

## THE STUDY OF BRITTLE MATERIALS GRINDING

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### Abstract

The development of optical systems, the use of laser and consequently the need of reflective surface with high finish level and precision are increasing significantly the demand for research on high precision machining. The surfaces obtained with the usual polishing process are limited in plane and spherical shape and spend a lot of time to obtain a good result. The grinding of brittle materials is an alternative to polishing and lapping and the use of a high precision lathe with a grinding spindle is the viable proposition to generate aspherical surfaces.

The surface roughness achieved was satisfactory considering the high influence of the diamond wheel grit, and the time spent to get the same results as with the polishing and lapping process.

A Rank Taylor Hobson Talystep was used to characterize the roughness of the ground surfaces. The instrument is specially designed to supply the needs of the microelectronic industry and measures with high resolution thin films thickness and also micro- and nanotopography of surfaces.

This work shows that the grinding of glasses, using diamond wheels on a high precision machine may replace the traditional lapping and polishing of optics. The experiments show that a surface can be generated in much less time than using traditional optics fabrication methods. A little polish may be required as a final mirroring operation. It is considered that the exploitation of this method may have implications for the economics of optics productive process.