ROYSON ENGINEERING COMPANY

VIBRATORY FINISHING
GENERAL PROCESSING INFORMATION

A. TYPES OF MEDIA

Media: Plastic - 50 to 60 lbs. per cubic foot.
Ceramic - 70 to 130 lbs. per cubic foot.
Steel - 320 lbs. per cubic foot.
Cob - 26 lbs. per cubic foot.

Plastic - Used mainly for preplate finishing and used on non-ferrous material, can obtain low micro.

Ceramic - Used mainly for ferrous and heavy burrs. Does leave an acceptable finish on non-ferrous. It is much more aggressive than plastic.

Steel - Used for ball burnishing or deburring, accomplished by a peening action. Does not actually remove burr but dulls the sharp edges. Leaves a very bright surface finish.
NOTE: Not all equipment can process steel media due to the weight. Consult equipment factory for further information.

Cob - Used on ferrous and non-ferrous parts to obtain a high polish as well as drying. Does no actual removing of material from the part.

Compounds - General purpose - 1 to 2 oz. per gallon.
Degreasing - 1 to 2 oz. per gallon water.
Burnishing - 3 oz. per gallon water.
Descaling - 5 oz. per gallon water.

Some type of compound must be used both to clean the parts and to retain the cutting surface of the media.

B. PROCESS TROUBLE SHOOTING

1. Taking longer to deburr.
   a. Media is glazed.
   b. Heavier burr.

2. Part impingement.
   a. Too many parts per media ratio.
   b. Media level low.

3. Parts drift to ends of tub.
   a. Maintain equal water flow throughout tub.
   b. Drain is plugged.
   c. Machine is not level.

4. Media impingement-burr rollover.
   a. Slow down RPM.
   b. Decrease amplitude.

5. Parts rusting, Gray Media Foam or Glazing Media.
   a. Increase amount of compound in cycle.

C. PROCESSING DATA

1. Processing Guidelines
   a. IMPORTANT: To obtain the most efficient deburring operation, the normal media level should be 3"-4" below the outside lip of the processing tub. Too low of a level will cause the work piece to drag and also increase the chance of getting part on part impingement. Too high of a media level will restrict the roll and create a "dead" mass.
   b. Never exceed the rated load capacity (350 lbs. per cubic foot).
   c. Always maintain an even flow of compound throughout the entire time cycle. Lack of compound will produce dirty parts and create longer time cycles. Excessive compound will restrict the roll and cause foaming and splashing. The proper amount of solution to be maintained in the tub will depend a lot on operator's experience.
   d. Processing without the proper compounds will cause the media to glaze, which will create longer time cycle's and dirty or smutty parts.

2. Media-to-Part Ratios

The volumetric loads that can be handled in a given vibratory unit vary with the model size or total cubic foot capacity. Parts are normally processed with media. The Med-to-Parts ratio controls the amount of part-on-part contact that can be expected during the process. The following table will give you some guidelines to follow when processing in any style vibratory unit.

MEDIA-TO-PART RATIO BY VOLUME	NORMAL COMMERCIAL APPLICATION
0:1	No media. Part on part. Used for beating off burrs. No media for cutting.
1:1	Equal volumes of media and parts. Forgings and sand castings. Crude, very rough surfaces.
2:1	More gentle, more separation
3:1	About minimum for non-ferrous parts. Considerable part-on-part contact. Fair to good for ferrous metals.
4:1	Probably "Average" condition for non-ferrous parts. Fair to good surfaces. Good for ferrous.
5:1	Good for non-ferrous metals. Minimal part-on-part contact.
6:1	Very good for non-ferrous parts. Common for preplate work on aluminum or zinc with plastic media.
8:1	For higher preplate finishes.
10:1 - 15:1	Even better for high quality finishes. Used for irregularly shaped parts

` 3. Selection of Media and Compounds

Selection of the proper media is one of the key factors in vibratory finishing. There are several things to take into consideration when choosing the proper media. One of the first considerations for proper media selection is size, shape and the material of the part to be processed. Recesses, angles, fillets, slots, holes and intricate contours must be carefully evaluated. Media must be of the proper type and size to reach all surfaces to be finished without wedging or lodging in work pieces. The type of metal, the hardness, the size of the burrs and the surface finish requirements all govern the type of media to employ. The primary functions of media are as follows:

a. Cut - Abrasive media can remove burrs and improve surface condition. As the media wears down, it conditions and continuously renews the abrasive surface so it can perform its task.
b. Luster - Certain grades of media do not contain abrasive grain. These are generally used to improve the surface luster.
c. Parts Separation - An important function of media is to separate parts during deburring, cutting, surfacing, improving or burnishing. The media-to-part ratio is normally used to control the amount of part-on-part contact during the finishing operation. At low ratios, considerable part on part contact occurs, while at high ratios contact is limited.
d. Cleaning - Media, with the assistance of compounds, has the ability to scrub or clean metal surfaces. Both abrasive and non-abrasive media are most effective in cleaning organic soils and other inorganic residues.

4. Various types of media

a. Natural or Random Shapes - 110 to 150 pounds per cubic foot. Natural media special stones that have been quarried, crushed and graded. Natural media may be classified in several sizes ranging from 3/32" to 2". Random-shaped media is recommended for plain design or for configurations in which there is no chance of wedging or lodging.
b. Ceramic Bonded Preform Media - 85 to 120 pounds per cubic foot. Ceramic media is available in many shapes and sizes (triangles, cones, pyramids, etc.). The porcelain is used primarily for burnishing. The size of the abrasive grains may vary from 60 to 600 grit. The higher the abrasive concentration the faster the cut, but the shorter the useful life of the media. Ceramic media containing 20 to 25 percent aluminum oxide, with a grain size of 100 grit or finer, are most commonly used in vibratory systems for burr removal and surface improvement because of longer life.

c. Resin Bond of Plastic Media: - 45 to 60 pounds per cubic foot. Plastic medias are also available in many shapes and sizes (cones, stars, triangles, pyramids, cylinders, etc.). Basic abrasives used in plastic media are crushed quartz, silicon, fused aluminum oxide and silicon carbide. Often grain sizes are in the range of 320 grit or finer. Because of low density, cushioning effect, resilience and mild abrasive action, plastic media is used for deburring soft alloy such as zinc-base die casting and aluminum and precision finishing intricate and complicated delicate parts. Plastic media is especially valuable in finishing parts for plating. Zinc and aluminum parts are processed in plastic media containing quartz or silica. Plastic media is very resistant to impact and will not fracture as easily as ceramic media.

d. Steel Media - 260 to 320 pounds per cubic foot. Steel media is available in various shapes and sizes (cones, pin, diagonal, ballcone, ovalball, ball, etc.). Metallic metals have the heaviest density or weight per volume of all available mass abrasive. The pressure exerted by metallic media on the parts processed in a given mass finishing machine causes the surface to the metal to flow and smooth out scratches, porosity and imperfections. Case-hardened steel media is designed mainly for deburring by peening, and for burnishing all metals to a high lustre. Steel media, if properly sized when purchased, will limit lodging problems. Due to its long life, infrequent replacement is required, Lighter media is generally used with non-ferrous or more delicate parts minimizing the possibility of part distortion. Heavier medias are more aggressive in cutting and recommended for parts that can take more rugged abuse.

5. Compounds

Compounds are available in either abrasive or non-abrasive liquid or powder form for cleaning, burnishing, deburring, descaling and other functions. Liquid compounds have the advantage of blending rapidly, whereas powders take time to dissolve. The non-abrasive compounds are comprised of acid, alkaline, and neutral or burnishing compounds.

a. The acid type (ph 1 to 6) - Used primarily for descaling parts that have been heat treated. Parts should never be allowed to remain stagnant in an acid solution, but should be neutralized at once by an alkaline compound. This cannot be emphasized too strongly, as the acid has a definite tendency to etch the parts.

b. The alkaline compound (ph 8 to 14) - Used to clean oils and soils off parts. They are generally used to prevent rusting of parts during the duburring process and maintain the neutral color of the metal.

c. Burnishing compounds (ph 3 to 6) - Used for final finish on all metals. They have an excellent lubricating action, which has a tendency to cushion and to work pieces from the abrasive in the media and the other parts

NOTE: When burnishing with steel media, the compound may be an acid or alkaline.