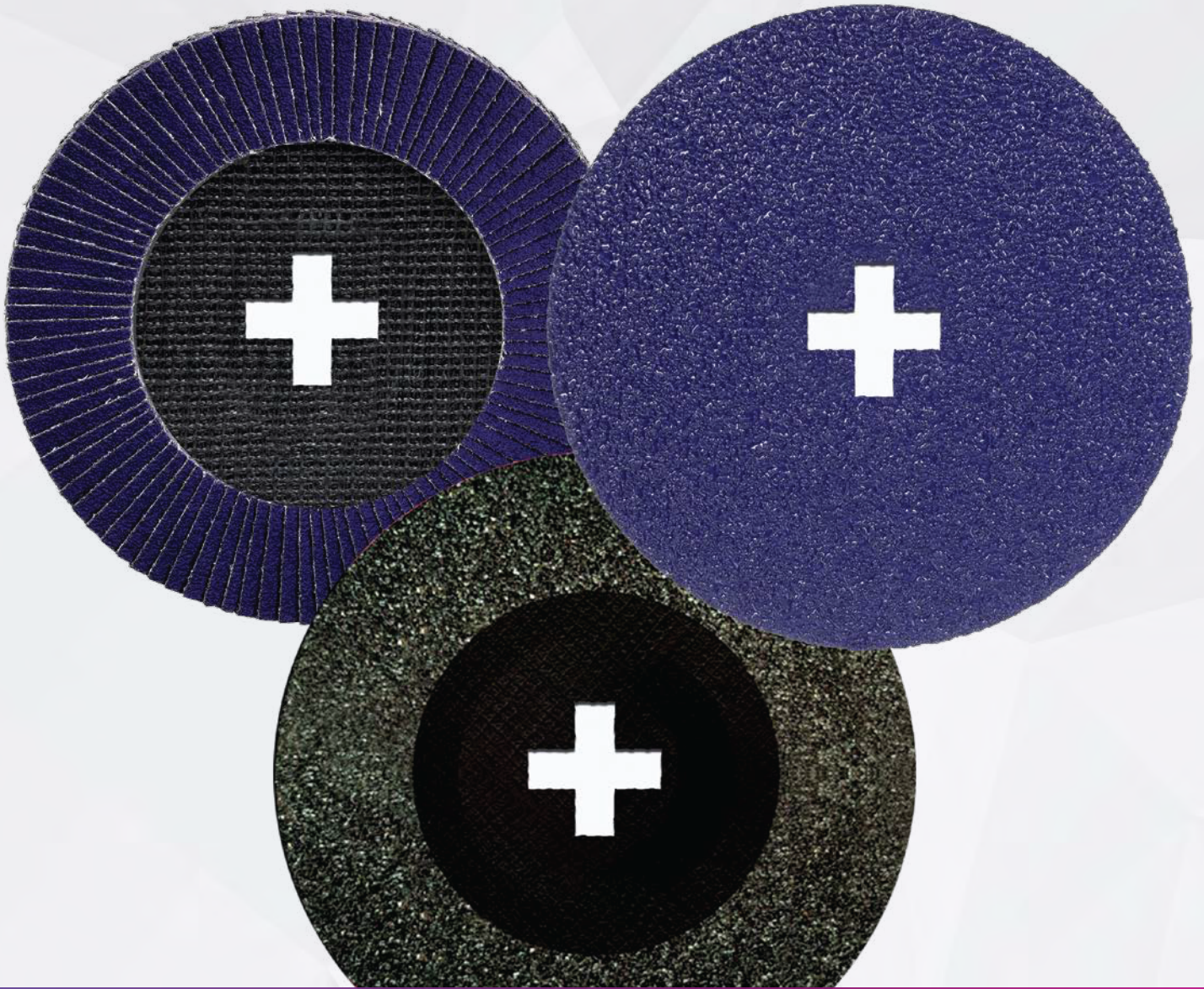




Abrasive Safety Assessment Guide



Helping to identify and reduce workplace hazards
associated with using abrasives in industrial applications.

Contents

Introduction	4
Abrasive hazards	6
Managing the risk	8
The Risk Reduction Indicator	11
3M technology applied to safety	12
Product options: Grinding Wheel	14
Product options: Cut-off Wheel	18
Product options: Fibre Disc	20
Product options: Flap Disc	22
Product options: Sanding Disc	24
Product options: Wire Wheel	26
Product options: Precision Radial Bristle	28
PPE guide	30



Abrasive Safety Assessment Guide

This guide will focus on four principal hazards associated with the use of abrasives in the workplace and the actions that can be taken to help reduce these risks:



Hand-arm vibration



Noise



Airborne particles



Injury

Abrasive processes using hand-held power tools, hand guided equipment, or holding materials being processed by machines play a critical role in many industries and are often the fastest and most efficient way to complete tasks or achieve production objectives.

The use of abrasives can involve an element of risk; the high speeds, temperatures and forces involved create immediate safety hazards due to the potential for equipment failure or accidental contact with moving parts. In addition, if not properly managed and controlled, the routine use of abrasives can potentially create significant short-term and long-term health hazards from hand-arm vibration, airborne particles and noise.

We will explain how control measures, such as substituting existing abrasive methods with more efficient/safer ones, can help to reduce the risks associated with abrasive operations like grinding, cutting, sanding and cleaning.

We also cover which complimentary personal protective equipment (PPE) should be used during common abrasive processes. Combined with other steps in the hierarchy of controls, appropriate PPE will help protect the health and safety of your employees and minimize risks of accidents.



We will explain how control measures, such as substituting existing abrasive methods with more efficient/safer ones, can help to reduce the risks associated with abrasive operations like grinding, cutting, sanding and cleaning.

Abrasive hazards

It is the responsibility of all employers to ensure the safety and well-being of their staff, especially those involved in potentially hazardous work. Employers must comply with a range of health and safety legislation, taking all the necessary steps to mitigate risk and provide employees with appropriate protection in a workplace.

Hand-arm vibration

There are many factors that can affect an operator's susceptibility to vibration, but generally, it is caused by working with vibrating equipment where exposure to vibration exceeds one hour per day.

- Prolonged exposure to vibration can cause damage to blood vessels, nerves and tendons in fingers, hands and wrists; leaving the sufferer with reduced sensitivity, strength and dexterity. e.g. vibration white finger (a circulatory problem where fingers turn white and numb).
- Once these conditions take hold, they are often irreversible and can become more severe over time if vibration exposure continues.



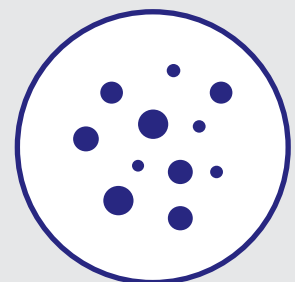
Employers' responsibility

Under the Control of Vibration at Work Regulations 2005, employers must prevent or reduce vibration-related risks from affecting the well-being of their staff. There is a maximum acceptable daily acceleration level of 5 m/s^2 , while any exposure to vibration levels above 2.5 m/s^2 requires the employer to introduce measures to reduce exposure.

Airborne particles

The creation of airborne particles is inherent in most abrasive processes. The composition and physical cross section (quantity and distribution of particle sizes) depends on the workpiece material, the machine and the abrasive type and grades being used.

- Airborne particles are hazardous to operators through contact with exposed skin or eyes, and especially by inhalation.
- Extremely fine airborne particles can be particularly hazardous, as they are often invisible to the naked eye and are more easily absorbed into lungs and respiratory tracts, leading to long-term health risks.



Employers' responsibility

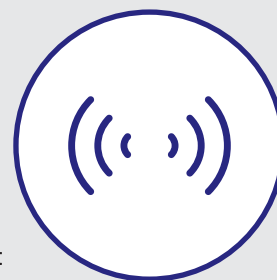
The Control of Substances Hazardous to Health 2002 (COSHH) requires employers to control, reduce, or prevent exposure to substances that are hazardous to their staff. Employers need to ensure exposure to airborne particles is kept as far below the Workplace Exposure Limits (WELs) as reasonably practicable. In cases where exposure below all WELs cannot be achieved, proper respiratory protection would be required.



Noise

Sound is energy transmitted by pressure variations that are detected by the human ear. Noise is normally defined as unwanted sound and is one of the most common health hazards.

- At high or sustained levels, noise can quickly damage the pressure-sensitive organs within the ear.
- Exposure to a single loud sound event, or prolonged exposure to persistent levels of noise can cause temporary or permanent hearing loss, along with other conditions such as tinnitus.



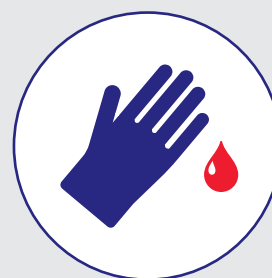
Employers' responsibility

Under the Control of Noise at Work Regulations 2005, employers must prevent or reduce noise-related risks to their staff. The regulations set out maximum acceptable levels for average noise exposure (87 dB) and peak sound pressure (140 dB). The HSE also requires companies to take action to reduce the impact of noise if exposure is close to those limits.

Cuts and other injuries

Fixed or hand-held abrasive equipment such as grinding wheels operating at high speeds create a hazard if they are incorrectly used or if grinding wheels or discs are damaged.

- Injury can be caused by direct bodily contact with rotating surfaces, leading to cuts and burns – often requiring hospital treatment.
- There is also a risk to workers in the immediate vicinity if debris is ejected at high speed from unguarded work areas, or if a tool is damaged or breaks in use.



Employers' responsibility

It is an employer's duty to protect the health, safety and welfare of their employees, protecting them from anything that may cause harm in the workplace. Managing the risks involves a number of factors: ensuring that each tool and consumable is safe and fit for purpose; checking that appropriate guarding is in place; and making sure that employees are fully trained in the use of equipment and the correct Personal Protection Equipment (PPE) is selected and worn.

* Content source: Health & Safety Executive. www.hse.gov.uk

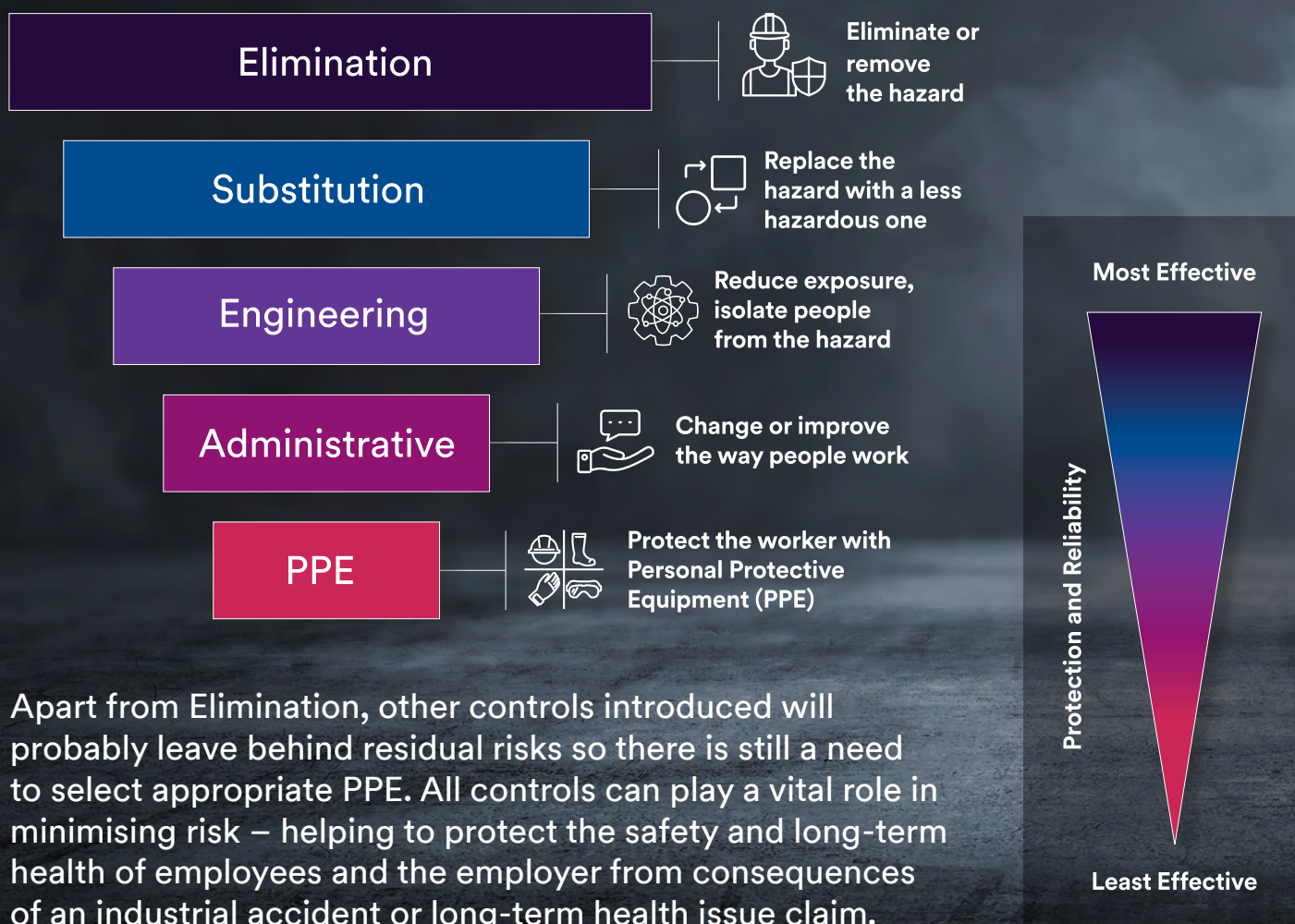
Managing the risk

Best practice in health and safety management begins with a thorough risk assessment, involving the operator in the process. The first priority is to identify hazards, e.g. the equipment and activities with the potential to cause harm, the nature of the hazard, the extent of exposure and employees that might be affected.

Once hazards have been identified and categorised for their risk potential, the next step is to implement the appropriate controls to eliminate or minimise each risk.

Hierarchy of Controls

There are five control stages that should be used in health and safety risk management. These are normally represented by the Hierarchy of Controls, where the control methods at the top of the inverted pyramid below have the greatest potential to eliminate or mitigate risk, and should therefore form the natural starting point for any risk management programme.



Apart from Elimination, other controls introduced will probably leave behind residual risks so there is still a need to select appropriate PPE. All controls can play a vital role in minimising risk – helping to protect the safety and long-term health of employees and the employer from consequences of an industrial accident or long-term health issue claim.

How can 3M help with applying the Hierarchy of Controls to abrasive processes?

Elimination

Automation within arms reach with 3M

Hazard elimination is the most effective control stage in any risk reduction plan and abrasive process automation provides an opportunity to take the worker out of the hazard zone completely.



The service life of 3M abrasives is ideally suited to automation value creation and capital investment return.



Dedicated robotic application experts at 3M can help optimise existing or build new automated systems.



Substitution

We can help you remove or reduce hazards from a process with alternative products

Just because a task has been done a certain way for a long time, doesn't mean there isn't a better way with cost effective, modern abrasive technology from 3M.



Substitution is the control that 3M Abrasives will be able to impact most effectively.

Example:

Replace traditional grinding wheels prone to high levels of vibration, noise and airborne particles with 3M™ Cubitron™ 3 Performance Abrasives to help reduce these hazards.



See Pages 14-21

Engineering

We can help you reduce exposure to airborne particles with the 3M Xtract™ Clean Sanding System

Reduce airborne particle exposure with 3M solutions that help to minimise this hazard from coming into contact with workers, while still allowing jobs to be completed quickly and efficiently.



Example:

The 3M Xtract™ Clean Sanding System is ergonomically designed for ease of use and optimal dust extraction; comprising sanding discs, sanders and extraction units.



Administrative

Expert advice for you

3M can advise on changes in work procedures to reduce the duration, frequency, and severity of exposure to abrasive related hazards.



This can include toolbox talks with your teams or support calculating when limit values are reached to optimise necessary operator rotation.

PPE

Known for quality and comfort

PPE is the last line of defence against abrasive hazards and remains an important component to consider regardless of what other controls are in place.



3M provides personal safety solutions that improve comfort while helping employers increase compliance.

Controlling risk with substitution

Minimising risk depends on a combination of factors. Critical among these is the correct choice of tools and consumable products for each application.

We have focused on three main workplace risks: hand-arm vibration, airborne particles and noise. These risks are commonly referred to as long-term hazards as they occur over time and the damaging effects are not immediately obvious. The risk reduction indicator (opposite) shows how these risks can be reduced by replacing existing abrasive products with alternative options that work more efficiently and could help minimise hazards and reduce exposure.

Working closely with our industrial customers over many years, 3M offers innovative solutions, support and training to help improve abrasive processes. We have developed a generation of advanced abrasive products and tools that help improve safety and reduce the exposure to certain risks in the workplace, whilst improving both productivity and quality of the finished job.

3M Precision-Shaped Grain technology, used in 3M™ Cubitron™ and Scotch-Brite™ abrasives is engineered to continuously fracture to form sharp points and edges – slicing cleaner and faster, staying cooler, and lasting longer than conventional abrasives.*

As the abrasive mineral is precision-shaped it slices cleaner with less friction so more of the energy from the power tool is used to remove material rather than generate heat. This results in significantly faster material removal rates, you can complete tasks more quickly. This reduced time spent cutting, grinding or sanding can result in less ‘trigger time’ for the operator and less operator fatigue meaning less exposure to some of the long term hazards highlighted in this guide.

By using the risk reduction indicator, the next section explains in greater depth how each of the hazards could be minimised by considering an alternative abrasive method or product.



Cubitron™
Performance Abrasives



Xtract™
Clean Sanding

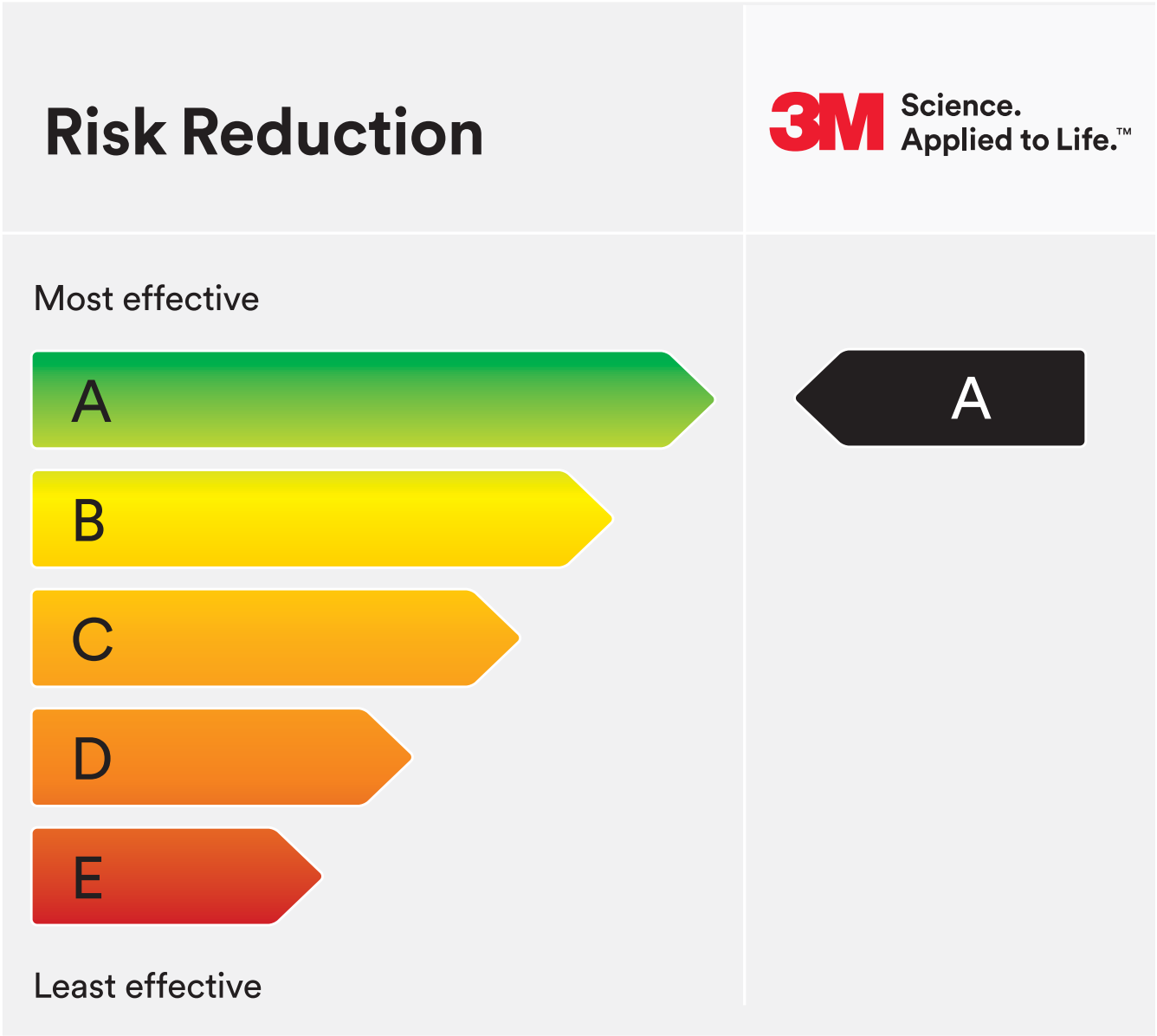
Scotch-Brite™

* Conventional abrasive refers to abrasives made with irregular shaped aluminium oxide, zirconia, silicon carbide and ceramic grain.

The risk reduction indicator

The risk reduction indicator is a visual concept developed by 3M Abrasives that represents the level of hazard mitigation that could be seen by users by substituting one product form for a specific 3M™ Cubitron™ or Scotch-Brite™ alternative product based on our extensive experience.

Green indicates the most effective in risk reduction and red is the least effective.

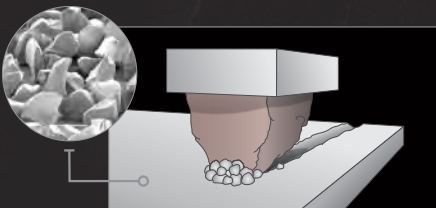


Technology that transforms safety and productivity

While safety is paramount, productivity improvements are also an ever-present need for many businesses. Our unique abrasive technologies can help transform processes in both of these areas, without significantly compromising either safety or productivity.

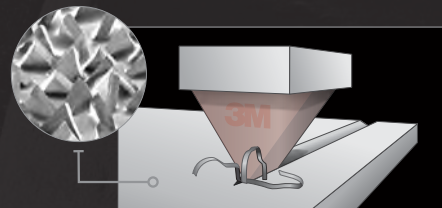
Conventional Abrasives

Conventional ceramic abrasive grain is irregular in shape and tends to “plough” through the substrate being worked on; causing heat to build up in the work piece and the abrasive – resulting in a slower material processing and shorter product life.



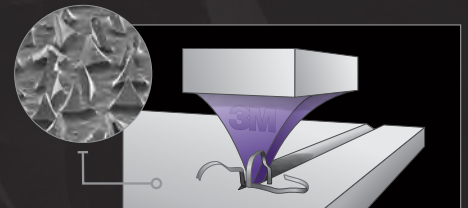
Cubitron™ 2
Performance Abrasives

In 2008, 3M pioneered the first Precision-Shaped Grain using micro-replication technology to form consistent sharp peaks. The grain now is more like a cutting tool, “slicing” through metal like a machining operation. It continuously self sharpens as points break off to expose new sharp edges.



Cubitron™ 3
Performance Abrasives

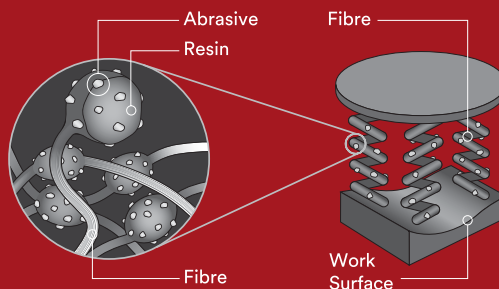
In 2024, continued dedication to material science and innovation delivered re-engineered Precision-Shaped ceramic grain using proprietary breakthroughs in grain shape with continuously curved sides and molecular bonding technology.



Scotch-Brite™

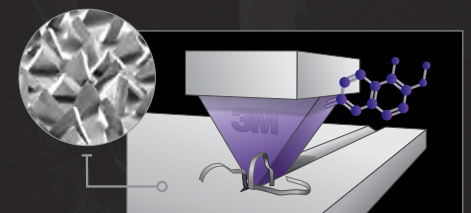
Our unique non-woven web binds together synthetic fibres and abrasive particles to create a conformable, three-dimensional material.

Its open structure reduces the risk of warping or discolouring the part, resists loading, improves finish and prolongs the product's life.



And now with 3M™ Precision-Shaped Grain

Our non-woven abrasive technology combines with Precision-Shaped Grain to transform speed and life without sacrificing the smooth finish expected from Scotch-Brite™ products.



3M products containing Precision-Shaped Grain cut with less friction and higher efficiency so are faster and cleaner as well as staying cooler and lasting longer than conventional abrasives.

How our technology supports the mitigation of specific hazards:

Airborne Particles



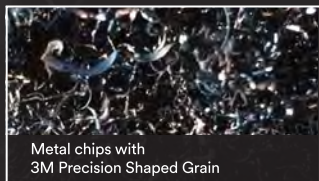
The grade and type of abrasive used for a task can have a significant effect on the quantity and size profile of the debris created.

When grinding or cutting metal

By slicing not ploughing through metal, compared to conventional abrasive grain the chips produced by 3M Precision-Shaped Grain are larger, longer and heavier – meaning particles stay airborne for less time.



Metal chips with Conventional grain



Metal chips with 3M Precision Shaped Grain

When sanding all types of surfaces

Orbital sanding grades create particularly fine particles that can be harmful if air quality isn't managed well.

With proprietary disc hole patterns and highly efficient tools/portable extraction units, the 3M Xtract™ Sanding System delivers up to 99%⁹ dust-free sanding – minimising the hazard at source.



Hand-Arm Vibration

Comparative hand-arm vibration exposure between two products is a function of two key factors; vibration levels during use and time spent on the tool getting the job done.

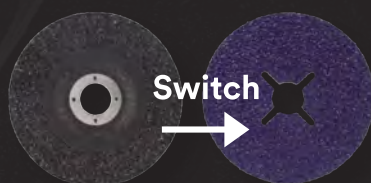


Consider the abrasive form in use

The cutting power of 3M Precision-Shaped Grain means that alternative abrasive forms can be considered with inherently less vibration during use compared with conventional methods of getting certain applications done.

Get the job done faster

The cutting power of 3M Precision-Shaped Grain also means high vibration exposure tasks can be done faster – delivering either lower overall exposure or getting more work done before actionable vibration limits are reached.



Example:

By switching from a depressed centre grinding wheel to a Cubitron™ 3 Fibre Disc for grinding tasks, the change in form and the speed of getting the job done can significantly reduce vibration exposure.

Up to
88%²
Reduction
in vibration

Noise Exposure

Regardless of PPE in use to protect hearing, reducing noise energy created during an abrasive process is important to protect both the operator and others around them.



Up to
70%¹
Reduction
noise energy

Example:

Switching from a depressed centre grinding wheel to a Cubitron™ 3 Fibre Disc means noise energy can be significantly reduced.

Physical Injury

Fixed or hand-held abrasive equipment can cause injury by direct contact or at a distance via the ejection of material. 3M technology can help here.



Example:

By switching from wire wheels to Scotch-Brite™ Clean and Strip XT Pro when cleaning surfaces, the risk of flying wires can be reduced to zero.

Currently using

Grinding Wheel

used with an angle grinder

Application:

Flame cut smoothing, weld preparation, bevelling, and weld removal

Substituting with 3M™ Cubitron™ 3 11-Series Fibre Discs

How 3M can help

When considering the full spectrum of health and safety risks associated with metal fabrication, the use of hand-held power tools with grinding wheels is among the most hazardous.

If the grinding application does not involve grinding into corners or where the edge of the grinding wheel must be used, 3M offers an innovative solution which compared to a grinding wheel helps to provide significant mitigation against noise, airborne particles and vibration. At the same time, it can also provide substantial improvements in productivity by increasing throughput and extending abrasive life.

Hazard Protection: PPE check list (page 30)		
 The correct PPE and operating techniques should always be used when working with abrasives		
3M respirators and face protection	3M hearing and eye protection	Safety clothing, footwear and gloves

Our suggestion:

3M™ Cubitron™ 3 11-Series Fibre Discs

The perfect products for demanding weld removal, bevelling or other stock removal jobs on flat surfaces.

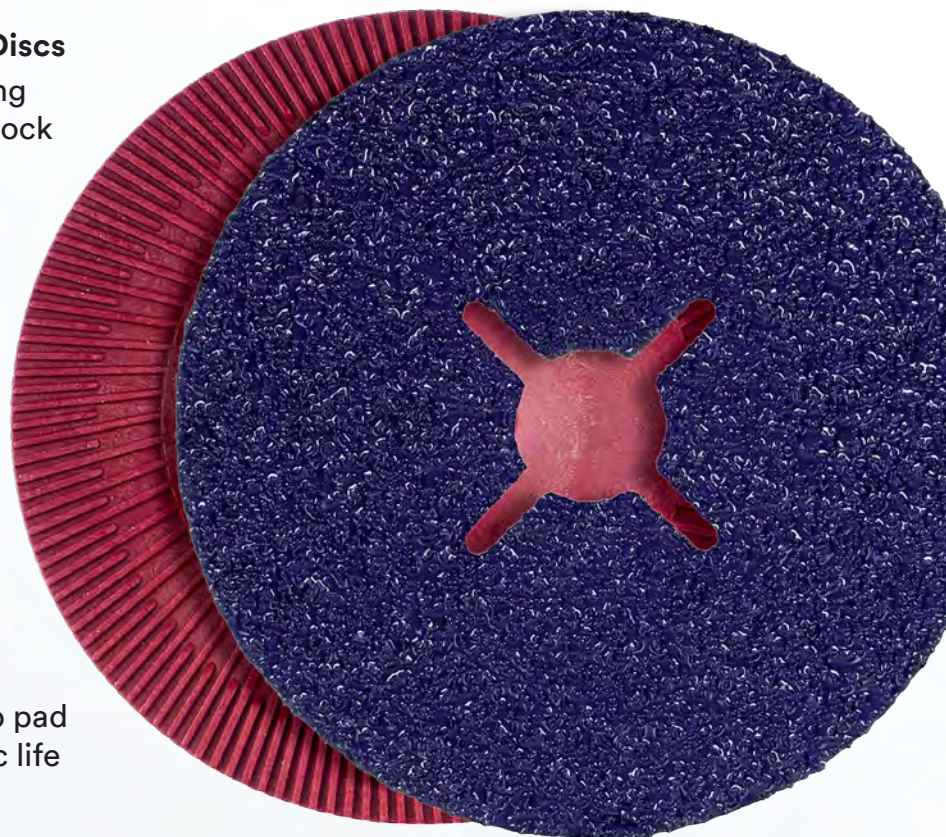
Performing the same job as a conventional depressed centre grinding wheel, these products offer a highly effective fabricating tool with significantly reduced risk, as shown in the risk reduction indicators opposite.

3M™ High Performance Ribbed Back-Up Pad

Designed for heavy stock removal, when used with 3M™ Cubitron™ 3 11-Series Fibre Discs, this back-up pad enables significantly improved disc life and cut rate.



Cubitron™ 3
Performance Abrasives



Hazard Reduction:

Noise



Up to
70%¹
reduction in
noise energy



Reduce the risk
to those in the immediate vicinity
not directly using the tool



Up to 6 db¹ quieter

3M Risk Reduction Index

Most effective



Least effective

A

Hazard Reduction:

Hand-arm Vibration



Up to
88%²
reduction in
vibration exposure

Less vibration
generated by the
abrasive disc and
transmitted to
the operator

Thanks to the less
rigid, lightweight
fibre disc construction

Reduced trigger time

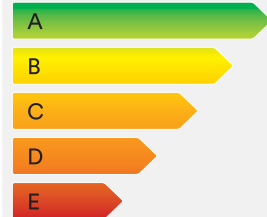
A significantly better material
removal rate reduces time
on the tool, cutting
vibration exposure
even further



Less applied pressure is required
Minimising operator fatigue

3M Risk Reduction Index

Most effective



Least effective

A

Hazard Reduction:

Airborne Particles



Significantly
reduced
wear means
less particles
emanate
from the abrasive
wheel itself

Innovative cutting action means
larger, longer metal chips (swarf)
that stay airborne for less time

Currently using

Grinding Wheel

used with an angle grinder

Application:

Fillet weld removal, grinding in corners, weld prep, and bevelling.

Substituting with 3M™ Cubitron™ 3 Depressed Centre Grinding Wheels

How 3M can help

When considering the full spectrum of health and safety risks associated with metal fabrication, the use of hand-held power tools with grinding wheels is among the most hazardous.

3M offers an innovative solution, which can provide significant mitigation of the risks from noise, airborne particles and hand-arm vibration, while at the same time providing substantial improvements in productivity and throughput.

Hazard Protection: PPE check list (page 30)		
 The correct PPE and operating techniques should always be used when working with abrasives		
3M respirators and face protection	3M hearing and eye protection	Safety clothing, footwear and gloves

Our suggestion:

3M™ Cubitron™ 3 Depressed Centre Grinding Wheels

Engineered to cut significantly faster and last longer than other grinding wheels, where applications demand use on the face and edge of the wheel.

3M™ Cubitron™ 3 Depressed Centre Grinding Wheels can play a vital role in reducing risk, as shown on the risk reduction indicators opposite.

3M

Cubitron™ 3
Performance Abrasives



Hazard Reduction:

Noise



up to
43%³
reduction in
noise energy



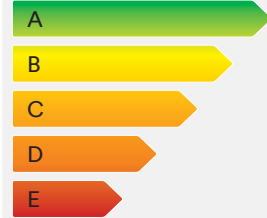
Reduce the risk
to those in the immediate vicinity
not directly using the tool



Up to 3 db* quieter

3M Hazard Reduction Index

Most effective



Least effective

B

Hazard Reduction:

Hand-arm Vibration



up to
33%⁴
reduction in
vibration exposure

With a fixed grinding workload,
the fast removal rates reduce trigger
time and vibration exposure



Less applied pressure is required,
minimising operator fatigue

3M Hazard Reduction Index

Most effective



Least effective

B

Hazard Reduction:

Airborne Particles



Significantly
reduced
wear means
less particles
emanate
from the abrasive
wheel itself

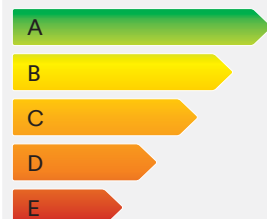
Innovative cutting action means
larger, longer metal chips (swarf)
that stay airborne for less time



Fewer airborne particles

3M Hazard Reduction Index

Most effective



Least effective

B

3, 4: See Page 32 for full details of claims substantiation

Cut-off Wheel

Metal cutting

How 3M can help

3M products can help mitigate these risks by reducing the time on tool. The remarkable cutting speed of Cubitron™ 3 enables work to be processed quicker and the smooth cutting action requires less operator pressure, boosting operator comfort.



The correct PPE and operating techniques should always be used when working with abrasives

3M respirators and face protection

3M hearing and eye protection

Safety clothing, footwear and gloves



Cubitron™ 3
Performance Abrasives



Hazard Reduction:

Noise



Fast cutting action enables work to be completed quicker, helping to reduce exposure



Reduce the risk to those in the immediate vicinity not directly using the tool

3M Hazard Reduction Index

Most effective



Least effective

D

Hazard Reduction:

Hand-arm Vibration



up to
33%⁶
reduction in
vibration exposure

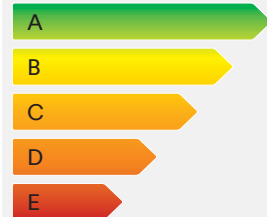
With a fixed grinding workload, the fast removal rates reduce trigger time and vibration exposure



Less pressure required due to the smoother cutting action puts less strain on the operator

3M Hazard Reduction Index

Most effective



Least effective

B

Hazard Reduction:

Airborne Particles



Significantly reduced wear means less particles emanate from the abrasive wheel itself

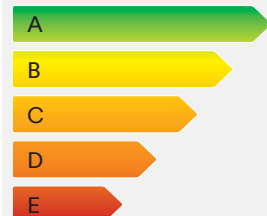
Innovative cutting action means larger, longer metal chips (swarf) that stay airborne for less time



Fewer airborne particles

3M Hazard Reduction Index

Most effective



Least effective

C

5: See Page 32 for full details of claims substantiation

Currently using

Fibre Disc

used with an angle grinder

Application:

Flat heavy weld removal, bevelling, and edge prep.

Substituting with 3M™ Cubitron™ 3 11-Series Fibre Discs

How 3M can help

For light and medium weld removal, a fibre disc is often the ideal solution. 3M's fibre discs deliver superior cutting power and product life, reducing time on tool and the frequency with which discs need changing – a procedure during which incorrect mounting of the disc on the tool can result in an increased risk of employee injury.

Our suggestion:

3M™ Cubitron™ 3 11-Series Fibre Discs

Cubitron™ 3 fibre discs use 3M's proprietary Precision-Shaped Grain to deliver their winning performance. For heavier MIG welds, bevelling and other heavy stock removal, you can use the 11-Series. For all other applications up to a 120 grit finish, we recommend 3M™ Fibre Disc 787C.

3M™ Cubitron™ 3 fibre discs have been designed to offer high levels of performance, while reducing the hazards from noise, airborne particles and vibration; compared with other products, 3M™ Cubitron™ 3 offers a far lower risk profile, as shown on the risk reduction indicators.

3M™ High Performance Ribbed Back-Up Pad

Designed for heavy stock removal, when used with 3M™ Cubitron™ 3 11-Series Fibre Discs the 3M™ High Performance Ribbed Back-Up Pad enables improved disc life and cut rate.

Hazard Protection:

PPE check list (page 30)



The correct PPE and operating techniques should always be used when working with abrasives

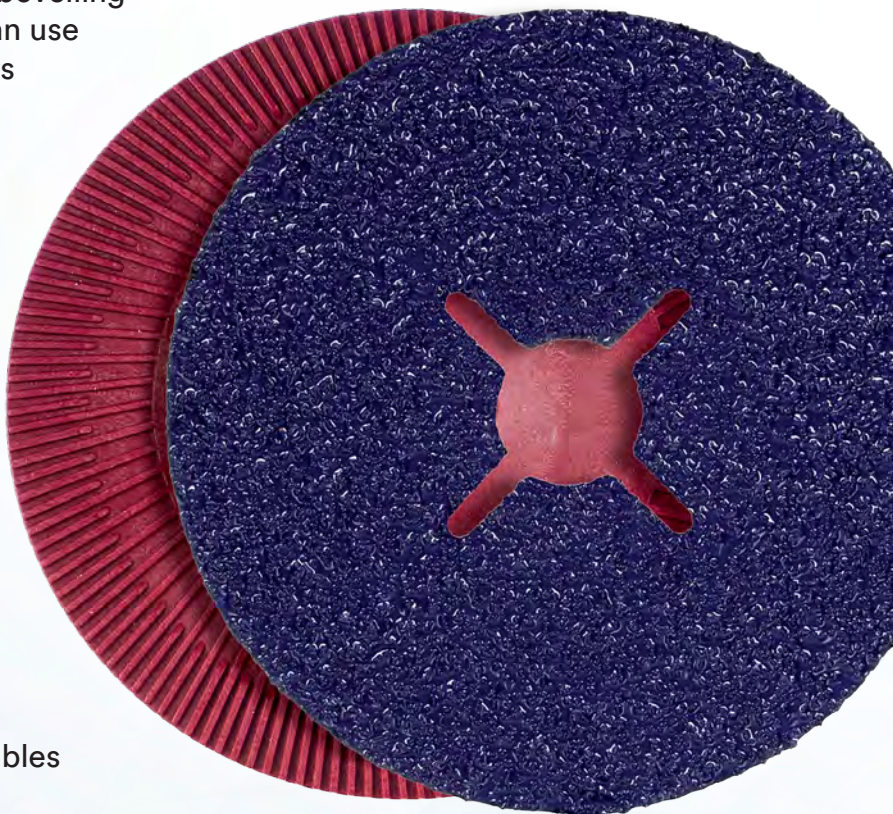
3M respirators and face protection

3M hearing and eye protection

Safety clothing, footwear and gloves



Cubitron™ 3
Performance Abrasives



Hazard Reduction:

Noise



Reduce noise exposure by completing the job quicker



Reduce the risk to those in the immediate vicinity not directly using the tool

3M Hazard Reduction Index

Most effective



Least effective

D

Hazard Reduction:

Hand-arm Vibration



Up to
47%⁶
reduction in
vibration exposure

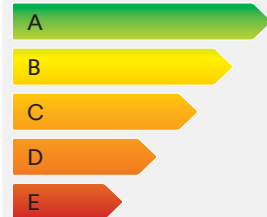
With a fixed grinding workload, the fast removal rates reduce trigger time and vibration exposure



Less pressure required due to the smoother cutting action puts less strain on the operator

3M Hazard Reduction Index

Most effective



Least effective

C

Hazard Reduction:

Airborne Particles



Significantly reduced wear means less particles emanate from the abrasive wheel itself

Innovative cutting action means larger, longer metal chips (swarf) that stay airborne for less time



Fewer airborne particles

3M Hazard Reduction Index

Most effective



Least effective

C

6: See Page 32 for full details of claims substantiation

Currently using

Flap Disc

used with an angle grinder

Application:

Flat heavy weld removal, bevelling, and edge prep.

Substituting with 3M™ Cubitron™ 3 Flap Disc 1169F can help to reduce the level of risk with angle grinders.

How 3M can help

For weld and stock removal on curved surfaces and edges or where a certain finish is required in one step, a flap disc is perfect for the job. 3M™ Cubitron™ 3 Flap Discs are available in flat or conical forms and deliver superior cutting power and product life, reducing time on tool and disc change frequency.

Hazard Protection: PPE check list (page 30)		
 The correct PPE and operating techniques should always be used when working with abrasives		
3M respirators and face protection	3M hearing and eye protection	Safety clothing, footwear and gloves

Our suggestion:



Cubitron™ 3
Performance Abrasives

3M™ Cubitron™ 3 Flap Disc 1169F

This flap disc uses 3M's proprietary Precision-Shaped Grain to deliver winning performance. For high pressure, heavy applications choose the 3M™ Cubitron™ 3 Flap Disc 1169F with a polyester backing, while for less aggressive applications we recommend the poly-cotton backed 3M™ Cubitron™ 2 Flap Disc 967A product.

In each case, 3M™ Cubitron™ discs have been designed to offer high levels of performance, while reducing the hazards from noise, airborne particles and vibration. Compared with other products, 3M™ Cubitron™ flap discs offer a lower risk profile, as shown on the risk reduction indicators.



Hazard Reduction:

Noise



Reduce noise exposure by completing the job quicker



Reduce the risk to those in the immediate vicinity not directly using the tool

3M Hazard Reduction Index

Most effective



Least effective

D

Hazard Reduction:

Hand-arm Vibration



Reduce vibration exposure by completing the job quicker

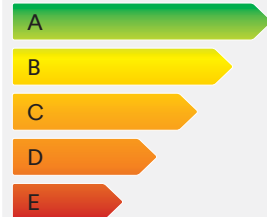
With a fixed grinding workload, the fast removal rates reduce trigger time and vibration exposure



Less pressure required due to the smoother cutting action puts less strain on the operator

3M Hazard Reduction Index

Most effective



Least effective

C

Hazard Reduction:

Airborne Particles

Innovative cutting action means larger, longer metal chips (swarf) that stay airborne for less time



Fewer airborne particles

3M Hazard Reduction Index

Most effective



Least effective

C

Currently using

Sanding Disc

used with a random orbital sander

Hazard Protection:

PPE check list (page 30)



The correct PPE and operating techniques should always be used when working with abrasives

3M respirators and face protection

3M hearing and eye protection

Safety clothing, footwear and gloves

Substituting with 3M Xtract™ Cubitron™ 2 Film Disc 775L can help to reduce the level of risk when sanding.

How 3M can help

Due to the way in which random orbital sanders work, vibration exposure using this type of tool can actually represent more of a risk to employees and their employers than using a right angle grinder.

The finer abrasive grades used in sanding applications also mean that airborne particles become an even greater issue.

3M sanding discs help resolve these problems, with exceptional cut rates and excellent airborne particle extraction capabilities.



Xtract™
Clean Sanding



3M Xtract™ Random Orbital Sanders are optimised for superior airborne particle extraction; precision-balanced to run smoothly with less vibration, rubber grips to absorb and reduce vibration and internal mufflers to help reduce noise.



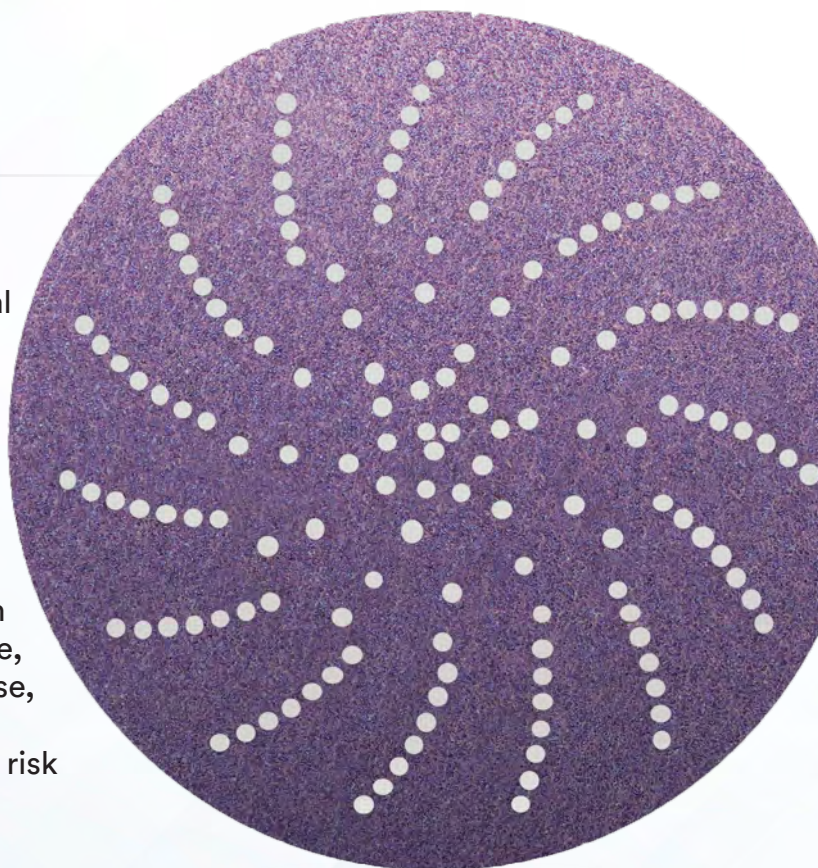
Cubitron™ 2
Performance Abrasives

Our suggestion:

3M Xtract™ Cubitron™ 2 Film Disc 775L

Engineered to work faster than conventional discs thanks to its Precision-Shaped Grain technology. The same technology also helps the product to have a very long service life. For the best dust extraction potential, pair this disc with 3M Xtract™ tools and portable dust extractor.

3M Xtract™ abrasives and tooling have been designed to offer high levels of performance, while reducing hazards associated with noise, airborne particles and vibration offering relatively a low risk profile, as shown in the risk reduction indicators opposite.



Hazard Reduction:

Noise



Up to
20%⁷
reduction in
noise energy

Stay on the job for longer
without compromising legal
exposure limits



3M tools are designed with
internal mufflers to help
reduce noise

3M Hazard Reduction Index

Most effective



Least effective

Hazard Reduction:

Hand-arm Vibration



Up to
32%⁸
reduction in
vibration exposure

3M Xtract™ tools are
precision balanced
to run smoothly
with less vibration,
their compact,
low-profile and
lightweight design
helps operators
produce more with
less effort and fatigue

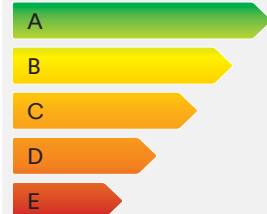


With a fixed sanding
workload, the fast
removal rates reduce
trigger time and
vibration exposure

Less applied pressure
is required minimising
operator fatigue

3M Hazard Reduction Index

Most effective



Least effective

Hazard Reduction:

Airborne Particles



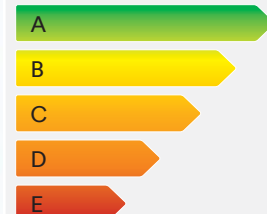
Up to
99%
dust extraction
Helps reduce
airborne particles
released into the
workplace

3M Xtract™ tools are designed to maximise
airflow into your central extraction system,
or can come with their own self-generated
vacuum action – extracting airborne
particles into a removable bag

The proprietary multi-hole configuration
delivers exceptional airborne particle
extraction rates

3M Hazard Reduction Index

Most effective



Least effective

7, 8: See Page 32 for full details of claims substantiation

Currently using

Wire Wheel

used with an angle grinder, disc sander, die grinder or bench motor

Hazard Protection:

PPE check list (page 30)



The correct PPE and operating techniques should always be used when working with abrasives

3M respirators and face protection

3M hearing and eye protection

Safety clothing, footwear and gloves

Substituting with Scotch-Brite™ Clean and Strip XT Pro or XT Pro Xtra Cut can help reduce the level of risk when undertaking rust, paint and or scale removal as well as metal cleaning.

How 3M can help

Wire wheels are commonly used to address many of the applications stated above. By moving to this alternative from 3M, vibration can be significantly reduced and exposure to flying metal particles emanating from the abrasive can be eliminated altogether.

Sometimes chemicals are used for cleaning surfaces and removing weld discolouration. With Scotch-Brite™ Clean and Strip XT Pro or XT Pro Xtra Cut, no chemicals are required, helping to reduce the risk of chemical burns.

Scotch-Brite™

Our suggestion:

Scotch-Brite™ Clean and Strip XT Pro or XT Pro Xtra Cut

The Scotch-Brite™ XT Pro range features abrasive mineral incorporated into an open nylon web. The discs effectively remove rust, paint, mill scale, coatings and adhesives from surfaces without significantly altering the base material.

The spring-like nature of the fibres means these discs are able to follow the contours of the work piece with greater accuracy, achieving a larger contact area for faster removal rates.



Hazard Reduction:

Noise



up to
54%⁹

More speed
Reduce noise exposure
by completing the
task quicker



Reduce the risk to those in the immediate
vicinity not directly using the tool

3M Hazard Reduction Index

Most effective



Least effective

C

Hazard Reduction:

Hand-arm Vibration



up to
90%¹⁰
reduction in
vibration exposure

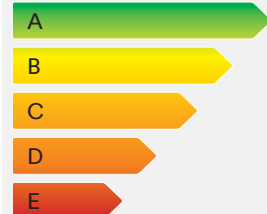
Reduced trigger time due to being 54% faster –
that reduces time on tool, helping to minimise
vibration exposure

Light, comfortable and
elastic construction helps
lower vibration amplitudes



3M Hazard Reduction Index

Most effective



Least effective

A

Hazard Reduction:

Airborne Particles

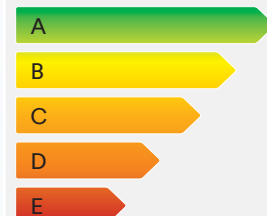


No flying wire
fragments

Users of wire wheels often complain of wire
fragments flying off the wheel and onto
their skin and clothing – with Scotch-Brite™
Clean and Strip XT Pro or XT Pro Xtra Cut
this doesn't happen

3M Hazard Reduction Index

Most effective



Least effective

A

9, 10: See Page 32 for full details of claims substantiation

Currently using

Wire Power Brush

used with bench motor or die grinder

Substituting with Scotch-Brite™ Precision Radial Bristle products can help reduce the level of risk when undertaking cleaning, edge-breaking, finishing and light deburring operations.

How 3M can help

Wire wheels are commonly used to deal with many of the applications stated above. By moving to this alternative from 3M, vibration can be significantly reduced and exposure to flying metal particles emanating from the abrasive can be eliminated altogether while retaining the conformability that some wire wheels offer.

Sometimes chemicals are used for cleaning surfaces and removing weld discolouration. With Scotch-Brite™ Precision Radial Bristle, no chemicals are required, helping to reduce the risk of chemical burns.

Hazard Protection:
PPE check list (page 30)



The correct PPE and operating techniques should always be used when working with abrasives

3M respirators and
face protection

3M hearing and
eye protection

Safety clothing,
footwear and gloves

Our suggestion:

Scotch-Brite™ Precision Radial Bristle

The Scotch-Brite™ Precision Radial Bristle range features moulded bristles containing 3M Precision-Shaped Grain for increased cut rate without sacrificing finish. It brings a new level of productivity and abrasive life to the Scotch-Brite™ line-up while maintaining its unique attributes of conformability and consistency to deliver repeatable results.

The flexibility in of the bristle structure ensures uniform finishes around protrusions, detail grooves, patterns, and other hard-to-reach areas.



With 3M
Precision-Shaped Grain

Hazard Reduction:

Noise



Fast cutting action enables work to be completed quicker, helping to reduce exposure



Reduce the risk to those in the immediate vicinity not directly using the tool

3M Hazard Reduction Index

Most effective



B

Least effective

Hazard Reduction:

Hand-arm Vibration



Faster cutting action can help reduce vibration exposure

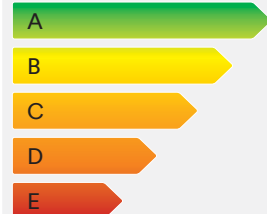
Reduced trigger time due to being 54% faster – that reduces time on tool, helping to minimise vibration exposure

Light, comfortable and elastic construction helps lower vibration amplitudes



3M Hazard Reduction Index

Most effective



A

Least effective

Hazard Reduction:

Airborne Particles

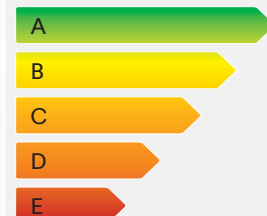


No flying wire fragments

Users of wire wheels often complain of wire fragments flying off the wheel and onto their skin and clothing – with Scotch-Brite™ Precision Radial Bristle this doesn't happen

3M Hazard Reduction Index

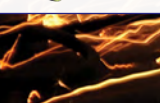
Most effective



A

Least effective

PPE Guide to Protect Against the Relevant Hazards

Product	Product Description
	3M™ Speedglas™ Welding Helmet G5-01 with 3M™ Adflo™ Powered Air Respirator For heavy duty welding and grinding tasks – flip up welding visor
	3M™ Speedglas™ Welding Helmet G5-03 Pro Air with 3M™ Adflo™ Powered Air Respirator Lightweight for ultimate versatility and comfort – tap to change from weld mode to grind mode
	3M™ Securefit™ 400X Series Safety Glasses Soft temple ends, brow guard and integrated nose bridge for additional top coverage and comfortable fit
	3M™ Securefit™ 3700 Series Over spectacles Designed to offer all-day wearability for workers wearing prescription glasses
	3M™ GoggleGear™ Protective Goggle 3000 Series Full-size protective goggle designed with a wraparound lens for improved field of vision
	3M™ Aura™ Disposable Respirators 9300+ Series Available with 3M™ Cool Flow™ Valve which helps reduce heat build-up
	3M™ SecureClick™ Half Mask Reusable Respirator HF 800 Series Breathability and comfort provided by the world's first quad flow cartridge system
	3M™ E-A-R™ Pushins™ Earplugs – Corded or Uncorded Unique push-to-fit foam tip shaped and sized to help fit comfortably in variety of sizes of ear canals
	3M™ PELTOR™ Level Dependent Earplugs, EEP-100 Helps promote auditory situational awareness while protecting hearing
	3M™ PELTOR™ Earmuff X4 Designed to optimize weight distribution and balance for outstanding comfort

PPE Diagram

Eye Protection

Protect your eyes from sparks and other airborne debris

Hearing Protection

Protect your hearing from noise caused by machinery and tool use

Face Protection

Protect your whole face from the added dangers of using cutting and grinding products

Respirator

Protect your lungs from fine particles produced using abrasives

Apron

Additional protection must be worn to protect operator from sparks created by cutting and grinding products

Hand Protection

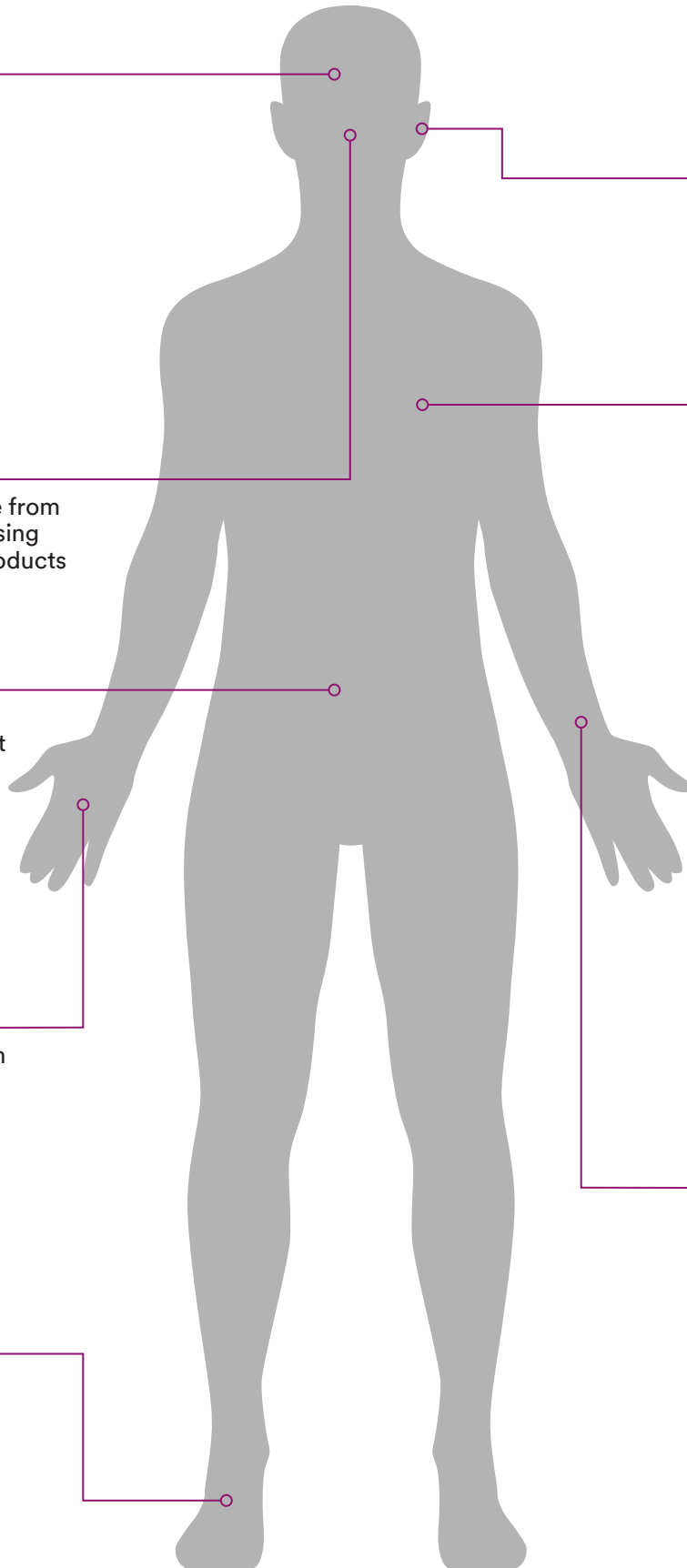
Protect your hands from sparks and other debris

Long-Sleeved Clothing

Protect bare skin with gauntlets or long-sleeved fire retardant clothing

Safety Footwear

Protect your feet from falling heavy objects



Claim References

- 1, 2: Performance testing in a typical weld preparation process; 3M™ Cubitron™ 3 Fibre disc average compared to the average result of 10 globally selected high-quality competitive Type 27 grinding wheels including ceramic grain products, according to independent testing by Fraunhofer Institute - January 2024.
- 3, 4: Performance testing in a typical weld preparation process; 3M™ Cubitron™ 3 Depressed Centre Grinding Wheels average compared to the average results of the high-quality ceramic grain competitive Type 27 grinding wheels tested, according to independent testing by Fraunhofer Institute - August 2023.
- 5: Performance testing in a typical weld preparation process; 3M™ Cubitron™ 3 Fibre disc average compared to the average result of 5 globally selected high-quality competitive fibre discs including ceramic shaped grain products, according to independent testing by Fraunhofer Institute - January 2024.
- 6: Performance testing in a typical metal cutting operation; 3M™ Cubitron™ 3 Cut-Off Wheels average compared to the average results of the high-quality ceramic grain competitive wheels tested, according to independent testing by Fraunhofer Institute - August 2023.
- 7, 8: 3M Xtract™ Pneumatic random orbital sander with 3M Xtract™ Cubitron™ 2 Film Disc 775L 320+ over other leading random orbital sanding mesh competitive discs tested. Hand-arm vibration and noise energy compared to listed competitor and 3M Xtract™, according to independent testing by Fraunhofer Institute - April 2022.
- 9: 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, PN 88946, was utilized for sanding and dust capture with 3M Xtract™ Filter Bag, PN 89137.
- 10: Scotch-Brite™ Clean and Strip XT Pro Disc, Type 27, compared to a general use crimped wire cup brush, according to independent testing by Fraunhofer Institute - October 2021.

DISCLAIMER: The information in this guide is based on 3M's experience of similar processes and applications and is correct to the best of our knowledge at the date of publication, but we do not accept any liability for any loss, damage or injury resulting from reliance on the statements contained in this guide (except as required by law). Because of the wide variety of processes and conditions in which these products may be used, it is important that customers carry out their own test(s) to evaluate 3M products before use and satisfy themselves as to the suitability of any 3M product(s) for their own intended applications. This document should be used for guidance only, it is not a substitute for a full risk assessment. 3M occupational and industrial products are intended, labelled, and packaged for sale to trained occupational and industrial customers for workplace use. Unless specifically stated otherwise on the applicable product packaging or literature, these products are not intended, labelled, or packaged for sale to or use by consumers (e.g. for home, personal, school, recreational/sporting, or other uses not described in the applicable product packaging or literature), and must be selected and used in compliance with applicable health and safety standards, as well as all product literature, user instructions, warnings, and limitations. Misuse of 3M occupational and industrial products may result in injury, sickness, or death. For further information relating to 3M products please visit go.3M.com/NZabrasives.

**For more
information please
contact your local
3M representative.**

3M New Zealand Ltd
Abrasive Systems Division
94 Apollo Drive, Albany
Auckland, New Zealand
Phone: 0800 362 886
Fax: 0800 362 880
Web: go.3M.com/NZabrasives

