
Lesson 3

Guide to Selecting Mass Finishing Consumables

With such a wide range of media types and compounds, it can be overwhelming when it comes to choosing the right mix. In this guide, we talk about the types of consumables you can find on the market and how to choose the best consumables for your finishing process.

The key to achieving the optimum surface finish involves using the correct machinery, media and compounds. Combined correctly the media and compound allow you to achieve consistent and repeatable surface finish applications including, deburring, polishing, descaling, radiusing, burnishing, surface smoothing, cleaning and degreasing.

Mass Finishing Media

Finishing media is often described as an abrasive material used to generate different surface finishes on a part, via a mass finishing process. Media is usually manufactured out of a bonding agent and abrasive particles and it is available in a wide range of shapes, sizes and finishing capabilities.

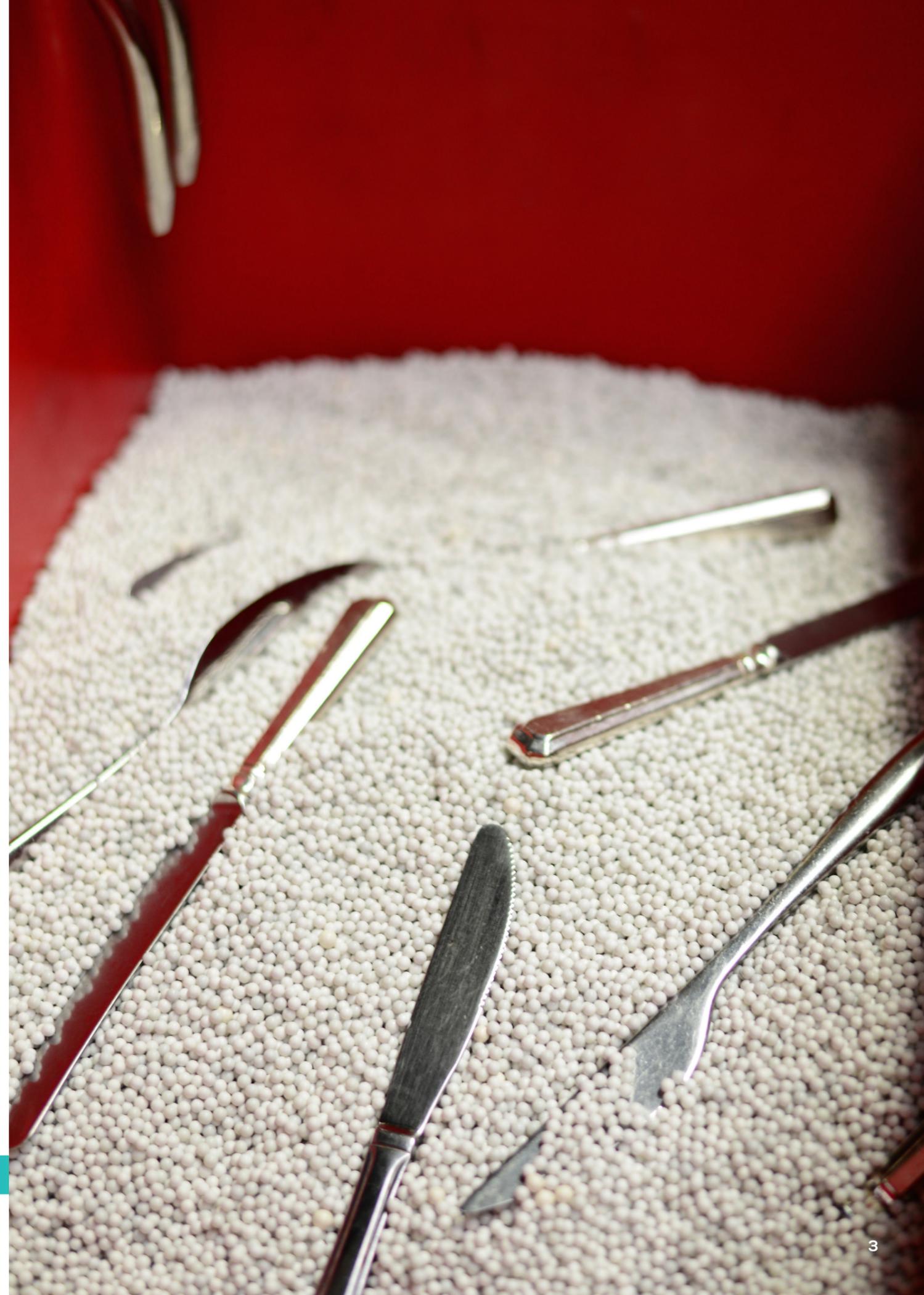
The main functions of the mass finishing media are as follows:

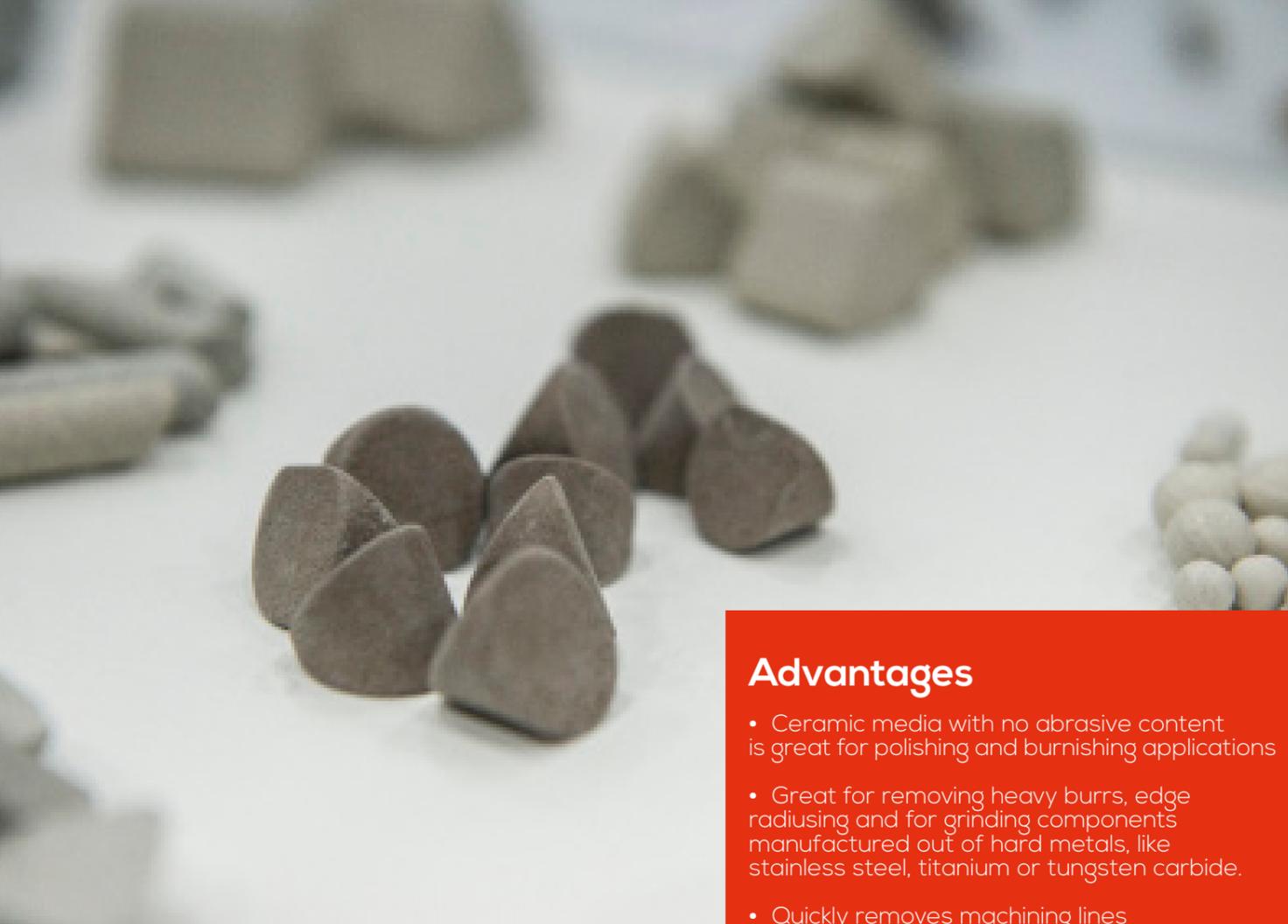
- Transmitting the energy generated from the machine, through the media to the parts being processed, resulting in the desired component finish – cleaning, deburring, surface improvement, smoothing, radiusing, polishing, burnishing, etc.
- Suspends and protects components during the finishing process, thus avoiding any part-on-part impingement. Find out how you can calculate the media part ratio from our [“7 Essential Steps to Set up a Vibratory Finishing Process”](#) eBook.
- Carries the compound during the finishing process.

Mass finishing media categories

Media can be categorised as:

- Ceramic media
- Plastic media
- Agro and pretreated media
- Wood media
- Steel media





Advantages

- Ceramic media with no abrasive content is great for polishing and burnishing applications
- Great for removing heavy burrs, edge radiusing and for grinding components manufactured out of hard metals, like stainless steel, titanium or tungsten carbide.
- Quickly removes machining lines
- Quickly removes finishing lines
- Can be used to reduce surface roughness and obtain a smooth surface
- Has a high strength and long wear ability

Disadvantages

- Can cause damage to softer materials
- Some formulations can chip causing lodgement
- Surface refinement may require high energy or plastic media

Ceramic media

This type of media is manufactured by mixing an abrasive, such as aluminum oxide, silicon carbide or quartz, with a ceramic matrix in a wet state. The matrix (a damp clay) is extruded through various shaped dies and wire cut into small pieces. The pre-formed media is then fired at high temperatures through a kiln for up to 24 hours with precise heat up and cool down cycles. The ceramic pieces can then be pre-conditioned to remove any flash if required.

Ceramic media that has a higher content of abrasive, or that has been fired at a lower temperature, has a high cutting rate and it also wears fast. In comparison, media with lower content of abrasive, or that has been fired at a higher temperature, is more of a slow-cut media and wears more slowly.

Ceramic media comes in shapes such as angle cut and straight cut triangles, angle cut and straight cut cylinders, wedge, star, tristar, ellipse, arrow, pyramid, cone, rhombus and ball. The advantage of having such a wide range of shapes is that it allows you to achieve a consistent,

4 highly homogeneous surface finish on parts with intricate shapes and contours.



Plastic media

Plastic media is manufactured by mixing an abrasive (quartz, aluminum oxide or silicon carbide) with a polyester or synthetic based resin fluid, with a catalyst added to harden the matrix. After media is molded into specific shapes and it hardens, this is tumbled to remove any flash.

In comparison with ceramic media, this media does not cut as much, however provides smoother finishes. Plastic media is great for deburring soft materials like aluminum, zinc, copper or brass and for pre-plate surface finishing. Other applications include precision finishing of die-cast and delicate parts, smooth finishing & obtaining a mat surface.

Like ceramic media, plastic media comes in a wide range of sizes and shapes, such as cones, pyramid, tetras, tristars, wedge, paracones, and octocones.

For further technical information about ActOn's Ceramic and Plastic media check our [website](#).

Advantages

- The light weight and soft bonding agents allow it to wear a burr off without rolling the burr onto the part.
- Reduces risk of part damage.
- Very smooth surface finish.
- Great for bright and matte finish.
- Can be used for a long time even if it wears down, as it will maintain its shape.

Disadvantages

- Plastic media is non-biodegradable
- Media can wear quickly

Agro and pretreated media

Agro and pretreated media is manufactured out of corn cob (Maizorb) or walnut shell and can be used for drying, polishing and cleaning. Both types of media come in a wide range of grain sizes to suit finishing requirements.

Moreover, pretreated walnut shell can produce a much brighter finish than pretreated corn cob.



Maizorb and Pretreated Maizorb

Maizorb (corn cob) grains are highly absorbent, making this material an excellent media for drying parts after a wet process.

Usually the Maizorb is loaded into a vibratory/rotary dryer and is heated by the finishing machine heating elements. The wet components are loaded in the dryer's work chamber and tumbled in the heated Maizorb. The corn cob acts as an absorbent and removes any moisture from the parts. To collect the fine dust resulting from using the corn cob media in the drying process, we recommend the usage of a Dust Extractor for Maize Application.

When the Maizorb is pretreated this can produce a bright mirror finish. This finish can be obtained in both vibratory and high energy finishing machines.

Walnut Shell & Pretreated Walnut Shell

Walnut shell is manufactured out of crushed walnut shells. This media is great for shot blasting and mass finishing applications. The walnut shell is hard and fibrous and are known as 'soft abrasive'. Being extremely durable, walnut shells are used for the cleaning and polishing of heat-treated components, jewelery, surgical components, watches, etc.

When pretreated, this media is great for imparting high luster on parts.

Did you know that ActOn agro and pretreated medias are bovine free? Read more about ActOn agro and pretreated media [here](#).

Wood media

Wood media is generally used in dry finishing processes, in vibratory finishing machines and centrifugal finishing machines. Used in combination with finishing compounds, this media is great for applications such as, smooth finishing, polishing, dry tumbling or light deburring. Wood media comes in shapes such as cubes, diamonds and pegs can be used on parts manufactured from materials such as plastic, nylon, ceramics, wood and metals.



Steel media

Stainless Steel media is mainly used for burnishing, cleaning and light deburring. This media wears very slowly with a life of up to 10,000 hours. For a burnishing finish, we recommend that the media is used with the burnishing compound in reinforced vibratory finishing machine. SS Media is manufactured in different shapes and sizes, such as balls, ball cones and pins.

This media can also be used for smooth the part surface, remove imperfections, and peen metal parts' edges.

It is important to use this media with a non-abrasive, polishing compound, with corrosion protection properties. In this way, the steel media will be protected from corrosion, during the finishing process and when it is stored.



Selecting the right media for your process

When selecting the media, you should consider the following factors:

a. Media type

Ceramic Media is recommended for removing burrs, edge radiusing, burnishing and to quickly remove polishing lines on components made from harder materials. Faster cut Medias are designed to be softer, thus allowing the cutting elements to be exposed. Polishing Medias are harder (which contain no abrasives) and are used for polishing and burnishing. In general, the slower the cut, the harder the media.

Plastic Media is lightweight and is manufactured out of soft bonding agents, which allows it to remove burrs without rolling the burr onto the part. Furthermore, we recommend using this media to achieve a very smooth surface finish, or a bright or matte finish on components made from softer materials.

Agro Media can be used for surface brightening or final finish refinement. The Pretreated Media is recommended for achieving a high luster or mirror finish on components.

Applications for Stainless Steel Media include burnishing, cleaning, improving compressive strength and light deburring.

b. Media size

The component finish is also subject to the size of media chosen. A larger media will generate higher energy; hence it will cut and finish faster with higher wear rates. This is also recommended for processing larger parts.

A smaller media can hold more water and compound resulting in less part-on-part damage. Also, a smaller media has a gentler impact on part, which results in longer processing times, better finishes and less media wear.

Generally, media size has to be of a different size to the part to allow complete separation at the end of the finishing process. If media is larger than parts, then an inverse separation system can be used. For ferrous components, magnetic separation is also available.

c. Media shape

When choosing the shape of the media it is important to consider the geometry of the part, hence any lodgment of media can be avoided and the part finish will be consistent.

A flat sided media, such as triangles, tri-stars, wedges and the end side of cones, can generate longer surface contact time on edges for deburring and radiusing. However, round shaped media, such as balls, cylinders and cones generate a single point contact concentrating energy in one small point, therefore producing more work in that area.

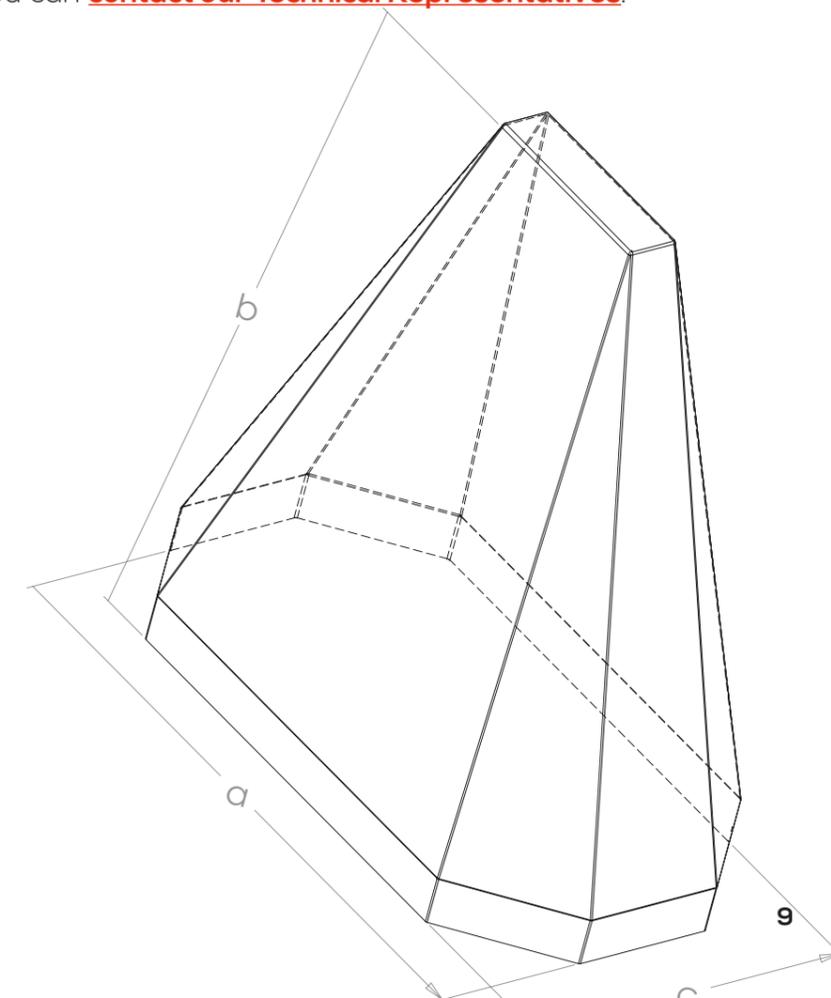
For components which have corners, holes and slots both Tri-Star media and wedge media are recommended, minimising the possibility of media lodgment.

For surface improvement of hard to reach areas, an ellipse or cylinder shape can be considered.

d. Media hardness

To avoid damaging the component, it is important to consider the part material and the hardness of the media. Ceramics are harder than plastic; hence it may cause damage to soft materials.

To discuss your finishing application you can [contact our Technical Representatives](#).



Mass Finishing Compounds

Compounds are integral to the success of a process. These have many functions such as:

- Suspending the dirt, oils and media residues and flushing them from the system
- Keeping the components and media clean, which brings stability to the process.
- Act as corrosion inhibitors
- Great for brightening of different materials
- Remove post heat treatment scale.
- Act as lubricants, thus extending the media life
- Control the solution pH
- Will separate and cushion parts during the finishing process, thus avoiding component damage.

Compounds can be in liquid form, powders or pastes. Like media these can be abrasive or non-abrasive and can be used for processing ferrous and non-ferrous materials.

To obtain the required finishing results, it is important to consider the type of compound used and the amount used in the finishing process. This can be determined through process trials or can be recommended by the compound supplier. If too much compound is used the work efficiency of the media will be reduced. In the same time if not enough compound is used parts might not be clean at the end of the finishing process; or there can be less protection against corrosion.



Compound applications

a. Deburring compounds

Deburring compounds can be abrasive or non-abrasive. The abrasive deburring compounds are manufactured using a mix of chemicals and different abrasives. The abrasives in the compound will speed the cutting process of media hence parts are deburred, radiused or polished. Generally, a deburring compound which includes a grainier abrasive will cut faster, the result being a matte finish. For components made out of a soft material, we recommend a deburring compound with a soft abrasive, to cut down and polish.

A deburring compound that is non-abrasive, is mostly used to keep the media and parts clean, during the finishing process, thus enhancing the deburring, grinding or cutting process. The pH of these compounds can be either neutral or above 9.5 and produce a low foam. In comparison with the abrasive deburring compounds, the non-abrasive compounds do not contain any type of abrasives and are strictly used to enhance the properties of the media.

b. Cleaning compounds

These compounds are manufactured using a mix of soaps, detergents, salts, dilute acids, etc. Their main property is to remove grease, oil or soils from part's surface. In some situations, these can be used also in deburring processes. Cleaning compounds can also include a rust inhibitor and can be used for cleaning both ferrous and non-ferrous components.

Tips for using the abrasive deburring compounds

Make sure to add enough water into the finishing mix, when using an abrasive deburring compound. You will avoid the formation of slurry during the finishing process, which if not controlled, can reduce the cutting efficiency.



d. Descaling compounds

A descaling compound is usually an acidic or alkaline compound. This type of compound is recommended for removal of scale, oxides, scale and other impurities from the part's surface. Descaling compounds can be used on both ferrous and non-ferrous materials. However, an alkaline descaling compound can be used only on ferrous parts. This compound can also be used for pickling and light deburring applications and are great as rust inhibitors.

e. Polishing and burnishing compounds

The result of using this type of compound in the mass finishing process is a bright and polished finish. Polishing and burnishing compounds include a corrosion inhibitor to protect the parts and media (when stainless steel media is used). These compounds would foam better, than other compounds, to give a cushion effect during the process, thus avoiding any part impingements.

Did you know that all ActOn compounds are environmentally friendly and biodegradable? Check out our [Consumables Brochure](#) to find the compound perfect for your finishing requirements.

f. Finishing compounds for special processes

At Acton Finishing we understand the numerous challenges faced in the different industries and developed suitable compounds to achieve the requirements of our customers:

- **Turbocut** is great for rapid removal of surface defects on ferrous parts. This is a neutral compound ideal for harden steel used in the hand tool industry or for removing machine marks prior to electro plating. The result is a smooth surface ready for being plated.
- **Chemcut** is a compound used for removing of grinding, finishing and machine marks. We recommend Chemcut for finishing parts made out of steel, hardened steel and certain stainless steels, as it gives rapid metal cut-down and leveling. This compound produces a super smooth surface, ready for polishing and electro-plating if required. Mainly used with non-abrasive media.
- **ActoGrind** is an abrasive paste used in vibratory finishing machines for removal of machining or grinding lines on ferrous and non-ferrous parts. This compound can also be used for polishing, descaling, derusting and removing light heat treatment marks.
- **Separating Compound** is used to keep flat parts from sticking to each other when wet in a process. It is used in all types of vibratory and barrel finishing machines with all types of metals.



Dosing the compound in a mass finishing process

Depending on the finishing machine used, we recommend dosing the compound through:

- **Dosing Unit:** includes a diaphragm dosing pump, which controls the liquid compound flow rate dosed into the finishing machine. Once set, the pump gives accurate control of the liquid compound usage, thereby reducing wastage, saving costs & providing a consistent finish. This is great for vibratory finishing machines, centrifugal disc finishing machines, wheel polishing machine and other tumblers
- **Automated Dosing Controls:** designed for the Centrifugal High Energy finishing machine. It includes a compound & water reservoir, which is fitted with diaphragm pump allowing precise metering of desired compound and water mix. The solution is transferred into the barrel via the swivel tube.
- **Compound Mixing Tank:** a specially designed tank for mixing of powder compounds or special compounds such as Chemcut. The tank has an agitator to ensure contents are thoroughly mixed and a pump attached so it can be dosed directly into the machine. The controls of the tank can be combined with the main control of the finishing machine or the tank can have an individual control panel.

As a general rule we recommend dosing in the finishing machine 1L of compound / hour along with 1L of water/ minute. This needs to be increased if parts are dirtier and oilier.



How to determine the right media and compound mix

Selecting the correct media and compound to achieve the desired finishing results requires experience with mass finishing processes, consumables and finishing machines. However if your knowledge in the field is not so advanced, we recommend carrying out processing trials. This will enable you to test, improve and ascertain the finishing process parameters and establish a repeatable solution.

When finishing trials prove to be time consuming and less successful, we believe that it is prudent to take expert advice and recommendations. Carrying out trials with the help of an expert will help you achieve optimum, repeatable and cost effective finishing results.

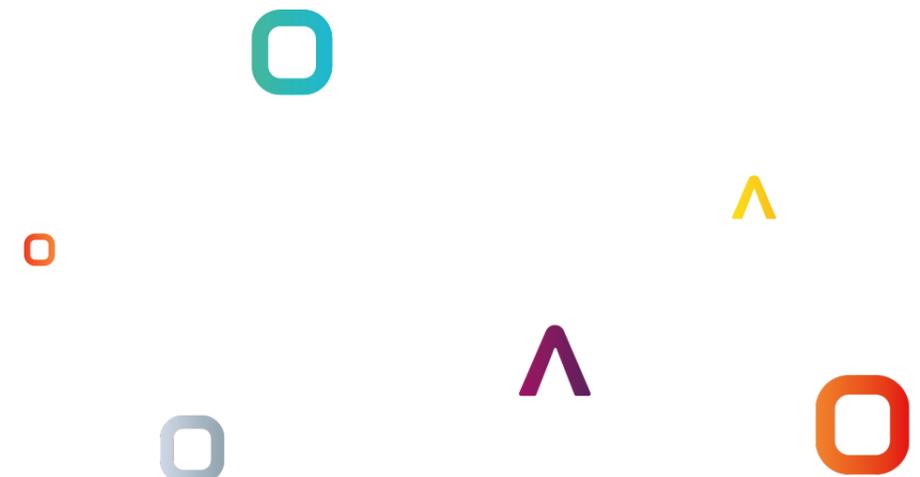
Interested in a free of charge processing trial? [Click here](#) to request your Free Trial today!

Outro

Ready to apply everything you learned? Great. Armed with your newfound knowledge of mass finishing consumables, it's time to dive into the challenge of finding the right media and compound for your needs .

To help you along the journey and make sure you keep on track, our specialists with decades of experience in this field are available to answer your specific questions in mass finishing. You can contact them via email at sales@acton-finishing.co.uk or call at +44 (0) 24 7646 6914.

Good luck!



About ActOn Finishing

ActOn Finishing Ltd is UK's leading expert in designing and developing the state-of-the-art machinery and finishing solutions of tomorrow.

Established in 1965 as a UK leading family business, we've worked hard to design, develop and manufacture a product of high British standard that will redefine your work.

We cater to a range of industries including Aerospace, Medical, General Engineering, Hospitality, Automotive and Additive Manufacturing.

Our products and services include:

- Vibratory Machines
- High Energy Machines
- Fully Automated Systems
- Waste Water Treatment
- Finishing Consumables
- High Energy & Vibratory Finishing Services
- Shot Blasting & Peening
- Precision Polishing
- Equipment Installation, Training & Maintenance
- Polyurethane Lining, Repair & Spare Parts Service

While our head office, manufacturing facility and subcontracting facility are located in Coventry, U.K., our shot blasting and peening facility is based in Stourbridge, U.K.

Our ActOn Stourbridge facility, offers the widest range of shot blasting in the West Midlands and it has a reputation for high quality services and quick turnaround time. Our specialists with decades of experience in this field are always available to answer your questions and provide you with quality and cost-effective solutions.



Quality You Can See

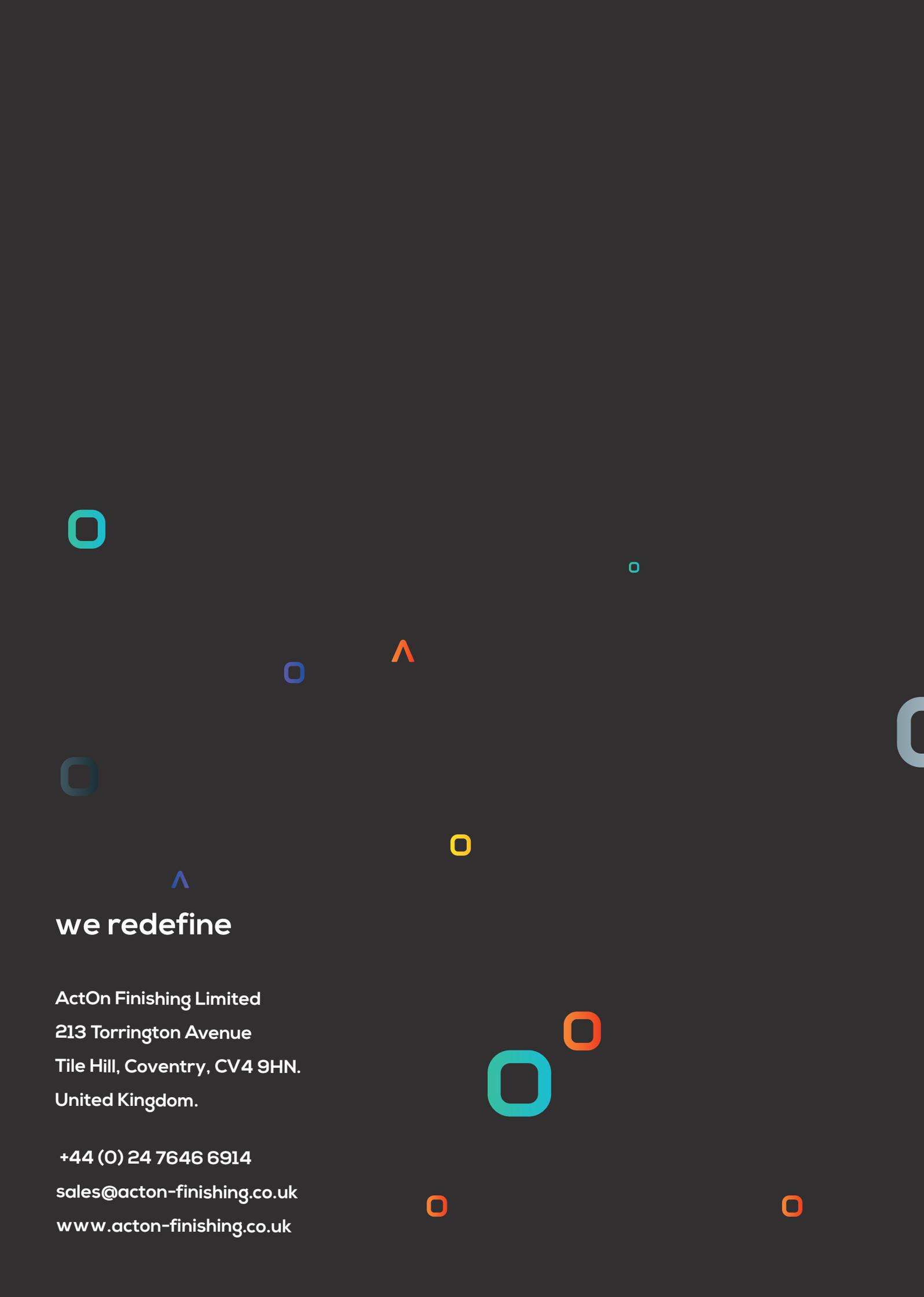
We pride ourselves on our excellence, and over the years we have successfully demonstrated an ongoing compliance with ISO quality and environmental standards.

For ISO, we currently hold:



We're proud members of the 'Made in Britain' campaign.





we redefine

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