

Hydro Deburr is Not for Everyone

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Hydro Deburring is not for everyone

Get the product out the door. In today's robust, global economy there appears to be enough work to go around for everyone. Appearances can be deceiving however, and that attitude is a sure precursor to a company one step away from losing its best customer. The truth is, there is work to be done and money to be made by any organization that can control its process enough to meet production requirements with a quality end product.

One method metal forming companies are using to achieve each of these goals is by processing cut and bored parts through a high pressure hydro deburr system after the cutting process. Hydro deburring units, however, have limited applications. In many processes, brushes and media tumblers are better choices for the simple reason a metal cutter will not always leave burrs in the same location. If this is the case, a high water pressure, jet spray system is inappropriate. So, although this style of burr removal can help control process results, it should not be considered the proper machine tool for every component with a metal or aluminum burr on it.

Once a part is formed, depending on the thickness of the substrate and the condition of the cutting wheel or bore, burrs are left that are not acceptable to subsequent processes. Traditionally, these burrs have been removed with media in tumble units, power brushes or even with hydraulically controlled, probing, powered brushes. This media or these brushes deliver acceptable results, however, they do come with some negative characteristics.

Tumble deburr systems require the part be unloaded and dropped into a media filled tumble unit. This action is preferred for parts that are bulk loaded. They can be dumped from bins, retrieved from tumblers using bins and transported to the next process in bins. If this material handling method sounds familiar, and is acceptable, there is no need to consider an automated, jet spray, deburring system. Even with the constant cost of new tumbling media and its disposal cost, it would take years to justify the purchase of hydro deburring equipment. It would be a more practical alternative to place a small washer after the tumbler in order to wash off the media dust and burrs that have been generated from the media based process.

For more complex parts, particularly those that are held in position and transferred through the plant from process to process via a palletized conveyor, surface brushes can address the extended rough face of a part. These brushes are most suitable for parts with a series of intermittent, inconsistent burrs. When the part is brought to the brush deburr station, the brush is energized and placed in position. It is then able to scrub the entire surface. This is the most intelligent means of attacking parts with many burrs of varying sizes that are not left in the same spot on the part each time. Despite the inconsistency of brush wear, which makes it virtually impossible to schedule when brushes will need to be replaced, this method is still the most appropriate method for removing a wide range of burr sizes from an extended surface area.

Probing brushes are similar in both application and limitation to the surface brushes. They are directed into bores that have been made in the casting. As is the case with surface brushes, these probing brushes are best suited for areas that leave inconsistent burr patterns. Also, similar to the surface brushes, this variable burr pattern makes it impossible to accurately predict when the brush wear will require replacement.

Manufacturers begin looking for alternatives to brushes once they start dealing with these uncertainties and the maintenance nightmares of using them. Brushes wear, they wear unevenly and probing brushes bend. Often these inadequate brushes go undetected until the customer reports inferior product arriving. That report could come days and thousands of parts after the first poorly deburred part exits the process house of the unit. Even if internal quality checks discover a measurable time frame that determines when it will be

appropriate to schedule brush changes, the time and labor to do so is extensive.

The distinction between the two styles of applications can best be related via the following, rather violent, analogy. A powered brush system to relieve the part of burrs is like throwing a grenade at a stone fence full of empty cans. The cans will all be knocked off regardless of their size and no matter where you place them, but there may be some damage to the fence. A direct, high-pressure water spray is like a sharp shooter trying to knock the cans off the fence. He can shoot cans off the fence one at a time without touching the fence.

High-pressure, direct spray streams are the correct system for machined parts with similar size burrs left in consistent locations. One example of this type of part can be found in an automotive transmission plant. An aluminum valve body is milled and then transported to the high-pressure system. A consistent, roll over burr is left in the spool bore during the milling process. A powered brush cannot be used because it cannot get past the brain face of the part to get down into the bore. If it does get in there with a probing brush, then that brush could still damage the machined surface and render the part scrap. Conversely, if a straight stream of water is shot directly at that rollover burr it will knock it off perfectly every time, flush it out of the spool bore area and not do any other damage to the brain face surface. The best part is, as long as the material handling functions properly the burr will be knocked off every time, guaranteed.

There is a price to pay for this type of process control. Properly engineered high pressure deburr systems start at \$500,000.00 and can go up from there. The cost associated with these is most often attributed to purchased components and customer driven plant safety regulations. Here are a few of these items that contribute to the high cost:

5,000 and above psi pump \$55,000.00
High pressure pump motor \$8,900.00
80 psi pump to feed the high pressure pump \$4,500.00
Transfer pump from filter tank to feed pump sump \$5,100.00
Chiller to cool the water temperature that rises under pressure \$20,000.00
Drive and clutch system for proper indexing \$12,600.00
Roller chain for secure part transport \$13,200.00
Part fixture (could be anywhere from 15 total on up) \$800.00 (ea)
Air blow off \$5,500.00
Water filtration system to prepare fluid for high pressure pump \$64,920.00
Each jet spray tip made of tungsten carbide \$140.00 (ea)
Patented Water diverter valve \$7,400.00
Pressure regulating valve \$7,500.00

Add these purchased components to the cost of heavily insulated, sound deadening boxes and the thick plate necessary to withstand the high pressure spray stream and this becomes a very expensive piece of equipment. This high price is even before you calculate the engineering time spent to design the system for a specific part.

Is this high cost worth it? Find the difference in cost between a new Hydro deburr unit and the cost of losing your most valued customer due to poor quality and late delivery and you will have your answer.