
Overview

This standard identifies the competences you need for cutting and shaping marine steelwork, such as plate of 3mm thickness and above, rolled sections, pipe and tube for marine fabrications, using handheld thermal cutting equipment, in accordance with approved procedures. The equipment to be used will include handheld oxy-fuel gas cutting equipment or hand plasma cutting equipment. You will be required to assemble and set up the appropriate equipment to be used, for the material and thickness to be cut, the type of operation to be carried out and the accuracy required. Materials to be cut and shaped may include mild steel, stainless steel, special steels and other appropriate materials and will include guided cuts, vertical cuts, overhead cuts, external curved contours, round and square holes and demolition work, as appropriate.

Your responsibilities will require you to comply with organisational policy and procedures for the cutting operations undertaken and to report any problems with the equipment, materials, consumables or cutting activities that you cannot personally resolve, or are outside your personal responsibilities, to the relevant authority. You will be expected to work to instructions, with a minimum of supervision, taking personal responsibility for your own actions and for the quality and accuracy of the work that you carry out.

Your underpinning knowledge will be sufficient to provide a sound basis for your work, and will provide an informed approach to applying thermal cutting procedures in a marine environment. You will understand the cutting processes and will know about the equipment, its application, the materials and consumables, in adequate depth to provide a sound basis for carrying out the activities to the required specification.

You will need to understand the safety precautions required when working with the thermal cutting equipment, especially those with regard to fire and potential explosion and the necessary safeguards for undertaking the activities safely and correctly. You will be expected to demonstrate safe working practices throughout and will understand the responsibilities you owe to yourself and others in the workplace.

Performance criteria

You must be able to:

1. work safely at all times, complying with health and safety and other relevant regulations, directives and guidelines
2. confirm that the equipment is set up and ready for the cutting activities to be carried out
3. operate the cutting tool controls safely and correctly in line with operational procedures
4. produce cut steelwork components to the required quality and within the specified dimensional accuracy
5. carry out quality sampling checks at suitable intervals
6. deal promptly and effectively with problems within your control and report those that cannot be solved
7. shut down the equipment to a safe condition on conclusion of the machining activities

Knowledge and understanding

You need to know and understand:

1. the specific safety precautions to be taken when working with portable thermal cutting equipment in a marine fabrication environment, both on land and onboard vessels (including general workshop and site safety, appropriate personal protective equipment, fire and explosion prevention, protecting other workers, safety in enclosed/confined spaces; fume control; accident procedure; statutory regulations)
2. the personal protective clothing and equipment (PPE) to be worn when working with marine steelwork and thermal cutting equipment (including leather aprons and gloves, eye/ear protection and safety helmets)
3. the correct methods of moving or lifting plate materials and components
4. the hazards associated with thermal cutting (including naked flames, fumes and gases, explosive gas mixtures, oxygen enrichment, spatter, hot metal, elevated working, enclosed spaces) and how they can be minimised
5. safe working practices and procedures for using thermal equipment in line with British Compressed Gas Association (BGCA) codes of practice (to include setting-up procedures, permit-to-work procedures and emergency shutdown procedures)
6. how to obtain and interpret information from job instructions, drawings and thermal cutting specifications, in relation to the work undertaken
7. basic principles of thermal cutting and related equipment; the various techniques and their limitation; care of the equipment to ensure that it is safe and ready to use
8. the accessories that can be used with handheld thermal cutting equipment to aid cutting operations (such as guides, trammels, templates); arrangements for attaching cutting aids to the equipment
9. the gases used in thermal cutting, gas identification and colour codes, their particular characteristics and safety procedures
10. how to set up the thermal cutting equipment (including connection of hoses, regulators and flashback arrestors); selection of cutting torch and nozzle size in relationship to material thickness and operations performed
11. preparations prior to cutting (including checking connections for leaks, setting gas pressures, setting up the material/workpiece and checking the cleanliness of materials used)
12. the holding methods that are used to aid thermal cutting and the equipment that can be used
13. setting of operating conditions (including flame control and the effects of mixtures and pressures associated with thermal cutting)
14. the correct procedure for lighting and extinguishing the flame and

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- the importance of following the procedure
15. procedures to be followed for cutting specific materials and why these procedures must always be adhered to
 16. the terminology used in thermal cutting, in relation to the operations being performed
 17. why tool/equipment control is critical and what to do if a tool or piece of equipment is unaccounted for on completion of the activities
 18. 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)
 19. the effects of oil, grease, scale or dirt on the cutting process
 20. the causes of cutting defects, how to recognise them and methods of correction and prevention
 21. the procedure for the safe disposal of waste materials
 22. the extent of your own responsibility and whom you should report to if you have problems that you cannot resolve

Scope/range related to performance criteria

1. Confirm that the equipment is safe and fit for purpose by carrying out all of the following checks:
 1. the equipment selected is suitable for the operations to be performed
 2. regulators, hoses and valves are securely connected and are free from leaks and damage
 3. the correct gas nozzle is fitted to the cutting torch
 4. a flashback arrestor is fitted to the gas equipment
 5. appropriate gas pressures are set
 6. the correct procedure is used for lighting, adjusting and extinguishing the cutting flame
 7. hoses are safely routed and protected at all times
 8. gas cylinders are handled and stored, safely and correctly (where applicable)
2. Use one of the following thermal cutting methods:
 1. handheld oxy-fuel gas-cutting equipment
 2. handheld plasma gas-cutting equipment
3. Perform thermal cutting operations, to produce four of the following features:
 1. down-hand straight cuts - freehand
 2. angled cuts
 3. straight cuts - track guided
 4. radial cuts
 5. vertical cuts
 6. rough cutting (demolition)
 7. overhead cuts
 8. gouging/flushing
 9. regular shapes
 10. bevelled edge (weld preparations)
 11. irregular shapes
4. Produce thermal cuts in two of the following forms of material:
 1. plate
 2. rolled sections
 3. bar
 4. pipe/tube

5. Produce cut profiles for one type of material from the following:

1. mild steel
2. high tensile steel
3. other specific material

6. Produce thermally cut components which meet all of the following standards:

1. dimensional accuracy is within the tolerances specified on the drawing/specification, or within +/- 3mm
2. angled/radial cuts are within specification requirements (perpendicular/angularity/elliptical/parabolic)
3. cuts are clean and smooth, with minimal drag lines

Behaviours

You will be able to apply the appropriate behaviours required in the workplace to meet the job profile and overall company objectives, such as:

- strong work ethic
- positive attitude
- team player
- dependability
- responsibility
- honesty
- integrity
- motivation
- commitment

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Cutting marine steelwork using handheld thermal cutting equipment



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