

Forename: _____ Surname: _____

School / College / Institution: _____

Course date: _____

These Training and Accreditation Guidelines are based on, and should be used in conjunction with the following essential publications:

- Health and Safety Training Standards in Design and Technology: D&T Association.
- BS 4163:2021+A1:2022 Health and safety for design and technology in educational and similar establishments – Code of practice.
- Model Risk Assessments for D&T in Secondary Schools and Colleges: CLEAPSS.
- **NB: This unit includes the use of, but not the changing of, wheels**

Summary Overview**Please tick the boxes below to confirm the sections that you have completed in this document:**

1. Requirements relating to off-hand grinding machines.

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2. Practical Assessment – skills using off-hand grinding machines.

☐**The RDTHSC/Trainer will sign and date this form on completion.**

RDTHSC/Trainer signature: _____

Date: _____

Delegate signature: _____

Date: _____

Please tick the individual requirements listed in the following sections to confirm your knowledge, skills and understanding, and that you have completed the Practical Assessments:

Assessment Task 1 Requirements Relating to <u>Off-Hand Grinding Machines</u> – what you should know and understand:		
Hazards	Safe system of working (control measures)	
Entrapment/entanglement.	- Long hair and loose clothing should be secured. - Dangling jewellery should be removed. - Gloves or bandages should not be worn. - An apron or work coat should be worn. - Work rest should be adjusted as close as possible to the wheel to prevent fingers and workpieces from becoming jammed. - The gap between the work rest and the wheel should not exceed 3mm. - Fixed guards (removable only with a tool) must enclose the motor, wheels and spindles.	☐
Contact with the wheel/sharp edges.	- Contact with the wheel and sharp edges can cause cuts. - The guard should be able to contain debris from a wheel breaking in motion and should prevent entanglement with the threaded spindle ends. - The only gap in the guard should be at the front to allow access for the workpiece.	☐
Overspeeding/damaged/incorrectly mounted wheels.	- Overspeeding, damaged or incorrectly mounted abrasive wheels can break while rotating and be violently ejected. - Mounting abrasive wheels should only be carried out by appropriately trained staff (see HSE publication HSG 17, Safety in the Use of Abrasive Wheels), in accordance with the manufacturer's instructions. - Wheels should be suitable for the material of the workpiece. - Spark arrestors (where fitted) should be adjusted correctly. - Spindle speed marked on the machine should not be exceeded.	☐
Ejection.	- Suitable eye protection should be available near to machine. This should conform to EN ISO 16321:2022 'E' rating. (Existing eye protection BS EN 166:2002 1B can continue in use until 2029). - Eye protection stickers should be visible on the machine. - Eye protection should be worn at all times. - Workpieces should be held securely to avoid them being violently ejected from the machine.	☐
Burns.	- Hot workpieces – provide 'Hot' warning notice. - A nearby source of water should be available for quenching, tempering.	☐
Electric shock/inadvertent starting of the machine.	The machine must have: - A means of electrical isolation. - Fused switch-disconnector. - Starter with overload protection and no-volt release. - Armoured cable to isolator. - A conveniently positioned mushroom-headed stop button or other control device that can quickly stop the machine in an emergency.	☐
Dust.	A risk assessment should be carried out on dust inhalation at the machine, and LEV/PPE used as required.	☐
Lack of space around the machine.	- Machine should be securely mounted on a suitable stable stand or substantial bench. The stand or bench should be fixed to the floor. - Sufficient space around the machine should prevent the operator being pushed by passers-by.	☐
Flooring.	- Floor surface should not be slippery and should be kept free of loose items. - Suitable footwear should be worn. - See BS 4163:2021+A1:2022 Section 6 Working Area Environment.	☐

Lighting.	- Adequate lighting should be provided. - See BS 4163:2021+A1:2022 Section 6 Working Area Environment.	☐
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Teaching Strategies

- It is essential that a risk assessment is completed to cover the use of this machine by learners and colleagues. This will normally involve the adoption and adaptation of model risk assessments, e.g. BS 4163:2021+A1:2022.
- It is essential that a regular maintenance programme is put into operation and that a maintenance log is kept. This should involve daily, weekly and termly checks, covering general maintenance and identifying any faults that require repairs.
- The machine should be included in a planned maintenance programme that includes electrical safety inspections and tests.
- Learners should be aware of the hazards associated with the equipment and the precautions that should be taken during use.
- Before using the equipment, learners should be trained and assessed as competent, and a record of their training should be kept.
- Learners should be supervised at all times by a trained, competent person.
- Grinding machine health and safety rules should be available and observed.
- Demonstration of bench and pedestal grinding machines to learners should include:
 - The position of all controls, i.e. workshop emergency stop buttons, isolator switch, start button and emergency foot stop button on the machine.
 - The use of LEV (where fitted).
 - Explanation of safety hazards (loose clothing, eye protection, sharp edges, overcrowding etc.)
 - The use of eye protection, and dust masks if required.
 - How to check the condition of the wheel surfaces.
 - How to check the correct positioning of the work rest.
 - The correct stance to be adopted.
 - Ensuring they work on their own and are not distracted or pushed by observers.
 - How to hold the workpiece, and the use of the work rest, i.e. firmly on the rest, keeping fingers behind the workpiece to prevent contact with the abrasive wheel.
 - How to feed the workpiece across the surface and against the rotation of the wheel for even wear and to prevent overheating.
 - Regular quenching of workpiece to prevent heat build up.
 - To be aware of problems associated with over-heating the material e.g. drawing the temper of HSS.
 - Ensuring that when work is complete, learners turn off the machine and never walk away until the machine has come to a complete stop.

Assessment Task 2 Practical Assessment –

what you should be able to demonstrate when using Off-Hand Grinding Machines



Understand that changing/mounting abrasive wheels is not covered by this training, and that specific training is required before this may be carried out.

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Demonstrate practical familiarity with:

- Procedure for isolating the machine, stop/start controls, and use of emergency stops.
- Maintenance and use of machine eye shield.
- Checking the machine guard is secure, capable of containing debris from a broken wheel, prevents entanglement with the spindle.
- Adjustment of work rest, i.e. as close as possible (3mm gap max.)
- Adjustment of spark arrestor, i.e. as close as possible (3mm gap max.)
- The need to grind only 'hard' ferrous metals, to avoid clogging the wheel.
- Danger points, e.g. never grinding on the side of the stone.
- General environmental health risks and conditions.

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Demonstrate practical familiarity with grinding wheels:

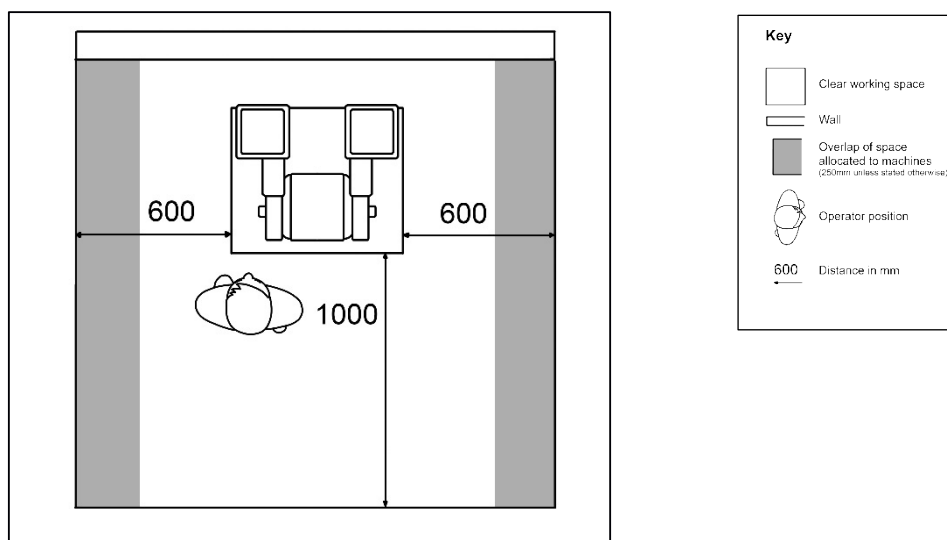
- The selection of grinding wheels and suitability for task, i.e. abrasive type, grit size (4–1200), grade (a=soft: z=Hard).
- Grinding wheel labelling.
- Spindle speed – not exceeding the speed marked on the machine or abrasive wheel.
- Method of storing, handling and transporting abrasive wheels.

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• Methods used for inspecting and testing to check damage. • Identify flanges, blotters, bushes, and nuts. • Recognise all components are correctly assembled. • Recognise that abrasive wheels are correctly balanced.	
Undertake a range of grinding operations commonly undertaken in school workshops, to demonstrate correct practice: • Dress a clogged/worn/damaged wheel using carborundum stick/star wheel dresser/diamond dresser. • CS: cold chisel head maintenance and sharpening. • HSS: scriber/centre punch sharpening and maintenance. • HSS: centre lathe tool sharpening. • TCT: centre lathe tool sharpening – ‘green’ silicon carbide. • HSS: wood turning tool sharpening – ‘white’ aluminium oxide.	☐
Discuss routine maintenance requirements: • The requirements recommended by the manufacturer. • The identification of defects and reporting problems.	☐

Supplementary materials:

The space-allocation diagrams indicate the clear working space required on either side of the machine. Where machines are next to another, dimensions can be overlapped, as indicated by the shaded zone on the diagram. Distances in front of the machine are assumed to adjoin circulation routes. A 200mm space has been allowed at the back of the machine for cleaning and maintenance.



Off-hand grinding machine

The following references provide additional notes and guidance to support training sessions:

<https://www.axminstertools.com/activities/sharpening>

[HSE Safety in the use of abrasive wheels.](#)