



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.

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

1a. Requirements relating to forging and brazing.	☐
2a. Practical Assessment – skills when forging and brazing.	☐
1b. Requirements relating to low temperature casting.	☐
2b. Practical Assessment – skills when low temperature casting.	☐
1c. Requirements relating to soft soldering.	☐
2c. Practical Assessment – skills when soft soldering.	☐

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 1a Requirements Relating to Forging and Brazing– what you should know and understand:



Hazards	Safe system of working (control measures)	
Hot metal/burns.	- Care should be taken when carrying hot metals, particularly metals at black heat that might not appear hot. - Appropriate PPE should be used, i.e. fire-resistant aprons, gloves, face protection and sturdy footwear. - Hot metal should be held using appropriately shaped tongs. - Tools should be appropriate and of the correct size for the work. They should be quenched and stored after use. - Quenching tanks should be sited as close as possible to the hearth or forge. - A warning notice should be displayed where hot metal is left to cool.	☐
Quenching of hot metal.	- Quenching of hot metal, particularly tubular components, can present a risk of scalding. - Learners should understand the risks of scalds from steam.	☐
Clay bricks.	Only firebrick or other refractory materials should be used for the brazing base.	☐
Ceramic chips.	A warning notice should be displayed to remind learners that chips remain hot for a considerable time after the heat source has been removed.	☐
Dangerous gases/foreign materials.	LEV should be provided to remove fumes, tested every 14 months and a record kept.	☐
Flooring.	- Floor should be kept clear of any loose materials and tools. - 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.	☐

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.
- 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.
- Health and safety rules should be available and observed.
- Learners should be familiar with the actions necessary in case of accidents.

Assessment Task 2a
Practical Assessment –
what you should be able to demonstrate when Forging and Brazing



Demonstration of each piece of equipment to learners should highlight safe working procedures, i.e.

- Familiarity with the equipment, i.e. isolator, gas isolation, on/off, pilot light, hot parts, fire brick and controlling the flame.
- Setting up procedures, including PPE.
- Lighting procedures/closing down procedures.

☐

In relation to brazing:

- How to mix and apply appropriate fluxes.
- How to secure work for brazing.
- How to control gas and air velocity to achieve the appropriate flame type.
- How to prepare and carry out a range of silver soldering/brazing joining techniques.
- How to recognise and correct common brazed joint faults.
- How to clean up braze.
- How to clear up safely after use, especially hot fire bricks and isolating gas and electrical supplies.

☐

In relation to forging:

- How to control gas and air velocity to achieve the appropriate flame type.
- How to heat, avoiding scale inclusions, avoiding over heating, avoiding water on the working equipment - i.e. steam pockets.
- How to bend, equipment and procedures.
- How to draw down/change section shape, equipment and procedures.
- How to form an eye or twist, equipment and procedures.
- Quenching procedures.

☐

Assessment Task 1b
Requirements Relating to Low Temperature Casting –
what you should know and understand:



Hazards	Safe system of working (control measures)	
Molten metal in contact with moisture.	- Molten metal in contact with moisture can cause an explosion. - Crucibles and other equipment that will be in contact with the molten metal should be preheated before use to avoid cracking and to remove moisture. - Casting should only be carried out in a dry area.	☐
Harmful fumes.	LEV should be used, or casting should take place in a well-ventilated area.	☐
Burns.	- All persons involved in pouring molten metal should wear appropriate PPE, i.e. suitable eye protection, heat-resistant gloves, leather apron, sturdy footwear. - Any persons not directly taking part in pouring metal should be kept at a safe distance.	☐
Unstable equipment/workpieces.	Only equipment specifically intended for metal casting should be used.	☐
Electric shock.	Trailing leads should be inspected regularly.	☐

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.
- Casting equipment should only be used under the supervision of a competent colleague with training at least to the standard specified in the Health and Safety Training Standards in Design and Technology (published by the D&T Association) or who has equivalent recognised qualifications to industry standards.
- 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.
- Health and safety rules should be available and observed.
- Learners should be familiar with the actions necessary in case of accidents.

Assessment Task 2b
Practical Assessment –
what you should be able to demonstrate when Low Temperature Casting:



Demonstration of the equipment to learners should highlight safe working procedures, i.e.

- Familiarity with the equipment
- Suitable moulds, e.g. use of split MDF moulds, cuttlefish
- Setting up procedures, including PPE
- Pouring procedures
- Cooling procedures
- Safe removal of mould and casting

☐

Assessment Task 1c
Requirements Relating to Soft Soldering –
what you should know and understand:



Hazards	Safe system of working (control measures)	
Fumes from rosin based fluxes.	- Non-rosin based fluxes should be used wherever possible. - Where rosin based fluxes have to be used, a risk assessment on fume inhalation should be carried out and LEV provided as required. - Fume concentration can be limited by staggering student access.	☐
Fumes from lead based solders.	- When soldering with a blow torch, LEV will normally be required. - Lead-free solder is advisable where possible.	☐
Electric shock.	- Use low voltage soldering irons whenever possible. - Use 240-volt equipment protected by Residual Current Devices (RCD). - Use heat-resistant insulated wiring on soldering irons. - All 240 volt equipment must be PAT tested, labelled and records kept.	☐
Burns.	- All soldering irons should be used with a soldering iron stand. - Lightweight stands should be screwed to a suitable base material. - Surfaces should be allowed to cool before handling. - Hands should be kept away from the soldering iron tip. - Learners should wear aprons to prevent damage from hot solder.	☐
Butane fuelled irons.	- Avoid using butane-fuelled irons where possible. - Punctured cans can lead to explosive fires and burns. - Attention should be paid to the potential theft and use of containers for inhalation (solvent abuse).	☐
Foreign bodies.	All learners should use appropriate PPE to avoid flux/solder splash in their eyes. Eye protection should conform to EN ISO 16321:2022 '1CT' rating. (Existing eye protection BS EN 166:2002 1FT can continue in use until 2029).	☐

Teaching Strategies

- It is essential that risk assessments are completed to cover the use of soldering equipment by colleagues and learners. 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/termly checks as appropriate, covering general maintenance and identifying faults that require repairs.
- The equipment should be included in a planned maintenance programme that should include annual electrical safety tests.
- Learners should be aware of the hazards associated with the equipment and 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 kept.
- Learners should be supervised at all times by a trained, competent person.
- Health and safety rules should be available and observed for all equipment.
- Learners should be familiar with the actions necessary in case of accidents.

Assessment Task 2c
Practical Assessment –
what you should be able to demonstrate when Soft Soldering:

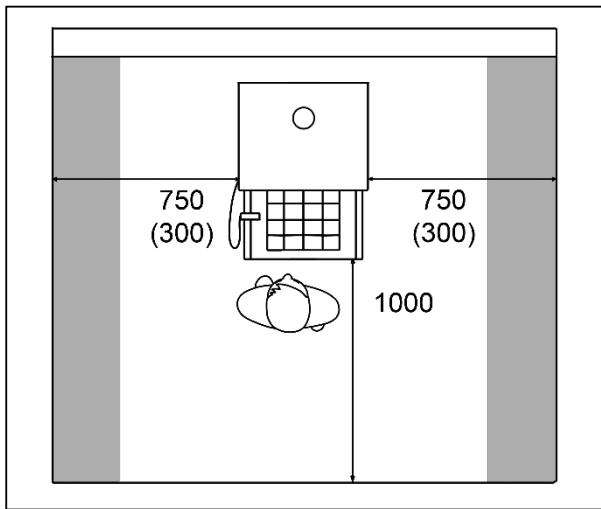


Demonstration to learners should include:

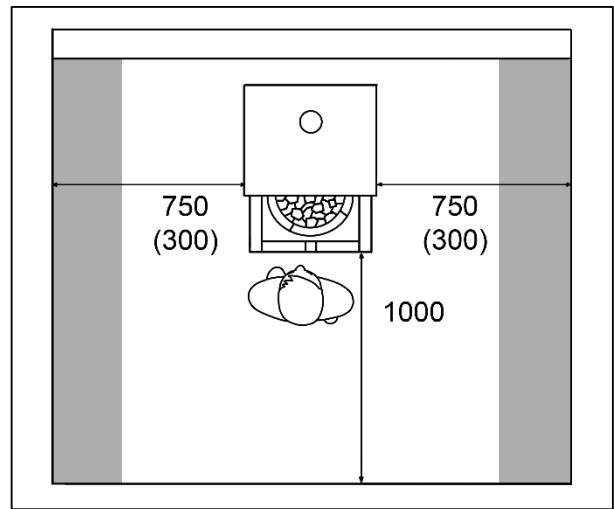
- Parts of the soldering iron, i.e. plug, cable, stand and heating element.
- How to plug in the iron safely and switch it on.
- How to prepare for soldering - wetting the sponge in the stand.
- Heating and tinning the soldering iron.
- How to strip and tin wires.
- How to de-solder components using a Solder Sucker or Solder Wick.
- How to correctly position/apply heat to make soldered joints on a strip board or PCB.
- How to solder components to a strip board or PCBs using a heat sink.

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.



Brazing hearth



Chip forge

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

<https://www.hse.gov.uk/cleaning/topics/coshh.htm>

<https://www.flamefast.co.uk/hot-metal-foundry/brazing.html>

