

How to Achieve Flat Parts with Secondary Machining Operations

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Understanding the processes of achieving flat parts with secondary machining operations will enable stampers to take on more jobs by sub-contracting these operations.

BLANCHARD GRINDING

Blanchard grinding is accomplished through rotary work motions, with the worktable rotating counterclockwise and the abrasive wheel rotating clockwise. All work pieces being ground receive the same treatment resulting in uniform size and surface finish.

These machines are versatile in that one piece or a multitude (1000+) can be loaded on a magnetic work holding device. Production rates are high because of the ease of loading as well as the number of parts that can be ground at the same time. Large stock removal on very broad surfaces is easily accomplished because of the efficiency of the machine and set up is fairly simple. Blanchard grinding has such broad applications that it can be considered for rough and finish machining any flat

surface unobstructed by projections.

SURFACE GRINDING

These machines have magnetic tables and are usually reciprocal in nature with horizontal spindles. There is a rotary table version that would be able to generate concave or convex surfaces. These machines are usually used in a tool room and they are capable of holding tolerances in the range of $\pm .0005$ or less. These machines are also good on production runs, especially on small or thin pieces (1/4" dia., .013" thick) but not good with high stock removals.

DOUBLE DISC GRINDING

Double disc grinders are good for parts that must have parallel and flat surface areas, finished to critical tolerances $\pm .001$. Double disc grinders use two abrasive discs to remove even stock on two opposite and parallel sides of product components. The simultaneous grinding of two sides reduces handling, eliminates extra grinding time, speeds production and provides con-

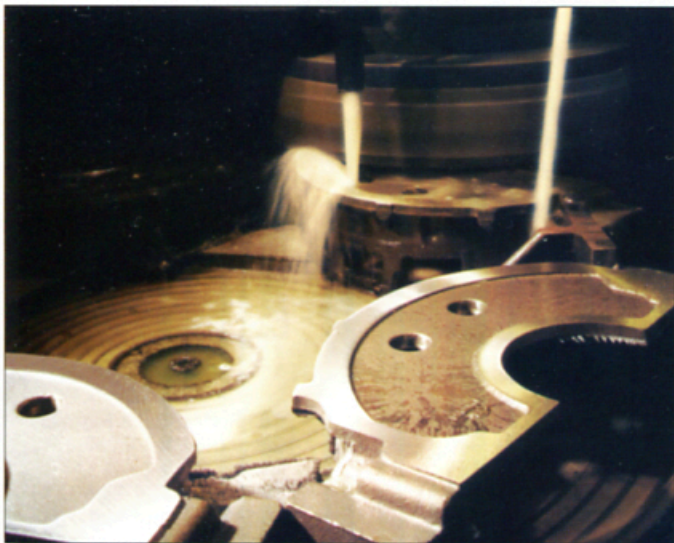
sistency over the entire run of parts. With suitable tooling, profitable production rates can range from twenty to over ten thousand pieces per hour.

LAPPING

Lapping is the process of mixing loose abrasives with a vehicle, such as oil, and letting it remove material from the work piece at a very controlled rate. There are one and two sided machines. You can hold flatness of 1 Light Band (11.6 millionth of an inch). Parallelism: .0001 can be held on one-sided and .000020 on the two-sided machines. Size Control: $\pm .00015$ inches on the single and $\pm .000020$ on the two-sided.

Surface finishes can be as low as 4 Ra or 2 Ra if polished. Lapping is a slower process with many other advantages:

- Thermal distortions are virtually non-existent
- Clamping distortions are a thing of the past
- Brittle parts are easy to run because of the gentle grinding action



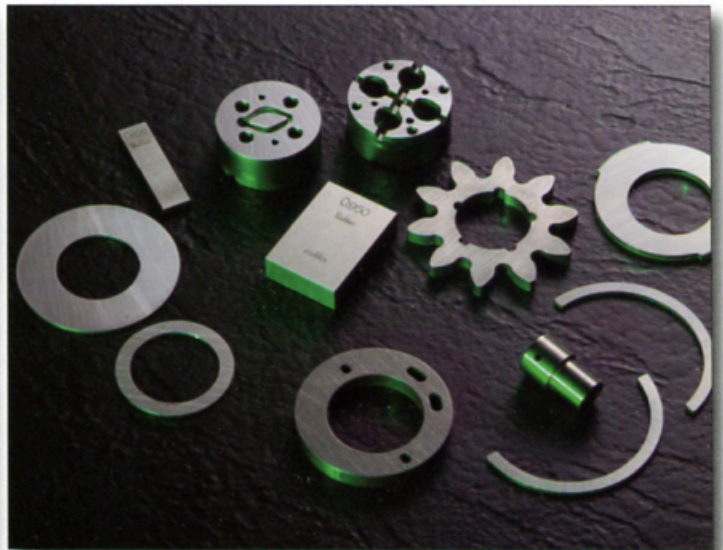
Blanchard grinding



Double disc grinding



A two-sided lapper with carriers



Flat honing / fine grinding produces statistically consistent parts

- Small thin parts are easily lapped
- Any kind of material including non-magnetic can be run

FLAT HONING / FINE GRINDING

This unique grinding process uses fixed abrasives such as diamond or CBN to remove material at an extremely controlled rate without dirty residue. The parts are held in multiple carriers that allow simultaneous grinding of the top and bottom surfaces. This provides a more consistent surface finish than conventional grinding processes.

Flat Honing / Fine Grinding has many advantages including:

- Flatness, parallelism and surface finishes can be produced similar to lapping
- Production rates can be 3 to 20 times faster than conventional lapping
- Ideal for small thin metal parts, stampings, fine-blanked stampings, thin-metal molded parts, machined parts, powdered metal, and both ferrous and non-ferrous metal alloys
- Ceramics, plastics and irregular shapes are easily ground to high tolerances

ABOUT COLUMBIA GRINDING

In 1953, Joe Shavor constructed a building in South Milwaukee, Wisconsin and started Columbia Grinding Co.

In March 1976, Richard and Kay Lussier purchased the business and ran the shop in much the same way Joe had successfully done for many years.

Columbia's growth has been steady over the years and in 1986 operations moved from an 1800 square foot building to another larger facility in the Oak Creek Industrial Park. As business increased the company built a specially designed 20,000 square foot manufacturing facility in 1994. Further investment in state-of-the art grinding equipment and production processes led to a building addition in 2007 that has brought total manufacturing space to over 43,000 square feet. ■



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