KARAT®
NEDERLAND B.V.

Parameters for Diamond Polishing Cutter

General:
The monocrystalline diamond (MCD) which is attached to a carbide shank consists of pure carbon and is extremely resistant to wear. Although it has been produced synthetically, it has the same characteristics like a natural diamond. This ultra-hard material ensures glassy polishing edges. It is center-cutting and cuts sidewards as well as downwards.

Fields of Application:
This tool is used for polishing edges and pockets of any contour in acrylic. A cutting edge or pocket that has been milled is a sufficient preparation.

Hints for Machining:

- This tool is not suitable for milling. You should remove between 0.04 mm and 0.06 mm of the material in each working cycle.
- If vibrations should occur at higher rotational speeds, please reduce the rotational speed stepwise by 1,000 RPM – and reduce also the feed rate accordingly – until you have reached a vibration-free running.
- Tip: You can polish your workpieces in several steps if a fine polishing step does not bother you. For instance you can polish your 10 mm thick material with a cutting edge length of 4 mm in three steps. So you do not have to use a polishing cutter with a cutting edge length of 10 mm which is much more expensive.

Other Important Hints:

- Do not process metal and ensure that no metal chips get in touch with the cutting edge during the working process.
- Some laser tool measuring devices do not recognize the diamond automatically, so they return wrong tool lengths. Please adjust the tool manually in such a case.
- The diamond is regrindable for several times. We offer this service on request. Please allow approximately 14 days for this service.

Please note...

In order to achieve best results with your new precision tool for a long time, you should set your tool parameters according to the following data. However, whether it is actually possible to work with these theoretically determined values for feed rate and rotational speed depends on the interaction of a number of factors. Thus we cannot assume liability for the calculated values. Among others, the following factors determine the machining process:

- additional cooling with compressed air or lubrication?
- power/maximum rotational speed of the spindle
- minimum/maximum feed rate of the CAM system
- controller features (look-ahead path calculation, etc.)
- stiffness of the machine.

Please turn over ⇨

Karat Nederland B.V. • Postbus 10040 • 3004 AA Rotterdam • Overschieseweg 87 • 3044EH Rotterdam
T: +31 (0)10 245 26 30 • F: +31 (0)10 245 26 40 • www.karat.nl

KARAT®
NEDERLAND B.V.

Tool Data/Formula

Tool Data:
Feed rate f_z: 0,03 mm/cutter tooth
rotational speed n: min. 18,000 RPM

Formula for Calculating the Feed Rate:
v_f [mm/min] = f_z [mm] x n [RPM]

Variables:
v_f Feed rate
f_z Feed rate per cutter tooth
n Rotational speed of spindle

Hints for the Calculation

As the diamond can work with very high cutting speeds (rotational speed of up to 80,000 RPM) which can be reached by only few spindle types, you can work theoretically with the maximum rotational speed of your spindle. However, we do recommend to stay approximately 20% below the maximum rotational speed in order to reduce the spindle load. Moreover, the spindle runs smoother then. Please ensure, however, that the rotational speed amounts to at least 18,000 RPM. Starting from the rotational speed, the feed rate is being calculated then.

Sample Calculation:
You want to process the material with a rotational speed of 24,000 RPM. The tool data indicates a feed rate f_z of 0.03 mm per cutter tooth. Using the above formula, you can calculate then the feed rate of your machine:

Feed rate v_f: 0.03 mm x 24,000 RPM
= 720 mm/min = 12 mm/s

Overview of Feed Rates

Rot. Speed in RPM	Feed Rate in m/min	Feed Rate in mm/s
18,000	0.54	9
24,000	0.72	12
30,000	0.90	15
36,000	1.08	18
42,000	1.26	21
48,000	1.44	24
54,000	1.62	27
60,000	1.80	30
80,000	2.40	40

Karat Nederland B.V. • Postbus 10040 • 3004 AA Rotterdam • Overschieseweg 87 • 3044EH Rotterdam
T: +31 (0)10 245 26 30 • F: +31 (0)10 245 26 40 • www.karat.nl