

## Overview

This standard identifies the competences you need to install marine sensor equipment and systems, in accordance with approved procedures. You will be required to use appropriate installation drawings, specifications and documentation to install the various types of equipment. You will be expected to position, align and secure the equipment in the correct locations, using the specified/appropriate techniques and fastening devices. The equipment to be installed will include surveillance radar, navigational, weather tracking radar, heat sensing systems, obstacle warning systems, infrared systems, weapon associated and RF sensing/jamming devices and passive/active sonars.

Your responsibilities will require you to comply with organisational policy and procedures for the installation activities undertaken and to report any problems with the installation activities, components or equipment that you cannot personally resolve, or are outside your permitted authority, to the relevant people. You will be expected to work 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 provide a good understanding of your work and will provide an informed approach to applying installation techniques and procedures to marine sensor equipment and systems. You will understand the marine sensor systems being installed and their application and will know about the installation techniques, tools and methods, 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 operations. 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 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 equipment and components in accordance with the specification, using appropriate methods and techniques
5. ensure that all necessary connections to the equipment are complete
6. deal promptly and effectively with problems within your control and report those that cannot be solved
7. check that the installation is complete and that all components are free from damage
8. complete relevant documentation in line with organisational procedures

## Knowledge and understanding

### *You need to know and understand:*

1. the specific safety practices and procedures that you need to observe when working with marine sensor systems (including any specific legislation, regulations/codes of practice for the activities, equipment or materials)
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 associated with installing marine sensor systems 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 of compartments in the case of fire or other major incident, first aid, fire fighting and resuscitation of personnel)
5. the protective equipment that you need to use for both personal protection (PPE) and protection of the vessel and system
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. the interpretation of drawings, standards, quality control procedures and specifications used for the installation (including BS and ISO schematics, symbols and terminology)
10. how to carry out currency/issue checks of the specifications you are working with
11. the components to be installed and their function within the particular marine sensor system
12. the various mechanical fasteners that will be used and their method of installation (including open and blind rivets, threaded fasteners, special securing devices)
13. the importance of using the specified fasteners for the particular installation and why you must not substitute others

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14. why securing devices need to be locked and labelled and the different methods that are used
15. the torque loading requirements on the fasteners and what to do if these loadings are exceeded or not achieved
16. the quality control procedures to be followed during the installation operations
17. the procedures for ensuring that you have the correct type of tools, equipment, components and fasteners for the activities
18. the techniques used to position, align, adjust and secure the components to the vessel/compartment structure, without damage
19. methods of lifting, handling and supporting the components/equipment during the installation activities
20. the use of seals, sealants, adhesives and anti-electrolysis barriers and the precautions that need to be taken
21. why electrical bonding is critical and why it must be both mechanically and electrically secure
22. how to conduct any necessary checks to ensure the system integrity, functionality, accuracy and quality of the installation
23. how to recognise installation defects (such as poor seals, misalignment, ineffective fasteners or terminations, damage or contamination)
24. the importance of ensuring that the completed installation is to the category of cleanliness prescribed and of ensuring that any exposed components or pipe ends are correctly covered/protected and warning notices are fitted
25. the procedure for the safe disposal of waste materials
26. the tools and equipment used in the installation activities and their calibration/care and control procedures
27. 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
28. the problems that can occur with the installation operations and how these can be overcome
29. the recording documentation to be completed for the activities undertaken and where appropriate, the importance of marking and identifying specific pieces of work in relation to the documentation
30. 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.

Carry out all of the following during the installation of the marine sensor equipment and systems:

- 1.1 use the correct issue of vessel/craft/structure installation drawings and technical documentation
- 1.2 use copies of relevant COSHH sheets, risk assessment and marine engineering standards
- 1.3 check the calibration dates of tools to be used
- 1.4 obtain clearance to work on the equipment and observe the power isolation and safety procedures
- 1.5 return all tools and equipment to the correct location on completion of the activities
- 1.6 leave the work area in a safe condition and to the prescribed category of cleanliness

2.

Install one of the following marine sensor systems:

- 2.1 surveillance radar
- 2.2 weather tracking radar
- 2.3 obstacle warning systems
- 2.4 passive sonar
- 2.5 bathy thermograph
- 2.6 echo sounder
- 2.7 infrared
- 2.8 navigational
- 2.9 heat seeking system
- 2.10 weapon associated radars
- 2.11 electronic warfare (EW) passive/active systems
- 2.12 active sonar

3.

Install marine sensor components, to include five of the following:

- 3.1 scanners
- 3.2 receivers
- 3.3 power supply units (PSU)
- 3.4 aerials
- 3.5 processors
- 3.6 intermediate frequency unit (IFU)
- 3.7 transmitters
- 3.8 microwave generators
- 3.9 waveguides
- 3.10

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transducers

4.

Use all of the following installation methods and techniques:

- 4.1 levelling and aligning
- 4.2 earth bonding
- 4.3 taking ESD precautions
- 4.4 securing and locking
- 4.5 screening

5.

Use three of the following types of mechanical securing connections:

- 5.1 threaded fasteners
- 5.2 wire locking
- 5.3 screws
- 5.4 torque loaded bolts
- 5.5 quick-release fasteners

6.

Make five of the following types of electrical connection:

- 6.1 co-axial
- 6.2 overall screened
- 6.3 terminal blocks
- 6.4 tray-mounted sockets
- 6.5 tri-axial
- 6.6 module blocks
- 6.7 multi-pin plugs/sockets
- 6.8 earth bonding points
- 6.9 multicore cables
- 6.10 fibre-optics

7.

Produce installations which comply with one of the following standards:

- 7.1 BS or ISO standards and procedures
- 7.2 company standards and procedures
- 7.3 specific system requirements
- 7.4 customer (contractual) standards and requirements
- 7.5 IET Regulations (current issue)
- 7.6 recognised compliance agency/body's standards
- 7.7 other accepted international standards

8.

Complete the relevant documentation, to include one from the following, and pass it to the appropriate people:

- 8.1 installation records
- 8.2 job cards
- 8.3 system log
- 8.4 work authorisation documents
- 8.5 acceptance documentation

8.6 other specific recording method

## Behaviours

### **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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