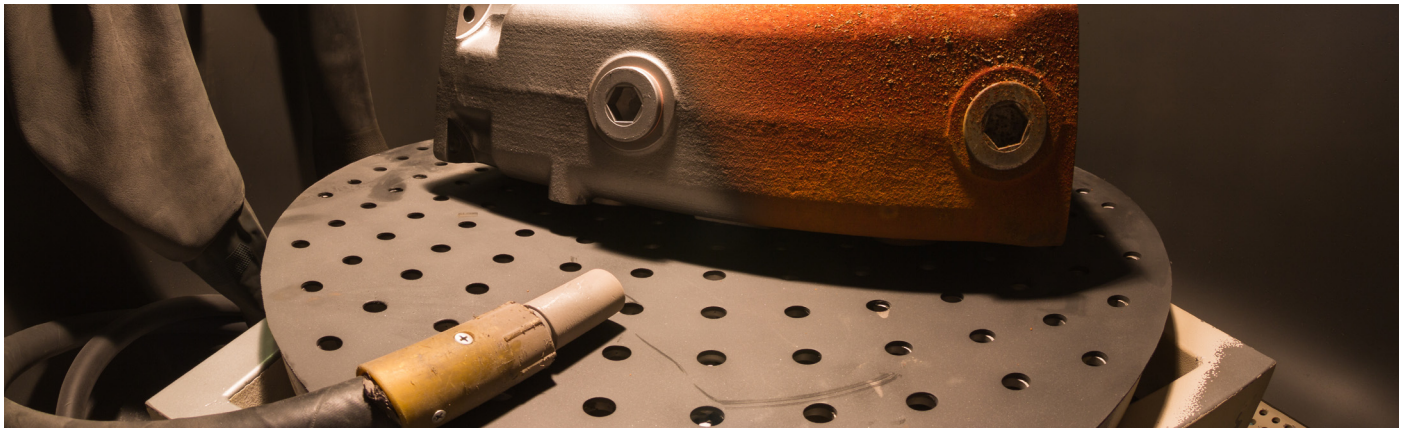


SELECTING ABRASIVE BLASTING CABINETS

An abrasive blasting cabinet is a machine into which the object or workpiece to be processed is placed. Blasting then occurs either automatically or manually. If manually, the operator performs the work by placing hands through glove holes in the cabinet, grasping the blast gun or nozzle, and directing it toward the workpiece, while viewing the operation through a window. An automatic machine requires the operator only to load and unload the workpieces from the machine. All abrasive, dust, and dirt will be contained within the machine and its associated equipment.

When selecting an abrasive blasting cabinet, it is best that you have the following information at hand:

1. Size of cabinet you desire;
2. Amount of area on workpiece that requires blasting;
3. Type of abrasive you would like to use;
4. How much production you require;
5. Amount of compressed air you have available in CFM or CBM3, or the horsepower rating of your compressor.

With this information, you will then be prepared to talk to an Airblast abrasive blast equipment salesperson. Talking to a knowledgeable salesperson will save you money and lost production time.

On the other hand, if you succumb to the temptation of special deals and low prices, you may ultimately lose both money and production time.

Blast cabinets can be divided into manual and automatic machines. Manual machines can be further divided into the classes of standard duty, and heavy duty machines.

Manual Air Blast Cabinets

Manual machines require a source of compressed air to propel the abrasive toward the surface of the workpiece. There are 2 basic methods of blast: suction blast (low production) and pressure blast (high production).

Low production incorporates the use of a hand-held gun with an air jet and nozzle. This gun is usually referred to as a suction, or induction gun. Airblast offers this gun in several sizes to accommodate varying production rates as well as to conserve compressed air. See "Blast Gun" in the section "Terminology" for explanation of operation.

High production pressure blast incorporates a pressurized tank of abrasive, a single hose, and a nozzle. The pressure blast method offers 3-4 times the production and impact of the suction/induction blast method. The high production method should be considered when there is a large area to be blasted, or where heavy rust, multiple layers of paint, or heavy oxides and scale must be removed. See "Pressure Blast" for explanation of operation.

Standard duty machines are designed for blasting 3-6 hours per day. There are many options available, from size and door configurations to various bolt-on accessories. System components usually consist of cabinet with 2 door openings, view window, lighting fixture, gloves, abrasive reclaimer, blower and bag house, or pull-through dust collector. This machine is also offered with either the low or high production method of blast.

Heavy duty machines are designed for blasting in excess of 6 hours per day, or where heavy blasting with aggressive abrasives is required. Construction is heavy duty, incorporating 14 gauge metals. These machines should be considered for high abuse work areas such as mills, foundries, or structural steel fabricating shops, but are not limited to these. System components are basically the same as the standard duty machines. We offer options such as wear kits,or tungsten carbide-lined feed valves, all for use with aggressive abrasives. This machine is usually the most expensive of all manual blast equipment.

Cleaning speed. The cleaning speed varies with the amount of compressed air used. When you double the Cubic Feet per minute (Cubic Meters per minute) of compressed air, you triple the production capacity by two-thirds.

Cabinet Size. Never choose a blasting cabinet based on part size alone. Better operator visibility and room for moving the part within the cabinet result in faster blasting. Larger cabinets produce better visibility by allowing the abrasive to expand to a lower particle density inside the cabinet. A larger cabinet size also increases part mobility, allowing for movement and rotation when blasting 100% of the part surface. Visualize painting the part: if you need to flip or turn the part to paint it, you will need to do the same inside the cabinet when blasting. The more three-dimensional the part, the more rotation required.

Regardless of the part's shape, however, picture it inside a box, then flip it visually in your mind to determine the required cabinet size.

Automatic or Batch Production Blasting Equipment

This type of equipment may be of various styles, including tumble blast, through conveyors, powered rolls, powered turntable, indexing turntable, satellite turntable, skew conveyor, or computer-controlled robotics.

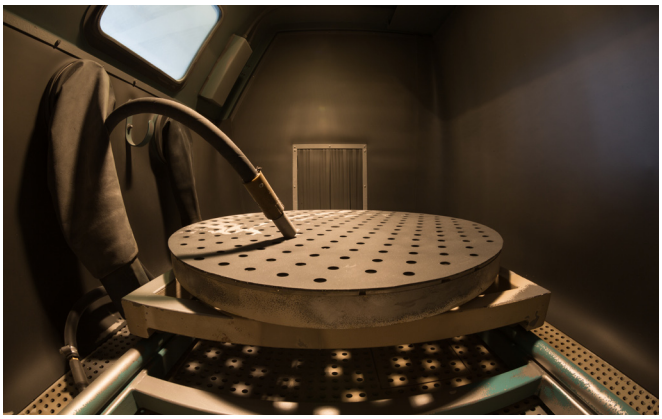
The method of blast may be multi-gun suction, single- or multi-nozzle pressure.
The operator does not manually blast clean each item, but loads the items to be blasted into the machine, either individually or by batch; turns on the machine for desired time cycle; then unloads processed items at the end of the cycle.

This type of machine should be considered when there is a large volume of a particular configuration of workpiece, and when consistency of finish is mandatory.

Airblast has an engineering department capable of providing the type of machine to fit your needs.
Automatic equipment can also fall into the categories of standard, and heavy duty machines.
In addition to understanding blasting equipment, you should be familiar with abrasives and compressed air usage. Not utilizing the proper abrasive or not having the proper amount of compressed air could keep your new blast equipment from working to its potential.

Abrasives for Blasting

It is not wise to use sand in an enclosed blast cabinet unless the machine is designed for it because the breakdown rate of sand is approximately 50 percent to 80 percent on impact, producing a large volume of dust and fines.



Special abrasives have been mined and manufactured specifically for use in blasting cabinets. These abrasives are recyclable or reusable, and are available in many types and sizes. They include, but are not limited to, glass beads, glass grit, aluminum oxide, silicon carbide, garnet, corn cob, walnut shell, metal grit, metal shot and plastic abrasives.

When you select a size of abrasive to use, you should realize that the finer the abrasive, the more aggressive it becomes, creating more wear on your machine's components. But do not let this deter you in using fine abrasives; just be certain it is considered when purchasing equipment.

One exception to this rule is glass beads. Glass beads are round, and they do not create a high degree of component wear. Abrasives that will create a high degree of wear are sand, aluminum oxide, silicon carbide, garnet, and iron or hardened metal grit.

Compressed Air

Air pressure is not as important as volume of air when it comes to selecting and using blasting cabinets. Most blasting is performed between 5 and 125 psi pressure. Only the necessary amount of pressure should be used; too high a setting may cause rapid breakdown of abrasive, without any significant increase in production.

The volume of compressed air a machine will consume is based on the size of the air jet in a suction/induction blast gun, or the nozzle in a pressure blast system. The amount of compressed air, measured in CFM or CBM3/min. at a specific pressure, is what you need to know to select a compressor. The larger the size of air jet/nozzle combination in a suction/induction blast gun, or the larger the nozzle in a pressure blast system, the more production you will achieve, and the larger the size of the air compressor you will need.

A standard rule of thumb is l horsepower on an electric-driven air compressor produces approximately 4 CFM of air at 100 psi.

When buying an air compressor, be certain you ask what the Free Air Delivery Rating of the compressor output is. This is the actual amount of compressed air you can use. Do not confuse this with CFM displacement, which will always be higher.

Again, as in abrasive blasting cabinet purchases, it is wise to speak with a knowledgeable salesperson before buying.

Terminology

Air Blast—General term given to blasting equipment using compressed air as a means of propelling abrasive particles.
Air Jet—The orifice in a suction/induction gun, through which compressed air passes before mixing with abrasive and passing through the nozzle.
Bag House—A cabinet or structure, partially or completely enclosed, that holds dust bags.
Blast Gun—Suction or induction type. The blast gun consists of a body, air jet, and a nozzle. When compressed air is induced into the air jet, a vacuum is created, drawing abrasive from a storage hopper through the abrasive line into the gun body, and propelling it through the nozzle to the workpiece.
Blower—The blower consists of a fan or impeller, fan housing, and motor. It is used in several positions, including cabinet mounting, mounting on a reclaimer, or mounting on the clean air side of a dust collector. Its purpose is to ventilate the blasting cabinet and remove airborne fines to a bag house, dust bag, or dust collector. In the case of a reclaimer, it is also used to create an air wash for cleaning the abrasive.
CFM—Cubic Feet per Minute, sometimes designated SCFM (Standard Cubic Feet per Minute). A measure of air volume, this term is used in rating blowers as well as compressed air. It will be used in the rating of blowers, reclaimers, and dust collectors. It is also used in rating the air consumption of a blastgun or nozzle. These two ratings should not be confused; each has a different purpose.
Door Interlock—Electrical or pneumatic arrangement of preventing blasting when cabinet doors are open.
Dust Bag—Attached to the blower or used in bag houses or dust collectors for the purpose of filtering fine dust from the air.
Dust Collector—A totally enclosed cabinet with dust bags or cartridges on the interior and a blower on the

exterior. During operation, dirty air is drawn into the inlet, through dust bags filtering out the fine dust, allowing only clean air to exit the blower. This is commonly called a pull-through dust collector.
Feed Valve—Used on pressure blast machines for proper adjustment of abrasive delivered to the nozzle.

Metering Valve—Used in suction/induction blast equipment to allow for proper feeding of abrasive to the blast gun. The process meters a fixed amount of atmospheric air with abrasive.
Moisture Separator—A device attached to the compressed air line for the purpose of removing water and moisture, produced during the compression of air. It is mandatory that an air blast machine has dry air for proper operation.
Nozzle—A device used for accelerating abrasive particles powered by compressed air or gas. Acceleration occurs by choking down the abrasive path at the point where it is ready to enter the atmosphere. Various types of nozzles are available. The most productive type is the Venturi style. Nozzles are made from various materials, to be used for various abrasives. Starting from the least resistant to wearing and progressing to the longest wearing, they are steel, stainless steel, hardened steel, iron, alumina, ceramic, tungsten carbide, silicon carbide or silicon nitride, and finally boron carbide.
psi—Pounds per Square Inch. Rating of compressed air pressure.
Pressure Blast Method—System utilizing a specially designed pressure tank, into which the abrasive is charged. Pressurizing this tank of abrasive allows the abrasive to flow, via gravity, through an adjustable feed valve into an air stream at the bottom of the valve. The air stream, with abrasive, now travels through a blast hose, exiting through a nozzle toward the workpiece.
Reclaimer—Also referred to as Particle Separator, Cyclone, or Abrasive Separator, a reclaimer is a precisely engineered component used for cleaning dirty and heavily contaminated abrasive to achieve the maximum production out of a single load. It is also used for fine abrasives to keep the abrasive from entering the dust collector.
Regulator—A compressed air device that controls and allows manual adjustment of desired air pressure for the blasting operation. Pressure is read on a pressure gauge.