The Vibratory Finishing 101: A Layman's Guide

By inovatec / July 6, 2020

Vibratory finishing is an industrial process where materials get a finished look.

Applications of vibratory finishing

Vibratory finishing is a mechanical/chemical process usually done on a large scale.

Vibratory finishing machines are universally acclaimed mass finishing machines used for a wide range of workpieces and surface finishing objectives.

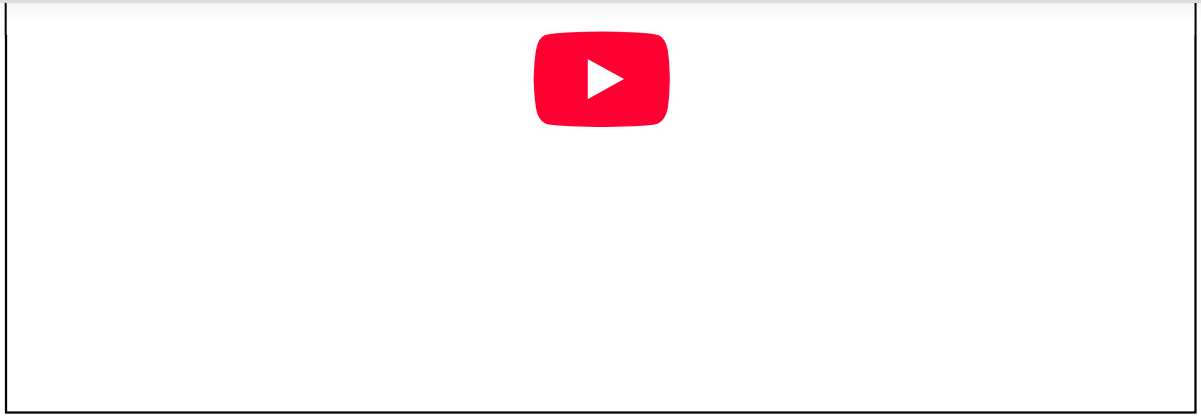
Metallic components that have undergone the previous machining can make use of vibratory processes, and it is also applicable for non-metallic.

Parts Drilling before vibratory finishing

Vibratory finishing is excellent at removing grease and dirt from components after machining.

Where a vibratory finishing machine usually ranks is while deburring and creating isotropic surface finishes on, for example, a burr leftover from a drilling process.

Burrs are highly undesirable in industries and being able to remove them using an automated process — such as vibratory finishing — is highly advantageous.



A well-tuned process can get your component a highly desirable high-gloss finish.

More applications range from intensive deburring and edge radiusing all the way to mirror image polishing.

In other words, from aggressive grinding to pre-plate surface finishes.

Descaling, reducing the edges, polishing, and rust removal are other applications of the vibratory finishing process.

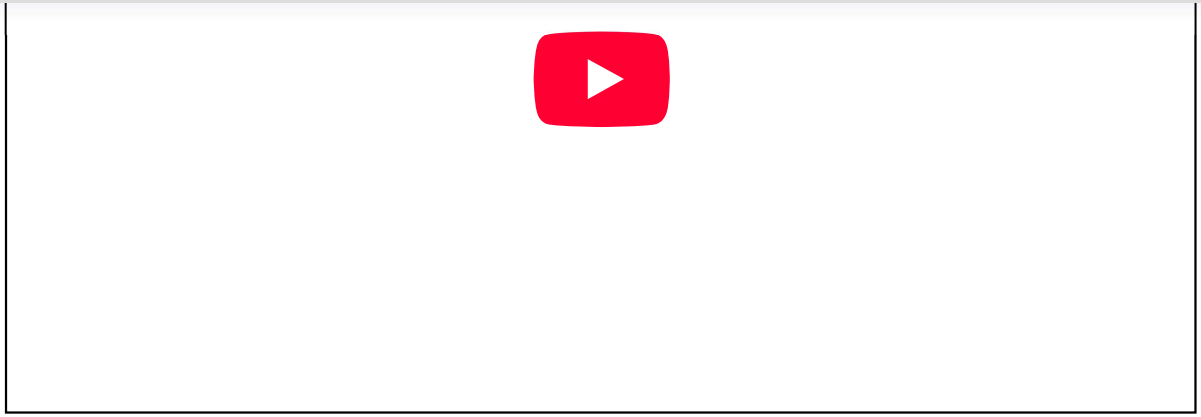
A great everyday example where vibratory finishing helps is your cutlery polishing: knife, fork, and spoon.

It isn't good to eat with a rough-surfaced spoon.

The solution?

Your metal cutlery undergoes smoothening with the help of vibratory finishing.

Cutlery vibratory polishing



The process

Workpieces are components that require finishing.

Media in a **bowl** that vibrates are mixed with the workpieces to achieve the finish.

The process is simple: the media aids in getting the desired finish of the workpieces.

There may be a supply line that will add a compound to your media.

Media to Parts Ratio	Normal Commercial Application
0:1	No media. Used for beating off burrs

2:1	More gentle, more separation, but still allows relative severe part-on-part damage
3:1	about minimum for non-ferrous parts, Considerable part contact. Fair to good for ferrous metals
4:1	Probably average for non-ferrous parts, Good for ferrous metals
5:1	Good for non-ferrous metals, Minimal part-to-part contact
6:1	Very good for non-ferrous parts, Common for pre-plate on zinc with plastic media
8:1	For higher quality pre-plate finishes
10:1 to 20:1	Even better. Used for very irregular shaped, fragile parts
infinite	Absolutely no part-to-part contact. One part per machine or compartment or the part is fixed

The compound is typically water and detergent, or water and degreaser.

You can add in rust inhibitors, or some additional polishing compound as well.

parts.

It also acts as a cushioning for rapidly moving parts by serving as a carrier for compounds such as water.

Choosing the right tumbling media accounts for proper mass finishing.

The workpieces determine the shape, size, and performance characteristics of the media that must be selected for the job.

Water and compound are essential ingredients, not only for cleaning and passivating, but also pickling of the workpieces.

They also help maintain the abrasiveness of the media.

The industry use variety of media.

Ceramic Tumbling Media

The usual media used in vibratory finishing are steel, ceramic, and plastic.

Sometimes, you have to choose the media by trial and error method.

The finishing machine provider can also help.

For example, general finishing uses ceramic media, finishing metal parts, plastic, and even organic media (walnut shells and corn cob) when required to use steel media.

Mixed pellets of media are also common such as stones, river stones, and tiles.

If workpieces are much smaller than media, inverse separation can be a bit of a hassle.

It will leave your bowl rougher if you choose bigger size media that are cheaper, cut faster, and have a longer life.

Striking a balance between media size and bowl longevity is essential.

The Vibration & Finishing

Typically, the bowl of a vibratory finishing machine sits on springs, with a motor on the underside.

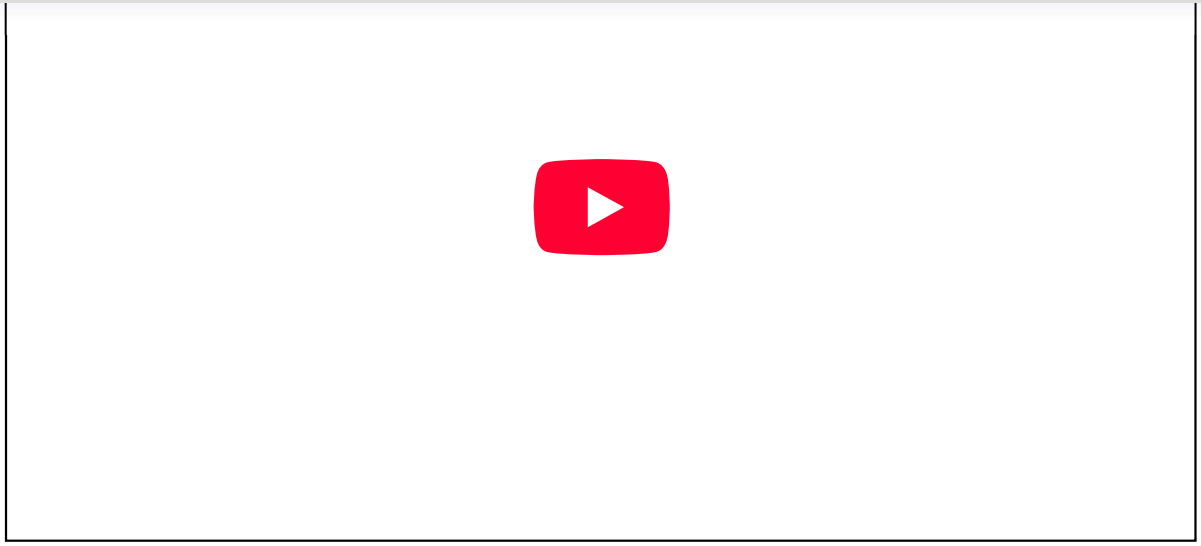
The vibratory finishing process involves basic kinematics (motion of objects) and components in the system.

Components include bowls that have different sizes — 1/3 meter to over 1 meter, depending on the application.

To the container's underside, we have a motor that has an offset mass attached to it.

The bowl sits on reasonably stiff springs.

The deburring process takes on a steady-state flow trajectory when the motor is on; It entrains the workpieces.



The Oscillating Movement

The relative motion between the media and the workpieces causes the deburring on the surfaces of the workpieces to happen.

The oscillating movement of the processing bowl created by the vibratory drive system causes constant rubbing between the workpieces and the media.

Oscillating movement leads to the removal of material, especially from the workpiece edges.

The relative motion between them is what removes material and gives you the desired isotropic surface finish.

The quantity and setting of the imbalance weights on the vibratory motor control the characteristic vibratory motion of the processing bowl.

Pushing and holding a dedicated button changes the motor's rotational direction.

When the button is released, the motor changes its rotational direction back allowing the mix of media.

The vibratory motor speed is controllable, and it ranges anywhere between 900 and 3600 cycles per minute.

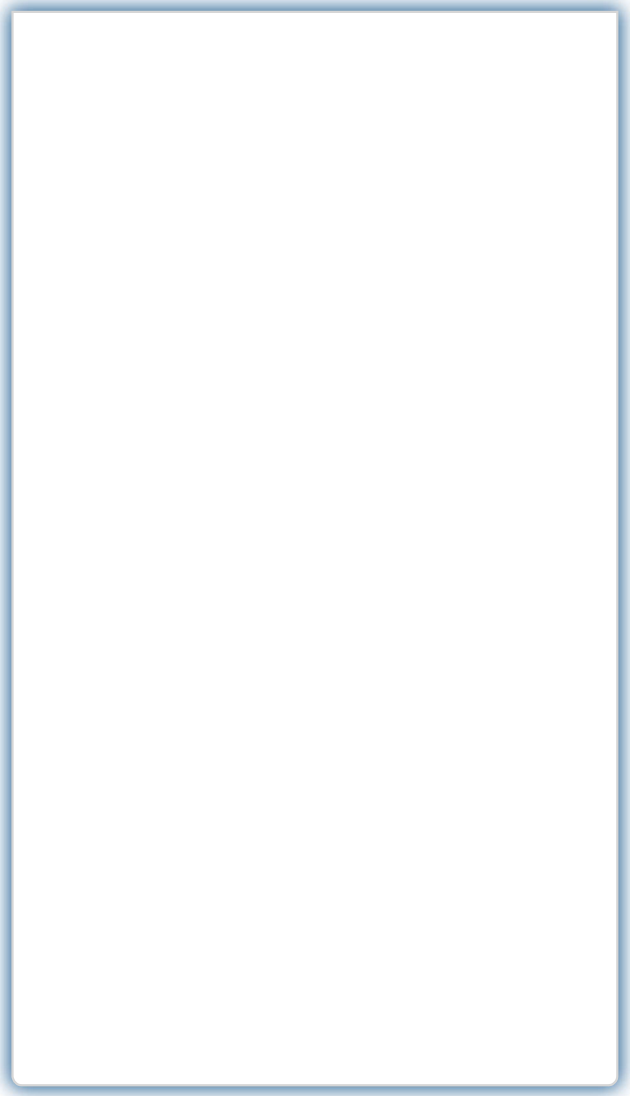
Amplitude is the maximum extent of vibration and it ranges from 0 to 5 mm.

Types of vibratory finishing equipment

Inovatec Machinery has a full range of mass finishing machines and vibratory finishing media for your choice. You can **download our catalog** for more information.

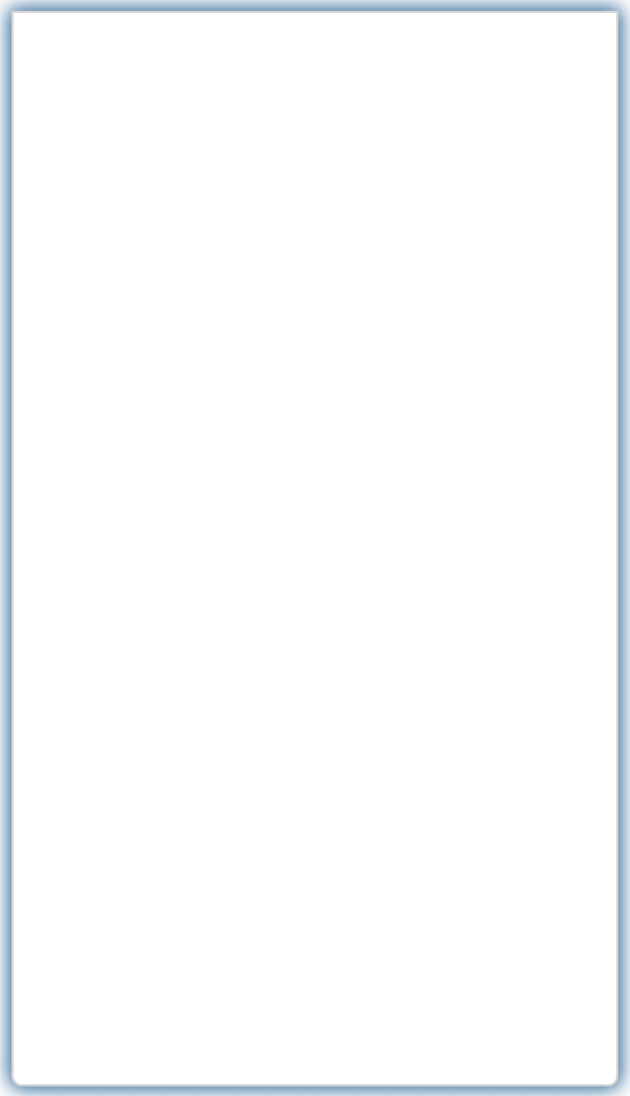
1. Curved Wall Design without separator

- Ideally Suitable for the burnishing process.
- Suitable for Stainless Steel balls, zirconia ball,s and porcelain media



2. Straight Wall Design without separator

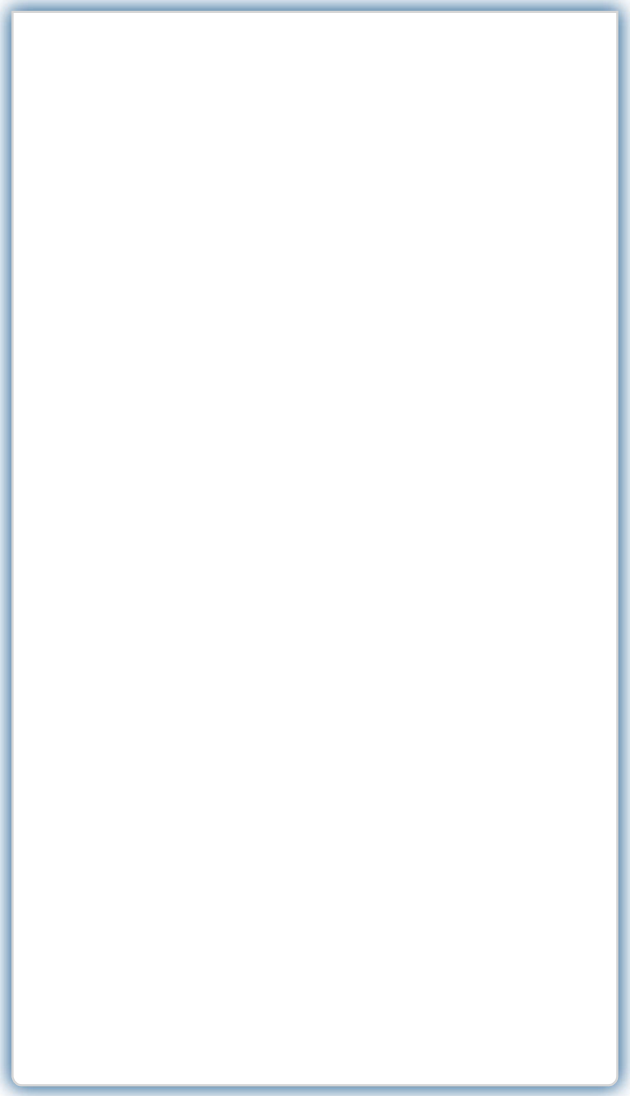
design.



3. Straight Wall Design with separator

VBS(B) vibratory finishing machine:

- 100% separation of media and parts
- Process capacities ranging from 3.5 to 40 cubic feet



4. Curved Wall Design with separator

VBS(A) vibratory finishing machine:

5. Vibratory Dryer German Design

Vibratory dryer:

6. Longitudinal Continuous Feed-though Vibratory Finishing System

Longitudinal Continuous Feed-though Vibratory Finishing System:

- High production deburring or descaling
- Available in 8-192 cubic foot capacity
- 15-20 minutes of processing time

Continuous Flow-Thu Longitudinal Vibratory Finishing Machines

equipment

When you purchase equipment, it is recommended to consider not only suits your needs but also someone who meets all statutory industry standards.

Customization plays a crucial role.

It would be best if you looked out for these usual customization options:

- Use a soundproof cover to reduce noise in vibratory production
- Input pump for constant compound feed-in into the vibratory bowl
- Use a separation flap for media and workpieces' separation, and installed- an on-floor control box and hang-on-wall control box.

Vibratory Finishing Equipment with Separation

When electronic parts are involved, is not the best option to choose an expensive and intricate machine.

It's important that you look out for equipment that is ISO or CE certified.

Running vibratory finishing equipment

3-phase electricity: 380V, 460V, or 480V is best for running vibratory finishing equipment because it is safe and grounded. First-time users are advised to take the help of expert electricians.

Conclusion

Vibratory finishing is a simple process but needs a thorough understanding.

Many considerations come into play.

A personal investigation into vibratory finishing equipment can save a lot of time and resources in your journey down the line.

About us

Based in China, we are a mass finishing equipment and media manufacturer with a renowned global clientele, including Bosch, Swatch, and Toyota.

From vibratory finishing machines to centrifugal disc and barrel finishing machines, we produce all sorts of finishing tools.

We also have a wide selection of tumbling media for various industrial applications including automotive, medical, electronics, and jewelry.

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