

Overview

This standard identifies the competences you need to modify electrical circuits, in accordance with approved procedures. You will be required to modify, rewire and update circuits in accordance with specifications and latest issue drawings and standards. You will be expected to remove and replace cables, add new cables, change breakout points and change the routing of cables. You will also be expected to change components, units and trays. You will need to show proficiency in using various tools and equipment for cutting, stripping, crimping and soldering, and in the installation of the various wires, cables and components that make up the electrical system and circuits worked on.

Your responsibilities will require you to comply with organisational policy and procedures for the modification or rewiring activities undertaken, and to report any problems with the activities, components or equipment that you cannot personally resolve, or that are outside your permitted authority, to the relevant people. You must ensure that all tools, equipment, and materials used in the modifying or rewiring activities are removed from the work area on completion of the activities, and that all necessary job/task documentation is completed accurately and legibly. You will be expected to work with minimal supervision, taking full responsibility for your own actions, and for the quality and accuracy of the work that you carry out.

Your underpinning knowledge will provide a good understanding of your work, and will provide an informed approach to applying modification or rewiring procedures. You will understand the modification or rewiring to be carried out, and its application, and will know about the methods, tools and equipment to be used, in adequate depth to provide a sound basis for carrying out the activities, correcting faults and ensuring that the modification is carried out to the required specification and remains compliant with all standards and regulations.

You will understand the safety precautions required when carrying out the modification activities. You will be required to demonstrate safe working practices throughout, and will understand the responsibility 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 legislation and other relevant regulations, directives and guidelines
2. obtain and follow the relevant modification specifications and job instructions
3. confirm and agree what modifications are to be carried out to meet the specification
4. prepare the electrical system for the required modification
5. carry out the system modification using approved materials, methods and procedures
6. complete the modification within the agreed timescale
7. ensure that the modified electrical system meets the specified operating conditions
8. complete and store all relevant modification documentation in accordance with organisational requirements
9. dispose of waste materials in accordance with safe working practices and approved procedures
10. deal promptly and effectively with problems within your control and report those that cannot be solved

Knowledge and understanding

You need to know and understand:

1. the specific safety precautions and procedures to be observed whilst carrying out the modifications or rewiring of the electrical systems (including any specific legislation, regulations or codes of practice relating to the activities, equipment or materials)
2. the health and safety requirements of the work area in which you are carrying out the modification or rewiring activities, and the responsibility these requirements place on you
3. the hazards associated with carrying out modifications or rewiring of electrical systems, and how to minimise these and reduce any risks
4. how to recognise and deal with victims of electric shock (to include methods of safely removing the victim from the power source, isolating the power source) including the difference of AC and DC electrical shock and how this affects the victim
5. how to reduce the risks of a phase to earth shock (such as insulated tools, rubber matting and isolating transformers)
6. the personal protective equipment and clothing (PPE) to be worn during the modification or rewiring activities
7. how to obtain and interpret drawings, circuit and physical layouts, charts, specifications, manufacturers' manuals, graphical electrical symbols, wiring regulations, and other documentation used during the modification or rewiring activities
8. the basic principles of how the system functions, the operating sequence, the working purpose of individual units/components, and how they interact
9. the different types of cabling (such as multicore cables, single core cables, SWA cables, MI cables, screened cables), their fittings and their application
10. the different types of electrical component (such as plugs, switches, lighting and fittings, junction boxes, consumer units)
11. preparations to be undertaken prior to the modification or rewiring of the system
12. how to extract and insert new cables in wiring enclosures (such as conduit, trunking and traywork) without causing damage to other cables or components
13. the methods and techniques to be used for soldering and de-soldering, and the importance of adhering to these procedures

14. the methods and techniques to be used for crimping and heat shrinking, and the importance of adhering to these procedures

15. the various mechanical fasteners that can be used, and their methods of installation or removal

16. the procedure for obtaining replacement parts, materials and other consumables necessary for the modification or rewiring activities

17. the importance of ensuring that the completed circuit is free from foreign objects, and that all terminations are electrically and mechanically sound and secure

18. how to conduct any necessary checks to ensure that the completed modification or rewiring complies with all appropriate standards

19. the methods and equipment used to transport, handle and lift components/cabling into position, and how to check that the equipment is within its current certification dates

20. how to check that tools and equipment are free from damage or defect, are in a safe and usable condition, and are configured correctly for their intended purpose

21. the problems that can occur with the modification or rewiring operations, and how these can be overcome

22.

the recording documentation to be completed for the activities undertaken

23.

the extent of your own authority and to whom you should report if you have problems that you cannot resolve

Scope/range

1.

Carry out all of the following during the modification and rewiring activities:

- 1.1 obtain and use the correct issue of organisational and/or manufacturers' drawings and planning documentation
- 1.2 adhere to procedures or systems in place for risk assessment, COSHH, personal protective equipment and other relevant safety regulations and procedures to realise a safe system of work
- 1.3 ensure the safe isolation of equipment (such as electricity, mechanical, gas, air or fluids)
- 1.4 provide and maintain safe access and working arrangements for the modification area
- 1.5 confirm and agree modifications/rewiring to be made
- 1.6 modify or rewire electrical circuits using approved techniques and procedures
- 1.7 report or take action with regard to any problems that arise
- 1.8 apply safe working practices and procedures at all times
- 1.9 dispose of waste materials in accordance with safe working practices and approved procedures and leave the work area in a safe condition

2.

Carry out modifications or rewiring of six of the following electrical systems:

- 2.1 single-phase power circuits
- 2.2 control systems and components
- 2.3 three-phase power circuits
- 2.4 electrical plant
- 2.5 direct current power circuits
- 2.6 wiring enclosures (such as conduit, trunking or tray work)
- 2.7 motors and starters
- 2.8 luminaires
- 2.9 switchgear and distribution panels
- 2.10 other specific electrical equipment

3.

Carry out six of the following types of modifications:

- 3.1 replacing cables of different size or length
- 3.2 making changes to looms or mains circuits
- 3.3 changing or adding components to panels or sub-assemblies
- 3.4 changing the position or angle of breakout points
- 3.5 changing position of electrical units
- 3.6 adding or removing components from circuits
- 3.7 fitting new electrical systems
- 3.8 changing the route of cables
- 3.9 removal of cables

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- 3.10 adding further looms or mains circuits
- 3.11 addition of cables
- 3.12 other specific type of electrical modification

4.

Carry out six of the following processes:

- 4.1 terminating mineral cables
- 4.2 terminating armoured cables
- 4.3 heat shrinking (devices and boots)
- 4.4 bending and forming conduit
- 4.5 crimping (tags and pins)
- 4.6 bending and forming trunking and trays
- 4.7 stripping cable insulation/protection
- 4.8 sealing and protecting cable connections
- 4.9 removing cable end fittings
- 4.10 making mechanical/screwed/clamped connections
- 4.11 extracting/inserting components
- 4.12 soldering and de-soldering
- 4.13 allocating identification markings

5.

Produce modified or rewired electrical systems in accordance with one of the following:

- 5.1 organisational guidelines and codes of practice
- 5.2 current wiring regulations
- 5.3 equipment manufacturers' operation range
- 5.4 BS, ISO and/or BSEN standards

6.

Complete and store all relevant modification documentation in accordance with organisational requirements, using one of the following:

- 6.1 job cards
- 6.2 permits to work/formal risk assessment and/or sign- on/off procedures
- 6.3 maintenance log or report
- 6.4 organisational-specific documentation
- 6.5 electronic reports

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