

Hydro De-Burring

Complex aluminum parts often leave behind burrs during the manufacturing process. Burrs can be located deep within tough to reach holes, or in more accessible locations along grooves. No matter where they are located, it is necessary to remove these burrs before the product is finished. Hydro de-burring is a process that can the removal of these burrs more efficient, while also making that removal repeatedly consistent as well.

Hydro de-burring machines use high-pressure water jets, that direct water at pressures ranging anywhere from 1,500 PSI to 7,500 PSI using from 5 to 30 GPM solution flow to knock away burrs at their root, leaving the part burr free. These machines are able to break off the burrs and blow away the residual chips, but they are not a miracle solution to all problems. Hydro de-burring cannot mechanically machine off the burrs, it does not leave behind a smooth finish, nor does it create rounded edges. The manufacturer will need to continue whatever process they are using to achieve those ends once the de-burring unit is installed.

Although a hydro de-burring unit is limited in its ability to accomplish the goals listed above, it is effective in many other areas. For example, it effectively removes heavy grease and oil. Also, high pressure spray impingement can take off paint and knock out embedded sand and dirt. Pockets of embedded chips are also removed from the part, along with solvents left over from the cleaning process.

Hydro de-burring uses a system of hydraulically powered rotary high pressure water jets, which shoot water at a straight, 0 degree angle. This allows the water to hit the part at a right angle, ensuring that the jets will travel into any hole on the part as deep as possible.

The effectiveness of hydro de-burring depends on three factors. First, the volume of water used. It must be enough to have the power to knock off the burrs. Second, the speed of the water propelled through the jets must be sufficient. And finally, the thickness and type of burr that is being attacked. The thinner the root of the burr, the more effective the process will be. Bigger burrs will require more water and higher pressures to be removed. A good test to determine if the burr being removed is of the correct size is the pencil test. If a burr can be removed by a .5mm diameter pencil lead that is 9.00mm long without damaging the lead itself, then the burr can be removed with high-pressure water.

Hydro de-burring is an effective and efficient process, but it is not ideally suited for all manufacturers. Not all metal cutters leave burrs in the same location every time. In these cases, brushes and media tumblers are a better choice for the company. Hydro de-burring is effective, but it should not automatically be considered the best option. If the burr is not consistently placed, the jets will not be able to remove the burr all the time. If it is, the hydro system will remove it consistently and effectively.

Therefore, if a part has consistent placement of burrs, a high-pressure direct spray system is appropriate. An example of this can be found in an automotive transmission plant. An aluminum valve body, once milled, is left with a consistent roll over bore in the spool bore. A power brush cannot access the hole where the spur is located. A probing brush may be able to access the burr, but there is the chance that it will damage the machined surface of the part and render it scrap.

A high-pressure water stream can shoot into the hole and knock the bore off with precision. It can then flush the burr out, and do no damage to the machined surface.

Assuming the burr is formed in the same spot in the prior stages, the high-pressure water system will deliver the best quality possible every time.

With this quality comes a high cost. Properly engineered high pressure deburr systems cost at least \$500,000 or more. The high cost can be attributed to the purchased components and customer driven plant safety regulations. Many of the parts necessary for a high-pressure system can cost upwards of \$5,000. Hydro de-burr systems require parts such as:

- High Pressure Pump
- High Pressure nozzles and manifolds
- High Pressure tubing and hoses
- Filtration
- Oil Separation
- Fixtures to hold part in place
- Sound dampening measures

All of these parts can be expensive. However, if the hydro de-burr system is able to remove burrs quicker and easier than a wire brush system on a particular part, it is well worth the cost to invest in the unit. The guaranteed removal of burrs combined with the lack of damage to the part itself (wire brushes can remove burrs but also inflict damage on the part) will help the manufacturer recoup their initial investment through production of high quality parts.

The high pressure system comes in many different types of machines. Manufacturers can pick from robotic transfer, conveyORIZED pallet, rotating dial table, chain driven, belt driven, manual, and automated machines, depending on the needs of their specific plant and part. They also include part drying and blow off stations, to ensure that the part received when finished is clean, burr-free, and dry.

Hydro de-burring is especially popular within the automotive industry. Producers of oil pumps, engine blocks, valve bodies, transmission components, and crankshafts are among the users of hydro de-burring units. Any company with a repeatable, consistent burr production in their parts should consider a hydro system to make their production process better. If the money they will make from delivering a high-quality end product is worth the cost of the machine, then it may be time to invest in a hydro-deburring unit.