



### Pressure Blast

Pressure blast cabinets use a pressure vessel to pneumatically push the blast media through a single abrasive hose and out the blast nozzle. An easy way to understand is the pressure blast systems drop the abrasive into an air hose and pneumatically push the abrasive out through an air jet. These two items are often referred to as abrasive hose and blast nozzle but they are really an air hose and air jet due to the direct pressure delivery configuration.

Pressure blast systems concentrate the abrasive which creates a bigger hotspot on the surface. Because the pressure blast system pneumatically pushes the blast media, it is possible to clean into blind holes and pockets.

All pressure blast cabinets double the particle velocity over the vacuum injection systems at any given pressure. Processing with the pressure blast system requires lowering the blasting pressure by 50% over vacuum injection to prevent exceeding the maximum abrasive impact velocity. Because of the concentrated pattern, the pressure blast system operates with more frictional heat on the part. Pressure blast models do something that vacuum injections can't and the applications listed below are reasons the choice would be pressure blast.

### Advantages

- Greater media velocity. A pressure blast system produces greater abrasive particle velocity than a vacuum injection system which means faster cleaning of tough contaminants.
- Heavy abrasives or large abrasives, steel shot for shot peening etc.
- Removal of heavy thick coatings that require additional frictional heat on the surface to be removed.
- Blind holes or deep pocket cleaning.
- Moves more media. More abrasive particles are propelled against the work surface per minute. This translates into greater productivity, particularly on difficult applications.
- As a general rule of thumb, pressure abrasive blast machines are four times as productive as suction abrasive blast machines.



### Vacuum Injection

Vacuum injection machines use an injector gun to create suction on the abrasive supply hose. The abrasive hose is used to convey the mixture of abrasive and suction air to the gun where the compressed air supply line and air jet are used to accelerate the abrasive. All vacuum injection type machines include two hoses attached to the abrasive blast gun assembly.

Vacuum injection cabinets are the most common type of blast cabinets found in the market today. All vacuum injection cabinets include an abrasive media-mixing valve for proper adjustment and flow of the blast media to the gun. Consider this feature the same as a mixing control on any painting system; beware of units that claim "no mixing valve necessary". Machines operating without mixing valves cannot regulate the amount of media being delivered to the gun assembly. Because not all applications use the same abrasive type and or size and vacuum injection systems operate best with a 20-25% abrasive to air mixture, a mixing valve is required. This eliminates the troublesome abrasive surge associated with units having no abrasive mixing valve, often called the "Splatter Blast" with no abrasive behind each pulsing surge!

Vacuum injection cabinets operate with less frictional heat and higher operating pressures but it must be stated that almost all abrasives used can reach maximum impact velocity in any vacuum injection system operating at pressures of 5,5 - 6 bar (80-90 psi).

Wider patterns make vacuum injection systems suitable for general surface cleaning on larger open areas and normal parts. Vacuum injection style delivery will create a more uniform surface pattern on the part surface than pressure blast systems. The larger the injector gun, the more uniform the surface texture. Easier to operate, less to purchase and reduced maintenance are all reasons to purchase a vacuum injection system.

### Advantages

- Lower capital equipment cost. Vacuum injection blast cabinets are lower cost than the same sized pressure blast cabinet.
- Easier maintenance. There are far fewer moving parts and valves in a vacuum injection system than a pressure blast system. This translates into much easier maintenance and trouble shooting.
- Less air and abrasive requirement. A vacuum injection blast gun has its air demand governed by the abrasive air jet, which is typically half the size of the blast nozzle diameter. This means that for a given nozzle size, a vacuum injection system uses a fraction of the amount of air volume (CFM) than is required for a pressure abrasive blast machine, when both units are blasting at the same pressure.
- Continuous blasting. Because there is no pressure blast pot in a vacuum injection blast system, there is no reason to stop, depressurize the vessel and allow abrasive to refill the pot because there is no pressure vessel. In a pressure blast system, the length of continuous blasting time is dictated by the amount of abrasive media the pot will hold.





### How to determine which system is right for your job?

- Evaluate the application. If a vacuum injection blast system is capable of producing the level of cleanliness, surface finish, and productivity that your application requires, it will almost always be the better choice than a pressure blast system because of the lower cost, air demand and ease of maintenance. Ask to have your work-piece test blasted to determine whether vacuum injection can do the job or if pressure blasting is required.
- Does the job require automation? Because of lower air consumption and the ability to continuously blast, vacuum injection abrasive blasting is almost always the preferred method over pressure blasting in a multiple nozzle, automated system. Multiple nozzle pressure abrasive blast machines with continuously operating "dual chamber" blast pots are available, and for some jobs they are by far the best solution. These systems can tend to be somewhat complex, more maintenance intensive, require a larger air compressor, and tend to have a higher capital investment than a comparable suction blast system, however.
- What blasting abrasive are you going to use? Some abrasives require the high velocity of a pressure blast system in order to work effectively. In particularly lightweight abrasives like sodium bicarbonate (soda), corn cob, walnut shells, and plastic blast media. If you're using one of these abrasives, you will probably require a pressure blast machine to get acceptable results.
- Does the job demand pressure? For some types of contaminants, very hard work surfaces, or specific applications like most shot peening, pressure abrasive blasting is the only technology that will do the job.
- Do you need a high degree of flexibility? For the highest volume output, (remember the rule of thumb that pressure is 4 times more productive than suction) pressure abrasive blasting is the way to go. Are you only going to own one abrasive blasting cabinet and want it to be capable of everything that you ever throw at it? A pressure blast cabinet will offer the ultimate flexibility for the widest range of applications.

Without considering the specific needs of the application, neither technology – vacuum injection blasting or pressure blasting is "better" than the other. This subject is often discussed in the surface preparation industry, and often a source of confusion among buyers, the key is to always match the application and production needs with the right tool to do the job. This approach will produce the shortest return on investment and best fit for your business needs.