



INSTRUCTION MANUAL FOR PIRANHA CUTTING BLADES

INTRODUCTION

Piranha introduction

This instruction book / guide will help you choose and understand all Piranha Diamond Products. Whether it is a regular cutting blade from a grinder or a specialised cutting blade for many different materials, including:

- Bridge saw blade
- Cup wheels
- Grinding tools.

Piranha Diamond Products is a Chinese design manufacturing company.

Company Profile

Piranha Diamond Product Tools Co., Ltd. is a specialized manufacturer supplying a full range of diamond saw blades, TCT saw blades, cutting discs, grinding wheels and drill bits. Our factory is near Shanghai Port with convenient transportation.

With 20 years' production experience, we enjoy a good reputation in the tooling industry. We have a team of skilled workers and experienced technicians. Our products are widely used for cutting and grinding granite, marble, concretes, asphalts, tiles and good quality wood. All of our products are exported to foreign countries and regions around the world due to their quality.

Products we manufacture

- Diamond Saw Blade
 - Diamond Cup Grinding Wheel
 - Diamond Core Bits
 - TCT Saw Blade
 - HSS Twist Drill
 - Masonry Drill
 - SDS Hammer Drill
 - Chisel
 - Arbasive Cutting and Grinding Wheel
 - Wire Brush
- Hardrock UK is our EU Distributor and main contact for 20 years.
- Product design: We have a strong product design team and have been engaged in various product design for over 20 years.
 - Product customization, mould manufacturing: We accept OEM/ODM, we have our own mould workshop, plastic injection molding machine, aluminium die casting machine, etc

PIRANHA DIAMOND PRODUCTS

SAFETY FIRST POLICY

Safety laws and regulation can change over time and in different locations and countries it is imperative and important for you to research and study your local laws and health and safety policy's both nationally and in the work place and adhere to them every time you use cutting equipment.

You need to invest on high quality, head-to-toe PPE equipment for your own health and safety. Please consider the level of PPE you have before using this product or any Piranha Diamond Product. We recommend Class 1 & 2 personal protective equipment when flush cutting, or 4-5 star protection depending upon brands measuring and testing procedure.

1. Check your health that you are physically and mentally fit to perform the job task in hand.
2. Read and study research further for any appropriate Personal Protection Equipment (PPE) you might need. Ensure that the condition of clothes and equipment is good without breakages, tears or being worn out.
3. Assess the work space, do a risk assessment and talk to fellow workers and managers.
4. Plan your job task after discussions with the information shared.
5. Obtain all PPE and specialised equipment needed for the task job.
6. Estimate the time needed to complete the job task safely.
7. Inform any other works colleagues (cutting blades can cause dust and flying debris) and ensure a safe working zone of 15 metres.

PPE Equipment

Here is a list of adequate PPE clothing examples you should consider when using these products. These are minimum recommended protections:
Class 1 230mm 9" level 5
Class 2 125mm 5" level 4



Hi specification Anti vibration anti cut gloves.



Full face, head, visor, dust mask with Powered Respirator air filters combined (not goggles or safety spectacles)
20V0066 3M VersaFlo Powered Respirator Starter Kit



Cut Protection Trousers

Conforms to EN 381-5:1995, cut protection class 1 form A, KWF-professional tested and FPA-accredited.



Ear plugs or protection from loud cutting and hi-pitched grinding noises



Class 1 protective cut-resistance leather or rugged anti rip cut toe foot / ankle protection / toe protection / anti puncture sole protection to the main foot and bones



Fore Arm Cut Protector



Chest Body Armoured Jacket by Stihl with cut protection



CONFORMITY TO EN13236

Piranha Diamond Products conforming to EN13236 as a top priority to provide safe and reliable products to customers.

All Piranha Diamond Products have always complied with highest standards (such as DSA, VBG49, BGV D12...). However they now comply with European safety regulation EN13236 "Safety requirements for super-abrasives". The intention of this regulation is to obtain and ensure the highest possible level of product safety to guarantee safe working conditions. Our very strict self-control conditions comply with or exceed EN13236 standard requirements.

Maximum operating speeds for dry cutting with hand held machines

Safety instructions for the use of Norton diamond blades are supplied with each blade. They also inform on the max. operating speed to be used by diameter.

DIAMETER (mm)	m/s MAX	RPM MAX
105	80	15300
115	80	13300
125	80	12250
150	80	10200
180	80	8500
200	80	7650
230	80	6650
300	100	6400
350	100	5500
400	100	4800

Other diamond blades (wet cutting, other diameters...)

Maximum operating speed for these blades to be used safely can not exceed 63m/s

DIAMETER (mm)	m/s MAX	RPM MAX
250	63	4850
300	63	4050
350	63	3450
400	63	3050
450	63	2700
500	63	2450
600	63	2050
750	63	1650
800	63	1550
900	63	1350
1000	63	1250
1220	63	1050

Laser engraving

The following information is engraved on the steel centre of our diamond blades. Laser-engraving ensures that the information remain visible during the whole life of the product.

- Maximum speed in m/s and RPM
- Directional arrow
- Diameter and bore (in mm)
- Specification
- Material reference number
- Manufacturing date
- Manufacturing batch number
- Name of manufacturer (NORTON)
- Applicable Safety Standard

Individual Protection Equipment

It is recommended to always wear adapted Individual Protection Equipments to ensure operator's safety when using diamond tools.

RISK ASSESSMENT: ABRASIVE WHEELS

Introduction

Risk assessments are important for all workplaces and all work activities but they are particularly vital for hazardous work involving the use of abrasive wheels.

All employers have a responsibility to identify the risks and put in place a plan to control them. As an employee you must follow any safe systems of work that are implemented.

This section of the course looks at each of the essential steps in the risk assessment process so that you know what to look out for when carrying out your own workplace risk assessment.

Topics to be Covered

The topics covered in this section are:

- What is a risk assessment?
- Identifying hazards
- Deciding who may be harmed
- Evaluating risks
- Recording findings
- Reviewing and updating

What is a Risk Assessment?

A risk assessment is simply a careful examination of what in your work could cause harm to people so that you can weigh up whether you have

taken enough precautions or need to do more.

Employers are legally required to assess the risks in their workplace so that they can put in place a plan to control the risks.

The main steps of a risk assessment are:

1. Identify the hazards.
2. Decide who might be harmed and how.
3. Evaluate the risks and decide on precautions.
4. Record your findings and implement them.
5. Review your assessment and update if necessary.

What is a Risk Assessment?

A few key definitions relating to risk assessments are as follows:

Reasonably practicable - the risk assessment should be realistic and possible to achieve with the resources available in your workplace.

Suitable and sufficient - the risk assessment must be tailored towards the tasks at hand and be thorough enough to ensure there are no discrepancies.

Competent person - the person that carries out the risk assessment should understand HSE guidance, develop an action plan, know which information to obtain for the risk assessment, seek help when needed and record all the results.

Hierarchy of control - the order in which control measures should be implemented.



Step 1: Identify the Hazards

The first step of your risk assessment is to identify the hazards that your work activities pose. Techniques for this include:

- **Workplace observation** - where are abrasive wheels used in the workplace? Can you identify any hazards just by looking?
- **Feedback from employees** - have workers identified any hazards?

Check manufacturers' instructions or data sheets - what safety guidance does the manufacturer offer? Much of Roc, Piranha Diamond Products and ceramic Cobra polishing systems safety can be found on www.hardrockuk.com main web site. The manufacture recommends cutting blades are made to exceed the EN13263 standard this that blades can be fitted as a normal blade to a grinder with back locking nut. Maximum operational

speeds 6650Rpm 80mps. for cutting.

- Recommended safety operational speeds: 1000-6650RPM / 12-80mps with a bolt on steel flange attached. (20 minutes intervals, depending on the task in hand = risk assessment reduce speed where and when possible. to 50mps)

We recommend extra safety PPE is used worn when flush cutting. Some training should be given to identify the risks. But the flush cutting blade can serve as a potentially superior solution in some cases of use.

This information is based on typical grinder maximum output speed of 80Mps

- For polishing sanding systems form ceramic Cobra & Manufactures MISCELLANEOUS SUPPLIERS speed from 1000 - 4500 max RPM on 100mm disc approximately 25mps. = ideal polishing sanding speeds.
- Review accident and ill-health records - have there been any accidents or near misses related to abrasive wheels before?

Some hazards may already be present in the workplace environment and some may arise from the job being carried out, so be sure to consider every aspect of the work activity.



Ceramic



Cobra

Diamond Resin Bonded Stone Polishing Systems

Step 2: Decide Who Might be Harmed and How

This step of the risk assessment involves looking at each specific hazard and then identifying the people who may be harmed. These people may be:

- Specific groups of employees
- Customers
- Visitors
- Members of the public nearby

Some employees have particular requirements, such as younger workers, expectant mothers or people with disabilities.

Temporary workers, part-time workers or sub-contractors need further consideration as they are likely to have limited knowledge of the conditions and dangers in your particular workplace.

Who is Most at Risk?

In the case of abrasive wheels, the people most at risk from harm include:

- Those responsible for mounting, setting and/or dressing new abrasive wheels.
- Those using a fixed or portable grinding wheel e.g. a disc sander, angle grinder or portable stone polisher dry. (Wet Polishers have extra electrical safety considerations.)
- Those within reach of rapidly flying particles following disintegration of a wheel.

Step 3: Evaluate the Risks

After identifying the risks and who may be harmed, the next step is to evaluate those risks and decide whether the hazards can be eliminated.

If the use of abrasive wheels cannot be avoided, then how can you control the risks so that harm is unlikely? The hierarchy of control suggests:

- Using a less-risky work process.

- Preventing access to the hazard.
- Re-organising work to reduce the need for exposure.
- Issuing personal protective equipment.
- Involving and training staff to ensure the precautions will work in practice and don't introduce new hazards.

More on control measures will be covered in the next section of the course.

Step 4: Record Your Findings and Implement Them

It is recommended that your risk assessment findings are written down, even though where there are fewer than 5 employees in your company this is not required by law.

You need to be able to show that:

- A proper check was made.
- You have considered who might be affected.
- You have dealt with all the obvious significant hazards, taking into account the number of people who could be involved.
- The precautions are reasonable and the remaining risk is low.
- Staff or their representatives have been involved.

Exercise

Who is at risk on your current job / Task?

Exercise

Identify the risks of that specific task job you are

Step 5: Review and Update

You should check on a regular basis whether there have been any changes in the workplace that may affect your risk assessment. For example:

- Are there any improvements still to be made?
- Has there been employee feedback?
- Have you learnt anything from accidents and near misses?
- Has any new equipment or machinery been introduced?
- Do you have any new employees that require training?

All of these changes would require your risk assessment to be reviewed and updated in order to take into account what has been learnt.

Exercise

Which of the following is NOT a step in the risk assessment process?

- Review your assessment and update if necessary
- Ensure that face masks are tested for fit
- Identify the hazards
- Record your findings and implement them
- Evaluate the risks and decide on precautions

It is recommended that RPMs are reduced and time between breaks is reduced when using and operating with flush cutting blades. We recommend to use the product with a variable speed grinder on slower speeds slower RPMs. It is recommended that RPMs are reduced and time between breaks is reduced when using and operating with flush cutting blades. We recommend to use the product with a variable speed grinder on slower speeds slower RPMs There is a handy chart to convert MPS to RPM. Please use our speed conversion chart on page 24 – slower speeds provide more accurate and safer detailed cutting. Where there is more risk of injury operate at very slow speeds RPM. Think about your safety!

Summary

A risk assessment is simply a careful examination of what in your work could cause harm to people so that you can weigh up whether you have taken enough precautions or need to do more.

The main steps of a risk assessment are:

- Identify the hazards.
- Decide who might be harmed and how – consider everyone from employees to site visitors.
- Evaluate the risks and decide on precautions – can work be avoided? If not, how can you control the risks so that harm is unlikely?
- Record your findings and implement them – keep a written record of your findings to show compliance with the law.
- Review your assessment and update if necessary – have there been any changes that mean the assessment needs amending?

In the next section of the course we'll take a look at some of the control measures you can implement to protect yourself and others from harm.

You should complete the following exercise on a weekly basis.

Exercise

Record your finding who is at risk on your current job / task?

Exercise

Record your finding Identify the risks of that

Exercise

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WHAT IS 'WHITE FINGER'?

Carpal Tunnel Syndrome & Raynaud's

If you work in the construction industry, you have probably heard the term "White Finger" in connection to operational hazards and workplace health & safety many times.

Why is it called "White Finger?"

Vibration White Finger is the more colloquial name for HAVS (Hand-Arm Vibration Syndrome) or Raynaud's phenomenon and is a condition most commonly associated by the chronic use of vibrating equipment in the workplace.

The malady gets its nickname from the striking white, dead-looking appearance of the finger caused by a lack of blood, which also coincides with a tingling sensation. These are symptoms of prolonged vibration-induced blood vessel and nerve damage.

If the condition worsens, the loss of colouration becomes ever more frequent (particularly when exposed to cold temperatures) and can even deteriorate to the extent where dexterity is lost entirely.

Complete loss of dexterity would almost certainly inhibit a person's quality of life and be a disaster from an employability standpoint. Everyday tasks, such as fastening small buttons on clothes, may become difficult or impossible depending on how advanced the condition is.

Carpal Tunnel Syndrome - a medical term

Carpal Tunnel Syndrome is the name given to a group of symptoms that includes swelling, pain, tingling, and loss of strength in your wrist and hand.

Carpal Tunnel Syndrome is three times more common in women than in men. It can occur at any age, but tends to affect those in their 40s and 50s. The risk increases for both men and women as they age.

"Carpal" is a medical term that refers to the wrist. The small bones in the wrist form a narrow channel (the carpal tunnel) that is covered by a tough ligament called the flexor retinaculum. The flexor tendons which run down from the muscles in the forearm to bend the fingers pass through this tunnel. The median nerve which controls movement of the thumb and carries information back to the brain about sensations felt in the thumb and fingers (particularly the index, middle and (occasionally) the ring fingers) also passes through this narrow channel. The carpal channel is very narrow, particularly in women and any swelling around it can put pressure on the median nerve, interfering with the nerve impulses causing the symptoms of carpal tunnel syndrome.

Diagnosis And Treatment Of Carpal Tunnel Syndrome

Carpal tunnel syndrome can be diagnosed from an examination and description of your symptoms. Your GP may refer you to a specialist in diagnosing and treating conditions such as carpal tunnel syndrome. A diagnosis can usually be confirmed by a series of tests which may include the Tinel test, the Phalen test, a nerve conduction study, electromyography and / or ultrasound imaging.

It is important to obtain an early diagnosis and treatment to avoid permanent damage to the median nerve. Some people recover from carpal tunnel syndrome especially if the underlying cause is removed, for example, when diabetes or an underactive thyroid is treated. If treated early, mild cases usually get better without surgery.

Raynaud's

Raynaud's phenomenon is common and does not usually cause any severe problems. You can often treat the symptoms yourself by keeping warm. Sometimes it can be a sign of a more serious condition.

Check if it's Raynaud's

Raynaud's affects your blood circulation. When you're cold, anxious or stressed, your fingers and toes may change colour.

Other symptoms can include:

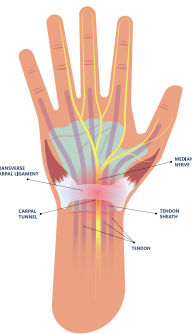
- Pain
- Numbness
- Pins and needles
- Difficulty moving the affected area



The skin turns white as blood flow is restricted.



The skin turns red as blood flow returns.



Some people also find their ears, nose, lips or nipples are affected.

The symptoms of Raynaud's may last from a few minutes to a few hours.

If you're not sure it's Raynaud's

Things you can do to help

Do

- Keep your home warm
- Wear warm clothes during cold weather - especially on your hands and feet
- Exercise regularly - this helps improve circulation
- Try breathing exercises or yoga to help you relax
- Eat a healthy, balanced diet

Speed conversion table for speed of rotation (RPM) vs peripheral operating speed (m/s) of various wheel diameters

From BS EN 12413: 1999

Wheel diameter in millimeters	Maximum operating speed in m/s													
	10	12	16	20	25	32	35	40	45	50	63	80	100	125
6	31 900	38 200	51 000	64 000	80 000	102 000	112 000	128 000	143 500	160 000	201 000	-	-	-
8	24 000	29 000	38 200	48 000	60 000	76 500	84 000	95 500	107 500	120 000	150 500	191 000	-	-
10	19 100	23 000	30 600	38 200	48 000	61 200	67 000	76 500	86 000	95 500	120 500	153 000	191 000	-
13	14 700	17 700	23 550	29 500	35 600	47 100	51 500	58 800	66 200	73 500	92 600	118 000	147 000	184 000
16	11 950	14 350	19 100	23 900	29 850	38 200	41 800	47 800	53 750	59 700	75 200	95 500	120 000	150 000
20	9 550	11 500	15 300	19 100	23 900	30 600	33 500	38 200	43 000	47 800	60 200	76 500	95 500	120 000
25	7 650	9 200	12 300	15 300	19 100	24 500	26 800	30 600	34 500	38 200	48 200	61 200	76 500	95 500
32	6 000	7 200	9 550	11 950	14 950	19 100	20 900	23 900	27 000	30 000	37 600	48 000	60 000	75 000
40	4 800	5 750	7 650	9 550	11 950	15 300	16 750	19 100	21 500	23 900	30 100	38 200	47 200	59 700
50	3 850	4 600	6 150	7 650	9 550	12 250	13 400	15 300	17 200	19 100	24 100	30 600	38 200	47 750
63	3 050	3 650	4 850	6 100	7 600	9 750	10 650	12 150	13 650	15 200	19 100	24 300	30 250	37 900
80	2 400	2 900	3 850	4 800	6 000	7 650	8 400	9 550	10 750	12 000	15 100	19 100	23 900	29 850
100	1 950	2 300	3 100	3 850	4 800	6 150	6 700	7 650	8 600	9 550	12 100	15 300	19 100	23 900
115	1 700	2 000	2 700	3 350	4 200	5 350	5 850	6 850	7 500	8 350	10 500	13 300	16 650	20 800
125	1 550	1 850	2 450	3 100	3 850	4 900	5 350	6 150	6 900	7 650	9 650	12 250	15 300	19 100
150	1 300	1 550	2 050	2 550	3 200	4 100	4 500	5 100	5 750	6 400	8 050	10 200	12 700	16 000
180	1 100	1 300	1 700	2 150	2 700	3 400	3 750	4 250	4 780	5 350	6 700	8 500	10 650	13 300
200	955	1 150	1 550	1 950	2 400	3 100	3 350	3 850	4 300	4 800	6 050	7 650	9 550	11 950
230	830	1 000	1 350	1 700	2 100	2 700	2 950	3 350	3 750	4 200	5 250	6 650	8 350	10 400
250	765	920	1 250	1 550	1 950	2 450	2 700	3 100	3 450	3 850	4 850	6 150	7 650	9 550
300	640	765	1 050	1 300	1 600	2 050	2 250	2 550	2 870	3 200	4 050	5 100	6 400	8 000
350/356	550	655	875	1 100	1 400	1 750	1 950	2 200	2 460	2 750	3 450	4 400	5 500	6 850
400/406	480	575	765	960	1 200	1 550	1 700	1 950	2 150	2 400	3 050	3 850	4 800	6 000
450/457	425	510	680	850	1 100	1 400	1 500	1 700	1 910	2 150	2 700	3 400	4 250	5 350
500/508	385	460	615	765	960	1 250	1 350	1 500	1 720	1 950	2 450	3 100	3 850	4 800
600/610	320	385	510	640	800	1 050	1 150	1 300	1 450	1 600	2 050	2 550	3 200	4 000
660	290	350	465	580	725	930	1 050	1 200	1 300	1 450	1 850	2 350	2 900	3 650
750/762	255	310	410	510	640	820	895	1 050	1 150	1 300	1 650	2 050	2 550	3 200
800/813	240	290	385	480	600	765	840	960	1 075	1 200	1 550	1 950	2 400	3 000
900/914	215	255	340	425	535	680	750	850	955	1 100	1 350	1 700	2 150	2 700
1 000/1 016	195	230	310	385	480	615	670	765	860	960	1 150	1 500	1 950	2 400
1 050/1 067	185	220	295	365	455	585	640	730	820	910	1 150	1 500	1 850	2 300
1 120	175	210	280	350	435	560	610	695	785	870	1 100	1 400	1 750	2 200
1 220	160	195	255	320	400	510	560	640	720	800	1 050	1 300	1 600	2 000
1 500	130	155	205	255	320	410	450	510	575	640	805	1 050	1 300	1 600

INTRODUCTION TO ABRASIVE WHEELS

Statistics on accidents from the Royal Society for the Prevention of Accidents tell us that nearly half of all accidents involving abrasive wheels occur due to an unsafe system of work or operator error.

If you work with abrasive wheels it's essential that you follow safe work practices at all times in order to avoid accidents, injuries and ill-health.

This training course aims to provide you with an introduction to working safely with abrasive wheels so that you can understand more about the legal requirements, potential risks and control measures needed in order to carry out your job role safely.

Course Aims

By the end of this course learners will be able to:

- Give examples of common tasks using abrasive wheels and understand the associated risks.
- Identify the factors that contribute to injury and to ill-health.
- Recognise the control measures that reduce the risk of injury and ill-health from the use of abrasive wheels.
- Understand how to correctly use abrasive wheels, including the control measures to reduce or eliminate the risk of injury and ill-health.

Topics to be Covered

The topics covered in this module are:

- Who this course is for
- What are abrasive wheels?
- Injuries and ill-health
- Legislation
- Employer and employee responsibilities
- Hierarchy of control measures

Who this course is for

Abrasive wheels are dangerous because of their high speed of rotation and the possibility of disintegration due to centrifugal stress i.e. wear and tear from rapid rotation.

This course focusses on the safe use of abrasive wheels, with particular focus on bench grinders, pedestal grinders and angle grinders. If you are required to use any of these in your work activities then this training will be beneficial to you.

There are many other specialist grinding machines, such as surface grinders, cylindrical grinders and internal grinding machines etc. and, although these are not covered in this course, many of the general rules covered are applicable.

The hazards associated with cutting lubricants are not covered.

What Are Abrasive Wheels?

An 'abrasive wheel' is a wheel made of abrasive particles stuck together with various substances.

Abrasive wheels are used by a variety of industries but, if not used correctly and safely, can cause injury in several ways. For example:

- Contact with a moving abrasive wheel.
- Fragmentation (bursting) of the abrasive wheel.
- Vibration injuries, such as Hand Arm Vibration (HAV).
- Exposure to harmful dusts.
- Exposure to noise.

What Are Abrasive Wheels?

Many abrasive wheels are used for grinding, although this is a diverse field.

Grinding may be used to finish off work-pieces that need to have a high surface quality and high accuracy of shape and dimension. It is often a finishing operation, removing comparatively little substrate i.e. surface material, often about 0.25 to 0.50 mm depth.

At the other extreme, grinding can be used to remove large amounts of substrate quite quickly. Bench grinders and pedestal grinders are commonly used to hand-grind cutting tools and perform other rough grinding.

Grinding operations generate heat, which is why many grinding operations incorporate the use of coolants.

Injuries and Ill-Health

Abrasive wheels are highly dangerous if used incorrectly and can cause all manner of injuries and ill-health to the operator. This includes:

- Injuries due to contact with the dangerous moving parts of the abrasive wheel (the rotating wheel).
- Injuries due to fragmentation or bursting of the abrasive wheel.
- Incidents caused by sparks generated from the use of abrasive wheels.
- Ill-health caused by the inhalation of dust generated by the use of abrasive wheels with materials like silica, metal etc.
- Ill-health caused by prolonged exposure to vibration like Hand-Arm Vibration (HAV) or excessive noise.

We'll take a look at some of the control measures used for reducing the likelihood of these injuries later in the course.

Legislation

The main legislation for abrasive wheels is the Provision and Use of Work Equipment Regulations 1998 (PUWER), which cover a wide range of equipment and activities.

The primary objective of PUWER is to ensure that work equipment, including abrasive wheels, do not give rise to risks to health and safety, regardless of the work equipment's age, condition or origin.

PUWER applies to all workplaces and work situations subject to the Health and Safety at Work, etc. Act 1974. The Act revoked the remaining provisions of the Abrasive Wheels Regulations 1970.



Legislation

PURER requires:

- All machinery to be suitable for its intended use.
- All machinery to be properly maintained.
- Anyone using, supervising or managing the use of abrasive wheels is fully informed and adequately trained for health and safety purposes.

The Approved Code of Practice for PURER contains advice specific to the use of abrasive wheels. You can access the document on the HSE website here:

[hse.gov.uk](https://www.hse.gov.uk/)- Approved Code of Practice and Guidance

There is also a significant amount of associated legislation, such as:

- The Control of Noise at Work Regulations 2005.
- The Control of Vibration at Work Regulations 2005.
- The Control of Substances Hazardous to Health Regulations 2002.
- The Health and Safety at Work, etc. Act 1974.
- The Management of Health and Safety at Work Regulations 1999.

There are also duties placed on abrasive wheel manufacturers under the Supply and Safety of Machinery Regulations 2008 to ensure that the equipment is safe for its designed use.

Machinery must be designed and constructed to meet the minimum European requirements for safety. The outward signs of compliance include CE (European Conformity) marking on the equipment. (EN13236 relating to diamond cutting blades.)

Employer Responsibilities

Under the Health and safety at Work, etc. Act 1974, all employers must ensure the health, safety and welfare of employees as far as is reasonably practicable.

In practice, this is achieved through the use of control measures that are identified during a risk assessment.

Employers must, by law, assess the hazards and ensure that controls are in place to protect workers from any risks to their health and safety. This is a requirement under Regulation 3 of the Management of Health and Safety at Work Regulations 1999.

Employee Responsibilities

As well as employers, employees also have duties under health and safety legislation. As an employee:

- You must take reasonable care of your own health and safety and that of other people who may be affected by your work.
- Under the Management of Health and Safety at Work Regulations 1999, you must inform your employer of any danger to health and safety posed by a work activity.
- You must inform your employer of any shortcomings in the protection arrangements.
- You must co-operate with your employer's health and safety arrangements.

Hierarchy of Control Measures

The hierarchy of control measures has five levels. The hierarchy helps you to understand the order in which precautions should be applied to control the risks posed by abrasive wheels.

The hierarchy states that you should first avoid work with abrasive wheels altogether. If this isn't possible then you need implement controls so that the hazards are reduced and the risk of harm is unlikely.

Some practical steps you could take include:

- Trying a less risky operation or process.
- Preventing access to the hazards.
- Organising your work to reduce exposure to the hazard.
- Providing suitable protective equipment.
- Providing welfare facilities such as first aid.
- Involving and consulting with workers.



Exercise A

Workplace machinery is covered by which piece of legislation?

- The Provision and Use of Work Equipment Regulations 1998
- The Control of Vibration at Work Regulations 2005
- The Control of Noise at Work Regulations 2005
- The Management of Health and Safety at Work Regulations 1999

Exercise B

Which of the following comes first in the hierarchy of control measures?

- Wear the appropriate PPE
- Ensure suitable first aid is available on site
- Avoid the need for using abrasive wheels altogether
- Provide suitable training to all operatives

Exercise C

What things should you do to check your own safety before you use a Piranha Diamond Product? Following comes first in the hierarchy of control

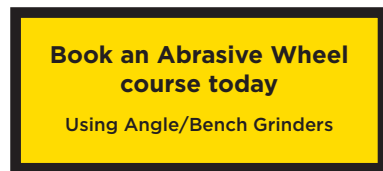
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Summary

In this section of the course we've taken a look at what your health and safety responsibilities are in regards to the use of abrasive wheels in the workplace. We've considered:

- What abrasive wheels and grinding are, plus the hazards that they present.
- The injuries and ill-health that may be sustained.
- The legislation you must comply with.
- The hierarchy of control measures.

In the next section of the course we'll explain more about how a risk assessment is conducted so that you understand the steps and can carry out an assessment in your place of work.



HOW TO CHOOSE THE RIGHT DIAMOND BLADE

Before you get started

Decide which is most important to you: the initial price of the blade or the cost per cut. For smaller jobs or occasional use, a low priced blade may be preferable. For larger jobs or regular use, a higher priced blade will actually be less expensive to use because it will deliver the lowest cost per cut. For really big jobs, the lowest possible sawing cost (cost per foot) is usually much more important than the initial price. Piranha Diamond Products has a grading system to help you identify the different performance levels of blades. We also colour the blades to make it easy to know what the blade is best designed to cut.

Know the type and horsepower of the saw being used

A list of different types of equipment you may use diamond blades on is provided on page 7. There is a corresponding symbol for each, and these symbols are used throughout the catalogue to help you locate the right blade. Blades that are to be used on power cutters have to be rated at higher RPMs. Please refer to the chart on page 16-17. All Piranha Diamond Products high-speed cut-off blades are rated at the appropriate, higher rpms.

Correctly identify what you're cutting

Correctly identifying the material you are going to cut is the most important factor in choosing a blade. It directly affects the cutting speed and the life of the blade. You will find diamond blade recommendations charts throughout the catalogue to help you locate the proper blade for your job. Most Piranha Diamond Products cut a RANGE of materials. For

maximum performance (cutting speed and life), the material should be matched to the blade as closely as possible. As a general rule, determine the material which will be cut most often, or the material for which top blade performance is most important.

Choose wet or dry cutting

Choosing wet or dry may be a matter of user preference or job requirement. When using a power hand tool such as a power hand saw, it is not safe to use water because of the electrical power source. However for concrete saws, wet cutting is usually preferred because you can cut deeper when using water as a coolant. For tile and masonry saws, either wet or dry cutting blades can be used. For power cutters, dry blades are more popular, but they are often used wet to control dust. Wet blades MUST be used with water. Dry blades may be used EITHER dry OR wet, as the job or equipment allows.

The Significance of Segment Height

Total segment heights may be misleading because of none diamond bearing segment bases necessary for the laser welding or brazing process. That is why Piranha Diamond Products shows you exactly how much of each segment has diamonds and can actually be used to cut.

Diamond blade segment height by itself is not a true measure of a blade segment height by itself is not a true measure of a blade's value. Many other factors affect a blade's performance and consequent value. Consider the diamond size, concentration and quality, the hardness of the bond, the cutting power (torque) of the saw, and how well the blade specification is matched to the material being cut.

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Maximum Blade Cutting Depths

Diameter (Inches)

Cutting Depth

HS is for high-speed diamond blades.

Based on 9,500 sfpm (surface feet per minute) – the general optimum performance range for cutting concrete and masonry products is +10%. For hard, dense materials such as stone and tile, the optimum performance speed is 10-25% less than the speeds shown above.

Blade shaft speeds (RPMs at no load) for most tools will be higher than the recommended operating speeds shown above. Under normal sawing conditions, the actual blade shaft speed of the tool will slow down under load, and should fall within the optimum speed range.

This speed (RPM) represents the maximum safe speed [in revolutions per minute (RPM)] at which each blade can be used. Before using any blade, make sure the blade shaft (arbor) speed or the tool is within the "maximum safe" limit of that blade.

Note: Diamond blade cutting depths listed above are approximate. Actual cutting depth will vary with the exact blade diameter or saw type (or brand), or the exact diameter of the blade collars (flanges). Cutting depth will also be reduced if saw components (motor housing, blade guard) extend below the blade collars (flanges).

Diamond Blade Operating Speeds

Diameter		Recommended RPM*	Never Exceed RPM
4"	(102mm)	9,000	15,200
4-1/2"	(114mm)	8,000	13,500
5"	(127mm)	7,200	12,250
5-1/2"	(140mm)	6,500	11,090
6"	(152mm)	6,000	10,200
7"	(178mm)	5,100	8,500
8"	(203mm)	4,500	7,650
9"	(229mm)	4,000	6,650
10"	(254mm)	3,600	6,150
12"	(305mm)	3,000	5,100
	12" (High Speed Blades)		6,300
14"	(356mm)	2,500	4,400
	14" (High Speed Blades)		5,460
16"	(406mm)	2,200	3,800
18"	(457mm)	2,000	3,300
20"	(508mm)	1,800	3,000
22"	(559mm)	1,600	2,780
24"	(610mm)	1,500	2,550
26"	(660mm)	1,300	2,350
28"	(711mm)	1,200	2,185
30"	(762mm)	1,200	2,040
32"	(813mm)	1,100	1,910
36"	(914mm)	1,000	1,700
42"	(1067mm)	800	1,455
48"	(1219mm)	700	1,275

Looking after your blades (longer life)

Keeping your diamond blade cool to extend its life and improve its performance

Dry cutting diamond blades may be used dry, eliminating the need for water tanks, water hoses or wet slurry cleanup. These blades depend on airflow around the blade to prevent excessive heat build-up during cutting.

Use dry diamond blades for "intermittent" sawing. After every 10 to 15 seconds of cutting, take pressure off the blade and allow it to run back up to full speed for several seconds. This "cooling" interval allows air to flow around the blade and dissipate the heat. Use dry diamond blades ONLY for shallow cutting (1-2" deep) or step cutting (making several shallow passes to reach the full depth required).

Piranha Diamond Products dry cutting diamond blades are also designed to cut equally well wet, if the job or equipment permits. Wet cutting diamond blades MUST be used with water to prevent excessive heat build-up during cutting. Using water on the blade also reduces dust and helps remove cuttings.

A continuous water flow is critical. Using "wet" blades without water, even for a few seconds, causes excessive heat and blade damage, and creates a safety hazard. Check the saw or tool carefully before using a wet cutting diamond blade. Make sure it is safe to use the saw or tool with water.



Example speed controller

INSTRUCTIONS

Basics

- Put in new screws each blade change.
- Check the screw heads are safely aligned in countersunk holes.
- Tighten very tight with allen key (until key is bending and hurts fingers).
- Regular check the screw heads for wear from flat grinding. Replace any screws if you cannot read any numbers on the heads 8.8 or 10.9. (This is for safety so the blade will not detach itself from the flange.)
- Once flange is attached correctly with all screws. Screw the blade directly on to your grinder spindle. You will need to remove all the backing nuts and holders.



Directions

Flanged diamond blades or flush cutting diamond blades. Attached with a boss or flange.

1. Holding bolt – on steel flange in hand wind in M5 countersunk screws all the way down and back out the threaded holes to clear any metal coating and debris in the thread holes for easier unscrewing. Do this before permanently attaching.
2. Remove all screws.
3. Place and position Piranha diamond blade with the screw holes to allow counter sunk screws to fit flush. Tighten screws in a X pattern to ensure even pressure and balanced.
4. On our Metabo low vibration grinders the blades fit perfectly, with a blades width outside the guard so you can keep the guards on but flat flush cut. On other manufactures you might need to pack a washer on the spindle to position the blade into the best position for your own model of grinder.
5. On our Metabo grinders you can remove the blade by holding down the spindle lock button with your thumb and with your other hand unscrew the blade. Please disconnect all power before doing this.

Maximum operating speeds 80 meters per second.



Diamond Blade Operating Speeds

It is recommended that RPMs are reduced and time between breaks is reduced when using and operating with flush cutting blades. We recommend to use the product with a variable speed grinder on slower speeds and slower RPMs.

There is a handy chart to convert MPS to RPM. Please use our speed conversion chart on page 16-17 – slower speeds provide more accurate and safer detailed cutting. Where there is more risk of injury operate at very slow RPM speeds. Think about your safety!



Multi-speed Adjustment

Variable speed angle grinders reduce the RPMs or mp/s of the diamond cutting blades:

- Prolonging the life of your blade
- Reducing the heat to the blade body and diamond
- Reducing the risk of injury to the operator at very slow speeds (RPM)

Think about your safety!

WHEN TO CHOOSE TO USE A FLUSH CUTTING BLADE

Piranha Diamond Products offer a wide range of diamond cutting blades and abrasive grinding equipment for multiple applications. It is imperative that you research and consider carefully as each tool holds its own merits.

Disclaimer

Only use / choose to use the flush flat cutting option on the Piranha Diamond cutting blade when there is no other option available. It is not ideal to hold attach steel spinning cutting blades on with counter sunk screws that can grind and wear from the cutting / grinding process. When you do this the blade no longer conforms to the EN13236 for blades.

Risk Assessments

Download and complete the training course and complete the risk assessment before every job.

Breaks

Take more breaks maximum operating time recommended when using flush cutting blades is 20 minutes then take a 10-15 minute break

The benefits to using a flush cutting blade

- Fast change of tools example: (grinding cup wheel to cutting blade)
- Blade with a solid steel bolt on blade flange offers better stability
- A stiffer less flexing blade
- Lower vibrations
- Higher controllability
- Ability to enter work on a flat or flush basis
- Piranha flush cutting blades are safer by design
- Piranha flush cutting blades offer most versatile options and protection to the user
- Piranha flush cutting blades have anti under drawing protection
- Piranha flush cutting blades offer side carving protection benefits
- Piranha flush cutting blades are available in many different cutting bonds for better cutting applications

The blades can be used on a wide range of applications but we must stress that they should not be used to replace a normal EN13236 blade. The blade with a normal backing holding nut does conform to EN13236. Take extra care.

Extra PPE personal Protection Equipment

Take time to consider and purchase better PPE wears for your hands, feet, pants, shirts, coats, and especially breathing equipment dust masks and cutting and grinding can cause serious effects to your health. Well being long term!

Choose the best size of blade for the work application

We do 3 sizes: 125mm / 150mm / 230mm diameter cutting discs in the flush cutting.

Piranha Flush Cutting Blades

The Piranha cutting blade offers the most safe and versatile options to the user.

Potential jobs

- Cutting recesses or wedges of stone
- Skimming off small amounts of stone
- Removing concrete spillages from floors
- Small shaping of any stone
- Sculpting granite marble sandstone
- Under mounted sinks cut outs / round sinks

DO NOT USE ON!

- Cutting any foreign object in the stone. wood, plastic, metal
- Reinforced concrete
- Avoid contact with nails or screw heads
- Avoid and cutting multi layered surfaces, like plastic, wood or stone



USEFUL LINKS

Providing and using work equipment safely

<https://www.hse.gov.uk/pubns/indg291.pdf>

Health & Safety The Control of Vibration at Work Regulations 2005

<https://www.hse.gov.uk/vibration/wbv/regulations.htm>

Provision and Use of Work Equipment Regulations 1998

<https://www.hse.gov.uk/pubns/priced/puwer.pdf>

HSQE Online Abrasive Wheels Course

<https://www.hsqe.co.uk/course/abrasive-wheels/>

Risk Assessment Part A - Generic Hazards

<http://www.msrm.co.uk/Risk%20Assessments/Disc%20Cutters%20&%20Abrasive%20Wheels.pdf>

NOTE

Hardrock UK can provide more indepth training classes on this product and abrasive cutting wheels.

You should research:

- Work places health and safety practices
- Local government health and safety guidelines/practices
- Regional government health and safety regulations and follow all advice

Hardrock UK and Piranha Diamond Products aim is to have a zero-injury policy.

Please recommend our products to friends and colleagues.

Any other improvements and to place orders, telephone: **01706 220795**

