



Optimize

Reducing Steps: Using the Right Abrasive Products Can Have a Significant Effect on the Bottom Line of a Business

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The phrase “time is money” has been making the rounds since Benjamin Franklin used it in his essay, “Advice to a Young Tradesman,” published in 1748. But even after two-plus centuries, everyday citizens still need to be reminded that their time is valuable.

Interestingly, Franklin’s intended audience, budding entrepreneurs, might be the ones that need that reminder the most. It’s not uncommon for new business owners to choose cheaper options even though they might not offer the quality or time savings of a higher priced option.

In the case of abrasives, even experienced business owners are prone to neglecting Franklin’s sage advice. When the abrasive is such a small fraction of the overall expense of producing a part, why even bother with it? Well, Franklin coined a phrase for that, too: “Beware of little expenses. A small leak will sink a great ship.”

CUMULATIVE COSTS

According to Jim Darocha, product manager at Norton | Saint-Gobain Abrasives, the cost of abrasives accounts for about 3 percent of the total cost to produce a part. That number can vary, of course, but the idea for some is that 3 percent isn’t worth the time it would take to even consider switching to a new abrasive. But Franklin would push back on that philosophy. Those little costs add up.

Whenever a grinding wheel needs to be changed out, time is lost. If extra steps are required to get to the final desired finish, more time is lost. If the wrong abrasive is used, it could require rework, which takes more time. Dealing with each of these a few times every day means that time adds up to a lot of lost productivity, which, in other words, adds up to a lot of money lost.



Norton Vortex Rapid Prep non-woven file belts offer users an easier way to obtain superior finishes when working with tight, intricate and complex parts.

On the flip side, if a business owner is willing to spend the time to learn about a new abrasive that costs more but lasts longer and produces better finishes quicker, that is time well spent. The staff won't have to change out their abrasives as often and, in many cases, the abrasive is so efficient that a four- or five-step process can be reduced to three or four steps or even less.

An example of a reduction in steps from five to four was found when applying the Vortex Rapid Blend 5AM abrasive versus a competitor's 80- and 120-grit products. This resulted in a 25 percent savings on the customer's inventory and 40 percent increased throughput and reduced scrap.



Norton Vortex Rapid Strip quick-change discs offer quick and easy cleaning and stripping of scale and heavy stock on a

variety of materials.

"If our disc costs 50 cents more than the disc you're currently using, but our disc can save you time, that's a much bigger value," Darocha says. "In many applications, we can reduce your active finishing time by a third."

BEYOND THE GRAIN

Darocha says the disc he was referring to – Norton Vortex – should probably be described more as a technology as it's applied to a variety of the company's product lines beyond abrasive discs. At the heart of the technology, however, is the Vortex grain itself.

"Instead of being a typical aluminum oxide or silicon carbide, this is an agglomerate, so it has more fracture points than a typical abrasive, which essentially means it has a lot more cutting points," he says. "For conventional grains, if they fracture once or twice, they become dull whereas the Vortex agglomerate fractures many more times and remains sharp, meaning it becomes a more aggressive product that also produces a finer finish."

Mike Radaelli, Norton senior product manager, adds that the Vortex technology goes beyond the grain as it is the compilation of three important components, all of which required several years of R&D to come to fruition.

"The three main components that we're working with are the grain, the resin and the nylon," Radaelli explains. "With its many cutting points, Vortex grains are fairly large, which makes adhering them and making them stay adhered to the nylon even more challenging. Imagine how difficult it is to get just one grain to adhere to one piece of string. To overcome that challenge, we redesigned the resin system and came up with a longer nylon system. It required years of R&D work to get those components to stay together to become a non-woven product."



Norton Vortex Rapid Blend depressed center discs leave a smear-free finish in fewer steps

The Vortex technology can be found in a variety of formats, including Norton's discs, wheels, rolls, belts and more. This wide spectrum of products allows Vortex to be useful in a variety of applications, including aluminum and stainless steel fabrication, aerospace work such as the finishing of high-nickel

alloy turbine blades in jet engines, pit mark removal in cast parts, MRO and welding. In that regard, Vortex abrasives are just as commonly used in larger formats in robotic cells as they are with handheld tools for manual work.

STEPS TO SUCCESS

The typical process for a welder after laying down a weld begins by blending that weld into the part to improve the finish. A welder usually starts with a 36- to 40-grit product to knock down the weld and then they go through a 60-, 80- and then 120- grit product before they're finished, meaning they require about four steps to get to the desired end result.

"Using the Vortex grain, however, you could probably achieve the same results in just two steps," Radaelli says. "It all comes down to the many cutting points with the Vortex technology, which acts as a coarser grain. But, because there are also a bunch of particles that are very small, it produces a finer finish, allowing you to skip steps."

There are a host of examples of where a customer can create the same quality part in less time. Darocha cites a stainless steel customer serving the food industry as an example.

"A customer was creating a stainless steel vessel and needed to blend the welds into the rest of the material," he explains. "Stainless steel customers serving the food industry, such as this one, have to get below a 32 Ra surface finish. They also need to be cognizant of the potential for deeper scratches because the surface needs to be smooth enough that cleaners can do their job properly. If it's rough, you can't always be sure that you're removing the bacteria."

Typically, when this customer had to blend a weld, they would use a flap disc or a thin grinding wheel. But, with the Vortex technology, the entire process could be done with a non-woven, starting with a coarse grain and moving through the sequence of products. Darocha can't stress enough, however, how important it is to start and finish with the right product.

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Jim Darocha

Product Manager, Norton | Saint-Gobain Abrasives

"Let's say you're digging a big hole with a bulldozer," he says. "You wouldn't start with the bulldozer scoop and then go straight to the trowel. You'd probably use different equipment in between. When you're taking down a weld, instead of starting with the bulldozer, our role at Norton is to take you through those various sizes of shovels, so you can be as productive as possible. We typically start with a coarse or extra coarse abrasive and then migrate down to medium to fine to very fine."

When it comes time to switch to – or even consider – the Vortex line of abrasives, the team at Norton is happy to provide recommendations for which products to use and when.

PRODUCT EXPECTATIONS

In terms of process improvements, there are quite a few that new Vortex users can expect. The

reduction in required steps and, therefore, the time it takes to finish a part is a huge selling point, but there is more to the story.

"The life of the Vortex product is a lot longer than that of a typical aluminum oxide grain," Radaelli says. "A longer product life results in a reduction in the number of times you have to change out the abrasive. With convolute wheels, as an example, sometimes the machines they go on can take a few minutes to change out, if not longer, and there's a cost to that, of course.

"In general, I've seen cost savings turned in by our application engineering team be as much as 50 percent," he adds. "Typically, we'll see around 20 to 30 percent, but I've seen the numbers go pretty high. Recently, we saw a customer experience a 46 percent improvement in cost savings."

Watch this short video to learn more about the technology behind Vortex.

Darocha says the industry is seeing increased adoption of robotic cells and higher volume applications and that the Vortex technology is well-suited for those growing types of opportunities. As more fabricators automate their processes, they inevitably look for additional methods for reducing the cost per component.

"The hourly rate of a robotic cell is typically much higher than it is for a manual operation," he says. "That naturally leads these companies to find products that can last a lot longer so that the abrasive won't have to be switched out every few minutes, which requires the whole cell to be shut down. The longer lasting a product we can provide, the more cost-effective it is for them.

"We're seeing customers require tighter and tighter tolerances and finer finishes on their products," he adds. "As manufacturing processes are able to generate more precise welds to begin with or parts that are closer to finished size when they're cast or forged, the trend of abrasives is that now we're having to not remove as much material for the customer, but that we need to help them generate that finer finish on the end."

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