

## Abrasive Safety Assessment Guide

Helping to move the dial on abrasive safety in the workplace.





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# 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:

-  Hand-arm vibration
-  Airborne particles
-  Noise
-  Injury

Abrasive processes using hand-held or bench-top equipment 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 prolonged use of abrasives can result in potentially significant long-term health risks, from hand-arm vibration, airborne particles and noise.

This guide will explain how engineering controls, such as replacing existing abrasive methods with more efficient/safer ones can help to reduce the risks associated with abrasive operations like grinding, cutting and sanding.

The guide is also covering which complementary personal protective solutions should be used during grinding and cutting operations. Combined with other steps of hierarchy of controls, appropriate PPE will help protect the health and safety of your employees and minimize risks of accidents.



# Abrasive hazards

It is the responsibility of all employers to ensure the safety and wellbeing 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

The risk of vibration-related injury is associated with tasks that require excessive bending of the wrists or time on tool.

- 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.
- Once these conditions take hold, they are often irreversible and can become more severe over time if vibration exposure continues.



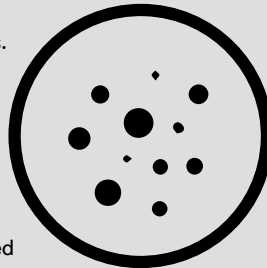
### Employers' responsibility\*

Under the Control of Vibration at Work Regulations 2005, employers must prevent or reduce vibration-related risks from affecting the wellbeing of their staff. There is a maximum acceptable daily acceleration level of  $5\text{m/s}^2$ , while any exposure to vibration levels above  $2.5\text{m/s}^2$  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 and the properties of the abrasive product 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 (87dB) and peak sound pressure (140dB). 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.



# Managing the risks

Best practice in health and safety management begins with a thorough risk assessment. 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. Controls such as risk assessments, using the right tools, regular training, improvements to workplace conditions and wearing the correct Personal Protection Equipment (PPE) are generally implemented to mitigate risk.

## Hierarchy of Controls

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

### ENGINEERING CONTROLS ADMINISTRATIVE CONTROLS

#### Choosing the right abrasive

An important factor that is often overlooked when assessing engineering controls is the selection of the abrasive products, ensuring the most appropriate abrasive product and abrasive mineral have been selected to help reduce the risks from hand-arm vibration, airborne particles and noise.

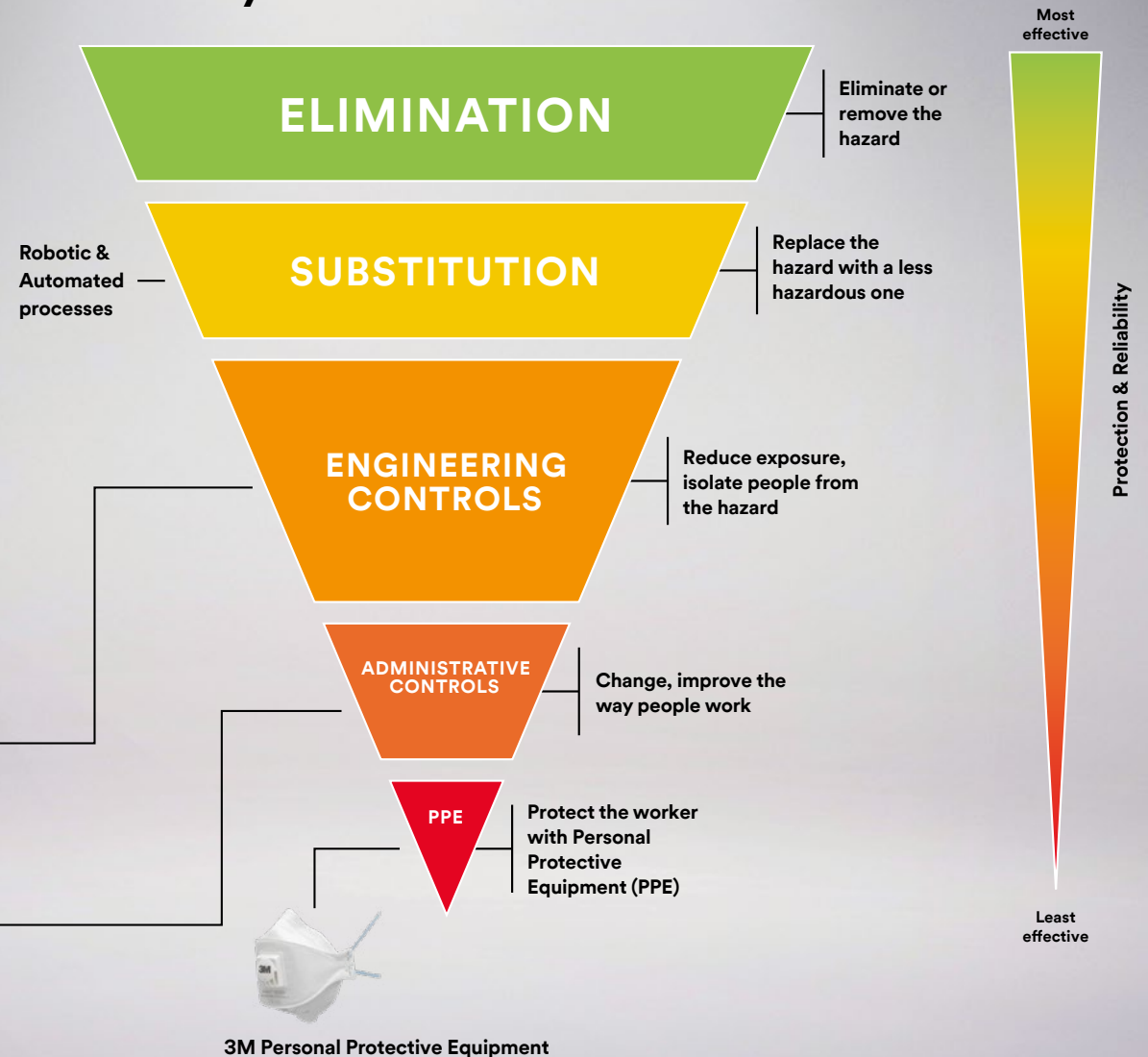


**CUBITRON II**

3M™ Cubitron™ II hand-held abrasives - powered by 3M's Precision Shaped Grain technology.

Although these controls will not eliminate the need to use the appropriate PPE, they play a vital role in reducing risk and combined with other steps in the hierarchy of controls, they will help protect the safety and long-term health of employees, and the employer from the consequences of an industrial accident.

## Hierarchy of Controls\*



\* Content source: Hierarchy of Controls (National Institute for Occupational Safety and Health) [www.cdc.gov/NIOSH](http://www.cdc.gov/NIOSH)

# The Risk Reduction Indicator

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 hazards: hand-arm vibration, airborne particles and noise. The risk reduction indicator shows how the risks associated with these hazards can be reduced by replacing existing abrasive products with alternative options that work more efficiently and could help minimise risks 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 the risks in the workplace, whilst improving both productivity and quality of the finished job.

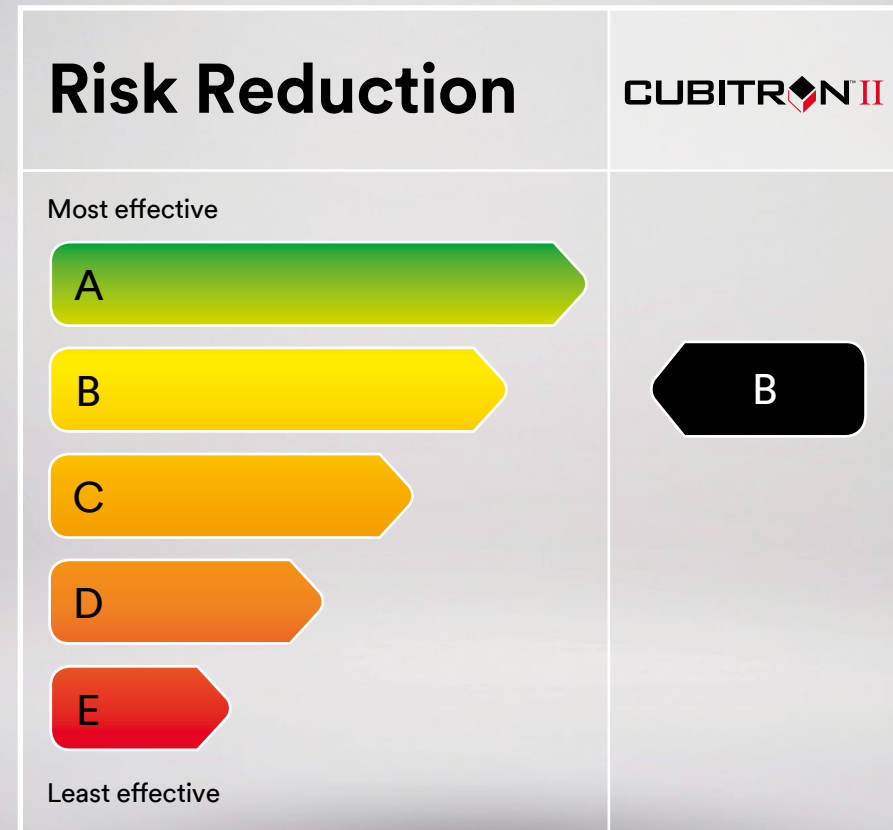
3M's Precision Shaped Grain technology, used in 3M™ Cubitron™ II abrasives is engineered to continuously fracture to form sharp points and edges – slicing cleaner and faster, staying cooler, and lasting longer than conventional abrasives. By cutting faster using 3M™ Cubitron™ II abrasives, you can complete 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 risks highlighted in this guide.

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



# The Risk Reduction Indicator

The risk reduction indicator represents the differential in the risks associated with abrasive processes; green indicating the most effective in risk reduction and red being the least effective in risk reduction when switching from conventional hand-held abrasives\* to 3M™ Cubitron™ II hand-held abrasives.



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

# 3M™ Cubitron™ II

## 3M™ Cubitron™ II abrasives powered by Precision Shaped Grain technology

3M's Precision Shaped Grain technology in 3M™ Cubitron™ II abrasives can help reduce the risks from exposure to hazards in the workplace. It has been engineered to continuously fracture to form sharp points and edges – slicing cleaner and faster, staying cooler, and lasting longer than conventional abrasives.

### 3M™ Cubitron™ II abrasives:



**Require less pressure** – allows the abrasive to do more of the hard work, reducing operator fatigue



**Cut faster** – helps improve productivity, reducing “trigger” time on tool



**Cut cooler** – less heat built up



**Last longer** – can reduce waste generated and lower costs



**Safer operation** – helps reduce exposure to vibration, airborne particles and noise



**Run smoother** – easy to use

**CUBITRON™ II**

## How 3M's Precision Shaped Grain technology works

It acts like a cutting tool, slicing through metal like a knife. The material is continuously self-sharpening as points break off during use to expose new sharp edges – slicing cleaner and faster, staying cooler and lasting many times longer than conventional grain types.

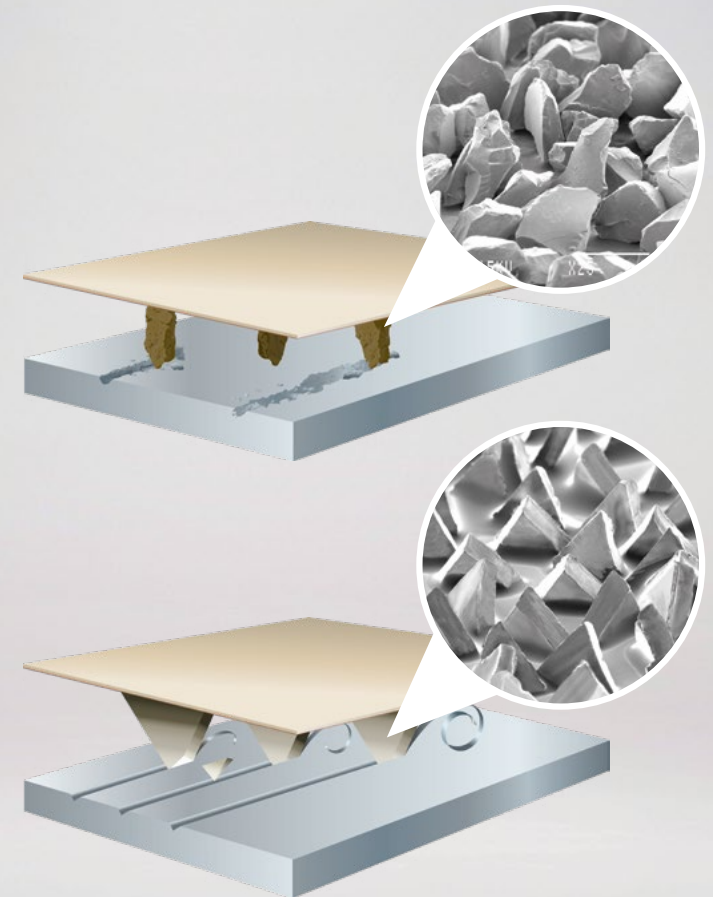
### Conventional abrasives

Conventional ceramic abrasive grain is irregular in shape and tends to “plough” through the metal, causing heat to build up in the workpiece and the abrasive – resulting in a slower cut and shorter product life.

VS

### Cubitron™ II abrasives

3M's Precision Shaped Grain uses proprietary microreplication technology to form sharp peaks that easily “slice” through metal – cutting cooler, faster and lasting longer than conventional abrasive grain.





Currently using

# Grinding Wheel

used with an angle grinder

Application:

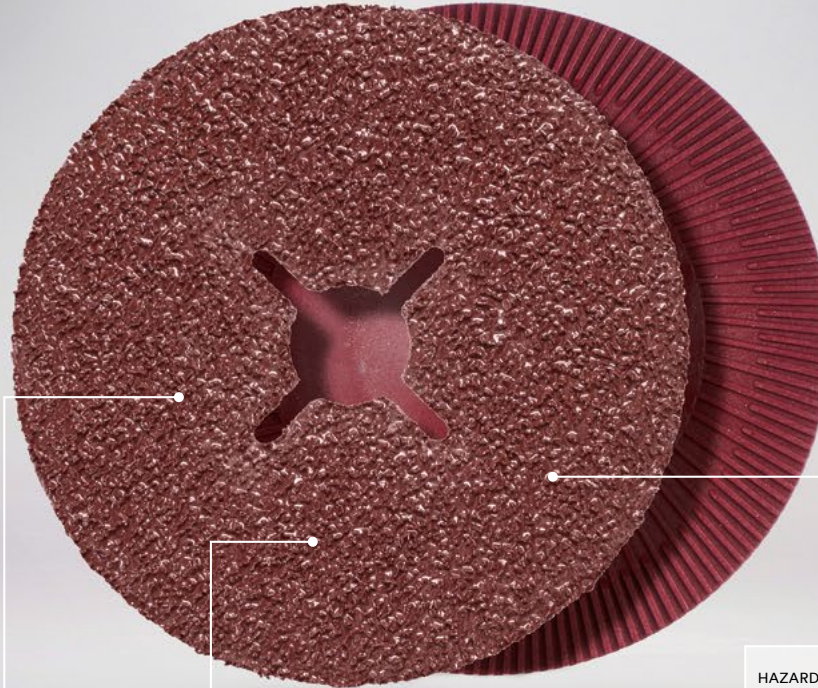
## Flat heavy weld removal, bevelling and edge prep.

Switching to 3M™ Cubitron™ II Fibre Discs 982C can reduce your level of risk when using angle grinders.

### 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 ingenious solution which compared to a standard grinding wheel, provides significant mitigation against noise, airborne particles and vibration while at the same time providing substantial increases in productivity and throughput.



### Our suggestion:

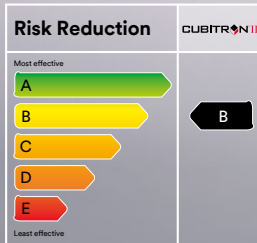
#### 3M™ Cubitron™ II Fibre Disc 982C

Putting 3M's proprietary Precision Shaped Grain technology into an open face format such as a fibre (sanding) disc, delivers exceptional levels of cutting capability, delivering the stock removal capability of a grinding wheel.

The 3M™ Cubitron™ II fibre disc 982C is perfect for demanding weld removal, bevelling or other stock removal jobs on flat surfaces. This flexible sanding disc, performing the same job as a hard grinding wheel, offers a highly effective fabricating tool with significantly reduced risk, as shown on the risk reduction indicators below.

#### 3M™ Cubitron™ II Ribbed Back-Up Pad

Designed for heavy stock removal, the 3M™ Cubitron™ II Ribbed Back-Up Pad, used with a 3M™ Cubitron™ II fibre disc, offers improved disc life and cut rate.



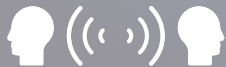
HAZARD REDUCTION:

### Noise



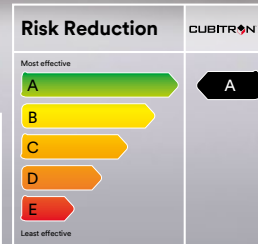
Reduce noise energy by up to

**75%\***



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

Up to **6db\*** quieter



HAZARD REDUCTION:

### Hand-arm vibration

Up to **91%\*** reduction in vibration exposure



The less rigid, lightweight fibre construction generates less vibration, so **less vibration is transmitted to the operator**

Less applied pressure is required, minimising operator fatigue

Reduced trigger time due to a significantly better material removal rate, reduces time on the tool, cutting vibration exposure even FURTHER



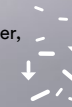
HAZARD REDUCTION:

### Airborne particles

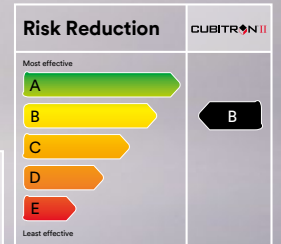


Up to **71%\*\*** less airborne particles

Innovative slicing action means larger, longer metal chips (swarf) staying airborne for less time



Conventional grinding wheels are responsible for a large proportion of the airborne particles produced as they wear. **Moving to a fibre disc construction can significantly reduce the hazard**



HAZARD REDUCTION:

### PPE check list (page 14)



Apropiate PPE and operating techniques and other controls should always be used when working with abrasives

3M respirators and face protection

3M hearing and eye protection

Safety clothing, boots and gloves

\* Noise and hand-arm vibration compared Tyrolit basic 2in1 Wheel and 3M™ Cubitron™ II Fibre Disc 982C – According to independent testing by Fraunhofer Institute.

\*\* Airborne particles compared 3M™ High Performance Grinding Wheel to 3M™ Cubitron™ II Fibre Disc 982C – According to independent testing by VITO.



Currently using  
**Grinding Wheel**

used with an angle grinder

Application:

**Fillet weld removal, grinding into corners, weld prep and bevelling.**

Switching to 3M™ Cubitron™ II Depressed Centre Grinding Wheels can help reduce the level of risk associated with angle grinding.

**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.

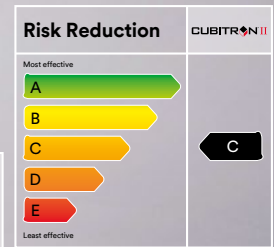
3M offers an innovative solution that can provide significant mitigation of the risks from noise, airborne particles and hand-arm vibration, while at the same time providing substantial improvements in productivity and throughput.



**Our suggestion:**

**3M™ Cubitron™ II Depressed Centre Grinding Wheel**

Engineered to cut significantly faster and last up to four times longer than competing products, where applications demand use on the face and edge of the wheel. Just as importantly, 3M™ Cubitron™ II Depressed Centre Grinding Wheels can play a vital role in reducing risk, as shown on the risk reduction indicators below.



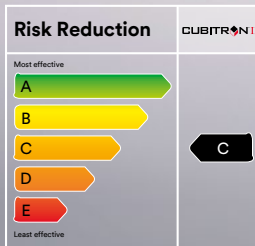
HAZARD REDUCTION:

**Airborne particles**

Up to **40%\*\*** less airborne particles

Innovative slicing action means larger, longer metal chips (swarf) staying airborne for less time

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



HAZARD REDUCTION:

**Noise**



Reduce noise energy by up to

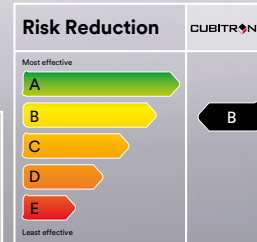
**50%\***



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



Up to **3db\*** quieter



HAZARD REDUCTION:

**Hand-arm vibration**



Minimise vibration by up to **64%\***

Less applied pressure is required minimising operator fatigue

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

HAZARD REDUCTION:

**PPE check list** (page 14)



**Apropiate PPE and operating techniques** and other controls should always be used when working with abrasives

**3M respirators and face protection**

**3M hearing and eye protection**

Safety clothing, **boots and gloves**

\* Noise and hand-arm vibration compared Tyrolit basic 2in1 Wheel to 3M™ Cubitron™ II Depressed Centre Grinding Wheel – According to independent testing by Fraunhofer Institute.  
 \*\* Airborne particles compared 3M™ High Performance Grinding Wheel to 3M™ Cubitron™ II Depressed Centre Grinding Wheel – According to independent testing by VITO.

Currently using

# Cut-off Wheel

used with an angle grinder

Switching to **3M™ Cubitron™ II Cut-Off Wheels** can reduce your level of risk when using angle grinders.

## How 3M can help.

Of all the metal fabrication processes, cutting metal with a cutting wheel is one of the most hazardous. This is due to the cutting wheels being relatively thin and the technique required by the operator to complete the job. Uneven pressures, cutting angles, damaged wheels and the close proximity of the operator to the high speed cutting wheels all contribute to the risks.

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

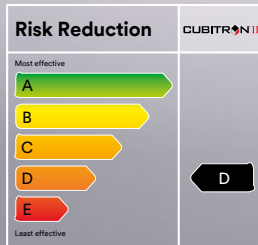


## Our suggestion:

### 3M™ Cubitron™ II Cut-Off Wheel

3M™ Cubitron™ II wheels have been engineered to cut significantly faster and last up to four times longer than competitive wheels.

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



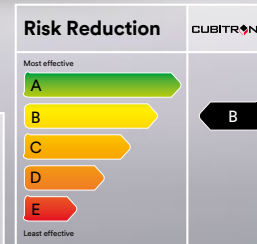
HAZARD REDUCTION:

### Noise



Faster cutting action enables work to be **completed faster**, helping to **reduce exposure**

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



HAZARD REDUCTION:

### Hand-arm vibration



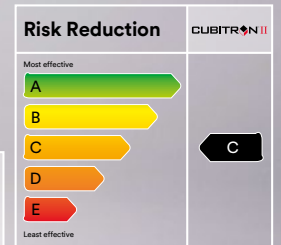
Reduction in vibration exposure



Reduced trigger time due to significantly faster cut rate



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



HAZARD REDUCTION:

### Airborne particles



Less airborne particles

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

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



HAZARD REDUCTION:

### PPE check list (page 14)



**Appropriate PPE and operating techniques** and other controls should always be used when working with abrasives

**3M respirators and face protection**

**3M hearing and eye protection**

Safety clothing, **boots and gloves**



Currently using

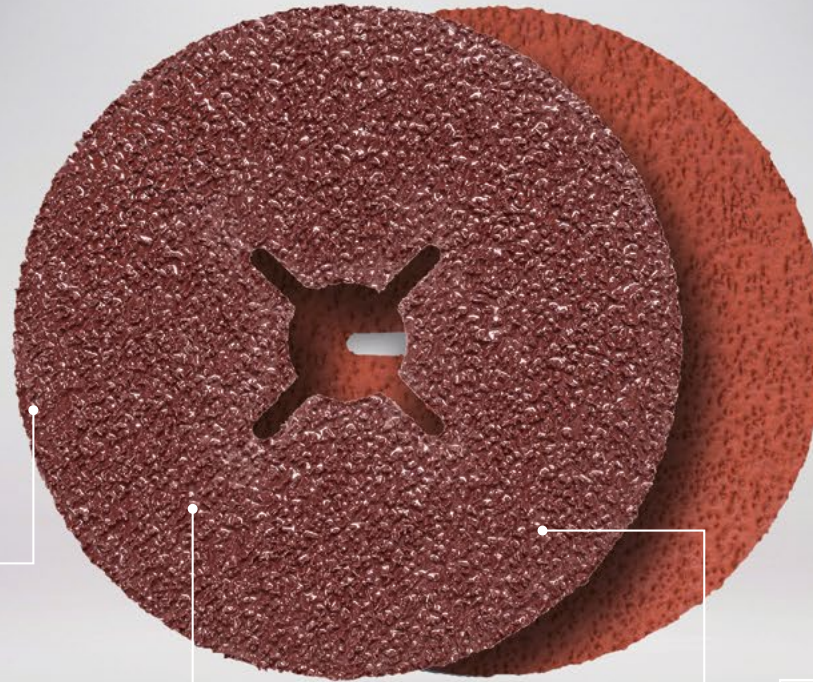
# Fibre Disc

used with an angle grinder

Switching to **3M™ Cubitron™ II Fibre Discs 982C** can help to reduce the level of risk with angle grinders.

## 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.



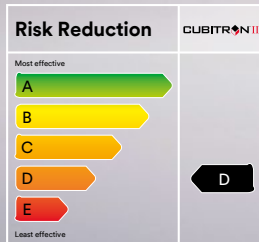
## Our suggestion:

### 3M™ Cubitron™ II Fibre Disc 982C

Cubitron™ II 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 982C Series and for all other applications up to a 120 grit finish, we recommend 3M™ Fibre Disc 787C.

3M™ Cubitron™ II 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™ II offers a far lower risk profile, as shown on the risk reduction indicators.

In each case, 3M™ Cubitron™ II fibre discs have been designed to offer high levels of performance, which in turn can reduce the hazards from noise, airborne particles, and vibration when compared with other products. Thus, 3M™ Cubitron™ II can offer a comparatively lower risk profile when properly used.



HAZARD REDUCTION:

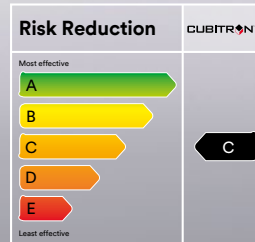
### Noise



Reduce noise exposure by completing the job quicker



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



HAZARD REDUCTION:

### Hand-arm vibration

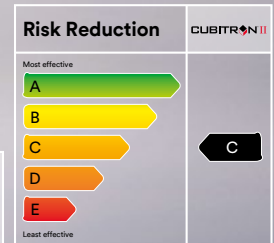


Up to **32%\*** Reduction in vibration

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



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



HAZARD REDUCTION:

### Airborne particles



Up to **48%\*\*** less airborne particles

Innovative slicing action of 3M's proprietary grain means larger, longer metal chips (swarf) staying **airborne for less time**



HAZARD REDUCTION:

### [PPE check list](#) (page 14)



**Appropriate PPE and operating techniques** and other controls should always be used when working with abrasives

**3M respirators and face protection**

**3M hearing and eye protection**

**Safety clothing, boots and gloves**

\* Noise and hand-arm vibration compared 4515 Siabite fibre disc to 3M™ Cubitron™ II Fibre Disc 982C – According to independent testing by Fraunhofer Institute.

\*\* Airborne particles compared 3M™ Cubitron™ Fibre Disc 985C to 3M™ Cubitron™ II Fibre Disc 982C - According to Independent testing by VITO.

Currently using  
**Flap Disc**

used with an angle grinder

Switching to **3M™ Cubitron™ II Flap Discs 969F** 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's flap discs are available in flat or conical formats and deliver superior cutting power and product life, reducing time on tool and the disc change frequency.

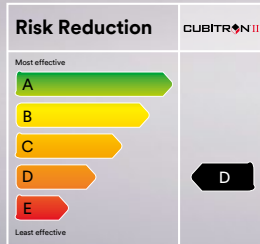


**Our suggestion:**

**3M™ Cubitron™ II Flap Disc 969F**

Cubitron™ II flap discs use 3M's proprietary Precision Shaped Grain to deliver winning performance. For heavier high pressure, heavy applications choose the 3M™ Cubitron™ II Flap Disc 969F with a polyester backing, while for less aggressive applications we recommend the poly-cotton backed 3M™ Cubitron™ II Flap Disc 967A product.

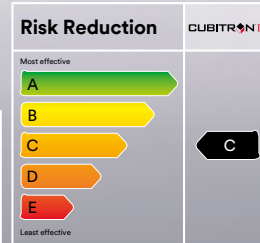
In each case, 3M™ Cubitron™ II discs have been designed to offer high levels of performance, while reducing the hazards from noise, airborne particles and vibration; compared with other products, 3M™ Cubitron™ II offers a far lower risk profile, as shown on the risk reduction indicators.



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

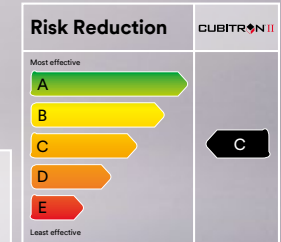


HAZARD REDUCTION:  
**Hand-arm vibration**

Up to **32%\*** reduction in vibration

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

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



HAZARD REDUCTION:  
**Airborne particles**

**Less airborne particle**

Innovative slicing action of 3M's proprietary grain means larger, longer metal chips (swarf) staying **airborne for less time**

HAZARD REDUCTION:  
**PPE check list** (page 14)

**3M respirators and face protection**

**3M hearing and eye protection**

**Safety clothing, boots and gloves**

Apropiate PPE and operating techniques and other controls should always be used when working with abrasives

\* Noise and hand-arm vibration compared Lukas SLTT flap disc to 3M™ Cubitron™ II Flap Disc 969F to – According to independent testing by Fraunhofer Institute.



Currently using

# Sanding Disc

used with a random orbital sander

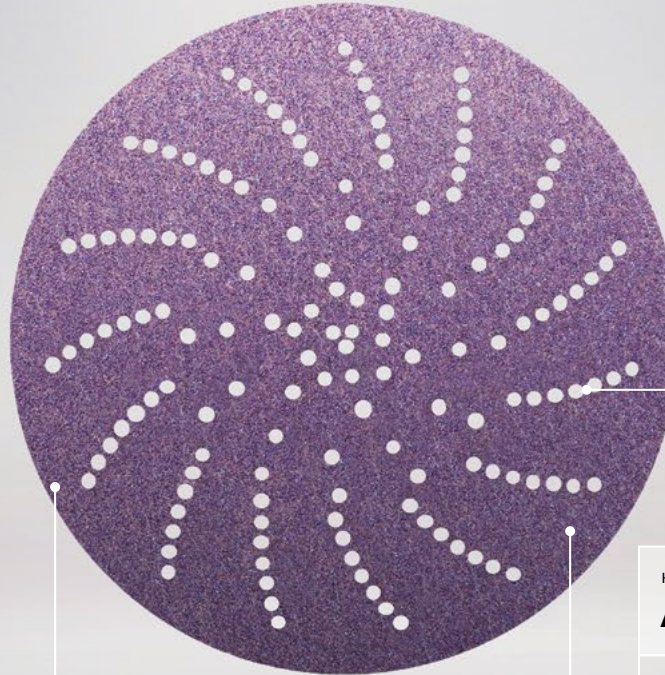
Switching to **3M™ Cubitron™ II Hookit™ Discs 775L** can help reduce the level of risk when sanding.

## How 3M can help.

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

The finer abrasive grades used in such applications also mean that airborne particles become an even greater issue. 3M sanding discs help resolve these problems, with exceptional cutting rates and class-leading airborne particle extraction capabilities.

3M Elite Series 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.

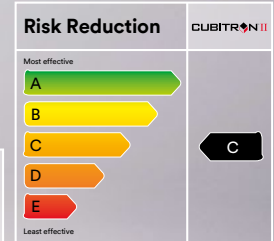


## Our suggestion:

### 3M™ Cubitron™ II Hookit™ Disc 775L

The 775L Disc is engineered to work faster than conventional discs thanks to its Precision Shaped Grain technology. The same technology also helps the product to last up to six times longer than competing materials. For even greater efficiency, pair our Cubitron™ II disks with 3M 'Elite' sanding tools.

3M™ Cubitron™ II discs and 3M 'Elite' sanders have been designed to offer high levels of performance, while reducing the hazards from noise, airborne particles and vibration, offering a far lower risk profile, as shown on the risk reduction indicators.



HAZARD REDUCTION:

## Airborne particles

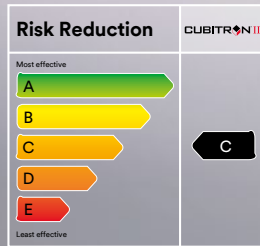


Less airborne particles released into the workplace



3M 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**



HAZARD REDUCTION:

## Noise

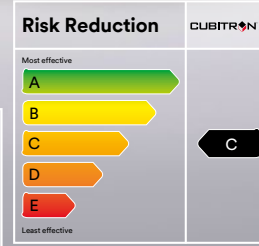
Reduce noise exposure by completing the task quicker



Stay on the job far longer without compromising legal exposure limits



3M tools designed with internal mufflers to help reduce noise by up to 6db



HAZARD REDUCTION:

## Hand-arm vibration

Get more work done with fast cutting abrasives

3M 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



Minimise vibration

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

HAZARD REDUCTION:

## PPE check list (page 14)



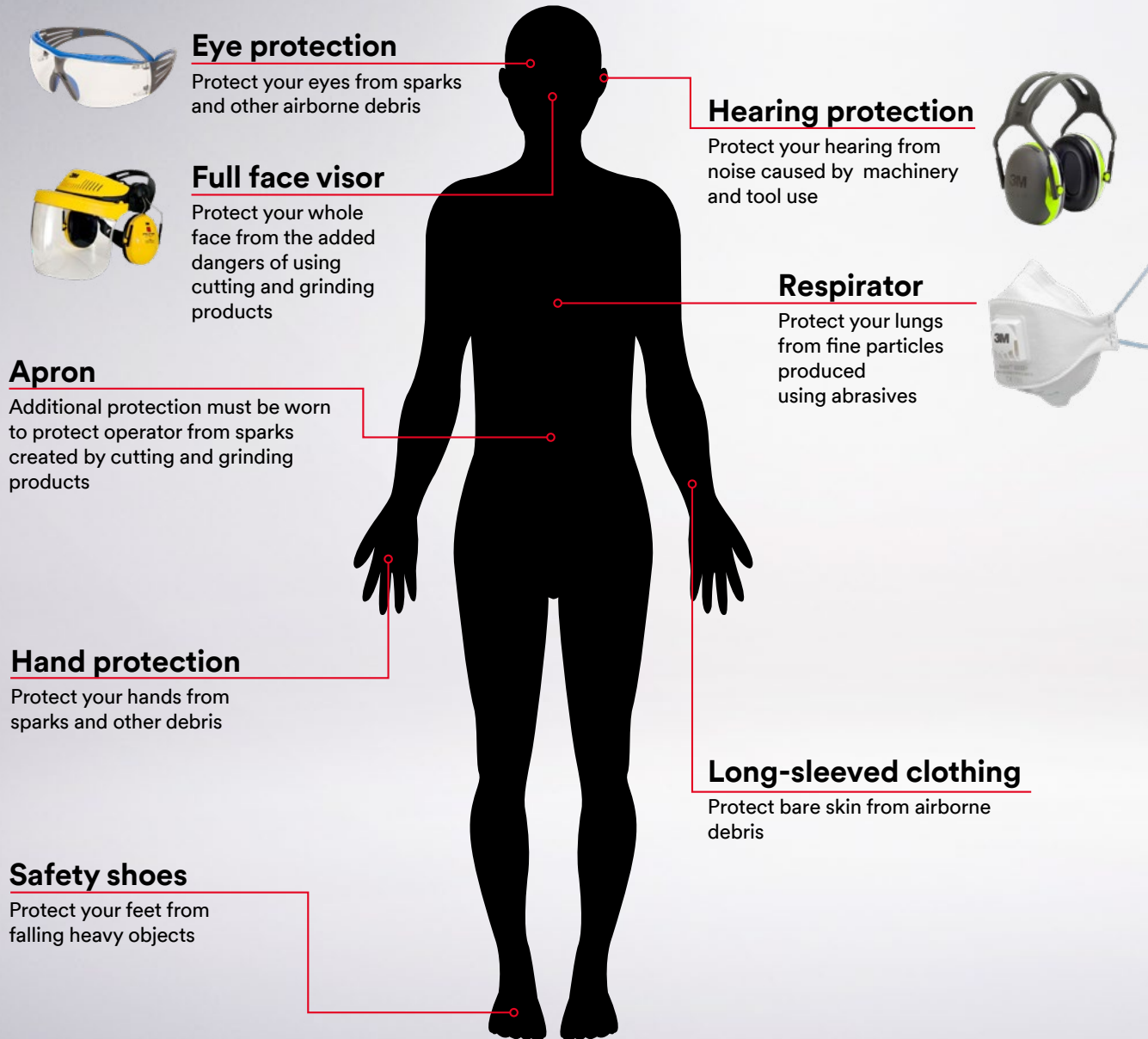
**Appropriate PPE and operating techniques** and other controls should always be used when working with abrasives

3M respirators and face protection

3M hearing and eye protection

Safety clothing, boots and gloves

# PPE guide to protect against the relevant hazards



## 3M™ Personal Protective Equipment

Product	Product description
	3M™ Headgear Combination, G500V5F11H51-GU (includes hearing protection)
	3M™ Versaflo™ Faceshield with Flame Resistant Poly Faceseal M-207 with 3M™ Adflo™
	3M™ Adflo™ High-Altitude Powered Air Respirator (to be combined with 3M headtops)
	3M™ SecureFit™ 400X Series Safety Glasses
	3M™ SecureFit™ 3700 Series Overspectacles
	3M™ GoggleGear™ 500 Series Goggle
	3M™ Aura™ Disposable Respirators 9300+ Series
	3M™ SecureClick™ Half Mask Reusable Respirator HF 800 Series
	3M™ E-A-R™ Flexible Fit Earplug HA 328-100
	3M™ PELTOR™ Electronic Earplug, EEP-100
	3M™ PELTOR™ Earmuff X4
	3M™ PELTOR™ X4 and Wireless Communication Accessory



## Links to further reading:

Health and Safety Executive  
[www.hse.gov.uk](http://www.hse.gov.uk)

British Abrasives Federation (BAF)  
[www.thebaf.org.uk](http://www.thebaf.org.uk)

Federation of European Producers of Abrasives (FEPA)  
[www.fepa-abrasives.com](http://www.fepa-abrasives.com)

Institute of Local Exhaust Ventilation Engineers (ILEVE)  
[www.cibse.org/Institute-of-Local-Exhaust-Ventilation-Engineers-I](http://www.cibse.org/Institute-of-Local-Exhaust-Ventilation-Engineers-I)

Industrial Noise Control:  
[www.industrialnoisecontrol.com/inc-library/noise-control-faqs](http://www.industrialnoisecontrol.com/inc-library/noise-control-faqs)

Hierarchy of Controls – National Institute for Occupational Safety and Health  
[www.cdc.gov/NIOSH](http://www.cdc.gov/NIOSH)

\* For further formation on the independent test data carried out by the Fraunhofer Institute and the Flemish Institute for Technological Research (VITO), please contact us: [abrasives.uk@mmm.com](mailto:abrasives.uk@mmm.com)

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

**Visit [3M.co.uk/safetybuiltin](http://3M.co.uk/safetybuiltin)**

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