Drills (118°, 4 facet point)

Cutting Diameter	Tolerance Minimum	Tolerance Maximum	Flute Length	Overall Length	Part Number Coated
1/32"	−0.0003"	+0.0005"	5/16"	1-1/4"	P810-100180-1
1/16"	−0.0001"	+0.0006"	3/4"	1-1/2"	P810-100023-1
3/32"	−0.0001"	+0.0006"	1"	2"	P810-100016-1
1/8"	+0.0001"	+0.0010"	1-1/4"	2-1/4"	P810-100024-1
3/16"	+0.0003"	+0.0011"	1-5/8"	2-3/4"	P810-100027-1
1/4"	+0.0006"	+0.0016"	2"	3-1/4"	P810-100002-1

Standard DCC Drills are 2 flute with a 118°, 4 facet drill point and come in jobbers lengths. The diamond coating extends a minimum of one diameter from the drill tip on the jobber drills and past the countersink on center drills.

DCC Drills are available as specials in sizes from 0.028” to 0.750”. Metric sizes are available.

Center Drills (only one end coated)

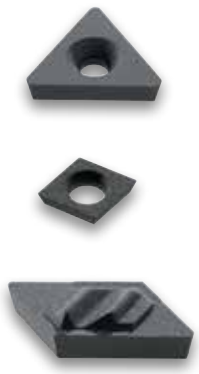
Tool Number	Drill Size	Body Size	Countersink Angle	Overall Length	Part Number Coated
#00	0.025"	1/8"	60°	1-1/2"	P810-100200-1
#0	1/32"	1/8"	60°	1-1/2"	P810-100071-1
#1	3/64"	1/8"	60°	1-1/2"	P810-100072-1
#2	5/64"	3/16"	60°	2"	P810-100073-1
#3	7/64"	1/4"	60°	2"	P810-100074-1
#4	1/8"	5/16"	60°	2-1/8"	P810-100075-1
#5	3/16"	7/16"	60°	2-3/4"	P810-100240-1

Inserts

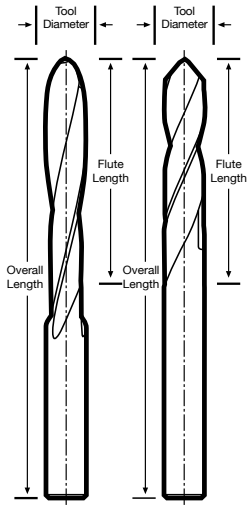
Insert ANSI Code	Insert ISO Code	Part Number Coated
ADKT-1505 PDR	ADKT1505 PDR	P830-100551-1
BDR-0500-N-F1-R1-R1/32	–	P830-100690-1
BDR-1000-N-F1-R1/32	–	P830-100699-1
CCGT-32.50HP	CCGT09T302HP	P830-100547-1
CCGX-431 AL	CCGX120404 AL	P830-100523-1
CCMT-21.50	CCMT060202	P830-100309-1
CCMT-21.51	CCMT060204	P830-100310-1
CDCD-500	–	P830-100006-1
CDCD-505	–	P830-100007-1
CNGA-430	CNGA120402	P830-100009-1
CNMG-431	CNMG120404	P830-100491-1
CNMG-432	CNMG120408	P830-100012-1
CNMP-431	CNMP120404	P830-100013-1
CPG-421	CPGN120304	P830-100017-1
CPG-422	CPGN120308	P830-100018-1
CPGT-32.52	CPGT09T308	P830-100091-1
DCMT-32.51	DCMT11T304	P830-100170-1
DDGB-522	DDGB190308	P830-100722-1
DNMG-431	DNMG150404	P830-100211-1
DPG-432	DPG150408	P830-100279-1
DPGT-32.52	DPGT11T308	P830-100347-1
FLGD 3062R	–	P830-100628-1
GFN-3	–	P830-100605-1
N151.2-300-30-4P	–	P830-100597-1
N151.2-400-40-4P	–	P830-100596-1
NG-2062L	–	P830-100436-1
NG-2062R	–	P830-100031-1
NPL-51	–	P830-100438-1
RCGX-10T3MO-AL	RCGX-10T3MO-AL	P830-100505-1
RCHT-130400KL	RCHT130400KL	P830-100588-1
RCMT-0803MO-100	RCMT0803MO-100	P830-100607-1
RD-6P	RXGB090300	P830-100224-1
RD-8P	RXGB120300	P830-100040-1
RD-10P	RXGB150300	P830-100153-1
RD-16P	RXGB250600	P830-100196-1
RFG-21F (5/16IC)	–	P830-100399-1
SPG-322	SPGN090308	P830-100063-1
SPG-422	SPGN120308	P830-100064-1
SPG-424	SPGN120316	P830-100065-1
SPG-428	SPGN120332	P830-100162-1

Inserts

Insert ANSI Code	Insert ISO Code	Part Number Coated
SPG-632	SPGN190408	P830-100343-1
SPG-634	SPGN190416	P830-100175-1
SPG-842	SPGN250608	P830-100583-1
SPGB-432	SPGB120408	P830-100385-1
SPMT-432-WH	SPMT120408WH	P830-100244-1
TCGW-32.52	TCGW16T308	P830-100072-1
TCGX-21.51-AL	TCGX110204-AL	P830-100327-1
TCGX-3(2.5)1-AL	TCGX16T304	P830-100602-1
TCMT-32.52	TCMT16T308	P830-100269-1
TCMW-21.51	TCMW110204	P830-100076-1
TD-6P	–	P830-100078-1
TD-6P1	–	P830-100080-1
TD-8P	–	P830-100081-1
TDAB-51	TDAB070104	P830-100083-1
TDAB-52	TDAB070108	P830-100084-1
TNMA-432	TNMA220408	P830-100454-1
TPCB-221	TCPB110304	P830-100360-1
TPG-221	TPGN110304	P830-100101-1
TPG-222	TPGN110308	P830-100102-1
TPG-320	TPGN160301	P830-100252-1
TPG-321	TPGN160304	P830-100104-1
TPG-322	TPGN160308	P830-100105-1
TPG-324	TPGN160316	P830-100107-1
TPG-431	TPGN220404	P830-100109-1
TPG-432	TPGN220408	P830-100110-1
TPG-433	TPGN220412	P830-100111-1
TPMA-322	TPMA160308	P830-100227-1
TPMM-321	TPMM160304	P830-100373-1
TPMM-322	TPMM160308	P830-100023-1
VBMT-221	VBMT110304	P830-100127-1
VBMT-331	VBMT160404	P830-100217-1
VBMT-332	VBMT160408	P830-100165-1
VCGT-221HP	VCGT110304HP	P830-100524-1
VCGT-331HP	VCGT160404HP	P830-100531-1
VCGX-331-AL	VCGX160404-AL	P830-100395-1
VCGX-332-AL	VCGX160408-AL	P830-100498-1
VNGP-330	VNGP160402	P830-100615-1
VNGP-330.5	VNGP160403	P830-100575-1
VPGR-331	VPGR160404	P830-100485-1
VPGR-332	VPGR160408	P830-100136-1
WNMG-431	WNMG080404	P830-100314-1
WNMG-432	WNMG080408	P830-100209-1



Aircraft Drills



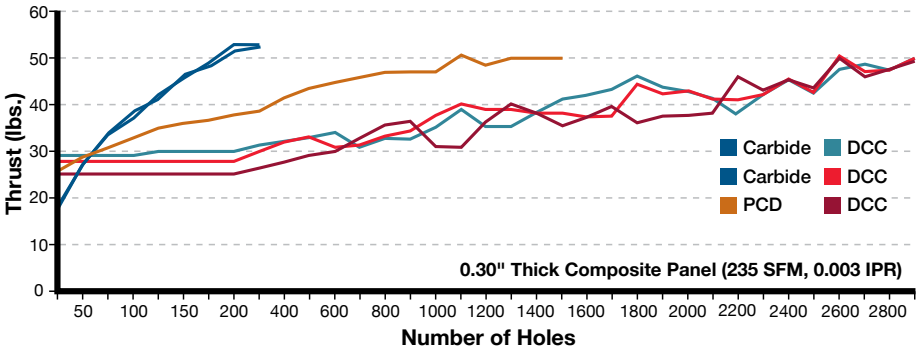
Composite Drills Tolerance

Tool Diameter = +0.0000/-0.0005"
Flute Length = +/-0.060"
Overall Length = +/-0.060"

Crystallume DCC rotating tools were developed in a NIST (National Institute of Science and Technology) program that involved a research partnership with Boeing Aircraft and three other large manufacturing companies. Some of the information gained in that program is presented here.

The material was 8-276 carbon fiber laminate 0.30" thick. Test tools were 0.251" diameter drill countersinks. The graph compares the number of holes drilled versus the thrust required. The test was concluded at 50 lbs. of thrust when breakout and haloing became unacceptable. Carbide lasted about 200 holes, PCD lasted 1,500 holes and Crystallume DCC lasted 2,700 holes. Also, note that the sharper carbide tool started with the lowest thrust while the PCD and Crystallume DCC started with about the same thrust (even though the PCD is a ground edge and the Crystallume DCC is a coated, faceted edge). These test lab results were repeated on the production floor.

Crystallume has continued to be a leader in developing diamond coated tools for aircraft applications.



118° Tip Standard Length Drills (4 facet)

Tool Diameter	Flute Length	Overall Length	Part Number Coated
0.0980"	1.4"	2.7"	P810-100345-1
0.1285"	1.4"	2.7"	P810-100334-1
0.1655"	1.4"	2.7"	P810-100335-1
0.1915"	1.4"	2.7"	P810-100336-1
0.1990"	1.4"	2.7"	P810-100411-1
0.2210"	1.4"	2.7"	P810-100346-1
0.2515"	1.4"	2.7"	P810-100337-1
0.2812"	1.4"	2.7"	P810-100410-1
0.3135"	1.5"	2.7"	P810-100338-1
0.3765"	1.5"	2.7"	P810-100341-1

Elliptical Tip Standard Length Drills

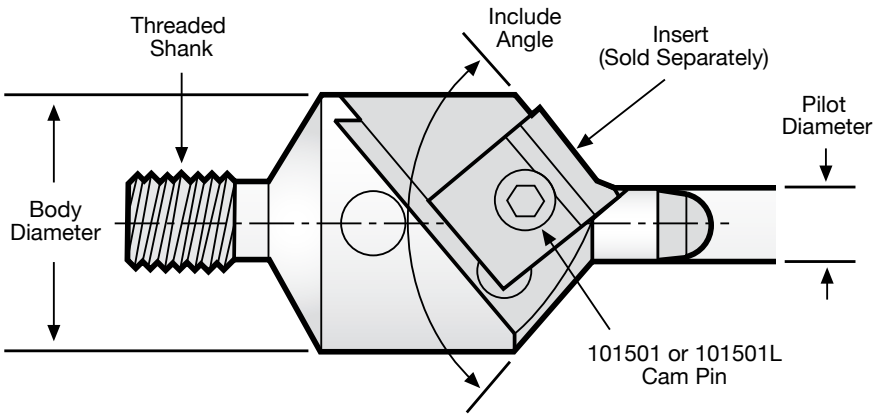
Tool Diameter	Flute Length	Overall Length	Part Number Coated
0.0980"	1.4"	2.7"	F104-100001-1
0.1285"	1.4"	2.7"	F104-100003-1
0.1655"	1.4"	2.7"	F104-100007-1
0.1915"	1.4"	2.7"	F104-100010-1
0.1990"	1.4"	2.7"	F104-100011-1
0.2210"	1.4"	2.7"	F104-100004-1
0.2510"	1.4"	2.7"	F104-100002-1
0.2812"	1.4"	2.7"	F104-100017-1
0.3135"	1.5"	2.7"	F104-100018-1

Aircraft Countersinks

100° Countersink with Threaded Shank and Diamond Coated Insert

Crystallume is proud to introduce our latest diamond coated product to enhance your productivity.

The aircraft style countersink is designed to be used in a micro-stop cage for producing 100° countersinks with a root radius or angle for aircraft rivets.



Countersink Bodies*

Body Diameter	Thread Size	Pilot Diameter Range	Part Number*
5/8"	1/4"-28	0.097–0.257"	CSKB1T-6XXXX1-1
3/4"	3/8"-24	0.257–0.319"	CSKB1T-7XXXX1-1
7/8"	3/8"-24	0.319–0.394"	CSKB1T-8XXXX1-1
1"	7/16"-20	0.394–0.559"	CSKB1T-9XXXX1-1

*For the tool holder body specify the pilot diameter XXXX (e.g. 0.2515" is 2515).

Countersink Inserts

Insert Style	Body Diameter	Part Number Coated
25° Double-Angle	5/8"	CSKIC-61C025-1
0.020" Radius	5/8"	CSKIC-61R020-1
0.035" Radius	3/4" 7/8" 1"	CSKIC-71R035-1

Don't see what you need? Call us at 1.800.789.4322.
It might be a stocked special.

Drill Reamers

Drill Reamer Tolerance

Cutting Diameter = +0.0002/-0.0000"
Shank Tolerance h6
Flute Length = +0.060"
Overall Length = +0.060"

The low helix Drill Reamers are designed to drill and ream a precision hole in CFRC material in one step.

Decimal Equivalent	Tolerance from Nominal Minimum	Maximum	Flute Length	OAL	Shank Size	Type or Point	Part Number
0.1280"	+.0002"	-.0000"	1.00"	3.00"	0.250"	118° X 17°	P810-100512-1
0.1620"	+.0002"	-.0000"	1.00”	3.00"	0.250"	118° X 17°	P810-100513-1
0.1910"	+.0002"	-.0000"	1.50"	3.50"	0.250"	118° X 17°	P810-100486-1
0.2240"	+.0002"	-.0000"	1.50"	3.50"	0.250"	118° X 17°	P810-100495-1
0.2340"	+.0002"	-.0000"	1.50"	3.50"	0.250"	118° X 17°	P810-100551-1
0.2510"	+.0002"	-.0000"	1.50"	3.50"	0.250"	118° X 17°	P810-100494-1
0.2640"	+.0002"	-.0000"	1.50"	3.50"	0.250"	118° X 17°	P810-100510-1
0.2730"	+.0002"	-.0000"	1.50"	3.50"	0.250"	118° X 17°	P810-100537-1
0.3140"	+.0002"	-.0000"	1.50"	3.50"	0.250"	118° X 17°	P810-100549-1

Recommended starting cutting speeds and feeds; 225 SFM and 10 IPM

Specials

Crystallume can design and build a tool to your specifications.

Customs and specials are a large part of Crystallume’s business, so contact one of our engineers with your requirements.

Typical Requests

- Tighter tolerances
- Special corner radius
- Special angle
- Reduced shank
- Multistep tools

Drill Reamers - DLC Coated

» Solid Carbide construction increases rigidity and reduces runout compared to high-speed steel

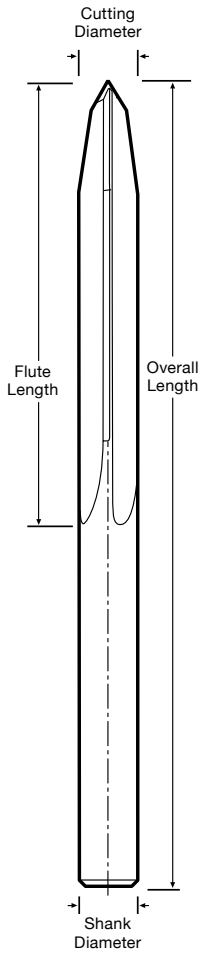
» Eliminates thrust and exit side delamination with elongated double-angle geometry

» Straight shanks for use in general purpose applications

» DLC coatings ensure these tools meet the most demanding applications

P861 High-Performance DLC Coated Drill/Reamer*

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Part Number Coated
#40	.0980"	1"	3"	P861-DR-0980-3-1
1/8"	.1250"	1"	3"	P861-DR-1250-3-1
#30	.1285"	1"	3"	P861-DR-1285-3-1
#28	.1406"	1"	3"	P861-DR-1406-3-1
5/32"	.1562"	1"	3"	P861-DR-1562-3-1
#21	.1590"	1"	3"	P861-DR-1590-3-1
#20	.1610"	1"	3"	P861-DR-1610-3-1
3/16"	.1875"	1"	3"	P861-DR-1875-3-1
#11	.1910"	1"	3"	P861-DR-1910-3-1
#10	.1935"	1"	3"	P861-DR-1935-3-1
#8	.1990"	1"	3"	P861-DR-1990-3-1
#7	.2010"	1"	3"	P861-DR-2010-3-1
13/64"	.2031"	1"	3"	P861-DR-2031-3-1
7/32"	.2188"	1"	3"	P861-DR-2188-3-1
1/4"	.2500"	1"	3"	P861-DR-2500-3-1
.2510"	.2510"	1"	3"	P861-DR-2510-3-1
5/16"	.3125"	1"	3"	P861-DR-3125-3-1
3/8"	.3750"	1"	3"	P861-DR-3750-3-1
#40	.0980"	1-1/2"	6"	P861-DR-0980-6-1
1/8"	.1250"	1-1/2"	6"	P861-DR-1250-6-1
#30	.1285"	1-1/2"	6"	P861-DR-1285-6-1
#28	.1406"	1-1/2"	6"	P861-DR-1406-6-1
5/32"	.1562"	1-1/2"	6"	P861-DR-1562-6-1
#21	.1590"	1-1/2"	6"	P861-DR-1590-6-1
#20	.1610"	1-1/2"	6"	P861-DR-1610-6-1
3/16"	.1875"	1-1/2"	6"	P861-DR-1875-6-1
#11	.1910"	1-1/2"	6"	P861-DR-1910-6-1
#10	.1935"	1-1/2"	6"	P861-DR-1935-6-1
#8	.1990"	1-1/2"	6"	P861-DR-1990-6-1
#7	.2010"	1-1/2"	6"	P861-DR-2010-6-1
13/64"	.2031"	1-1/2"	6"	P861-DR-2031-6-1
7/32"	.2188"	1-1/2"	6"	P861-DR-2188-6-1
1/4"	.2500"	1-1/2"	6"	P861-DR-2500-6-1
.2510"	.2510"	1-1/2"	6"	P861-DR-2510-6-1
5/16"	.3125"	1-1/2"	6"	P861-DR-3125-6-1
3/8"	.3750"	1-1/2"	6"	P861-DR-3750-6-1



Standard Tolerance

Cutting Diameter = +0.001/−0.001"
Shank Tolerance h6
Flute Length = ±0.060"
Overall Length = ±0.060"

Threadmills

Crystallume has added single profile diamond coated thread mills to our offering. We will be stocking sizes from #3 (2mm) to ½" (16mm) for UNC and UNF threads. These single profile diamond coated thread mills will allow the manufacture of ID and OD precision threads in difficult to machine highly abrasive non-ferrous materials. The single profile design creates minimum pressure during the machining operation on small or delicate parts. The same thread mill can cut right, left, or multi-lead threads with just a change in programing on the machine.

Diamond Coated Threadmills*

Number	for sizes (NC & NF)		Coarse UNC	Coarse UNF	Cutting Diameter	Crest	Neck Diameter	Neck Length	Shank & OAL	# of Flutes	Part Number
TM3	#3	2mm	48	56	0.072	0.001	0.040	0.160	3/16 X 2	1	TM-000003-1
TM4	#4 #5	3mm 3.5mm	40	48	0.083	0.001	0.045	0.190	3/16 X 2	1	TM-000004-1
TM6	#6	4mm	32	40	0.099	0.002	0.055	0.260	3/16 X 2	2	TM-000006-1
TM8	#8	4.5mm	32	36	0.128	0.002	0.083	0.320	3/16 X 2	3	TM-000008-1
TM10	#10	5mm	24	32	0.139	0.003	0.081	0.380	3/16 X 2	3	TM-000010-1
TM1/4	1/4	6mm	20	28	0.188	0.003	0.124	0.400	1/4 X 2	4	TM-000250-1
TM5/16	5/16	8mm	18	24	0.247	0.003	0.175	0.500	3/8 X 2.50	4	TM-000313-1
TM3/8	3/8	10mm	16	24	0.300	0.003	0.218	0.600	3/8 X 2.50	4	TM-000375-1
TM1/2	1/2	16mm	13	20	0.420	0.004	0.300	0.800	1/2 X 2.50	6	TM-000500-1

Milling

Working Material	Application	Cutting Speed fpm	Cutting Speed m/min	Chip Load ipt	Chip Load m/t
Aluminum (5–8% Si) (356, 308, 242, 208)	Rough Milling	2000–5000	610–1525	0.010–0.020	0.254–0.508
Aluminum (5–8% Si) (356, 308, 242, 208)	Finish Milling	2000–6000	610–1830	0.005–0.010	0.127–0.254
Aluminum Cast (8–12% Si) (354, 357, 380)	Rough Milling	1500–4000	460–1220	0.007–0.015	0.178–0.381
Aluminum Cast (8–12% Si) (354, 357, 380)	Finish Milling	1500–5000	460–1525	0.004–0.008	0.102–0.204
Aluminum Cast (12–18% Si) (390)	Rough Milling	1000–2000	305–610	0.005–0.010	0.127–0.254
Aluminum Cast (12–18% Si) (390)	Finish Milling	1000–3000	305–915	0.002–0.006	0.050–0.150
Other Materials					
Babbitt	Milling	700–1100	210–335	0.003–0.010	0.076–0.254
Brass	Milling	2000–4000	610–1220	0.001–0.008	0.025–0.200
Bronze	Milling	900–1350	275–410	0.003–0.008	0.076–0.200
Carbon	Milling	500–2000	150–610	0.0003–0.012	0.008–0.305
Carbon Fiber Materials	Milling	500–2000	150–610	0.003–0.015	0.076–0.381
Copper	Milling	750–1500	230–460	0.001–0.008	0.025–0.200
Glass Fiber Material	Milling	750–1500	230–460	0.001–0.010	0.025–0.254
Green Ceramic Materials	Milling	500–1500	150–460	0.002–0.010	0.050–0.254
Unfilled Plastic	Milling	1000–4000	305–1220	0.003–0.020	0.076–0.508
Wood	Milling	3300–9800	1000–3000	0.004–0.030	0.102–0.762

Turning

Working Material	Application	Cutting Speed fpm	Cutting Speed m/min	Chip Load ipt	Chip Load m/t
Aluminum (5–8% Si) (356, 308, 242, 208)	Rough Turning	2000–5000	610–1525	0.010–0.025	0.254–0.635
Aluminum (5–8% Si) (356, 308, 242, 208)	Finish Turning	2000–6000	610–1830	0.005–0.010	0.127–0.254
Aluminum Cast (8–12% Si) (354, 357, 380)	Rough Turning	1500–4000	460–1220	0.007–0.020	0.178–0.508
Aluminum Cast (8–12% Si) (354, 357, 380)	Finish Turning	1500–5000	460–1525	0.004–0.008	0.102–0.204
Aluminum Cast (12–18% Si) (390)	Rough Turning	1000–2000	305–610	0.005–0.010	0.127–0.254
Aluminum Cast (12–18% Si) (390)	Finish Turning	1000–3000	305–915	0.002–0.006	0.050–0.150
Other Materials					
Babbitt	Turning	700–1100	210–335	0.003–0.010	0.076–0.254
Brass	Turning	2000–4000	610–1220	0.003–0.015	0.076–0.381
Bronze	Turning	900–1350	275–410	0.003–0.010	0.076–0.254
Carbon	Turning	500–2000	150–610	0.005–0.015	0.127–0.381
Carbon Fiber Materials	Turning	500–2000	150–610	0.003–0.020	0.076–0.508
Copper	Turning	750–1500	230–460	0.003–0.010	0.076–0.254
Glass Fiber Material	Turning	750–1500	230–460	0.001–0.015	0.025–0.381
Green Ceramic Materials	Turning	500–1500	150–460	0.002–0.020	0.050–0.508
Unfilled Plastic	Turning	1000–4000	305–1220	0.003–0.020	0.076–0.508
Wood	Turning	3300–9800	1000–3000	0.004–0.030	0.102–0.762

Drilling

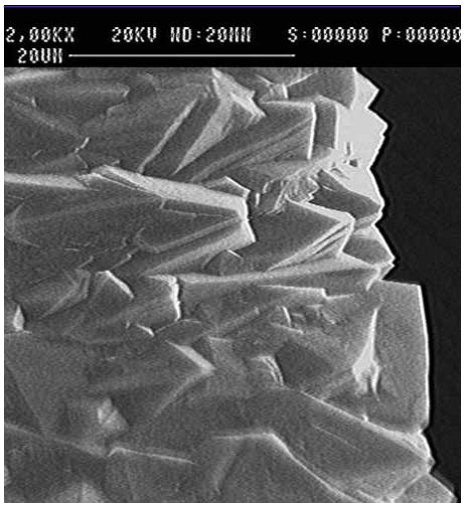
Working Material	Application	Cutting Speed fpm	Cutting Speed m/min	Chip Load ipt	Chip Load m/t
Aluminum (5–8% Si) (356, 308, 242, 208)	Drilling	2000–6000	610–1830	0.001–0.010	0.025–0.254
Aluminum Cast (8–12% Si) (354, 357, 380)	Drilling	1500–5000	460–1525	0.001–0.010	0.025–0.254
Aluminum Cast (12–18% Si) (390)	Drilling	1000–3000	305–915	0.001–0.010	0.025–0.254
Other materials					
Babbitt	Drilling	700–1100	210–335	0.001–0.010	0.025–0.254
Brass	Drilling	2000–4000	610–1220	0.001–0.010	0.025–0.254
Bronze	Drilling	900–1350	275–410	0.001–0.010	0.025–0.254
Carbon	Drilling	500–2000	150–610	0.001–0.010	0.025–0.254
Carbon Fiber Materials	Drilling	500–2000	150–610	0.001–0.010	0.025–0.254
Copper	Drilling	750–1500	230–460	0.001–0.010	0.025–0.254
Glass Fiber Material	Drilling	750–1500	230–460	0.001–0.010	0.025–0.254
Green Ceramic Materials	Drilling	500–1500	150–460	0.001–0.010	0.025–0.254
Unfilled Plastic	Drilling	1000–4000	305–1220	0.001–0.010	0.025–0.254
Wood	Drilling	3300–9800	1000–3000	0.003–0.025	0.076–0.635

Speeds and Feeds are only general starting points and may vary depending on specific applications.

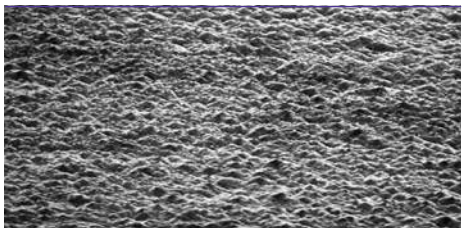
Coating Services

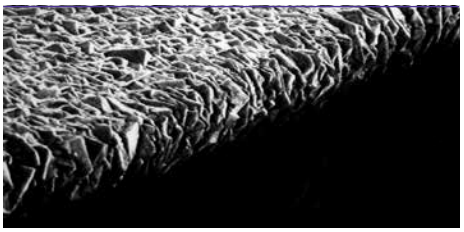
Crystallume DCC coatings can be applied to customer supplied cutting tools and wear parts.

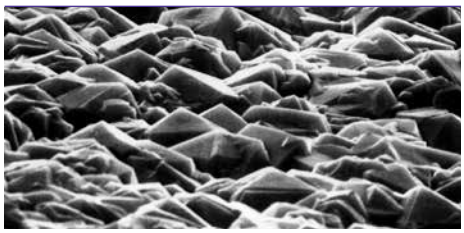
Some of the common carbide grades that are approved for coating are listed in the chart below. The specific requirements are 6% Cobalt and 94% Tungsten Carbide with a 1 to 3 micron grain size. For more information contact one of our engineers regarding your application needs.

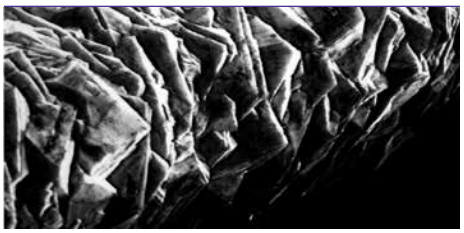


2000X faceted diamond cutting edge


2000X smooth diamond


1000X continuous uniform coatings over the entire surface


2000X faceted diamond

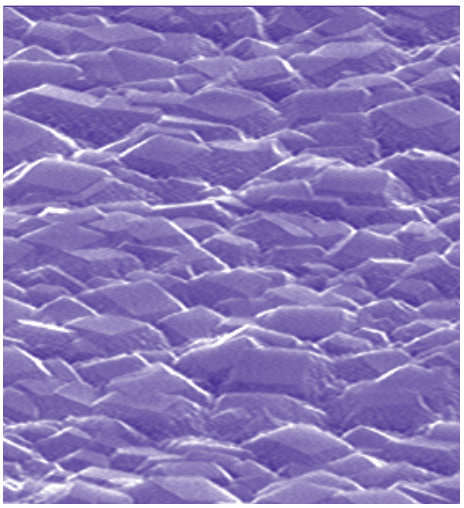

2000X faceted edge lowers cutting forces

Round Stock Carbide Grades

Company Name	Carbide Grade
Ceratizit	CTS12D,K100L
Fansteel	HC290
HB Carbide	HB2
Kennametal	K96
Newcommer	H21P
RTW	CQ2
Sandvik	H6N
Techmet	TMK-22D
Valenite	WA2

Insert Carbide Grades

Company Name	Carbide Grade
Ceratizit	H216T, H10T
Circle	C2, C3, C25
Everede	CS2
Fansteel/Hydro Carbide	HC290
Intrepid	CS2
Iscar	IC20
Kaiser	Dura-Max 5000
Kennametal	K68, K10, K313
Komet	K10
Mitsubishi	HTi10
RTW	CQ2, CQ23
Sandvik	H13A
Stellram (Teledyne)	H21
Thinbit	DM5
Tool-Flo	C25
Toshiba	TH10
Toshiba Tungaloy	TH10
Tungaloy	H10T
Ultramet	Z20, Z22, Z86
Valenite-Widia	THM
Valenite-Widia	VC-2, VC-21, VC-28
Walter	WKM
Waukesha	WK10


3000X cubic diamond texture [color added]

Terms and Conditions

Terms
1% Ten Days, Net 30 Days, Minimum Invoice, $75.00.

Shipping
F.O.B. Santa Clara, California, USA. All shipments via UPS Orange, unless otherwise specified.

Claims
Goods are considered sold and our responsibility ceases when delivery is made to the transportation company. In the event of goods being lost in transit, we will make every effort on behalf of customers to have lost goods found or to have the transportation company make proper restitution for loss.

Damage claims must be made against carrier.

Return Policy
Merchandise must be returned within 30 days of date of shipment or returns will not be accepted for credit. Only standard catalog tools that have not been used or damaged and do not exceed Crystallume's annual usage are eligible for return and credit.

No merchandise may be returned without prior authorization from the factory. Credit will not be issued for merchandise returned without a return authorization number. Call 800-653-1700 for a return authorization number.

All returns must be in their original packaging and should include a copy of the invoice and packing slip. Returned tools will be fully inspected for use and damage before credit is issued.

All merchandise returned for credit will be subject to a 15% restocking charge.

Specials
Orders for special tools, non-catalog or modified tools are sold on a no-cancellation basis and are not returnable. A confirming purchase order is required before any work begins on special tools.

A 10% over or under shipment on a special is acceptable based on industry practices unless no overshipment is stated at time of quoting.

Errors
Crystallume Corporation can not be held responsible for incorrect parts made with our products due to mislabeling or defect. We assume all tools used by our customers are inspected before use and that first part inspections in customer's plant is the rule. We will replace or credit in those situations.

Prices
Prices are subject to change without notice.

Terms and Conditions
All terms and conditions are subject to periodic changes published to crystallume.com/terms-and-conditions/

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Crystallume is a division of RobbJack Corporation, manufacturer of premium rotary cutting tools and experts in application technology.

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