



7 Most Common Errors when Applying Air Cannons

and How to Eliminate Them

Author

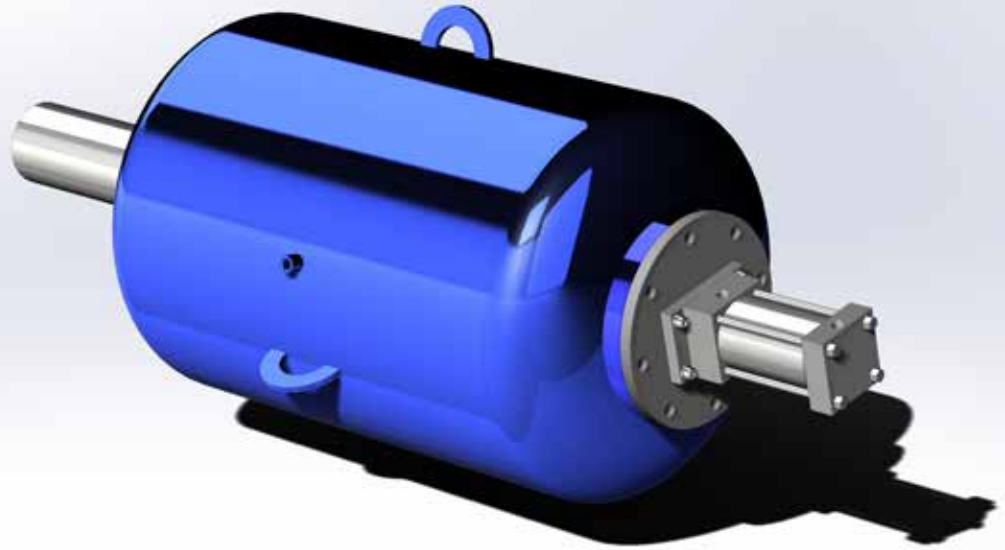


*Andrew Kline - IGS Environmental
Division Director | Air Cannon Expert*

andrew.kline@integratedglobal.com



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While every plant has its own unique features that differentiate it from others, one of the most common factors they all share is their usage of air cannons for the removal of build-up. Across the United States, Latin America, Europe, Asia, and countless other regions around the world, plants rely on air cannons to ensure maximum cleaning efficiency and effective operation of their equipment. The primary difference in these plants regarding their air cannons is how they apply them.

The focus of this paper is to identify the common mistakes that plants often make when installing and applying their air cannons and to implement the proper ways to improve cleaning performance while reducing maintenance requirements.

One primary factor to consider is that the power of the air cannon is largely irrelevant if it doesn't operate properly. In addition, a plant can possess a wide array of reliable cannons that always fire, but this doesn't matter if they don't remove build-up. A combination of air cannon power and reliability is critical in establishing an effective method of cleaning.

The seven most common errors in applying air cannons are:

1. Accepting poor performance
2. Using the wrong nozzle
3. Failure to protect the air cannon from environmental effects
4. Inability to perform cannon maintenance due to improper installation
5. Allowing air supply to have a negative impact on air cannon performance
6. Improper operational sequencing
7. Inability to get replacement parts

1. Accepting Poor Performance

This is one of the most egregious errors that plants make, yet it's also the most avoidable. The solution is simple: never accept an air cannon that doesn't perform to the best possible standard, and never succumb to the mediocrity of a lesser cleaning method. Plants often result to using CO2 explosives (known as cardoxing) and high-pressure water washing to clean their feed shelves and risers, but this frequently results in unsafe conditions for the operators and irreparable damage to the equipment. These methods can drastically reduce the life of the refractory and decrease plant efficiency. With a properly installed IGS Big Blue Air Cannon and nozzle, these archaic and dangerous cleaning tactics can be relegated to the past and thrown out forever!



2. Using the Wrong Nozzle

In the late 1970s, air cannons started to become an increasingly accepted method of cleaning in the cement industry. It was at this time that the fan jet nozzle was born. This nozzle was designed to produce a thin, wide blast of air that would clean a large area all with one fire of the cannon.

This design would ultimately allow for the reduction of the number of air cannons that would need to be purchased, thus saving the plant time and money. This nozzle worked well for what it was intended to do, but as time passed and cleaning demands became more abundant, the subsequent demand for a higher-powered nozzle followed suit.

Is the process for removing build-up the same in 2022 as it was back in the 1970s and 1980s? With the upgrades to facilities and their needs for higher cleaning power, the answer is most definitely no.

Cement plants have started burning supplemental fuel, which has made the build-up more difficult to handle. In addition, the dry process towers have gotten much larger, thus creating the need to clean greater distances from the exit of the nozzle. In today's world, the cleaning range produced by traditional fan jet nozzles is no longer good enough.

IGS has developed a way to overcome the inadequate cleaning methods of the fan jet nozzle with the new, innovative high-velocity nozzle. This state-of-the-art nozzle is designed to increase the velocity of the air discharge and greatly expand the cleaning power of any air cannon. In some cases, the improved cleaning distance is double of what was experienced with the standard fan jet nozzle.

In the video, notice the difference in power between the various tanks and nozzle designs. Witness the power of the IGS Big Blue Air Cannon with the high-velocity nozzle in comparison to the outdated and largely ineffective designs of our competitors.



*Watch the
video*

3. Failure to Protect the Air Cannon From Environmental Effects

Discharge Point Proximity

Air cannon OEMs typically recommend that the air cannon be installed as close to the discharge point as possible. Be wary of this recommendation, though, for this does not protect the air cannon from the environment. Close proximity to the discharge point exposes the air cannon to high heat and allows material to flow back into cannon. The primary reason for cannon failure is the environment that surrounds it. High levels of heat, excessive vibration, and the flow of material back into the air cannon will render it ineffective. These environmental effects, along with the ever-present dangers of high-pressure water washing and cardoxing, combine to form a plethora of errors to avoid when applying proper methods of cleaning.



IGS has several recommendations to protect the air cannon from environmental effects. This includes the following:

AUTOMATIC SAFETY SHIELD

Prevents the flow of material back into the cannon and allows workers to perform maintenance when the plant is online

Y-PIPE

Permits the cannon to be located further away from the harsh environment of the discharge point and opens another port to manually rod material, also allows workers to perform maintenance on the cannon when the plant is online

VICTORY VALVE

See the upcoming video on this new innovative solution from IGS

INSTALLATION OF BEND

A 90-degree bend prohibits the restriction of material back into the cannon if the plant chooses to perform cardoxing or high-pressure water washing, which IGS does not recommend as an effective cleaning method

MULTIPLIER UNIT

Protects the cannon from harsh environmental effects such as heat, vibration, and material flowing back into the cannon



*Watch the
video*

4. Inability to Perform Maintenance due to Improper Installation

Installation Close to Discharge Points

Air cannons and their nozzles are installed where build-up occurs. Unfortunately, these locations are not always convenient for maintenance when the cannon inevitably needs upkeep. As stated in the section on environmental effects, the air cannon OEMs recommend the cannons to be installed close to the discharge point.

This often presents a major problem when the need for maintenance arises. In many cases, the air cannons are mounted high in the air and plants don't know when they fail until build-up occurs. If this issue requires maintenance, it is critical to be able to access the air cannons in order to repair them safely and effectively.

Multiplier System

This is where the multiplier system demonstrates its value. By using this system, the cannon can be remotely mounted away from the discharge point because of the increased energy and air volume used in the firing process.

The multiplier system uses between two and four times more energy than a typical air cannon. This increased energy is a requirement due to the necessity for the rules of physics to be followed. If the air cannon is installed at a safe distance from the nozzle discharge, then naturally, the multipliers will demand greater energy because the pipe run creates a pressure drop and loss of power.

This higher demand for energy results in the reduction of the cannon's firing rate to compensate for the increased energy costs. Following these innovative installation methods developed by the IGS team will allow for safe and efficient cleaning methods.



5. Allowing Air Supply to Negatively Impact Air Cannon Performance

Plants often commit the error of storing air in their cannons at all times. Emptying the tanks of air when not in use may seem pointless, but it's important to remember one crucial aspect of air cannons: the pressurized device will always find a way to leak air. For example, if a plant only needs to operate their air cannons once every two hours or more, yet they still choose to keep the tanks filled at all times, the cannons constantly leak air despite only being fired a handful of times throughout the day.

In the worst cases, the higher demand for air will drop the available air pressure and risk failure of all surrounding cannons. This will also most likely impact other critical pneumatic components that are hooked to the same air supply. This process will surely lead to a reduction in performance capabilities and an unnecessary expense for the plant that could have been avoided with proper air management.

6. Improper Operational Sequence

Ineffective Cleaning Operation?

Even with the proper installation of the air cannon system, customers often wonder why their build-up is not being removed at the desired rate. Their cannon can be powerful and reliable. It can fire when needed and exert an enormous amount of force. So, why do some customers still report an ineffective cleaning operation? At IGS, we have the answers to this problem as well.

The Cause

Often times, a plant experiences a build-up problem, and it is believed that the air cannons are not cleaning this area effectively due to a lack of cleaning strength. The plant will then operate the air cannons more frequently to clean a smaller amount of build-up. The truth is that the air cannons had too much peak force and are just shooting holes through the build-up. When plant personnel look inside the feed shelf, the build-up resembles Swiss cheese.

The Solution

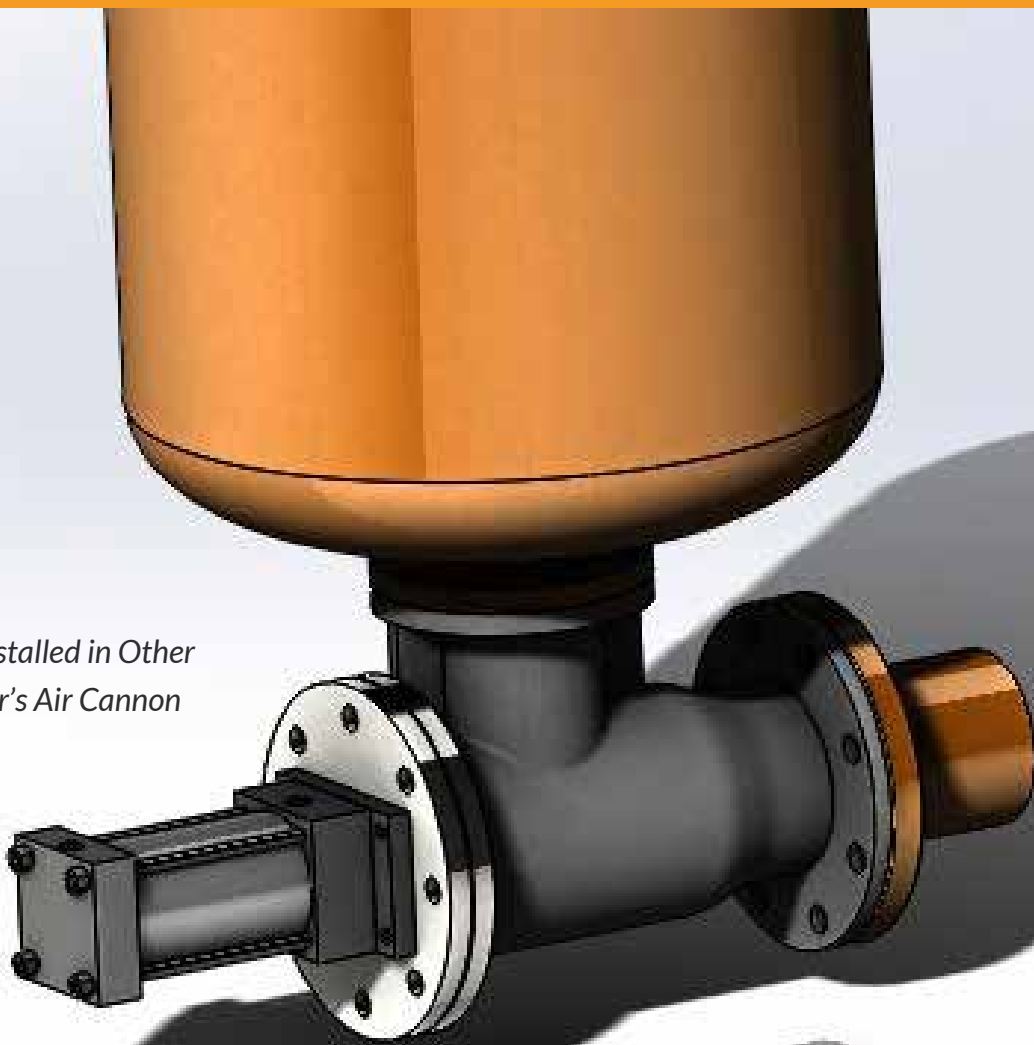
The solution, decreasing the operational cycle of the air cannon, is generally the opposite of what the plant typically does. This cycle reduction allows build-up to expand and bond together. Once the build-up reaches a significant mass, a blast from an IGS Big Blue Air Cannon will remove it in chunks as long as the adjustable force of the cannon is set to a level that will overcome the mechanical strength of the build-up. This results in a much larger cleaning area and a satisfied customer.

7. Inability to Get Replacement Parts

Unlike our competitors, almost all IGS replacement parts can be purchased off-the-shelf or from other vendors. Plants run into a cost issue when dealing with our competitors because they're repeatedly forced to buy the same parts time and again when the original part is damaged. This results in overwhelming expenses and a long-term commitment to the competitor company, even if unsatisfied with the results.

IGS approaches this problem in a different manner than the competition. By using replaceable parts such as standard u-cups, air cylinders, and hoses that can be purchased anywhere on the market, we expand a plant's ability to get the most cost-effective solution to their cleaning needs, even if it's not with us. This is just another way that IGS shows that we care about our customers and want them to be pleased with our product.

IGS Piston Installed in Other Manufacturer's Air Cannon





Conclusion

Here at IGS, we've helped thousands of satisfied customers get the cleaning services they need with our superior products and dedication to be the best at what we do. By following these proven steps laid out by our highly skilled team of engineers, plants can obtain the tools and knowledge needed to properly install and apply their IGS Big Blue Air Cannons and nozzles.

We know that our customers take pride in what they do, and they deserve the absolute best products that money can buy. At IGS, we match that pride with our own and stand ready to meet the customer's needs with new and innovative methods of cleaning that keep pace with an evolving and demanding market.

Limit Errors and Improve Cleaning with IGS! Contact us about our air cannon systems, nozzles and retrofits

info@integratedglobal.com | 888 506 2669 | www.integratedglobal.com





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