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## Overview

This standard identifies the competences you need to install and secure cable runs and circuits in marine structures, in accordance with approved procedures. You will be required to use appropriate installation drawings, specifications and documentation to install the various types of cabling/circuit. You will install the appropriate cable enclosures, which could include conduit systems, trunking and traywork systems and you will be expected to position, align and secure these in the correct locations, using the specified/appropriate techniques, bulkhead/screen penetration and fastening devices. The circuitry could include vessel system cable assemblies, high voltage, medium voltage and low voltage power supply cables, internal and external lighting cables, components and appropriate screening techniques. You will be expected to terminate cables to the appropriate circuit breaker panels, distribution panels and relay panels.

Your responsibilities will require you to comply with organisational policy and procedures for the cable/circuit installation activities undertaken and to report any problems with these activities that you cannot personally resolve, or are outside your permitted authority, to the relevant people. You will be expected to work with either a high level of supervision or as a member of a team. You will take personal responsibility for your own actions and for the quality and accuracy of the work that you carry out. Where team working is involved, you must demonstrate a significant personal contribution during the team activities, in order to satisfy the requirements of the standard and competence in all the areas required by the standard must be demonstrated.

Your underpinning knowledge will be sufficient to provide a sound basis for your work and will provide an informed approach to applying electrical cable/circuit installation techniques and procedures. You will have an understanding of the circuits being installed and their application and will know about the installation methods, tools and techniques used, in adequate 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 installation of the cables. You will be required to demonstrate safe working practices throughout and will understand the responsibility you owe to yourself and others in the workplace.

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## 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. follow all relevant drawings and specifications for the installation being carried out
3. use the correct tools and equipment for the installation operations and check that they are in a safe and usable condition
4. install, position and secure the cabling and components in accordance with the specification
5. ensure that all necessary connections and terminations are complete
6. deal promptly and effectively with problems within your control and report those that cannot be solved
7. complete relevant documentation, in accordance with organisational requirements
8. check that the installation is complete and that all components are fit for purpose

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## Knowledge and understanding

### You need to know and understand:

1. the specific safety practices and procedures that you need to observe when installing cable runs/circuits in marine structures (including any specific legislation, regulations/codes of practice for the activities, equipment or materials - particularly where the systems remain live whilst work is in hand)
2. the health and safety requirements of the work area where you are carrying out the activities and the responsibility these requirements place on you
3. the hazards and risks associated with installing cable runs/circuits in marine structures and with the tools and equipment used and how they can be minimised
4. how to recognise and deal with emergencies and the procedures to be followed (such as methods of safely evacuating and closing down compartments in the case of fire or other major incident)
5. the protective equipment that you need to use for both personal protection (PPE) and protection of the vessel/equipment
6. the precautions to be taken to prevent electrostatic discharge (ESD) damage to circuits and sensitive components (such as use of earthed wrist straps)
7. what constitutes a hazardous voltage and how to recognise victims of electric shock
8. how to reduce the risks of a phase to earth shock (such as insulated tools, rubber matting and isolating transformers)
9. how to obtain and interpret job instructions, drawings and specifications (to include symbols and conventions to appropriate British, European or relevant International standards) used during the installation process
10. the cable runs/circuits to be installed and their function within the particular system
11. the different types of cabling (multi-core cables, single-core cables, SWA cables, MI cables, screened cables), their fittings and their application
12. the different types of electrical components (plugs, switches, lighting and fittings, junction boxes, consumer units)
13. the techniques used to position, align, adjust carry, support, secure and distribute the cabling through the vessel
14. how to extract and insert cables in wiring enclosures (such as

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- conduit, trunking, traywork and through-bulkhead penetration, without causing damage to cables or components
15. the methods and techniques to be used for soldering, de-soldering, crimping and heat shrinking and the importance of adhering to these
  16. the importance of ensuring that the completed installation is free damage, of ensuring that any exposed components are protected and that advisory notices are placed
  17. the quality control procedures to be followed during the installation activities
  18. procedures for ensuring that you have the correct tools, equipment, components and fasteners for the activities
  19. methods of lifting, handling and supporting the cabling /equipment during the installation activities
  20. the use of seals, sealant, adhesives and anti-electrolysis barriers and the precautions to be taken
  21. why electrical bonding is critical and why it must be both mechanically and electrically secure
  22. the procedure for the safe disposal of waste materials
  23. the tools and equipment used in the installation activities and their calibration/care and control procedures
  24. 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
  25. the problems that can occur with the electrical wiring installation operations and how these can be overcome
  26. the recording documentation to be completed for the activities undertaken
  27. the extent of your own responsibility and whom you should report to if you have problems that you cannot resolve

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### Scope/range related to performance criteria

1. Carry out all of the following during the electrical cable/circuit installation activities:
  1. use the correct issue of structure/vessel/craft system installation drawings and technical documentation
  2. use copies of relevant COSHH sheets, risk assessment and electrical standards, and organisational procedures
  3. check the calibration dates of tools to be used
  4. obtain clearance to work on the system and observe the power isolation and safety procedures
  5. return all tools and equipment to the correct location on completion of the activities
  6. leave the system in a recognised and safe condition
  7. leave the work area in a safe and tidy condition with any incomplete terminations clearly identified
2. Install two of the following types of wiring enclosures:
  1. non-metallic conduit systems
  2. metal trunking system
  3. metal conduit systems
  4. tray work systems
  5. non-metallic trunking systems
  6. bulkhead/screen/deck penetration
3. Apply all of the following installation methods and techniques:
  1. marking out the location of the trunking, traywork or conduit
  2. positioning and securing the trunking, traywork or conduit by using mechanical fixings
  3. drilling and preparing holes for the trunking, traywork or conduit
  4. levelling and alignment of the wiring enclosures and components
4. Install cable runs in support of two of the following marine electrical systems/equipment:
  1. three-phase power circuits
  2. weapons systems
  3. single phase power circuits
  4. computer control equipment
  5. direct current power circuits
  6. rotating electrical equipment

7. communications systems
8. high voltage/power distribution supply/system
9. domestic electrical equipment
10. navigation systems
11. lighting and alarm systems
12. sensor systems (RADAR/SONAR )
13. emergency/temporary power supplies
14. other specific marine system

5. Install two of the following types of cable runs:

1. multi-core cables
2. mineral insulated (MI) cables
3. single core cables
4. screened cables
5. steel wire armoured (SWA) cables
6. fibre optic cables
7. wiring looms/harnesses

6. Apply two of the following installation methods and techniques:

1. bending and forming conduit
2. bending and forming trays
3. bending and forming trunking
4. through bulkhead/screen/deck penetration

Plus four more from the following:

5. allocating identification markings
6. heat shrinking
7. cable banding
8. sealing and protecting cable connections
9. taking electrostatic discharge (ESD) precautions
10. earth bonding
11. screening

7. Make four of the following types of electrical connections:

1. module blocks
2. free plugs and sockets
3. terminal blocks
4. tray-mount sockets
5. earth bonding points
6. overall screened
7. soldered connections
8. fibre-optic terminations
9. multi-pin plugs and sockets
10. armoured cable terminations
11. crimped connections
12. mineral insulated cable terminations

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13. co-axial cable
  14. other specific type of connection
8. Produce electrical installations, in accordance with one of the following standards:
1. BS, EN or ISO standards and procedures
  2. customer (contractual) standards and requirements
  3. company standards and procedures
  4. specific system requirements
  5. electrical regulations (current issue)
  6. recognised compliance agency/body's standards
  7. other accepted international standards
9. Complete the relevant paperwork, to include one from the following, and pass it to the appropriate people:
1. installation records
  2. system log
  3. job cards
  4. vessel wiring documentation
  5. system authorisation documentation
  6. other specific reporting method

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## 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



SEMME2004

Carrying out the installation of cable runs and circuits in marine structures



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