How-to

Four Important Considerations When Choosing the Right Convolute Wheel for Your Next Abrasives Project

Brought To You by Norton Abrasives | Feb 18, 2018

Convolute wheels, used in deburring, blending and final finishing of metal parts, have historically been gray, fairly non-descript and lacking instructions as to which wheel to use when.

Formed by wrapping non-woven material that contains abrasives around a center core so that the face of the wheel can be used for grinding, convolute wheels are commonly used in metal fabrication. These non-woven abrasives remove a small amount of material and also provide a finish on metal parts.

As ubiquitous as they are, however, Norton decided to make it easy for operators and buyers to select the right wheels for the job at hand and provide wheels with improved performance, longer life and therefore reduced cost of use. And they're doing it in color.

Norton | Saint-Gobain Rapid-Finish Convolute Wheels

There's always demand for a long-lasting, quicker-cutting wheel to match the efficiency needs in today's manufacturing environments. In response, Norton recently introduced the Rapid Finish General Purpose line of convolute wheels. The non-woven synthetic fiber mesh, impregnated with abrasives and bound by resins, creates surface finishes for the majority of applications.

The new line features a unique color-coding system to make wheel selection easy for operators on the shop floor. The company's Clean Bond® high-temperature resin and high-performance fiberglass cores combine for faster cutting, limited wheel wear and higher productivity. The wheels provide:

- A 30 percent faster cut based on a new grain/bond configuration.
- Substantially less shed so that wheels last 10-30 percent longer than competing wheels.
- A smear-free finish on a wide range of workpieces based on patent-pending Norton Clean Bond® resin technology.
- Simplified selection with color coding for quick wheel changes and purchases.

The first wheel offered within the new line, which is maroon in color, addresses approximately 80 percent of the market. Fiberglass cores replace traditional phenolic cores to provide greater concentricity, eliminate wear in wet applications and elevate operator comfort with a vibration-minimizing feel. In addition to the wheel itself being maroon, the fiberglass cores are now color-coded to indicate abrasive type; white cores are aluminum oxide and black cores are silicon carbide.

Conventional non-woven abrasive products can create smear on a workpiece surface. Heat generated during the grinding operation often prematurely expends the abrasive grain early in the finishing process, which then leaves only the coated fiber. Continued use eventually melts the fibers and ends up on the surface as smear. But Norton Abrasives' new convolute line isn't like conventional products.

The Norton Rapid Finish General Purpose convolute wheels offer a precise combination of abrasives, grit size, density and technology upgrades. Non-woven wheels feature a waterproof, washable, conformable and non-loading open mesh construction. So, how do you know for sure that this is the convolute wheel you need?

Four Steps to Arrive at the Correct Convolute Wheel Product

Here are four questions to answer to determine which convolute wheel is best for you:

1) Do you fall into the 80 percent range?

Does your application require a normal amount of deburring, blending and finishing? Is the amount of material removed fairly minimal? If you need heavy deburring or a specialty finish for your metal parts, stop here and ***contact Norton*** for additional options. If you're within that 80 percent, move to the next question.

2) Which abrasive grain type describes your requirements?

Are you working with ferrous metals? If so, the aluminum oxide general purpose wheel with the white core is for you. In comparison, non-ferrous metals will use the silicon carbide wheel with a core that is color-coded black.

3) What grit level is best for your application?

The general purpose line of wheels come in a range of grit sizes:

- Fine grit is used for middle-of-the-road blending,
- Very-fine grit provides a delicate finish, and
- Medium grit provides the aggressiveness necessary for light deburring.

Conventional non-woven abrasive products can create smear on a workpiece surface as applying the abrasive generates heat. That heat often prematurely expends the abrasive grain early in the finishing process, which then leaves only the coated fiber. Continued use, along with the heat and the binder coating of the fiber, further breaks down and, eventually, melts the wheel's fibers and ends up on the surface as smear. But the Norton Abrasives new convolute line isn't like conventional products.

4) Are you looking for conformability or durability?

The varied tightness of wrap around the core creates various density options:

- Lower density provides conformability, and
- Higher density provides durability.

Density, in this case, refers to the amount of fibers compressed into the abrasive material; densities of 5 (soft) through 9 (hard) are available, providing the flexibility necessary for diverse materials, including titanium, glass, stainless steel, carbon steel, non-ferrous metals, hard woods, soft woods and more.

Applications Addressed by the General Purpose Wheel

The basis for wheel choice involves application. Non-woven products are used across many manufacturing industries, including aerospace, automotive, electronics, medical products and others. Two examples of specific applications include:

APPLICATION/GRIT RECOMMENDATION GUIDE

MOST AGGRESSIVE ← → LEAST AGGRESSIVE

NORTON	Rapid Strip Wheels	Rapid Blend Unified Wheels	Rapid Finish GP Convolute Wheels	Metal Finishing Convolute Wheels	Clean & Finish Convolute Wheels	Light Finishing Convolute Wheels	Non-Woven / Interleaf Flap Wheels
Scale Removal	Best Choice						
Stock Removal		Best Choice	Second Choice				
Heavy Deburring		Best Choice	Second Choice				
Decorative Finishing				Best Choice	Second Choice		
Blending			Best Choice	Second Choice			
Cleaning				Second Choice	Best Choice		
Light Deburring			Second Choice			Best Choice	
Light Finishing			Second Choice			Best Choice	
Polishing						Best Choice	Second Choice
Buffing							Best Choice

The number of applications addressed by the Norton Rapid Finish convolute wheels addresses 80% of the market. Source: Norton Abrasives

When a company encountered difficulty removing the (carbon steel 1095) edge burr in its multi-head coil-polishing operation, a Norton 9SF Rapid Finish General Purpose convolute wheel was substituted for the current solution. The Norton GP wheel eliminated all burrs from the blade roll in a single pass and also eliminated lubricant application. The Norton wheel provided almost double the cut rate while shedding 30 percent less than the incumbent wheel.

In another application, the Norton Clean Bond® GP 6SVFN convolute wheel was tested in place of a comparable competing wheel to polish stainless steel 316 plates. The Norton wheel produced an improved finish (surface roughness (R_a) of 5 um vs. 9 um) and demonstrated 30 percent longer life.

Summary

The superior durability of Norton convolute wheels generates optimal cost savings and superior part quality. Consistent, reliable cut performance with less shedding, wheel wearing, dressing and reshaping, results in saved time and money. Minimal airborne dust improves operator environment, safety and part finish quality. Design conformability makes these wheels operator-friendly with less body fatigue.

Norton Rapid Finish convolute wheels are an easy choice to make, and once made, are rapidly identifiable on the factory floor. While color-coding makes visual identification simple, it's the increased performance, longer life, smear-free results and rapid operation that will substantially impact your bottom line.

Gray wheels are not just giving way to maroon general purpose ones. Norton continues to pursue best in class performance across all of their non-woven abrasive offerings. In the near future new and improved heavy deburring and final finishing wheel types will join the maroon general purpose wheel. A brown wheel will be used for heavy deburring, while final finishing wheels will be green.

Previously featured on the IEEE GlobalSpec website.