

How-to

# Improve Productivity in Cutting, Grinding and Finishing

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Most welding and fabrication operations look regularly for ways to improve productivity and save time and money. Assessing the cutting, grinding and finishing processes can uncover efficiencies that result in cost savings and improve throughput.

While many variables impact how much time is spent on cutting, grinding and finishing — from the welding process to the size and scope of what is being produced — using the right abrasive for the job and employing proper techniques go a long way toward boosting productivity.

Read on to learn some time-saving best practices.

## Consider the big picture

The purchasing process can hinder productivity. Often companies treat abrasives like commodities and make decisions based on the lowest purchase price. This may save money upfront, but it often runs counter to the productivity goals in the welding and fabricating operation.

Consider the actual performance of the product in the application. A longer-lasting (but more expensive) abrasive or one designed specifically for the application can pay off quickly through reduced changeover and increased efficiencies.

Take advantage of programs offered by some product manufacturers that help in selecting and testing the right abrasive solutions. These programs offer on-site technical support and process analysis. Measuring an abrasive's performance can provide companies with a competitive edge through greater productivity, while also driving down costs.

## Tips for cutting

To maximize productivity and performance when cutting, use a rocking motion with the grinder. This motion reduces the heat being produced from the abrasive contacting the metal, which speeds up the cut and increases wheel life. Less heat in the cut also helps minimize the time spent on rework.

The extent of the rocking motion depends on the thickness of the cutting wheel and of the base material. A thicker wheel used on thicker material requires a stronger rocking motion than a thinner wheel used on thinner material.

Ultra-thin cutting wheels are also available for working with thin materials. These products provide a smoother, faster cut, so they require much less of a rocking motion than thicker wheels do to maximize productivity.

The operator's approach to the workpiece also affects productivity and varies based on part configuration. When working on square tubing, for example, it's best to approach the piece directly on the corner and make first contact with the tool mirroring how the piece is mounted on the fixture. A rounded workpiece offers a more natural fit for a rounded cutting wheel, and the operator can approach it directly with good results.

In any cutting application, follow proper safety procedures, especially when offhand right-angle cutting. Always use clean, properly fitted personal protective equipment for the best view of the work.

## **Tips for grinding**

Improve productivity in grinding applications by paying close attention to the angle of the tool to the base material.

Generally, a steeper angle removes more material and, therefore, tends to be more productive. The recommended angle for a Type 27 bonded grinding wheel is 30 degrees, which grinds more material in less time compared to holding the tool at a shallower angle.

When cleaning a weld with a new grinding wheel, the operator should start by pulling the wheel toward his or her body for a few strokes before moving into the standard motion of pushing the wheel away to remove weld material. This technique helps break the wheel in for more effective and efficient grinding.

To reach into a corner or get into a tight spot for grinding, it can be helpful to use a Type 28 grinding wheel. This type has more of a saucer shape and can grind more effectively at lower angles.

In applications that call for a finer surface finish, it can be more productive to use a flap disc, which saves time by grinding and finishing in one pass. The recommended angles of use are different for flap discs than for grinding wheels. A Type 29 flap disc should be used at a 15- to 35-degree angle, while a Type 27 flap disc should be used at zero to 15 degrees for the best productivity.

## **Tips for cleaning and finishing**

When it comes to metal finishing, there are many product options — from wire and stringer bead wheels to cable twist wheels and circular flared end brushes. The proper tool for the job — and the most productive — depends on the type of material being cleaned and the surface finish requirements. Again, it's important to follow the guidelines for safe usage of any product. For example, never exceed the rated rpm of a wire brush.

With all wire brushes, the wire tips are designed to do the work. Encapsulated crimped wire end brushes are a good option to improve productivity. These use fill material encapsulated in an elastomer that gradually wears away, keeping only the wire tips exposed. This allows operators to use as much pressure as desired for effective cleaning without the risk of long wire breakage.

Because the wire tips are utilized through the entire life of the product, encapsulated wire brushes offer much longer life. These brushes typically last four to five times longer than other wire brushes, but their purchase cost is typically twice that of a standard brush. Still, encapsulated brushes offer fast payback, thanks to the reduced product changeover — saving significant time and improving productivity.

Designed for high-pressure applications, encapsulated wire brushes don't offer conformability or flexibility, but they do provide advantages for surfaces needing heavy cleaning. They are commonly used in pipe welding and spot facing. The brushes are available in a wide variety of configurations, just as other wire brushes are, and they include options rated as standard, heavy duty or heat stabilized.

## **Best practices to boost productivity**

When you're looking for productivity gains, don't forget the cutting, grinding and finishing applications. Following some key best practices for proper usage and operator technique can have a significant

impact on productivity and the bottom line for the entire operation.

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