Tough media need not be rough on blast cabinets

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Dry blasting is among the best and most expedient methods of preparing a surface. And a well-designed blast cabinet provides the mechanical environment for getting a job done. Equally critical to a successful outcome is selecting the right abrasive to produce the desired finish, on time, and within budget. But not all media are created equal. This article will focus on the effects of using extremely harsh, aggressive abrasives, such as aluminum oxide, silicon carbide, chilled iron grit, and garnet.

Choosing media involves carefully matching the media to the substrate of the object to be blasted for a satisfactory end product. Aggressive media are frequently the media of choice for a broad range of surface cleaning, texturing, etching, de-flashing, and other surface preparation and finishing jobs.

Each application will dictate its own formula for success. And the right media choice depends upon the characteristics that differentiate media which include: hardness, density, shape, and friability.

Aluminum oxide and silicon carbide are the most commonly used harsh media. They are manufactured and are extremely hard (in the range of 9 to 9.5 on the Mohs' scale, where diamond is 10). Garnet, a natural abrasive, rated 7 on the Mohs' scale, and generally considered a one-use abrasive, is an infrequent choice for blast cabinet production applications.

These media also vary in density. The more dense the media the more energy each particle delivers to the surface. Aluminum oxide and silicon carbide range in density from about 120 lbs per cubic foot to 150 lbs per cubic foot for; chilled iron has significantly greater density at 250 lbs per cubic foot. These aggressive media are normally angular in shape, and consequently sharp. It is sharpness that provides their desirable, powerful cutting action.

These harsh media also vary in friability, the degree of brittleness, which affects the rate at which media break down. As break down occurs in aluminum oxide and silicon carbide, new, sharp, but smaller, particles are produced. Chilled iron grit, on the other hand, while it packs power and offers long wear-life, tends to round with reuse. The blasting application will dictate the number of cycles achievable with the various media.

Unfortunately, while these super-harsh media provide powerful cutting action to perform their intended purpose with ease, they can be detrimental to the cabinet enclosure and critical functional components, unless a few simple precautionary measures are employed. Installing relatively inexpensive accessories in a few functional areas will help you protect your equipment investment and will help you manage your operation for high levels of efficiency and productivity.

To extend the life of the cabinet enclosure, the interior walls and doors should be lined with rubber. Rubber curtains easily can be installed and replaced when worn from exposure to the ricochet of the blast media. White-rubber curtains increase light reflectivity for improved visibility in some applications.

The most common method of media reclamation and cleaning is with a cyclonic-style media reclaimer. The wear life of this critical cabinet component is vastly improved with the installation of a few reinforcements. A wear plate at the reclaimer inlet prevents premature failure at the entry point where the cylindrical shape of the reclaimer causes air and media to move through in a cyclonic manner. Rubber liners protect the walls and consequently extend reclaimer life.

Cabinets used with aggressive media should be equipped with reverse-pulse (RP) dust collection for the most cost-effective operation. These collectors have blowers mounted on the clean-air side of the cabinet system protecting them from exposure to media. These collectors offer improved efficiency as cartridges are cleaned automatically and have greater filter area retaining a maximum amount of dust. RP collectors with HEPA filtration ensure the cleanest cabinet surroundings.

Just as the cabinet itself can benefit from protection and offer improved service life, using the best nozzle for the job will prolong its useful life. Aggressive

media calls for a nozzle lined with the most durable material available, boron carbide. By some estimates, boron carbide can offer a wear life as long as 500 hours with aluminum oxide media, though the normal expected wear life can also be as little as 200 hours depending upon blast media shape, mesh size, and blasting pressure. In comparison, in a similar environment using aluminum oxide media, silicon carbide nozzles will wear out in 50 to 100 hours, and tungsten carbide nozzles in 20 to 40 hours. While boron carbide nozzles cost more, the additional expense is offset by their improved performance. Using silicon carbide media considerably reduces the wear life of carbide nozzle liners due to its extreme hardness.

When planning to use harsh media, making a few simple accommodations at the outset and following through in a diligent maintenance program will pay dividends in considerable operational savings. You will maximize your capital investment by prolonging the life of the blast cabinet and its components, and avoid unnecessary downtime by having appropriate wear parts on hand. Even the most aggressive media won't interfere with your production flow. Understanding how to easily incorporate these production enhancements into your workflow will ensure a steady, efficient, highly productive operation.

Common blasting applications using aggressive media: Pressure and suction blast cleaning and surface preparation of aluminum castings, cast steel parts, motor and alternator housings, sheet metal fabrications, metal parts requiring painting, metallizing, or other protection. They are for de-burring, cleaning scale, etching, lettering, and smoothing irregular surface defects. Aluminum oxide is an excellent choice for blasting extremely hard metals, such as cast iron and tool steel, and for glass polishing and fine lens grinding. It is commonly used in granite and stone applications.

Aggressive media are used to blast welds on aluminum parts, clean steel aircraft housings, clean electronic parts, blend surface imperfections on steel and aluminum plates, clean steel pumps and impellors, surface prep aluminum parts prior to application of porcelain coating, blast steel to remove weld scale or to impart a textured finish. They are also used to remove plastic residue from extruded parts. Aluminum oxide works well to blast power plant turbine blades to remove surface contamination, blast electronic laminates for surface cleaning, and blast stainless steel and titanium jet engine components.