What Is Mass Finishing

Mass Finishing is a term used to describe a mechanical process in which large amounts of parts are economically processed to achieve one or several surface improvement functions. These surface improvements include cleaning, deburing, surface refinement, inhibiting, and drying. It is important to understand that these functions are not independent of each other. It is common to have several or all of these functions take place in a single mass finishing process. Mass finishing processes are based around four key elements, the part, media, compound, and equipment.

Why Mass Finishing

Nearly all manufactured parts require some amount of surface improvement prior to final assembly. Manufacturing companies who utilize mass finishing do so because of the economic advantages obtained, especially when compared to manual surface improvement costs. Mass finishing processes can reduce or eliminate procedures that are labor intense or require extensive part handling. This is especially important in meeting quality control standards, as mass finishing processes produce a uniformity that cannot be duplicated when parts are individually handled. Properly implemented mass finishing process greatly reduce part rejection and rework rates.

Mass Finishing Functions

Cleaning: Cleaning is the primary function of mass finishing, and is the basis for all finishing operations. In order to efficiently debur, surface refine, inhibit, and dry, the part must be clean. Cleaning is simply the removal of unwanted residue from the part, these residues may be present as dust or particulates, cutting or stamping fluid, die lubes, corrosion inhibitors, oxidation or scale. The cleaning process is primarily a chemical action but is greatly enhanced by mechanical action i.e. — media and equipment.

Deburring: Deburring employs the use of abrasive media to grind away machine lines, belting marks, burrs, sharp edges, slag, and establish radius.

Surface refinement: Surface refinement lowers rough surface finishes to acceptable standards for plating, polishing, anodizing, and painting operations. Generally these finishes are measured by a profilometer and expressed in terms of RA, or the average distance between the peaks and valleys of the parts surface.

Inhibition: Once the part has been cleaned, deburred, and surface refined it must be protected from oxidation and corrosion.

Drying: The result of the previous functions generally results in a wet part. To insure optimum corrosion inhibition the part needs to be dried. This is accomplished in mass finishing equipment with ground corn cob and is usually augmented by heat.

Mass Finishing Elements

There are four elements to mass finishing that encompass all process variables. The first and most important is the part itself. Many different parts may be processed in a similar fashion, but each part requires a specific process and corresponding controls. Among the variables to control relative to the part are the surface condition, hardness, residue and the quantity and extent of burrs. Parts whose variables fluctuate from lot to lot will have a profound impact on

a mass finishing process.

The second element is media. It separates the parts from contacting each other as well as performs the work. It also carries the compound to the part and accesses all the intricate detail areas. Media is chosen on the basis of surface improvement function, type, formulation, size and shape.

The third element of mass finishing is the compound and water solution. It is responsible for cleaning the part and the media, carrying away broken down media and abraded pieces of the part, brightening the part, and providing inhibition. Most compounds are used at a concentration of less than 2% therefore water hardness and PH are closely observed.

The fourth and last element is the finishing equipment. There are numerous types that present the part with different action, aggressiveness and finishes.

Each of these mass finishing elements imparts its own variables, however the interrelationship of each is critical to the overall process. Once a desired function or functions is determined process development can then be started.

Process Development

Process development is the key to a successful mass finishing process. A properly documented part evaluation provides you with the most efficient and cost effective process to meet your production and quality requirements. This evaluation establishes controls parameters for all the mass finishing element variables. Two key definitions learned during process development testing are:

Process Capability: The measured built in reproducibility of the product turned out by the process. Such a determination is made using test data, not wishful thinking. Determined limits can only then be compared to specification limits to decide if a process can consistently produce acceptable product.

Process Control: The maintenance of predetermined and approved process settings for both equipment and product (media, compound, ratios, etc.) in order to maintain process capability.