

How-to

## Cutting, Grinding and Finishing: 7 Tips For Success

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Getting the best results in metal cutting, grinding and finishing applications is a balance of numerous factors, including choosing the right abrasive product for the job and following best practices for product use and storage. It's also important to look beyond the specific abrasive application and consider the big picture. What is happening in the entire fabrication or manufacturing process from a cost and productivity perspective?

Before selecting a product, contact your abrasives manufacturer or local distributor to discuss the results you desire. It's much easier to achieve success when the process and the abrasive product are considered from the beginning. From there, consider these seven common tips to help optimize productivity, performance and safety in cutting, grinding and finishing applications.

### Tip No. 1: Identify Your Desired End Result

Knowing what you're trying to accomplish is the first step in choosing the right abrasive product. Completing rough grinding after a deburring operation requires a different process and products than does blending or finishing, for example.

A common pitfall in surface finishing is using the same wheel no matter the job. Always match the abrasive product to the task at hand. Identify your desired results and then plan the process that will produce those results. Choosing the right product for the job requires an understanding of the entire process. Will the part be painted, anodized, or have chemicals applied? All these factors play a role.



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As a rule, grinding wheels are used for rougher finishes that won't be painted, while flap discs grind and finish at once and produce relatively fine finishes. Resin-fiber discs can be used for a short lifespan to grind quickly with a relatively fine finish.

The desired finish for the material also impacts the needed grain type and grit size of the abrasive product. Generally, 24- through 50-grit discs leave a relatively rough finish and are used to remove a lot of material quickly; 60- to 100-grit discs fall in the middle of the spectrum and are typically used when the surface will be grinded and painted; and grits of 100 or more should be used to achieve fine finishes.

When considering costs, keep in mind the overall process rather than just the cost for each abrasive disc or wheel being used. The required labor and time for any rework can have a big impact on overall costs. For example, a cutting wheel that minimizes surface burn of the material makes part fit-up much easier and faster.

## **Tip No. 2: Know the Material**

The type of material you are grinding or cutting is another key consideration for choosing the right product and getting the best results. Different materials require different conditions and best practices. Stainless steel typically involves more stringent requirements to prevent expensive damage. Products designed specifically for stainless steel help improve material finish and overall workflow by reducing heat buildup and workpiece staining.

When you are working with aluminum, it's important to reduce the amount of material loading on the wheel or disc face. If your disc is not designed specifically for aluminum, you'll wind up constantly swapping out a disc or wheel that has been loaded, leading to more downtime and higher overall cost.

Know the material to determine the appropriate bond for grinding or cutting wheels. It's a good rule to choose a product with a softer bond when conditioning harder materials and choose a product with a harder bond when conditioning softer materials. This helps maximize product life and cutting ability.

**The bottom line:** The more you know about the base material, the better your results.

### **Tip No. 3: Match the Disc to the Tool**

Correctly matching the tool and abrasive can deliver significant cost savings and productivity gains as the efficiency of the abrasive is directly affected by the tool it's being used on. If the wrong tool is used for the job, problems will arise even with the right accessory. In grinding especially, it's key to match the appropriate abrasive product to the highest-performing tool (based on amperage or RPM) allowed by the job. For example, using a low-amperage tool with a 14-gauge extension cord can't turn the grinder fast enough to provide optimal performance.

### **Tip No. 4: Stay in Motion**

With any abrasive product, it's important to keep the wheel or disc in constant, smooth motion and avoid bearing down with heavy pressure or dwelling in one spot. Constant motion reduces the risk of gouging or material damage and helps prevent heat buildup that can cause discoloration.

Pull the initial stroke toward you rather than pushing the tool away from your body. This greatly reduces the risk of gouging, especially when you are using a new wheel.

### **Tip No. 5: Watch the Angle**

Position the tool at a slight angle to the workpiece when grinding. Increasing the angle of the grinding wheel provides more aggressive grinding but reduces wheel life. Reducing the grinding angle lessens the pressure being applied to enhance product life, but it also minimizes cut rate.

Grinding or finishing at an angle that is too steep may cause you to work much harder than necessary since you're not getting the full benefit the product is designed to provide.

When using cutting wheels, hold the tool at a 90° angle, perpendicular to the workpiece. This position enhances safety and helps improve wheel life and cut rate.

It's critical to use grinding and cutting wheels as designed to enhance safety and get the best performance and efficiency.

### **Tip No. 6: Store Equipment Properly**

Storage recommendations depend on the type of product you use. Resin-bonded abrasives should be stored at ambient temperatures, as exposing them to big temperature swings negatively affects the bonding agent. Compare this to coated abrasives (flap discs), which are less susceptible to changes in temperature.

With any abrasive product, store it in the original packaging when possible. If you remove the disc or wheel from the package and then store it in a toolbox, you may lose track of what type of product it is and what materials it should be used on. Storing the product in the original packaging helps reduce the risk of cross contamination, which is a critical issue in some applications. Any product used on carbon

steel, for instance, should not be used on stainless steel or aluminum.

The risk for contamination is high when a wheel is left on a grinder. When the grinder is taken back to the toolroom, it becomes difficult to remember which material the product was used on previously.

In addition to proper storage, always inspect the abrasive product and the tool for any cracks or damage before using it.

## **Tip No. 7: Always Be Safe**

Beyond choosing the right product, following proper safety procedures is also critical to success. The most important safety practice is to always use the tool guard.

Safe operation also involves watching the speed. The RPM rating of the accessory should meet or exceed the RPM rating of the tool. For example, a 7-inch grinding wheel that is worn down to a smaller size should not be used on a 5-inch grinder, because the wheel was not designed to be used at the much higher speed of the smaller tool. Also, if you can't read the RPM rating on either the tool or the abrasive product, don't use them.

It's also unsafe to use an abrasive product on a task for which it wasn't designed, such as using the sides of a cutoff wheel to perform grinding or deburring. Grinding with the side of a cutoff wheel—even for a few seconds—can damage the wheel and reduce the fiberglass reinforcement, causing the wheel to break apart.

Any product modifications can compromise safety and efficiency. Be sure you're following the recommendations for proper use. You can also try using a different wheel or disc to improve performance for the application.

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