

Specialist abrasive blasting – bringing media, equipment and service together

From its Sheffield base, the Mac'Ants Group has played a key role in the abrasive material sector for many years. Today, the company provides a range of application equipment, support services and, importantly, a choice of abrasive media – with a level of stockholding that is unmatched in the UK. It is well placed therefore to emphasise the importance of creating the ideal combination of these three elements – equipment, service and media – and to highlight a number of key areas that users need to consider to achieve their desired result.

Blasting with abrasive media to achieve a required level of surface finish is central to many manufacturing and engineering processes. Whether creating the optimum surface for further production stages, for cleaning, final cosmetic appearances, perhaps to remove waste machining materials, or to return a substrate to its original condition without damage, the need to ensure the optimum result is paramount.

The table on page 52 provides an insight into typical areas of application and abrasive material that can be specified to meet a range of objectives. The precise choice available to the user, however, is extremely broad but an analysis of the principal groups it defines and their characteristics will form a useful basis upon which precise selections can be made.

The specification of abrasive material is, understandably, at the heart of the success the user can achieve in this field. Alumina-based products, for example, offer a choice of properties – notably sharpness, purity (particularly due to the absence of ferrous elements) and durability. These make them extremely useful where high levels of consistency and repeatability are required – a common objective both in general manufacturing and in specialist application areas such as aerospace production, where purity is paramount. Vibratory media manufacturing and applications can also gain from alumina-based material as can the production of materials such as slip resistant coatings and paints. The Mac'Ants 'Alumac' range is a prime example, variants of which are approved to an array of aerospace and commercial standards and specifications for surface finishing processes.

Closely associated with this is a second media group of hard abrasives that can be used in processes that include bead blasting, peening and stress improvement as well as in specific applications – from the production of reflective material for road markings and safety-wear products to specialist paint milling beads and polymer fillers. The Mac'Ants 'Beadomac' range typifies products

in this group, comprising high grade soda lime glass beads which are precisely spherical, of tight gradation and within the reflective variants of high refractive index.

A third group, the metallic range, covers a long list of materials that, perhaps not surprisingly, meet diverse applications. Material such as cast iron grit, steel shot and steel grit can be specified to meet variations in hardness requirements and application equipment capabilities. Alongside these, stainless steel shots, stainless ferro-chrome grit, steel and stainless steel cut wire pellets can also offer distinct benefits. These include peening abilities to match specific surface profile characteristics with exceptional lifespan performances.

If components being treated are large or immovable, a choice of "expendable" material can often be the ideal option. Aluminium and calcium silicates, almandine garnet and norite products are typical examples of media that are used in this context, typically via open-nozzle blasting.

Plastic media

Where precision lapping and polishing, high purity surface preparation or the production of slip resistant coatings and black refractories are the key objectives, then silicone carbides can often be considered.

One of the most innovative developments the industry has seen in recent times has been the increased use of plastic blast media. This offers clear-cut advantages that have not only enhanced current blasting processes but have even opened up new applications. These are centred on the fact that the material allows highly effective blasting operations to be undertaken with no risk of substrate damage – of particular significance in a range of areas not least aerospace and aviation. Moreover, they offer high levels of finish consistency with, importantly, significant environmental benefits compared to the traditional coating removal processes.

The Mac'Ants' 'AviaLite' brand of plastics is a prime example in this field. Developed for stripping and de-painting applications –

from aircraft components to mould cleaning and rejuvenation uses – they have achieved approvals and certifications from leading aerospace manufacturers in the industry as well as a number of defence and military authorities.

The choice of the best media to achieve the required abrasive objective is, however, only part of the story. Its application method, and corresponding selection of equipment, is also fundamental and, again, a number of standard options are available – many of which can be adapted for bespoke application needs.

The choice of application system can depend on factors other than the desired surface preparation objectives – such as, for example, component size and weight. These are often significant as they will clearly point to whether products can be easily manoeuvred and processed in a manual hand blast cabinet or, alternatively, would require a dedicated blastroom.

Extraction of the resultant waste also needs assessment from two points of view. Firstly, whether it offers opportunities for the material's re-use and, secondly, how the safe disposal of any waste that cannot be re-utilised, can be achieved. Clearly, with an increased environmental emphasis throughout industry, this is an important consideration.

From pressure, suction or wet blast cabinets to dry or wet blast mobile machines and from entire mobile and sectional blast rooms to airless wheel and impeller systems, the choice of application equipment is diverse. Careful process analysis will not only suggest the optimum installation for the application in question, but even identify the viability of a new installation versus the subcontracting of specialist services.

This apparent complexity of equipment and blast media may bring with it an increased number of decisions that those involved in manufacturing processes need to address but close liaison with specialists in the field can prove highly beneficial. Bringing in an understanding of results that can be achieved through different material and application methods can impact directly on the ultimate performance of a component, its quality and therefore, in due course, a company's reputation and even profitability. At a time when much of industry is characterised by greater competition than ever before, and with unprecedented emphasis on environmental improvement, the involvement of abrasive service specialists has much to offer.

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Generic material	Typical surface finish	Application examples	Common user areas	Mac'Ants brand
Aluminium oxide	Matt etch	Casting cleaning and de-shelling + IGT refurbishment and thermal barrier removal prior to re-coating	Aerospace components and industrial cosmetic cleaning	'Alumac'
Glass beads	Semi- or high-polish	Cosmetic finishing or stress/fatigue relief	Aerospace components and industrial cosmetic cleaning	'Beadomac'
Chilled iron grit	Deep etch	Paint preparation	Prior to paint and powder coating	
Steel shot	Smooth/peened	Cosmetic finishing or stress/fatigue relief	Automotive and aerospace industry for automated applications and high energy peening	
Steel grit	Hammered	Heavy automated cleaning	Wheel blast applications where high volumes are processed with a surface profile	
Stainless steel shot	Hammered	Heavy automated or non-ferrous cleaning	Aerospace and automotive for non-ferrous applications	
Expendable abrasives	Matt	Cleaning buildings and large immovable objects	Building maintenance	'Macblast'
Garnet	Etch	High pressure water cutting and "clean" expendable	Sheets metalwork for cutting and blasting work in shipyards	
Silicone carbide	Deep etch	Precision high tolerance cleaning	Aeroengine applications and semiconductor/electronics manufacture	
Plastic	No change	Surface preparation with minimal substrate damage	Aviation paint removal, NDT inspection of landing gear and wheels, mould and print roller cleaning + rail and automotive applications	'Avialite'

This table provides an overview of the different types of abrasive blast media and typical applications. For more information about the Mac'Ants media range phone 01909 552500. www.macants.co.uk

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