Selecting Blast Cleaning Equipment

A quick guide to the types of blast cleaning machines available and what you need to know to select the right one for your operation.

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The cleaning and finishing of castings has always been a tough, labor intensive operation. It is noisy, dusty, backbreaking work. But it is necessary because, for most applications, castings must be cleaned before they can be considered finished and functional. In some cases, they need to be cleaned before their quality can be verified.

Also, many casting users, sometimes regardless of the application, expect to receive cosmetically perfect parts. Given the fact that, aside from the packing and shipping department, your cleaning and finishing people are the last ones to handle the castings before your customer sees them, it stands to reason that the importance of your foundry shop (as the Europeans might refer to it) should not be minimized.

Stated briefly, the role of the cleaning shop is to transform a casting from its as-cast rough state to a finished product with a minimum of time and effort. Further, in today's regulatory environment, this must be done in as clean and dust-free a workplace as possible. The ideal is for human handling of castings to occur only after they have cooled and been cleaned.

The factors to consider in selecting the right machine for your application are many and varied. But with the wide selection of machines and designs on the market, you may rest assured that there is equipment available to meet your needs.

Tumble Blast Machines

Probably the most common blast cleaning machine is the tumbler type. This design employs one or more shot blast wheels that hurl abrasive in an axial direction as the parts are tumbled in a drum. This is a good way to clean castings on a medium to high volume basis, providing the castings are not too delicate to be tumbled. The capacity range of these machines can run from about 200 lb. up to 10,000 lb. Larger machines may require special foundations and additional soundproofing. Also, high volume machines of any design with sophisticated separation systems may require additional ceiling clearances, so check these out before you make any final decisions.

Hanger Machines

In contrast to tumbler machines, generally considered the most effective for volume production, are hanger machines, used in applications in which cast components' size, fragility, or size variability preclude the tumbling option. These are two types of hanger machines.

In the first, castings are manually loaded onto a suitably designed hanger. The blast chamber is then opened and the loaded hanger is pushed or power driven into the chamber via an overhead monorail system that feeds directly into the chamber. Once the chamber doors are closed the castings are rotated against the shot blast stream until the cycle is completed and the castings are withdrawn from the chamber.

The second is a more advanced system in which a continuous stream of castings is rail-fed into and out of the blast chamber. Often incorporating several loading and unloading stations, the loop stops only during the blast cycle itself. For this type of application, as many as four blast wheels might be required to ensure adequate cleaning in a reasonable amount of time. This system has been used successfully in volume production of squeeze and high pressure aluminum cast automotive components.

Advantages of hanger machines are that they do not usually require any special foundations and they are quiet in operation. However, continuous rail systems can eat up shop floor space, which is at a premium in many metal casting facilities.

Table Machines

Table machines are probably the least efficient due to their limited area per load (castings are loaded onto a table top of limited size), manual loading/unloading, and the need to turn the castings over to achieve complete coverage. Despite this, these machines are popular because of their versatility, and many foundries have found the need for a table machine somewhere. They are extremely useful for cleaning a varied mix of castings or very large single castings. Their relatively low price makes them justifiable as an alternative or additional machines.

Table systems are available in sizes ranging from about 3 ft. diameter table tops to 10 ft. They usually incorporate two blast wheels, and can be made more flexible by the addition of integral hanger units, which give the machine a useful dual purpose.

Specialty Machines

In addition to the previously mentioned standard designs, there are numerous specialty designs available. For example, if you are producing only cylinder blocks, a dedicated through conveyor type of machine should be considered. This can provide a high level of throughput and integrates well with a highly automated operation. Typically, these machines can blast all four faces of an engine block at the rate of about 200 units hourly using eight blast wheels.

If you produce extraordinarily large castings, machines are available that operate on an axial throughput system providing a controlled flow of castings, simultaneously rocking and/or oscillating them under the blast stream.
Controls and Accessories

Virtually all manufacturers offer blast cleaning systems with state-of-the-art programmable and/or computerized controls that regulate the system’s sequence and rate. Many have diagnostic capabilities. Remote operator stations are also an option.

Since the blast cleaning process produces some by-products that are recoverable and recyclable, most manufacturers offer systems for use with their equipment. These systems separate and recover sand, abrasive, and metal particulates for proper disposal and recirculation for re-use.

Conclusion

There’s a blast cleaning system out there that meets your needs. To find it, get the manufacturers involved early in your evaluation process. You may know what you want to do, but they’re the ones who can show you how to do it.

Blasting Basics

Blast cleaning systems are complex mechanical, electrical, and electromechanical components integrated to provide practical and efficient cleaning of cast components. But despite the sophistication and complexity of modern blast cleaning equipment, it all boils down to the following basics:

- **Blast Wheel.** The heart of every blast cleaning system is the blast wheel. It has been said that the machine is only as good at cleaning as the wheel that throws the shot toward the cast components. It stands to reason, then, that the wheel design of a system under consideration for purchase should be studied closely. Examine the wheel’s construction noting the type and number of vanes it has; the materials used in its construction; the quality of its housing; the type of drive used to turn it; the horsepower ratings of the wheel motors; the types of bearings used; and the rate of abrasive delivered to the parts to be cleaned.

- **Separator.** The separator must meet the requirements of your application. Inadequate or poor separator systems can undermine your cleaning operations. In sand casting applications, for example, sand will come away from the castings first and quickly. It must be dealt with adequately, or the sand will cycle back to the blast wheel and cause wear problems. Make sure that air filters are capable of meeting current environmental regulations.

- **Shot Blast Chamber.** It is important to ensure that the chamber is adequately protected. Hard metallic plates used as liners are best, but some operators cut costs by using rubber to line the chamber. Be careful, though, since some manufacturers warn that economies here can lead to rapid wear, serious downtime, and additional overall cost.

- **Maintenance.** Blast cleaning is a self-destructive process, so a rigorous maintenance program is essential to realize an adequate return on your equipment investment. To facilitate the maintenance process, see how easy it is to check and replace vanes, impellers, linings, etc. Ask the manufacturer what the reasonable life of these items might be and on the availability of replacement parts. It may be a good and cost effective idea to contract for maintenance with the manufacturer of the system.

See page 18 for a Blast Cleaning Equipment Selection Checklist reprinted with permission from Foundry magazine.

Major Producers/Suppliers of Blast Cleaning Equipment

B & U Corp., Jet Wheelblast Equipment Div., Adrian, MI (517) 263-0502

Badger Products, Waukesha, WI (419) 547-7771

Blast Cleaning Products of Atlanta, Cumming, GA (404) 781-9494

Blastec, Inc., Alpharetta, GA 1-800-241-3016

Disamatic Inc., Oswego, IL (708) 820-9672

George Fischer Foundry Systems (Goff Div.), Seminole, OK (405) 382-6900

Pangborn Corp., Hagerstown, MD (301) 739-3500

Rapid Blast Products Inc., Newman, GA (404) 251-8175

Viking Corp., Wichita, KS 1-800-835-1096

Wheelabrator Corp., LaGrange, GA 1-800-544-4144

Shot Blast Replacement Parts

**Tumble Blast:**
- Conveyor Flights, Bolts, Links
- Sprockets, Traction Wheels
- Barrel Ends, Liners
- Shot Separator/Scalping Drums
- Screw Conveyors

**Continuous Blast:**
- Inlet, Transfer, Discharge Drums
- Manganese Screw Flighting
- Rotoblast Slats
- Wear Tires, Trunion Rollers

**Blast Cabinet:**
- Table Tops & Rims
- Rollers & Feed Screws

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