3M Science. Applied to Life.™

Winning Abrasive Combinations

Paint Preparation

The combination of 3M's trusted abrasive brands delivers a powerful solution for paint preparation, reducing steps and optimizing your finishing process for better outcomes.

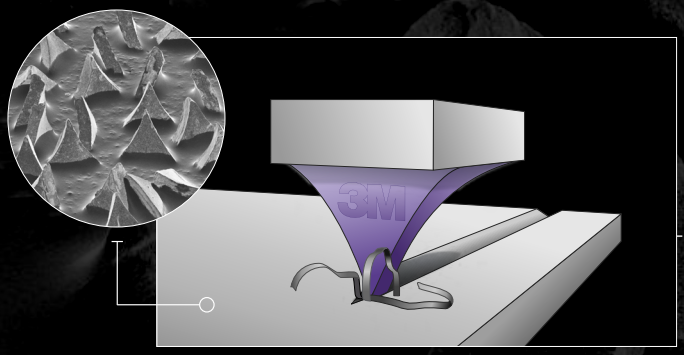
3M | Cubitron™ 3 Performance Abrasives

3M | Cubitron™ 2 Performance Abrasives

Scotch-Brite™

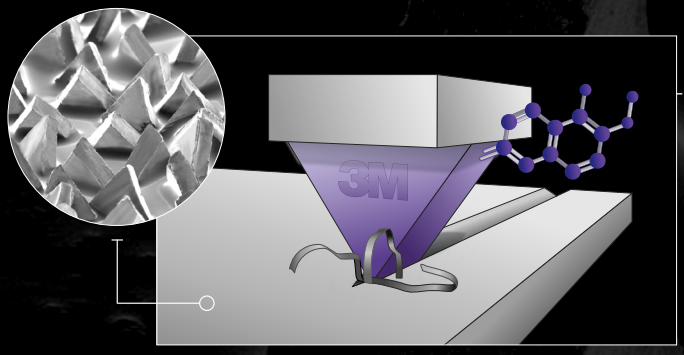
3M | Xtract™ Clean Sanding Solutions

Technology that transforms how work gets done

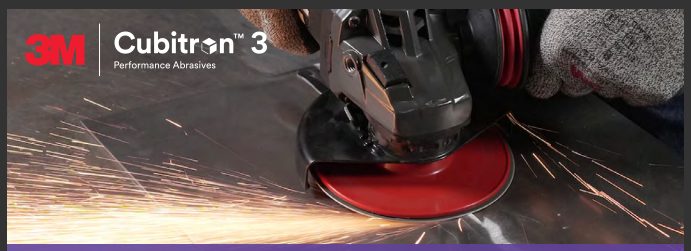


3M Cubitron™ 3 Performance Abrasives

Re-engineered precision-shaped ceramic grain using a proprietary breakthrough in grain shape with curved sides.



Re-engineered precision-shaped ceramic grain using proprietary breakthrough in molecular bonded technology.

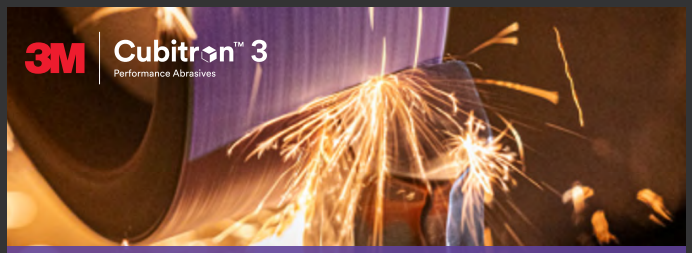


11-Series Fibre Discs

228%
Faster Sustained Cut Rate
vs. Competitive Shaped Grain Fibre Disc, 60+

207%
More Total Material Removed
vs. Competitive Shaped Grain Fibre Disc, 60+

These claims relate to 3M™ Cubitron™ 3 Fibre Disc 1187C, 60+ [1]



11-Series Cloth Belts

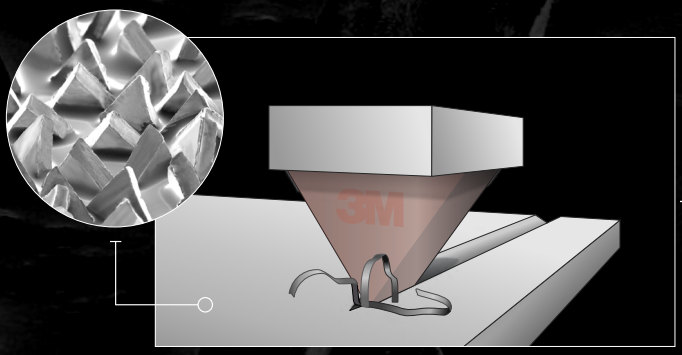
86%
More Speed
vs. 3M™ Cubitron™ 2 984F, 36+

78%
More Total Material Removed
vs. Crushed ceramic competition

These claims relate to 3M™ Cubitron™ 3 Cloth Belt 1184F, 36+ [2]

See how our proprietary technology breakthroughs can lead to exceptional performance gains – helping to make paint preparation more productive and designed to create a safer working environment for operators.

In this guide we show how combining these technologies into sequential process steps can take process transformation to another level!



3M Cubitron™ 2
Performance Abrasives

3M pioneered the first precision-shaped grain using micro-replication technology to form consistent sharp peaks that "slice" – cooler cut, longer life and fast!

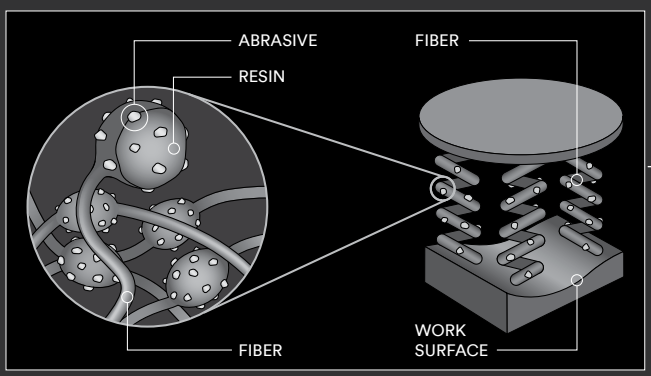
7-Series Orbital Sanding Discs

99%
Dust Extraction
vs. Conventional Abrasives

This claim relates to 3M Xtract™ Cubitron™ 2 Film Disc 775L.[3]

4x
Longer Life
vs. Leading Competitor

This claim relates to 3M Xtract™ Cubitron™ 2 Paper Disc 732U.[3]



Scotch-Brite™ With Precision-Shaped Grain

3M™ Precision-Shaped Grain and nonwoven abrasives combine the benefits of two 3M technologies. A transformation in speed and life without sacrificing the smooth finish expected from Scotch-Brite™ products.

Scotch-Brite™ Precision Surface Conditioning

40%
More Life
vs. Leading Competition

3x
More Speed
vs. Leading Competition

These claims relate to Scotch-Brite™ Precision Surface Conditioning Disc PN-DH A-MED[4]

Applications

When preparing a surface for paint, our process experts at 3M suggest three key principles when considering how to make improvements to your process.

Start at the Finish
Your coating type and thickness defines the required finish you need.

Be Open to New Solutions
Be open to completely new ways of getting the job done – changing products like-for-like will only get you so far.

Each Step Impacts the Next
One step in a process impacts the next – taking a total system approach will provide the biggest benefit to you.

Metal fabrication

Where welding is an important part of the process.

3M technologies combine to create innovative product combinations that can get most jobs done in just two steps.

Where a weld needs grinding with rotary tools, it takes just two reference points to determine that winning combination – the size of the weld and the thickness of the coating being applied at the end.

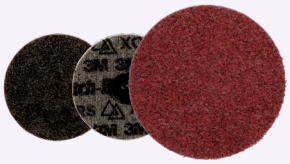
Your two-step combination for performance

Just 2 steps to the perfect finish when preparing metal for paint.

1

3M™ Cubitron™ 3 11-Series Fibre Discs & Roloc™

2



Scotch-Brite™ Precision Surface Conditioning Discs & Roloc™

Paint shop

Where welding is less common and random orbital sanders are the main tool in use.

Here, it's all about the power of our advanced grain technology to deliver a better process by either reducing the time to complete each step or skipping steps altogether!

When working with orbital sanders, it's more about that critical surface finish and to define the sequence for you, consideration needs to be paid to the substrate being sanded and any additional needs you might have.

3M Xtract™ Cubitron™ 2 Orbital Sanding Discs
Grades 40+ – 1000+

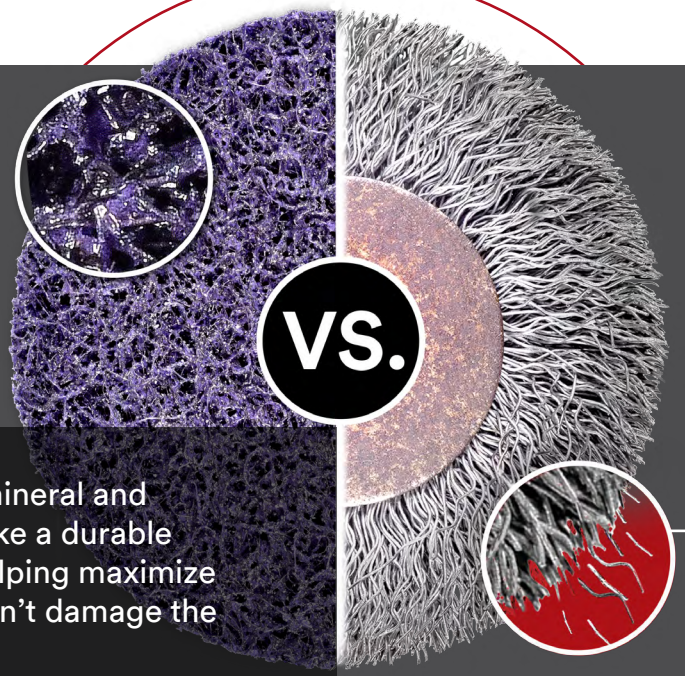
Paint preparation in metal fabrication

Transforming your paint preparation process in metal fabrication is about looking at the entire sequence of jobs to be done from start to finish.

Switching to 3M in as many of these jobs as possible gives you the best chance of reaching your productivity and worker safety potential. Take a look where we can help you:

Fabrication Environment

Spotlight on Scotch-Brite™ Clean and Strip XT Pro



Sharp silicon carbide mineral and re-engineered web make a durable disc that works fast, helping maximize operator safety and won't damage the base metal.

90%
Less Vibration

54%
More Speed
vs. crimped Wire Cup Brushes Tested[5]

No steel wires or high impact particles that could injure workers

Metal fabrication combination builder

Step 1 – Build the product combination

High Durability Option

To build your ideal winning product combination, the type of tool used will determine the right product form for the weld grind step.

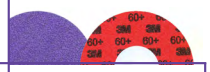
Surface refining is all about product durability and finish – rotary or random. Below you will see the options available to complete the two step process.

Weld/Grind → **Surface Refine** → **Paint**

Starting point
Angle Grinder

Tight space?
Small part?

Disc Sander



3M™ Cubitron™ 3 11-Series Roloc™ Disc

3M™ Cubitron™ 3 11-Series Fibre Disc

More durability?
Outer corners and sharp edges

Scotch-Brite™ Precision Heavy Duty Surface Conditioning Disc
Angle Grinder

Scotch-Brite™ Precision Heavy Duty Surface Conditioning Disc Roloc™
Disc Sander

Scotch-Brite™ Precision Surface Conditioning Disc
Angle Grinder

Scotch-Brite™ Precision Surface Conditioning Roloc™
Disc Sander

Orbital finish?

Orbital Sander

3M Xtract™ Cubitron™ 2 Film Disc 775L

For alternative options see page 10

Belt Machines
All types used for paint preparation

Paint preparation with abrasive belts

Compared to rotary and random orbital tools, building a winning combination for paint preparation with belts involves many more variables that determine application parameters that require consideration.

Use our 3M™ Cubitron™ 3 products on their own for weld prep/beveling and weld/surface grinding before applying thick paint coatings. For thinner paint coatings turn to a combination of 3M™ Cubitron™ 2 and Scotch-Brite™ belts to ensure that finish before paint is just right.

Whatever your application, 3M belts are designed to cut faster and reduce overall process costs.

Common paint preparation jobs

- ✓ Edge beveling
- ✓ Inside surfaces
- ✓ Defect removal
- ✓ Flat weld grinding
- ✓ Large flat surface grinding and refining

3M Cubitron™ 3 Performance Abrasives

3M Cubitron™ 2 Performance Abrasives

Scotch-Brite™

Contact your 3M process specialist to build your winning combination for belt applications

Metal fabrication combination builder

Step 2 – Build the grade sequence that fits the application

High Durability Option

Surface Conditioning Disc and Roloc™ Grades:

MED | CRS | XCRS | XXCRS

Power/Liquid Coating Thickness

Weld Type	Coated Abrasive Step	Surface Conditioning Disc Rotary Finish			Random Orbital Finish			
		+3 mil	+2.5 mil	+2 mil	+3 mil	+2.5 mil	+2 mil	+1 mil
Large	3M™ Cubitron™ 3 36+	Scotch-Brite™ Precision Surface Conditioning Disc XCRS Scotch-Brite™ Precision **Heavy Duty** Surface Conditioning Disc XXCRS	Rarely used for this thickness of coating		Rarely used as a finish step following a 36+ starting point			
Medium	3M™ Cubitron™ 3 60+	Scotch-Brite™ Precision Surface Conditioning Disc XCRS Scotch-Brite™ Precision **Heavy Duty** Surface Conditioning Disc XCRS	Scotch-Brite™ Precision Surface Conditioning Disc CRS Scotch-Brite™ Precision **Heavy Duty** Surface Conditioning Disc CRS	Scotch-Brite™ Precision Surface Conditioning Disc MED Scotch-Brite™ Precision **Heavy Duty** Surface Conditioning Disc MED	Rarely used for this thickness of coating	Try 80+ first. Consider stepping back to 60+ as a preceding step if required when following 60+ rotary step. Consider following 80+ with 120+ for +1 mil coatings. These guidelines assume a 5mm orbit – consider the impact of different orbit sizes on aggression (bigger orbit = more, smaller orbit = less).		
Small	3M™ Cubitron™ 3 80+	Rarely used for this thickness of coating	Scotch-Brite™ Precision Surface Conditioning Disc CRS Scotch-Brite™ Precision **Heavy Duty** Surface Conditioning Disc CRS	Scotch-Brite™ Precision Surface Conditioning Disc MED Scotch-Brite™ Precision **Heavy Duty** Surface Conditioning Disc MED				

Image: Tom Gibson – Professional Metalworker

"We quickly realized we couldn't afford to use anything else but 3M™ Cubitron™ 3."

60%
Less Abrasives Used

Graham Hanks, Production Manager at Reddish needed to find a faster way of removing the topcoat, machine marks and welds down to sound metal before the subsequent finishing steps could be completed. The substrates they use are particularly hard to grind with speed and consistency.

Once we saw the significant increase in through-put these fibre discs and belts are capable of delivering, we quickly realized we couldn't afford to use anything else but 3M™ Cubitron™ 3. We now get twice the work done in half the time and the products are lasting at least twice as long.

How 3M sanding solutions drive process transformation?

Productivity Delivered

Speed and Life

A comparison between 3M Xtract™ Cubitron™ 2 sanding products and alternatives in any one grade will deliver speed and product life improvements that can really make a difference.

Fewer Steps

The power of 3M Xtract™ Cubitron™ 2 sanding products can enable users to skip steps in your existing process – driving additional throughput improvement and cost benefits.

Safety Built In

Vibration

By getting the job done faster, the time operators are exposed to this hazard while using vibrating tools can be dramatically reduced.

Dust Management

With respiratory health and a clean workspace becoming an increased priority for many, the 3M Xtract™ hole patterns paired with our tooling make it easy to achieve excellence in this area.

Paint shop combination builder

Step 1 – Prep for Primer

Step 2 – Primer/Gel Coat Sanding

Prep for Primer

Primer / Gel-coat Sanding

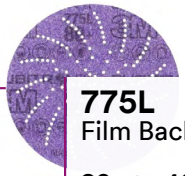
Paint

Scan for more product ordering information

Always Start Here

Best all-around product considering speed, finish and durability.

Likely to finish at grade 320+



775L
Film Backing

80+ to 400+

Move to Here

Paper backings deliver the best finish in finer grades.

Likely to start at grade 400+

732U
Paper Backing

80+ to 1000+

Additional Selection Step

Specific application requirements

More Durability	More Extraction	Cooler Running & More Flexible
		
900DZ Cloth Backing	**710W** Net Backing	**732U** Paper Backing
40+ to 320+	80+ to 320+	80+ to 1000+
Ideal for burrs, rivets and sharp corners.	Ideal for large flat surfaces where speed is important.	

Complete the system for maximum performance

3M Xtract™ Random Orbital Sanders

Powerful, comfortable and lightweight tools designed for ease of use and optimal dust extraction; so that you don't have to compromise high performance for dust management.

Pneumatic

Powerful 0.28HP motor
Self-generated vacuum and non-vacuum options

3M Xtract™ Portable Dust Extractor

Maximum dust extraction, right by your side. Connect air or electric tools for on-demand vacuum dust extraction.

High collection filters included.

Using 3M Xtract™ Cubitron™ 2 sanding products

"We don't base our decisions just on price alone."

Matt Stiffer, Floor Manager at Swift Canoe & Kayak needed to establish a process that provided more consistency in the finish with far better dust management when working on composite and fiber glass before painting.

"We don't base our decisions just on price alone, we mainly buy product because they're performing like we need them to so that we can get the quality that we need.

3M products give us great dust extraction, it's safer for our employees and it's better all around for contamination in the air.

Our industry is constantly growing and you need to grow with it. If you're not willing to change then the industry is just going to leave you behind."

"Lasts 4X longer."

Rick Edwards, Workshop Manager at Bakehouse needed to increase throughput, improve dust management and maintain the high finish consistency their clients expect from the subsequent paint process.

"The finish these discs give us is seamless and we've never had that from another product. When it's going straight into the paint shop and coming out with the exact finish you're looking for without lots of other re-work that saves so much time.

Before we were using a three grade process and with the 3M products we've managed to get a better end product with just two grades by skipping the 80 grit and starting with 120 grit. Combine this with something that lasts 4x longer and that's actually a huge saving when you look at this over a year.

The leap in technology in these discs gives us a clear advantage over what we had before."

Other products

Scotch-Brite™ Hand Pads and Flatstock

Fabrication Processes:

Re-work | Weld Cleaning

Scotch-Brite™ Hand Pads 7447 Pro

- Very fine grade aluminum oxide mineral cleans and finishes efficiently
- Tightly graded abrasive particles for consistent, uniform scratch throughout life of the hand pad
- Long-lasting pad made with durable nonwoven nylon web is flexible enough to get into hard-to-sand places; Specially coated to minimize loading
- Cleans, finishes and scuffs a wide variety of surfaces, offering ultimate versatility
- Can be used wet or dry and rinsed for repeated use

Available Forms

- Roll
- Hook & Loop
- Disc
- Pad

Scotch-Brite™ Hand Pads 7448 Pro

- Ultra fine finishing action outperforms steel wool for cleaning, blending, prepping and finishing on metal, wood, plastics and composites
- Cuts faster and produces a more consistent finish than conventional nonwoven abrasive products
- Long-lasting pad is specially coated to minimize loading
- Pad conforms to irregular surfaces and gets into corners without losing performance
- Performs like steel wool grade 00 without shredding, rusting, or splintering

Available Forms

- Roll
- Pad

3M™ Cubitron™ 3 Cut-Off and Grinding Wheels

Fabrication Processes:

Cutting | Weld Prep

3M™ Cubitron™ 3 Cut-Off Wheels

For carbon and stainless steel

Up to **3X** More Life

10% More Speed

vs. 3M™ Cubitron™ 2 Cut-Off Wheels[6]

Up to **33%** Less Hand-Arm Vibration

vs. Competitive Ceramic Grain Wheels[7]

- ✓ For ultra-fast cutting through sheet metal, metal tubing and more

Scan for more detailed product ordering info

3M™ Cubitron™ 3 Depressed Center Grinding Wheel

For carbon and stainless steel

Up to **50%** More Life

14% More Speed

vs. 3M™ Cubitron™ 2 Depressed Center Grinding Wheels[8]

Up to **33%** Less Hand-Arm Vibration

vs. Competitive Ceramic Grain Wheels[9]

- ✓ Beveling
- ✓ Surface Grinding
- ✓ Weld Grinding
- ✓ Gouging
- ✓ Flame Cut Smoothing

Automating paint preparation processes

Automation Ready

There are many reasons to invest in automating your abrasive processes: improvement gains in productivity; increase in consistency, quality and safety; an answer to your labor shortage. To ensure maximized ROI from your investment, the best path comes from automating correctly from the start. That's where 3M products and engineering expertise come in.

The limitations of manual operation.

Manual operators are constrained by the amount of force they can apply and the angles they can hold a tool. Automation removes many of these constraints, working consistently and repeatedly at targeted angles and an optimized level of force and speed.

A robot however, is still constrained by the abrasives it's running.

The vital importance of the right abrasives and process parameters in automation.

To realize the full ROI on your automation investment, you want to optimize your abrasive products and parameters for these four key elements:

How automation helped improve quality and throughput at a large agricultural equipment manufacturer as they prepared welds for the paint step:

Over

3x First Pass Quality Improvement

From 25% manual to 80% automated

6x More Speed

From 2 hours manual to 20 mins automated

Products engineered with automation in mind.

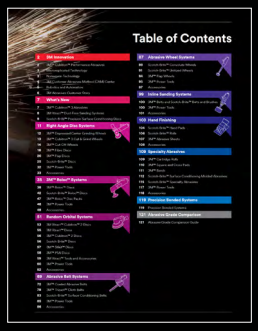
3M™ Cubitron™ and Scotch-Brite™ Abrasives elevate product life, cut rate and wear consistency.
This enhances processes that are already automated or increases the appeal of automating current manual ones.

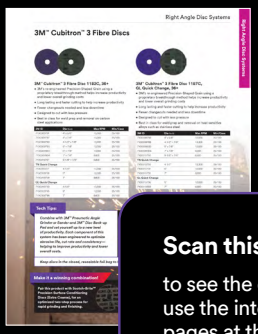
Start your journey with 3M.

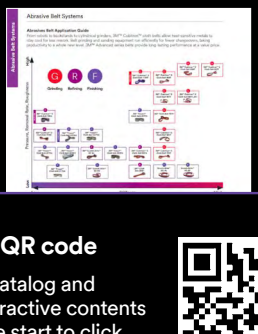
We know abrasive automation. We start with your part requirements in mind and offer consultation on the entire cell system; including recommendations on hardware and software, connections to partners in our 3M System Integrator Network and running proof of concept projects in our labs; to meet the needs of your process.

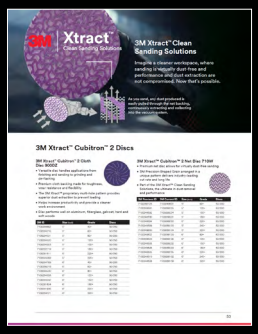
Product ordering details

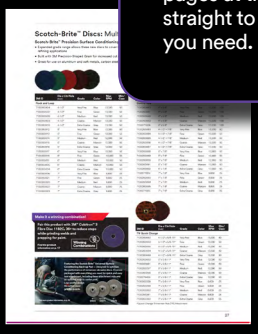
Our product catalog is the best place to find specific part codes and ordering information for products contained in this paint preparation guide.











Scan this QR code

to see the catalog and use the interactive contents pages at the start to click straight to the products you need.

1. **228%:** 60+ & 80+ Stainless Steel: The 'sustained cut rate' claim is determined from averaging the cut/cycle from cycles 5-24 (20 cycles total, which is approximately 4 minutes of grinding) Units for stainless steel will be (Grams/cycle)

   207%: 60+ Stainless Steel: The 'total material removed' claim is determined by averaging the amount of metal ground over 40 cycles, approximately 8.5 minutes of grinding 80+ Stainless Steel: The 'total material removed' claim is determined by averaging the amount of metal ground over 72 cycles, approximately 15 minutes of grinding.

2. **86%:** Results based on an automated, 10-minute grinding test on 304 stainless steel using 36" long belts. Error bars = 95% confidence interval. Cut rate: the total material removed in grams after 10 cycles minus total material removed in grams after 3 cycles divided by seven cycles. The unit is grams/cycles.

   Results based on an automated, 10-minute grinding test on 304 stainless steel using 36" long belts. Error bars = 95% confidence interval. Total material removed: The total material removed in grams at 40 cycles.

3. **Lasts up to 4x longer:** Compared to Competitive Aluminum Oxide Abrasive Products. Results are based on an automated test with solid surface material using 127mm 320 grit discs and 3M Xtract™ Low Profile Finishing Back-up Pad 20290. The disc reaches the end of life (EOL) when the cut rate per 1-minute cycle is 75% of the initial cut rate of average of competitors. Total cut is the amount the disc cut when reaching EOL.

   Up to 99% dust extraction: Determined by measuring captured dust through an automated sanding test using solid surface material. Percentage is measured by understanding total mass loss captured and not captured. 3M™ self-generated vacuum tool, part number 88946, was utilized for sanding and dust capture with 3M Xtract™ filter bag, part number 89137.

4. **40%:** Based on 3M internal testing: CRS 3" discs were tested robotically on 304 series stainless steel for 12 minutes, using a 3" 3M™ Hard Back-Up pad, part number: 45091. One part is equivalent to 20 g of material removed.

   3X: Based on 3M internal testing: MED 3" discs were tested robotically on 6061 aluminum until the end of life (end of life determined to be 50% of the averaged cut rate of the first three minutes) using a 3" 3M™ Hard Back-Up pad, part number 45091. One part is equivalent to 20 g of material removed.

5. **90% vibration and 54% speed:** Compared to listed competitor and Scotch-Brite™ Clean and Strip XT Pro Disc, Type 27, according to independent testing by Fraunhofer Institute on October 2021.

6. **3X life and 10% speed:** Results are based on an automated, cutting of a 3mm thick 304 stainless steel sheet. Cut-off wheel geometry was T41 125 mm x 1.6 mm x 22 mm mounted on a 1.5 hp angle grinder with an applied force of 9 lb. Cut speed was defined by time needed to cut 1 meter of stainless steel. The number of cuts was estimated by the amount of wheel that was used after cutting a distance of 1 meter. End of life is assumed to be 50% of initial wheel mass.

7. **33%:** Performance testing in a typical weld preparation process or cutting operation; 3M™ Cubitron™ 3 Cut-Off Wheels average compared to the average results of the high-quality competitive ceramic grain competitive wheels tested, according to independent testing, August 2023.

8. **50% life and 14% speed:** Results are based on an automated beveling of 1018 carbon steel bars. Grinding wheel geometry was 115 mm outer diameter mounted on a servo motor with an applied force of 12 lb. Cut speed was defined by metal removed after 10 minutes of testing life. End of life is assumed to be 50% of the initial wheel mass.

9. **33% vibration:** Performance testing in a typical weld preparation process or cutting operation; 3M™ Cubitron™ 3 Depressed Center Grinding Wheels average compared to the average results of the high-quality competitive ceramic grain competitive wheels tested, according to independent testing, August 2023.

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