

Graphite Electrode Machining

Crystallume DCC® tools are finding rapid acceptance among manufacturers of graphite electrodes for use in EDM operations because they last 10 to 30 times as long as carbide tools currently used. Increased tool life results in longer periods of unmanned machining. The machining speeds for Crystallume DCC tools can be increased 2 to 3 times over the speeds used with carbide tools to increase your productivity. These features combine to increase the utilization of your machine tools.

Machining Example 1

Mold company using POCO 200 to build graphite electrodes.

They machined the trode at 1400 sfm and 315 ipm. This was 2 times faster than the carbide tool. The Crystallume DCC end mill lasted 15 times as long as the TiN coated carbide tool used previously. The company was amazed at the tolerance control without having to recut.

Machining Example 2

Metal casting mold company using POCO 3 to build molds.

The machine was run at 940 sfm and 200 ipm. The Crystallume DCC end mill lasted 21 times as long as the TiN coated carbide tool used previously. Due to the extended tool life this customer now runs unmanned overnight operations.

Machining Example 3

Tool and die company using POCO 200 to build electrodes.

They finish machine the trode with a 1/4 ball end mill. The TiN coated carbide end mill lasted 7 hours (7 trodes) and the Crystallume DCC end mill lasted 97 hours (97 trodes). They now use the Crystallume DCC end mill as a roughing tool after this for an unknwn amount of time.

Deep Cavity Page 9

P820-200930-1

P820-200929-1



Mold Maker End Mills Page 6

Crystallume's Mold Maker tools offer features specifically for electrode and mold manufacturing. The Mold Maker tools have a 5 times 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 3mm 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 -0.0001/-0.0003 to assure consistent and concentric gripping in shrink fit holders. Mold Maker tools are available in sizes from 1/64 to 1/2 inch and from .5mm to 6mm in diameter with tools below 1/4 and 6mm available with and without extended reach. Crystallume Mold Maker tools are the most precise diamond coated tools available.

Cutting Speeds and Feeds for Graphite

Tool Diameter	Soft Graphite		Chip Load Per Tooth		Hard Graphite	
	Roughing	Finishing	Medium Graphite Roughing	Medium Graphite Finishing	Roughing	Finishing
1/32	.0006-.0008	.0005-.0006	.0005-.0006	.0004-.0005	.0004-.0005	.0003-.0004
1/16	.0013-.0015	.0010-.0013	.0010-.0013	.0008-.0010	.0008-.0010	.0005-.0008
3/32	.0019-.0023	.0015-.0019	.0015-.0019	.0011-.0015	.0011-.0015	.0008-.0011
1/8	.0025-.0030	.0020-.0025	.0020-.0025	.0015-.0020	.0015-.0020	.0010-.0015
3/16	.0038-.0045	.0030-.0038	.0030-.0038	.0023-.0030	.0023-.0030	.0015-.0023
1/4	.0050-.0060	.0040-.0050	.0040-.0050	.0030-.0040	.0030-.0040	.0020-.0030
5/16	.0063-.0075	.0050-.0063	.0050-.0063	.0038-.0050	.0038-.0050	.0025-.0038
3/8	.0075-.0090	.0060-.0075	.0060-.0075	.0045-.0060	.0045-.0060	.0030-.0045
7/16	.0088-.0105	.0070-.0088	.0070-.0088	.0053-.0070	.0053-.0070	.0035-.0053
1/2	.0100-.0120	.0080-.0100	.0080-.0100	.0060-.0080	.0060-.0080	.0040-.0060

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

Cutting Speed

Soft Graphite	1000-2000sfm
Medium Graphite	750-1500sfm
Hard Graphite	500-1250sfm

(Use maximum RPM if suggested RPM is higher than the machines capabilities)

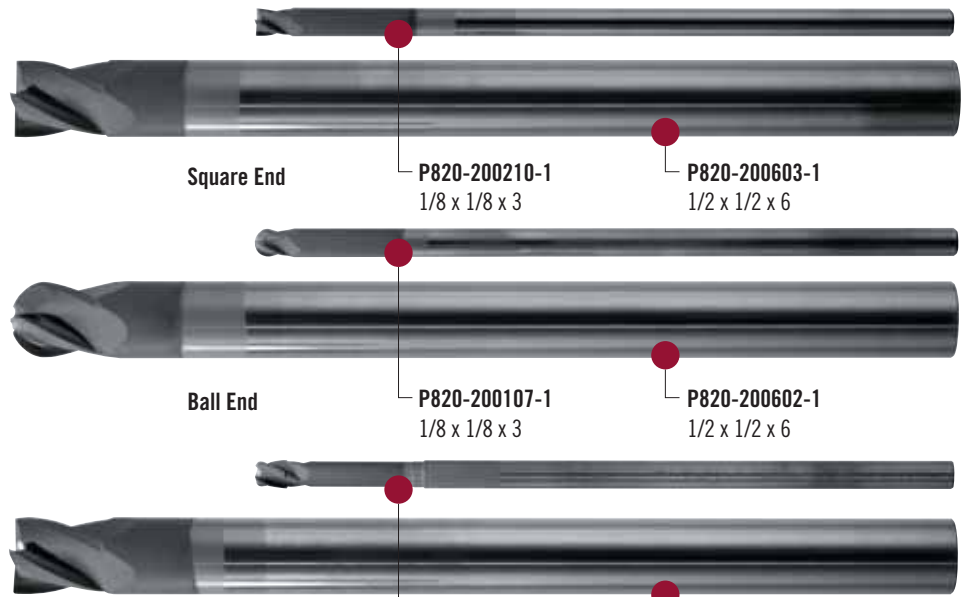


Extended Shank End Mills Page 6

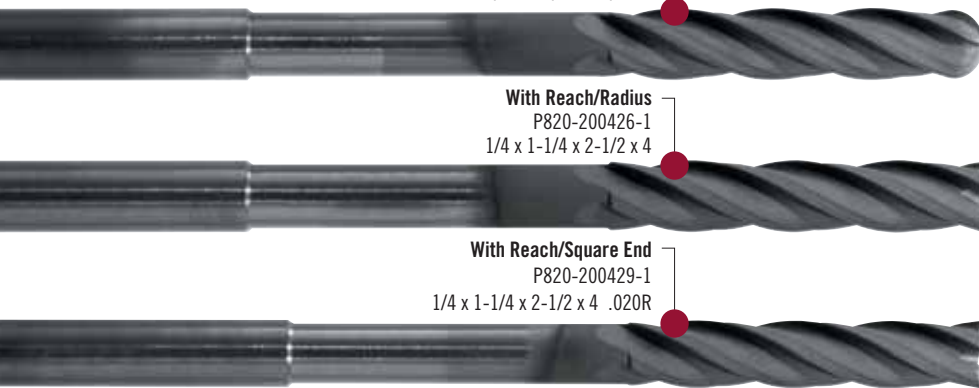
The Extended Shank tools combine a short flute length for maximum rigidity with a long shank for extended reach into deep cavities. When the extended reach is not required, you can choke up on the tool to make it extremely rigid as a stub tool. This is a great all around tool that will become the workhorse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

Standard Tolerance

Cutting Diameter: +0.001"/-0.001"
 Shank Tolerance: -0.0001"/-0.0003"
 Flute Length: ±0.060"
 Overall Length: ±0.060"



Mold Maker End Mills in US and Metric Sizes Page 6



With Reach/Ball End
 P820-200427-1
 1/4 x 1-1/4 x 2-1/2 x 4

With Reach/Radius
 P820-200426-1
 1/4 x 1-1/4 x 2-1/2 x 4

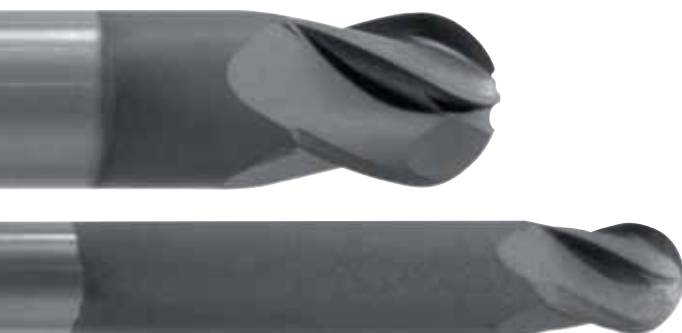
With Reach/Square End
 P820-200429-1
 1/4 x 1-1/4 x 2-1/2 x 4 .020R

Standard Tolerance

Cutting Diameter:
 +0.0000/-0.0005 up to 0.1250
 +0.0000/-0.0010 from 0.2500 to 0.5000
 Shank Tolerance: -0.0001"/-0.0003"
 Flute Length: ±0.060"
 Overall Length: ±0.060"

ThunderBolt Tools Page 10

The new ThunderBolt Ultra Thin Nano Diamond Tools have a real diamond coating that is the thickness of most PVD coatings.



Big Shank Tools Page 9

These tools have been designed for customers using automated machining cells where graphite electrodes are machined. These cells use heat shrink tooling and have multiple high speed ultra accurate machining centers from Rödgers or Mikron doing unmanned graphite machining. The large shank size helps to stabilize the smaller diameter cutting tools.

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