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Procedure of Diamond Milling: a Discussion by Chris Adam

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In the construction of custom micro optics, the diamond milling is considered as a significant procedure. It is also useful to fabricate the injection molds, used in the plastic injection beautification of micro optics. Please note that the diamond milling is fairly comparable to the conformist milling with CNC mills but a huge difference definitely is there. The conventional CNC milling generally forms fairly large shapes whereas the diamond milling is capable enough to create shapes down to size in 1 micron approx. Not only that, the diamond milling is also capable to create a wide variety of structures like Fresnel zones, free forms, binary shapes, blazed gratings and many more shapes you desire.

One of the greatest advantages of this process is a comparatively low cost for tooling. Usually, for a normal diamond milling bit, you have to spare a cost of Rs 1.6 lakhs approx whereas in case of custom diamond milling bits, you have to spend at about Rs 6 Lakhs or above. Please note that such high costs are charged mainly due to two reasons:

1. For â€œbitsâ€•

2. For â€œtimeâ€• which is taken to machine the optic.

However, the time for machining is mainly depends upon the roughness of surface needed, the structureâ€™s depth and off course the substance being milled.

The diamond milling can also be used on several different materials like glass, metals, plastic, etc. The glasses are the most suitable surface as they are fairly solid and hard material but not as hard as metals. The diamond milling of metals is usually difficult as they are too much hard but some of the metals usually used for diamond milling are copper, steel or beryllium alloy to inject molds. For mirror surfaces, gold is also used. Plastics are also used for diamond milling but because of the softness, they are tough to machine as the milling bit go slow and does not generate sufficient temperature to liquefy the plastic.

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