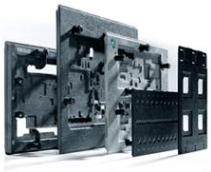


BOEDEKER PLASTICS, INC.

DUROSTONE® MACHINING GUIDELINES

CUTTERS FOR DUROSTONE® MATERIALS

1. Polycrystalline Diamond (PCD) Routers

A. Advantages of PCD

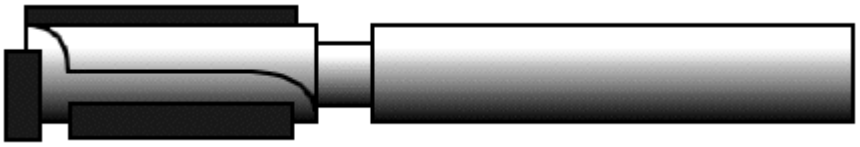
a. Exceptionally long production runs between tool relaps when compared to other tool types. This leads to enhanced cost effective production with reduced machine down time and consequent savings in tool stock holding.

b. Tighter tolerances may be held throughout the extended life cycle of the tools giving more consistent finished components.

c. Usually higher component finishes are obtainable than with conventional tooling.

PCD has significant advantages over tungsten carbide but may initially appear to be a relatively expensive material to use as a tool blank. Usually the resulting high initial tool costs are more than amply repaid in service.

Standard Non-Segmental PCD Router
(with Plunge facility)

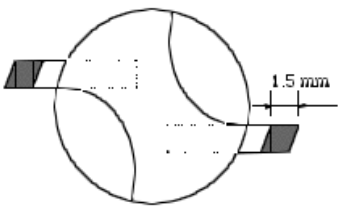


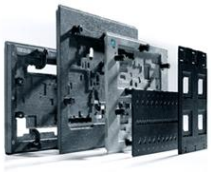
Advantages of Non-Segmental Routers

* Produces finest component finishes without tool marks or other blemishes
* Tools better balanced. important on high spindle speed machines.

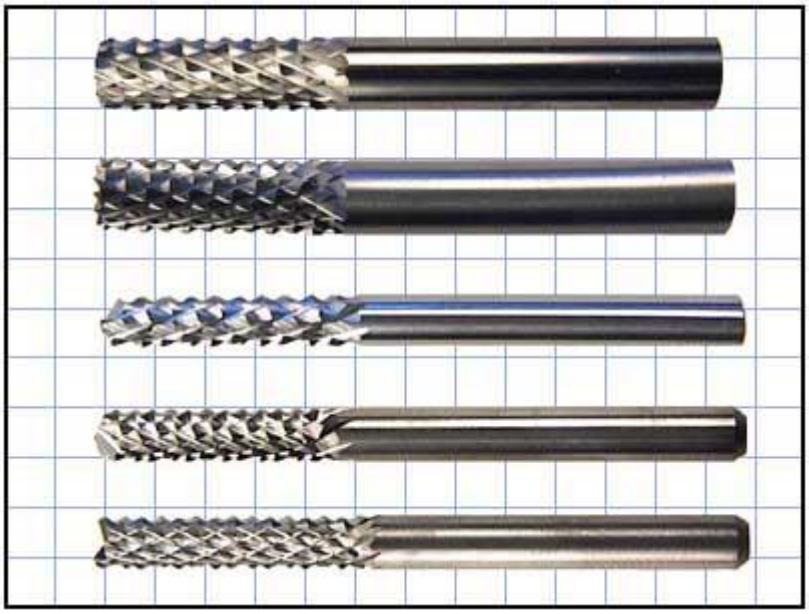
Disadvantages of Non-Segmental Routers

* More expensive to produce.
* PCD teeth more difficult or expensive to repair if badly damaged.

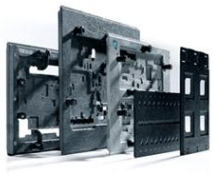




2. Diamond-Cut Carbide Routers (Fibreglass Routers)



3. PCB Carbide Routers



MACHINING PARAMETERS

The following are the machining guidelines to cut Durostone® solder pallet materials, CHP760, CAS761, CAG762 & CFR767.

Note: Spindle Speed (RPM) has been calculated using the formula - *Cutting Speed (m/min)*1000 / π * diameter (mm)*

Feedrate (mm/min) has been calculated using the formula - *Number of teeth x Feed per Tooth x RPM*

Carbide Cutters							
Cutter Ø	**Cutting Speed**	**Feed per Tooth**	**Number of Teeth**	**Depth of Cut**	**Spindle Speed (RPM)**	**Feedrate (mm/min)**	**Cutter Price (€)**
10	80m/min	0.05 mm - 0.10 mm	2	⅔ of Cutter Ø	2,546	255 - 509	27.00
8	80m/min	0.04 mm - 0.08 mm	2	⅔ of Cutter Ø	3183	255 - 509	23.00
6	80m/min	0.03 mm - 0.06 mm	2	⅔ of Cutter Ø	4,244	255 - 509	17.00
4	80m/min	0.02 mm - 0.04 mm	2	⅔ of Cutter Ø	6,366	255 - 509	8.00

Polycrystalline Diamond (PCD) Cutters							
Cutter Ø	**Cutting Speed**	**Feed per Tooth**	**Number of Teeth**	**Depth of Cut**	**Spindle Speed (RPM)**	**Feedrate (mm/min)**	**Cutter Price (€)**
10	300m/min	0.05 mm - 0.10 mm	2	½ of Cutter Ø	9,549	955 - 1,910	240.00
8	300m/min	0.04 mm - 0.08 mm	2	½ of Cutter Ø	11,937	955 - 1,910	200.00
6	300m/min	0.04 mm - 0.06 mm	2	½ of Cutter Ø	15,915	955 - 1,910	150.00
4	300m/min	0.04 mm	1	½ of Cutter Ø	23,873	955 - 1,910	110.00

NOTE: Coolant is not typically recommended for Durostone®

Conclusion:

Durostone® can but machined 4 times faster using a PCD cutter as opposed to a standard carbide cutter.

Lifespan of the PCD cutter can be 8 – 10 times longer than carbide cutters, depending on use. Machining using PCD requires a robust machine without vibration.

Care must be taken when using PCD as cutting edges can easily be chipped or broken.

The price difference between carbide and PCD is about 8 – 10 times so cost per solder pallet may be the same but the productivity is 3 to 4 times greater so overall they are more cost effective.