Stone World

Air and Water Filtration: What do you really need?

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With stone fabrication shops using 15,000 to over 200,000 gallons of water per day, an effective water treatment system can offer a significant savings for a business.

There are many choices that face the owner of a stone fabrication shop, and water filtration can seem to be the most complicated, as there are so many options to choose from. Especially with OSHA, EPA and state regulations, you want to be sure that your choice is the best one for you and your specific fabrication process.

Concerning water treatment or recycling, you must first determine how much capital you are willing to

invest, as solutions can range in price from less than $10,000 to $100,000 and more. The answer ranges from "some recycling" (with a permitted discharge for use of city water for critical applications), or a totally closed loop, zero-discharge system that requires no permitted discharge.

All fabrication equipment requires varied levels of water clarity. For a bridge saw, all that is needed is cooling water — "gray water" is usually acceptable. The same is generally true for the cooling ring or halo of a CNC. But a waterjet, the spindle of a CNC and most polishing equipment (including hand polishers) require a much higher water quality specification.

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Often, people use city water for these applications, although acceptable recycling solutions are available that do not require you to discharge excess water. Flow rates and pressure requirements for your equipment are key pieces of information that you will need to know as well.

The infrastructure of your facility, such as plumbing, electrical supply and available compressed air, should all be understood in order to properly evaluate any proposal. Who will be handling the installation? Who will pay for freight and related installation charges? Are delivery pumps required, and who will provide service for any system component that requires service?

It's important to factor the "extras" into the budget and also to make a decision based on what you do and do not have time for. Ask yourself, "What it the best use of my time? Installing a new system that I am not familiar with — like a child's bike or a new BBQ grill — or allowing the equipment professionals to do that for me?"

As you narrow down your selection, be sure to check references. This is your best source of information about any water recycling system that you are looking to purchase. When contacting these references, inquire about the warranty and what experience this individual has had with service or warranty issues.

In most cases, it is wise to avoid trying to make a recycling or filtration system on your own, but instead look for one that meets a balance between your budget and equipment needs — all while keeping you in compliance with state and federal regulations. One day of non-compliance fines for an illegal discharge can make an air or water recycling system seem cheap in comparison.

Focus on the business of stone fabrication, and let the air and water professionals help you by doing their job. By turning to these industry professionals for advice on water and air filtration, you need to be sure to ask for a guarantee that the equipment will perform as you require.

Air filtration considerations

The key to effective air filtration is placement, which will ensure proper and complete treatment. If the filter is not located near the source of the dust, the contaminated air will be pulled across the shop, exposing more people to the dust.

In a stone shop, contaminated air is also minimized by incorporating a wet fabrication process as much as humanly or economically possible. A wet cutting and polishing process will greatly minimize what is airborne in the first place. However, in many markets, this is easier said than done.

If the water filtration system is removing the majority of the sediment and providing clear water, then the concern about silica dust will almost be eliminated. You could also use this same clear, recycled water to rinse the floors at night, providing additional removal of any sediment that can become airborne when the water evaporates.

If the sediment is not properly removed, there is the potential for silica to keep going back into the air. This was the case for one stone fabricator in the Western U.S. The amount of the silica dust in the air was documented by state tests, which had standards higher than the federally mandated OSHA requirements.

Water filtration and recycling systems

There are many water recycling

systems available to the stone shop, and a range of benefits and attributes that each type of recycling process brings to the fabrication shop.

Tiered settling pits

Originally, many stone shops began with the age-old tiered settling pits. These worked well when production was slow, and the need for a high volume of water was not as important — and when fresh water supply was plentiful. The benefits of this type of water recycling system is that it is fairly easy to construct with a minimal investment. Be alert to the possibility that you will have to apply for a discharge permit if you are unable to recycle 100% of your water. Generally these systems will produce a "gray" water quality and will require you to clean the pits.

Filtration bags

Filtration bags are designed to hold solids while allowing water to drain out and back in to the fabrication process. These provide a gray water source, and a means to dispose of the solids collected, but need to be supplemented with a fresh water supply for your polishing applications. The bags are a consumable, and that cost will need to be factored into your budget. The filter bags can require some agitation to prevent the stone sediment from forming a layer on the inside of the bag, slowing down the drainage process.

Centrifugal systems

Centrifugal systems separate the liquids from the solids and produce gray water. However, some manufacturers offer point-of-use filtration cartridges, which increase the water quality to meet the needs of a shop's particular equipment. It is important to inquire about how to prevent the stone sediment from inhibiting water flow and about the frequency of cleaning and the cost of replacing point-of-use filtration cartridges.

General settling systems

Settling with or without an inclined plate clarifier usually requires a rather large aboveground collection area into which your pit wastewater is pumped. These systems are ideal for separating and concentrating high levels of solids. They produce gray water but are often sold with point-of-use filtration cartridges to improve water quality. Some require a flocculent to be added to their filtration process. Be sure to read the MSDS sheet and see if there will be any impact on your equipment or personnel if a flocculent is used.

Filter press systems

Filter presses are designed to squeeze the water out of the waste — in this case the stone sediment. A quality system, based around a filter press, can be the answer to supplying both the water clarity and volume of water required. If the system is engineered correctly, the water quality is safe to feed to all equipment in your facility; and it provides a 100% closed-loop, zero-discharge system.

Why all this effort?

Simply stated, the Clean Water Act passed by Congress in 1972 makes it illegal to discharge the wastewater that comes from your fabrication process without a permit. Permitting fees can be costly and unnecessary if the correct system is in place to recycle your fabrication water.

Being "green" in your operations is perhaps the most important reason to have a water recycling system. Show your community that you care and are doing something to preserve this precious commodity. It is also a great advertising and marketing edge for your business. Remember, the average shop can use 15,000 to over 200,000 gallons of water per day, and these systems can offer a great savings for your business, your town and for future generations.

All fabrication equipment requires varied levels of water clarity.

The fabrication of stone is one business that cannot be exported, and it requires those of us in the industry to lead by example and to take care of our environment and community — as they are what sustains our industry. ❑

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