

### Overview

This standard covers a range of basic competences that you need for cutting and shaping plate (3mm thickness and above), rolled sections, pipe and tube using oxy-fuel gas cutting equipment. This will prepare you for entry into the engineering or manufacturing sectors, creating a progression between education and employment, or it will provide a basis for the development of additional skills and occupational competences in the working environment.

The oxy-fuel cutting will include equipment such as hand-held oxy-fuel gas cutting equipment, simple portable machines running on tracks and fixed bench cutting machines.

In carrying out the cutting activities, you will need to ensure that the equipment is correctly set up and that the flame is adjusted to give the correct cutting conditions. Cuts will include straight cuts, guided cuts, vertical cuts, square/rectangular profiles, angular and curved profiles, round and square holes, as appropriate. You will be expected to prepare for the cutting activities by obtaining all the necessary job instructions, materials, tools, equipment and any documentation that may be required. On completion of the oxy-fuel cutting activities, you will be expected to return all tools and equipment to the correct location, and to leave the equipment and work area in a safe and tidy condition.

Your responsibilities will require you to comply with health and safety requirements and organisational policy and procedures for the oxy-fuel cutting activities undertaken. You will need to report any difficulties or problems that may arise, and to carry out any agreed actions. You will work under a high level of supervision, whilst taking responsibility for your own actions and for the quality and accuracy of the work that you carry out.

Your underpinning knowledge will provide an understanding of your work, and will enable you to apply appropriate oxy-fuel cutting techniques and procedures safely. You will understand the cutting process, and its application, and will know about the tools and equipment used, to the required depth to provide a sound basis for carrying out the activities to the required specification.

You will understand the safety precautions required when carrying out the oxy-fuel cutting activities, and when using the various tools and equipment (especially those involved in lighting up and closing down of the equipment and with regard to fire and potential explosion), and the safeguards necessary for undertaking the activities safely and correctly. You will be required to demonstrate safe working practices throughout, and will understand the

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responsibility you owe to yourself and others in the workplace.

#### **Specific Standard Requirements**

At least one of the cut components must combine different features and techniques, for example: by producing a component which involves cutting out a component profile, which has both square and curved contours, from a sheet of material, then cutting out a circle/hole in the component.

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### Performance criteria

*You must be able to:*

- P1 work safely at all times, complying with health and safety legislation, regulations and other relevant guidelines
- P2 obtain the appropriate tools and equipment for the oxy-fuel gas cutting operations, and check that they are in a safe and usable condition
- P3 check that the oxy-fuel gas cutting equipment is set up for the operations to be performed
- P4 where appropriate, mark out the components for the required operations, using appropriate tools and techniques
- P5 operate the oxy-fuel gas cutting equipment to produce items/cut shapes to the dimensions and profiles specified
- P6 check that the finished components meet the standard required
- P7 report any difficulties or problems that may arise with the cutting activities, and carry out any agreed actions
- P8 shut down the equipment to a safe condition on conclusion of the cutting activities
- P9 leave the work area in a safe and tidy condition on completion of the cutting activities

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### Knowledge and understanding

*You need to know and understand:*

- K1 the specific safety precautions to be taken when working with oxy-fuel gas cutting equipment in a fabrication environment (including general workshop safety; protecting other workers by siting protective screens; fire and explosion prevention; safety in enclosed/confined spaces; fume control)
- K2 the personal protective clothing and equipment (PPE) to be worn when working with gas cutting equipment (such as leather aprons and gloves, eye protection)
- K3 the hazards associated with carrying out gas cutting activities (including trailing hoses, naked flames, fumes and gases, explosive gas mixtures, oxygen enrichment, spatter, hot metal, enclosed spaces), and how they can be minimised
- K4 safe working practices and procedures for using thermal equipment, in line with British Compressed Gas Association (BCGA) codes of practice (to include setting up procedures and emergency shutdown procedures)
- K5 the procedure for obtaining the required drawings, job instructions and other related specifications
- K6 how to use and extract information from engineering drawings and related specifications (to include BS or ISO standard symbols and abbreviations, imperial and metric systems of measurement, workpiece reference points and system of tolerancing)
- K7 the various types of gas cutting equipment available (such as handheld, portable track driven, fixed machine)
- K8 the accessories that can be used with handheld gas cutting equipment to aid cutting operations (such as cutting guides, trammels, templates)
- K9 how to identify the gases used in the cutting process, and the colour coding of gas cylinders
- K10 preparations prior to cutting (including checking connections for leaks, setting gas pressures, setting up the material/workpiece, and checking the cleanliness of materials used)
- K11 the holding methods that are used to aid thermal cutting, and the equipment that can be used
- K12 the correct procedure for lighting and extinguishing the flame (to include lighting the cutting torch and adjusting gas controls to produce a neutral flame; methods of starting the cut and controlling the cutting speed, direction and angle of cut; the procedure for extinguishing the flame, and the importance of following the procedure)
- K13 the problems that can occur with thermal cutting, and how they can be avoided (including causes of distortion during thermal cutting and methods of controlling distortion)
- K14 the effects of oil, grease, scale or dirt on the cutting process
- K15 the causes of cutting defects, how to recognise them, and methods of correction and prevention

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- K16 when to act on your own initiative and when to seek help and advice from others
- K17 the importance of leaving the work area in a safe and clean condition on completion of activities (such as safely storing gas cylinders and cutting equipment, removing and disposing of waste)

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### Additional Information

#### Scope/range related to performance criteria

- You must be able to:*
1. Prepare for the oxy-fuel gas cutting process, to include carrying out **all** of the following:
    - 1.1 adhere to procedures or systems in place for risk assessment, COSHH, personal protective equipment (PPE) and other relevant safety regulations
    - 1.2 check that regulators, hoses and valves are securely connected and free from leaks and damage
    - 1.3 check that the correct gas nozzle is fitted to the cutting torch
    - 1.4 ensure that a flashback arrestor is fitted to the gas equipment
    - 1.5 ensure that appropriate gas pressures are set
    - 1.6 use the correct procedure for lighting, adjusting and extinguishing the cutting flame
    - 1.7 ensure that hoses are safely routed and protected at all times
    - 1.8 ensure that gas cylinders are handled and stored safely and correctly (where appropriate)
    - 1.9 prepare the work area for the cutting activities (such as positioning screens and fume extraction, ensuring that there are no combustible materials in the near vicinity)
  2. Use **one** of the following types of oxy-fuel gas cutting methods:
    - 2.1 hand-held oxy-fuel gas cutting equipment
    - 2.2 simple, portable, track-driven cutting equipment (electrical or mechanical)
    - 2.3 fixed bench gas cutting equipment
  3. Perform cutting operations, to include **three** of the following:
    - 3.1 down-hand straight cuts (freehand)
    - 3.2 making angled cuts
    - 3.3 gouging/flushing
    - 3.4 making straight cuts (track guided)
    - 3.5 cutting chamfers
    - 3.6 bevelled edge – weld preparations
    - 3.7 cutting regular shapes
    - 3.8 making radial cuts
    - 3.9 cutting out holes
    - 3.10 cutting irregular shapes
  4. Produce thermal cuts in **two** of the following forms of material (metal of

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3mm and above):

- 4.1 plate
- 4.2 rolled sections
- 4.3 pipe/tube
- 4.4 solid bars

- 5. Produce cut profiles for **one** type of material from the following:
  - 5.1 mild steel
  - 5.2 high tensile/special steel
  - 5.3 stainless steel
  - 5.4 other appropriate metal
  
- 6. Produce thermally-cut components which meet **all** of the following:
  - 6.1 dimensional accuracy is within the tolerances specified on the drawing/specification, or within +/- 3mm
  - 6.2 angled/radial cuts are within specification requirements
  - 6.3 cuts are clean, smooth, and free from flutes

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<b>Developed by</b>	SEMTA
<b>Version number</b>	2
<b>Date approved</b>	December 2011
<b>Indicative review date</b>	December 2016
<b>Validity</b>	Current
<b>Status</b>	Original
<b>Originating organisation</b>	SEMTA
<b>Original URN</b>	14
<b>Relevant occupations</b>	Engineering; Engineering and manufacturing technologies; Blacksmith
<b>Suite</b>	Performing Engineering Operations Suite 1; Craft (Blacksmithing)
<b>Key words</b>	performing engineering operations, oxy-fuel gas cutting, plate, rolled sections, pipe, tube, manufacturing, flame, materials, tools, Blacksmithing;