

Airblast Tech Tips

Grit Recycling Systems - common questions and answers



What type should I buy?

The type of system that you will require depends on the method you like to use or feel will give you the lowest costs for completing the work you want to bid on. Just as every job is different, every contractors' approach to completing the work is different.

There are basically three types of recycling systems on the market today.

1. Grit recycling trailer that will output cleaned grit at a low level (2-3' above ground)

This system represents the least costly piece of equipment to recycle steel grit. It is also the slowest, lowest production and most labor intensive to operate. Very simply, the low initial cost is offset by a high operating cost.

2. Grit recycling trailer that will output cleaned grit at a high level (fills mobile 5-8 ton pots)

This approach is similar to 1. except that it is designed to process AND store dirty and clean material to be loaded into mobile vessels. In most cases, it must be used with a mobile vacuum truck, which is used to vacuum up the dirty steel grit and deposit it for loading into the recycling machine.

Essentially, this machine loads dirty grit, cleans it and stores it ready for loading into mobile pots. By design, the steel grit must be handled TWICE before it gets to the storage area where it is processed. This system gives the user flexibility to use mobile pots but requires the use of a vacuum truck to vacuum and transport material. This process adds a considerable amount of labor to the process.

3. Grit recycling trailer that can recover grit, clean it and transfer to a pressure vessel.

This type may also include: compressor, air dryer, diesel vacuum, dust collector, etc.

This system offers the user a truly self contained mobile system that can handle vacuum recovery, steel grit recycling and blasting with a variety of pressure vessels. It allows the user to operate with the fewest number of workers. Labor will ALWAYS be the lowest because the grit is only loaded or handled once. Loading of the pressure vessel is manual or automatic. For users who need rapid mobility and low labor costs, this type of system provides the best chance of achieving those goals.

What are the most important points to remember?

1. Steel grit is 2.65 times heavier than sand

This simple fact has a tremendous impact on your operations. It will take more time to recover on the average than sand just because of the weight. Whatever process you are using to recover sand-slag, the recovery of steel grit is MUCH SLOWER AND MORE COSTLY. Every time you handle grit, you increase the cost of your operation and increase the chance of exposure to moisture.

2. Steel grit can be reused 1000's of times.

Steel grit can be recycled and reused thousands of times – we can consider that the average break-down rate for steel abrasive (depending upon the exact parameters of your application) is between 200 grams up to 500 grams per square meter blasted. In fact the biggest loss of steel grit is due to leaks from the equipment leading to abrasives falling onto the floor and not being recovered at all...



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3. When steel grit gets wet, it rusts immediately and must be dried out.

Steel grit must be kept absolutely dry to work properly. Condensation inside pots is enough to cause it to stick together into rust clumps (that will plug your metering valves).

You must have a system that will allow rapid recovery of grit into a dry, ventilated, waterproof container.

4. To be economical, 100% of steel grit must be recovered. Sometimes this must be done FAST!

You need to recover the grit to be able to reuse it. If rain is coming and the grit is exposed, you will need to get it recovered FAST. If it gets wet, either you will lose it or it will take you many labor hours to dry and reprocess into a usable material.

5. The cost of labor to recover steel grit is VERY significant!

Recovery will almost always occur at the end of the day. Sure enough, this will push you into overtime. You CANNOT safely leave steel grit in an uncovered container overnight. If it rains, even small amounts of moisture will cause BIG problems. Cutting recovery time-cost by using gravity will save a great deal of time and money. To be productive with steel grit, you must be able to recover it quickly, day after day.

6. Vacuum recovery of steel grit is a complex process.

The vacuuming of steel is 2.65 times harder than vacuuming sand-slag. Steel grit is very, very abrasive. To properly vacuum steel grit, a vacuum system capable of 26"HG (mercury) is required to overcome the friction created when a "plug" occurs. Vacuums producing only 15"HG are usually unable of reaching a sufficient vacuum level to break these common plugups. This is especially true when long hose runs are used. Because the density and weight of steel grit is very high, vacuuming requires a substantial amount of horsepower to accelerate the grit to "capture velocity". This is the speed at which grit will keep moving in an airstream. If a sand will blow off a pile at 30 MPH, it will take almost 80 MPH to blow grit off a similar pile.

If the vacuum cannot keep the airflow high enough to keep the grit in suspension, it will drop out in the bottom of the hose. When this happens, the grit must be accelerated again to break the stoppage.

7. Every job is different. Buy a system that you can change and expand as your needs change.

Lead paint removal projects are becoming very price competitive. It is smart business to purchase a "system" not a "machine". Buy equipment that can be changed meet the specific project you are working on.

Example 1: if you can recover most of the grit from your job using gravity, you save BIG. Less labor, less wear on parts, less fuel, less chance of getting your grit wet, etc. Why vacuum (with all the time and cost) when gravity is free.

Example 2: if mobile pots give you the mobility you can't get with a single, self contained machine, convert the machine to one that can be used to load mobile pots with a conveyor.

Example 3: if your project requires a mobilization each day, mount all the equipment on the trailer and pull it with one tandem axle tractor. This cuts labor by reducing drivers and cuts the setup time.

Airblast offers patented modular systems that allow you to create the combination of components that will fit your specific needs. Just remember, after less than a month of operation, your people will be able to tell you what works best. Tell you what system is most profitable for the job. Before the end of the first year, you can be bidding jobs with a specific system configuration in mind.

Buy the right vacuum. If you don't, you will pay for your mistake every minute.

The time required to recover steel grit may equal or exceed the man-hours required to blast clean the surface you are working on. The further you pull the grit, the longer it takes. Keep your vacuum lines as short as possible.

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Double chamber pots will payback in one season. Non-productive time is very costly.

Double the cost. You still pay when they aren't blasting and the delay extends the job, so you pay more overhead cost. Blasting is simple (sort of). If your thumb isn't down on the switch, you aren't making any money. If you waste even 6 minutes in each hour, you have increased the blasting time by 10%. That is a very expensive 6 minute break. A double chamber pot that allows 100% availability of blasting will eliminate downtime. A simple check of the hour meter will tell you how much you are getting from each man each day, and they can't have the excuse, "I was out of grit". Just remember, the most expensive part of your costs is labor.

Steel grit flows to an angle of repose of 41 degrees. Conical bottom vessels only reduce dead weight of grit in the bottom of the vessel.

Conical bottom pressure vessels must use at least a 45 degree angle to insure that the grit flows. If grit is allowed to flow on its' own, it will flow to 41 degrees. With a multiple outlet vessel, a conical bottom may actually REDUCE the potential volume of grit in the vessel. Conical bottoms work best with a vessel that has only 2-3 outlets. Even with a conical bottom, there is still grit left around the outlets. A conical bottom is no substitute for a proper air drying system.

Single chamber pressure vessels DO NOT allow TRUE CONTINUOUS blasting.

Even if it takes 3-6 minutes per hour to refill a vessel, that is unproductive time. With a large number of outlets, this can become a significant amount of time. In addition, the added starting and stopping causes significantly greater wear on all components. The greatest wear occurs when the grit flow starts and stops. A double chamber vessel is the only way to get all the benefits of true continuous blasting. 100% uptime and reduced component wear.

What size machine should I buy?

Size depends entirely on the number of blasters you want to run. What ever type of machine you choose, it should be capable of handling ALL the grit that you will be using. Loading and re-vacuuming is very expensive. Barrels routinely leak, so you can bet on losing material. This gets expensive both in material and the labor to handle it.

For estimation purposes, you should assume that each blaster will use 1 ton of steel grit per hour using a #7 nozzle. While the weight per hour is about the same as sand-slag, the VOLUME is 2.65 times LESS. Grit is MUCH denser than sand-slag.

Should I buy a pneumatic machine or a mechanical one.

Every moving part with eventually wear out. We believe the best machine is the one that meets the required performance criteria (ease of use, speed of cleaning, degree of cleaning) with the fewest moving parts. The simplest machine that provides the production that you need is the best one.

In general, mechanical machines will have more parts that require maintenance. With the greater number of parts comes the greater chance of downtime.

Airblast systems are designed to reduce the chance of downtime by reducing the complexity of the components. Items that are expected to wear are designed in such a way that rapid, on-site replacement is easily accomplished by painters.

WHAT IS CLEAN GRIT?

Over the past years, the entire industry has come to understand more about the clean-ing of grit. We now know that it is easy to clean grit if you remove all the small particles of dust and grit. The problem with this is that new specifications are requiring that the grit mix or proportions stay the same over the project. This means you must clean ONLY the coating dust and 90+ mesh steel grit from the mix. Small 20" airwash machines have a hard time doing this because they were never designed for the "flow through" that is being run through the machine. TOO much grit TOO fast.

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AIRBLAST

HOW MANY AIRWASHES DOES IT TAKE TO CLEAN GRIT?

Just one if it is done properly. The airwash concept has been used by foundries for over 40 years. It is a very simple principle. Imagine a waterfall of steel grit. Imagine a wind blowing through the waterfall. The light particles get blown to the side while the heavy particles drop sooner. What is the key? Ask yourself, how THICK is the curtain of grit? If the curtain is 1/2" thick the cleaning will be different than if the curtain is 1/8" or an inch thick. Imagine a waterfall. Is the grit coming over the waterfall at a constant rate? or is high one minute and low the next? The key to air cleaning of grit is that the grit must be a constant flow and not too thick. Remember, there is very little dirt in the grit, but it is important that a very HIGH PERCENTAGE be removed.

Some manufacturers have begun to boast about the number of airwashes their machines offer. If they did it correctly, it would only take one airwash. Given the nature of these machines, the key is to use a wider airwash that makes the curtain thinner. With a thinner curtain, it is easier to blow the light particles off.

WHEN YOU ARE DONE CLEANING THE GRIT, WHAT IS LEFT?

It's easy to clean grit... Just take out all the small particles.

The problem with that approach is that you NEED the 80-90 mesh metallic material to polish the steel surface and keep the blast profile in the 2-3 mil range. If you remove these small particles, you will only have the larger particles left which leave a deeper profile. Many states are now setting maximum profile limits. They don't want a 3.5 mil profile filled up with primer.

To properly clean steel grit, you must be able to adjust the system to keep 80-90 mesh metallic material. This can only be done using an airwash where the flow can be changed.

ARE MAGNETIC DRUM SEPARATORS THE SOLUTION?

They are not a solution by themselves. When used in combination with a properly designed airwash, they WILL provide optimum cleaning. A magnetic separator suffers from the same potential problem as outlined above with airwashes. If too much material is run over the drum, or the contact time with the drum is too short, the cleaning will be incomplete. Just like the airwash, if a magnetic drum is to work properly, it must be big enough for the flow of grit. How can a magnetic drum work if the grit is 1/2" thick on the drum. It won't.

Why use a magnetic drum? When properly matched with an adjustable airwash, very high rates of cleaning to specific degrees are possible. Magnetic drums are not adjustable, an airwash is.

DO I NEED A MAGNETIC SEPARATOR ON MY SYSTEM?

A magnetic drum will only remove the relatively large particles of non-metallic material. It does not do an effective job removing dust size particles, which represent the majority of lead in a grit mix.

The combination of magnetic separator and an airwash will make it possible to select the specific balance of cleaning that you need. This is particularly important where the goal is to retain 80 mesh and larger grit.

ELECTRIC, AIR OR HYDRAULIC POWER?

Every machine on the market today needs a power source to move material through the system. Over 99% of all construction equipment worldwide is run by hydraulic power. What is the reason?

Good:

1. It won't electrocute you.
2. Variable speed motors are as simple as turning one valve. Inexpensive and simple.
3. Gear reduction units can be eliminated by using internal fluid reduction. Less weight, fewer moving parts.
4. It can be reversed easily.

Bad:

1. It is affected by extreme high and low temperatures.
2. It is messy when oil leaks.

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What about electric power?

Good:

1. It is clean and efficient transmission of power.
2. For high horsepower requirements, it is cost effective.

Bad:

1. When used with steel grit, the steel dust will cause short circuits.
2. It is very expensive to reverse or create variable speeds.
3. It is bulky.
4. It induces high shock loads on components when it starts.
5. It can cause electrocution.

HOW ABOUT AIR POWER?

Good:

1. It is simple to hook up with hoses.
2. It is compact.
3. It is easy to vary the speed.
4. It is inexpensive to purchase.

Bad:

1. It requires an air compressor.
2. It is very inefficient in using horsepower. Electric and hydraulic are twice as efficient.
3. It has low starting torque. Not much power when it starts.
4. It requires steady lubrication to function.
5. It is expensive to repair if it fails.
6. It is noisy and messy with oil coming out the exhaust.

Airblast is committed to providing the best value and performance in grit recycling systems.

For additional information call +31 (0)72 5718002 or send an email to sales@airblast.com.

