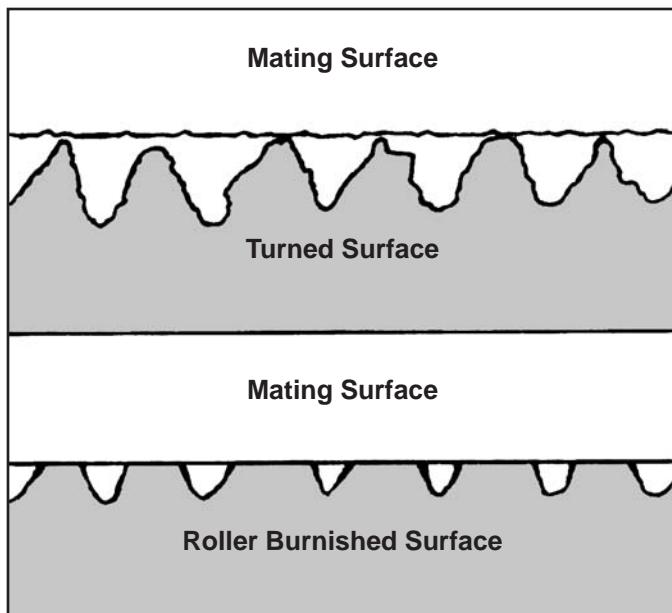


## Surface Finishes



Varying surface finishes are obtained in the machining of mating parts. Machined surfaces result in a loose fit on mating parts. Surfaces which have been roller burnished have a higher bearing capacity and abrasion resistance. Roller burnishing improves this fit by providing a larger contact area between the surfaces.

Pistons, valves, cylinders and other parts with similar functions require continuous lubrication. Roller burnishing will leave valleys in the surface of these parts, which act as oil reservoirs, extending part life. This can be achieved by controlling the burnishing size and hole size. Roller burnishing has resulted in product improvement and cost savings to the hydraulic cylinder industry.

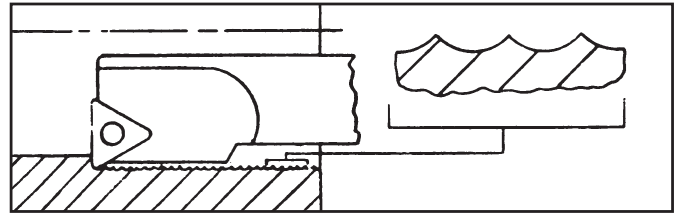
The electric motor industry has derived great benefits from roller burnishing to reduce noise levels in moving parts.

Heat, resulting from friction, has a direct effect on surface finish. This temperature rise causes dimensional changes that can have an adverse effect on the function of the parts. By roller burnishing, it is possible to reduce friction by up to 30%.

Burnishing tools can be used on any spindle driven machine. The burnishing tool or work piece can rotate, the roller burnishing process works well either way. No special skills are required to operate a burnishing tool. Simply set the tool to the proper size and the operator will turn out precision finished parts throughout the production run.

## Preparation for Burnishing

Several factors should be considered in preparation of the work piece. These are **feed pattern**, **cutting tool geometry** and **stock allowance**.

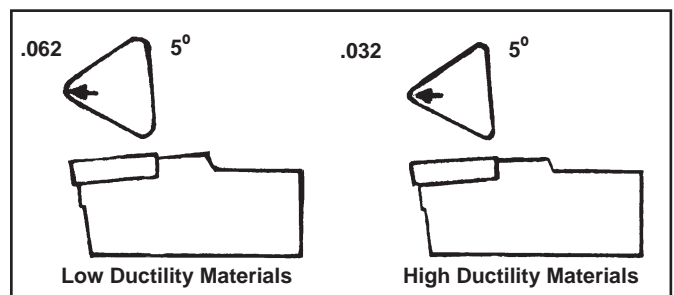


**Feed Pattern** the peak and valley effect, which is generated by the cutting tool. This is an ideal surface finish for roller burnishing.

An extremely smooth bore is not required to perform roller burnishing. However, gouges and tears in the surface caused by the drilling or reaming operation and/or the single point turning will be very difficult to roller burnish. These gouges and tears will cause a change in the surface micro-finish as well as a change in the diameter. Deep gouges will remain visible after the burnishing operation.

A finer machined surface is required before the burnishing operation with less ductile materials, such as cast iron and heat treated steel above R<sub>c</sub>35.

Ductile materials, such as brass, aluminum and annealed steels can have a rougher machined surface. Very finely machined surfaces can accept only a slight size change when burnished. Some 25% to 50% less material can be displaced from a reamed surface versus a surface machined with a single point tool.



**Cutting Tool Geometry** in ductile material with single point tools (a 1/32" nose radius with a minimum 5 degree back taper) is recommended. For best results, feed the cutting tool at a feed rate sufficient to produce a surface in the 80 to 120 microinch range with a consistent peak and valley pattern. For less ductile materials, use a feed rate of about 50% less than that of more ductile materials. The result should be a 60 to 100 microinch surface finish.