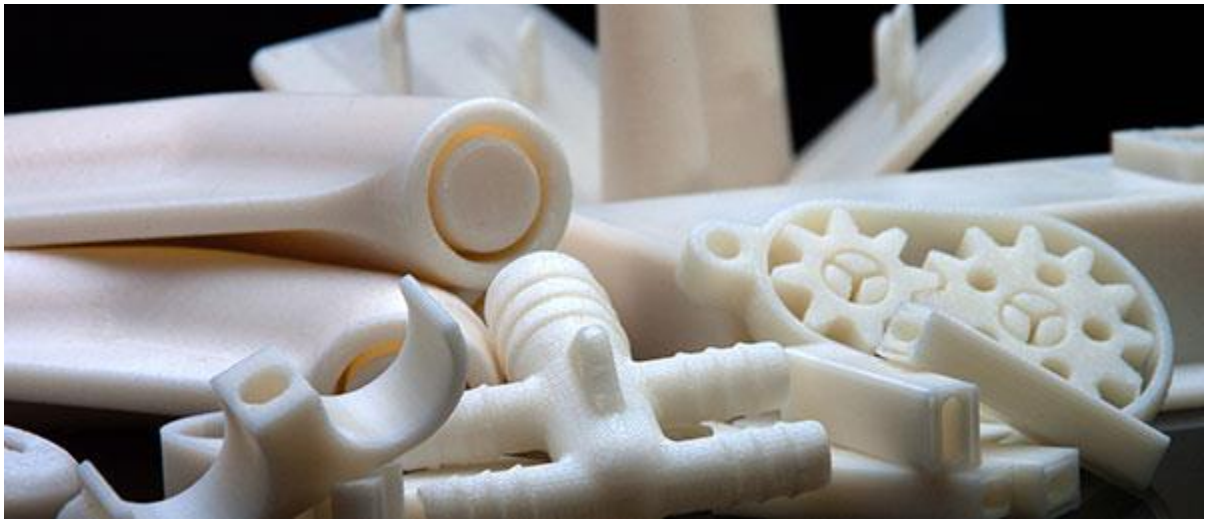
A Basic Guide to the Post Processing of 3D Printed Parts



An overview of Post Process Technologies for 3D Printed Plastic and Metal Parts

Innovative Finishing Technologies
www.innovativefinishing.us.com

A Basic Guide to Mass Finishing for Post Processing of 3D Printed Parts

Mass Finishing technology has been employed for the use of surface refinement of traditionally machined parts for decades. Many machine types, from low-end tumblers and vibratory finishers, to high-energy centrifugal disc and barrel finishers and blasting equipment has been used to remove burrs and parting lines as well as grind and smooth the surface of parts of various material construction. These machines use various process media that contain abrasives that can be equated to sandpaper. This process media comes in a variety of shapes and grits, just as sandpaper. These machines replace the traditional method of hand-sanding by use of mechanical action and forces. The advantages of this method are obvious. Many pieces can be processed at one time, thus eliminating many hours of tedious hand work which will lower the per piece cost of the parts.

Most 3D printed parts are designed to be printed to the final required dimensions without consideration of the final surface finishing and post processing steps required. Mass Finishing equipment is a non-discriminatory process, meaning the material removal is equal across the surface of the part. Material removal using this equipment can be between .001 - .005 inch. Therefore, consideration of the final part dimensions and the function of the part must be considered in the design phase of those parts. Extra consideration must be given to parts that have complex geometries or have interior areas that must be finished as well. It may well be that the part should be designed in multiple parts, or with built-in masked areas that can be removed after post processing. These masked areas can protect critical part dimensions and edges that may be affected in the finishing process.

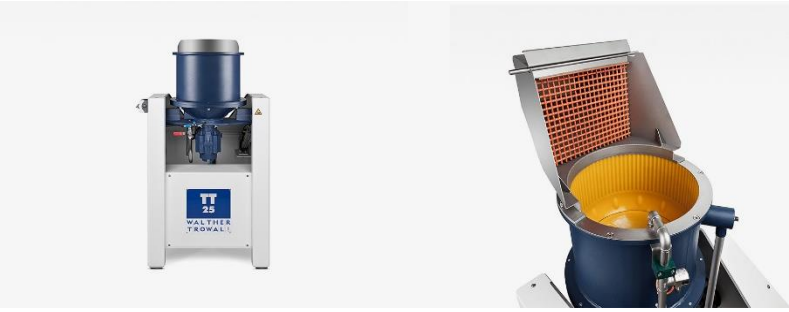
Overview of Equipment Types;

Vibratory Bowls – Low Energy Wet or Dry Processes

These economical machines are available in small table-top and free-standing designs. As they are low-energy machines, they serve in the most basic way and time-cycles can be as long as a few hours. They

are not as aggressive as the other high-energy machines but may suffice in a very low production environment.

Centrifugal Disc Finishers – High-Energy Wet or Dry Processes



These high-energy machines process parts in one-tenth the time of conventional vibratory equipment. Many different types of 3D printed parts can be processed, including: Nylon, SLA, FDM, DMLS, Steel and Stainless Steels as well as Aluminum, Inconel and Titanium. They are available in both manual and automatic configurations with built-in separation equipment.

Centrifugal Barrel Finishers – High-Energy Wet or Dry Process

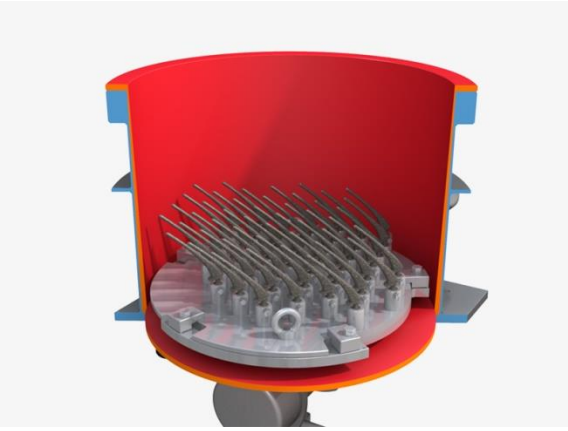
These machines provide up to 30 G's of processing power and come in many sizes and capacities. As they have multiple process chambers, different parts requiring different process media can be processed at the same time. Capable of processing all 3D materials.

Processing of Complex Geometries on High Precision AM and 3D Printed Parts

We have developed a new process that utilizes a unique piece of recently patented equipment. Traditional mass finishing, (centrifugal barrel, disc, vibratory bowl, etc.), is not well suited for complex geometries. The gross material removal and loss of geometry to critical dimensions is pronounced on outside dimensions while in some cases leaving the inside dimensions virtually untouched.

The process we have developed will treat all surfaces and have minimal effect on critical edge dimensions. We can also utilize the build plate in the finishing process. Depending on the final Ra of the AM component, we may utilize a pre-finishing process to even out the surface prior to providing a super-finish.

MV Multivibrator – Metal Part Processing



This unique machine incorporates built in part-holding fixtures including a magnetic part holder which allows you to utilize the build plate to hold the part during processing. As stated above, this machine processes parts with complex geometries while providing for even finishing of internal areas with minimal material removal on critical edges and features.

Wet Blast Equipment – Surface improvement and Build Removal in One

This equipment works well with powder-bed technologies by improving the overall surface finish significantly, while cleaning off the build material and eliminating the dust associated with other methods of build removal. They are available in both manual and fully automated systems in a variety of sizes, and can also be customized to your application.

In conclusion, the use of mass finishing equipment, when considered in the design phase of the parts, can help bring AM part production to a point where they can compete with conventionally machined mass-produced parts.

We also offer a full line of build removal, part cleaning, drying and dyeing equipment. Please visit our web site at www.innovativefinishing.us.com to see our entire range of equipment, supplies and technologies.

Free Sample Processing and Consultation

We offer free sample processing and can assist you with finding the best process and equipment to meet your needs. We can arrange to visit your facility to discuss your needs, or you can send your parts for processing.

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