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## Overview

This standard identifies the competences you need to install marine ancillary plant and equipment, in accordance with approved procedures. You will be required to use appropriate installation drawings, specifications and documentation to install the various items of equipment. You will be expected to select the appropriate tools and equipment to use, based on the operations to be performed and components to be installed. The marine ancillary plant and equipment to be installed will include equipment such as garbage disposal compactors, sewage treatment plants, reverse osmosis plant, incinerators, laundry and medical equipment, and evaporators.

The components to be installed will include items such as pipework, pre-heaters, drain coolers, control valves, pumps, seals, instrumentation, stops, filters, strainers, macerators, tanks, emergency stops, mechanical and electrical controls and safety devices. The installation activities will include making all necessary checks and adjustments to ensure that components are correctly positioned and aligned, have appropriate working clearances, are tightened to the correct torque and that they function as per the specification.

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 ensure that all tools, equipment and materials used in the installation are correctly accounted for on completion of the activities and to complete all necessary job/task documentation accurately and legibly. 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 for marine processing plant and equipment. You will understand the processing plant and equipment being installed and the function of the various mechanical controls. You will know about the relevant components, fastening and securing devices, in adequate depth to provide a sound basis for carrying out the activities, correcting faults and ensuring that the completed installation is 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, both ashore and afloat.

**Performance  
criteria**

*You must be able to:*

- P1 work safely at all times, complying with health and safety and other relevant regulations, directives and guidelines
- P2 follow all relevant drawings and specifications for the installation being carried out
- P3 use the correct tools and equipment for the installation operations and check that they are in a safe and usable condition
- P4 install, position and secure the equipment and components in accordance with the specification
- P5 ensure that all necessary connections to the equipment are complete
- P6 deal promptly and effectively with problems within your control and report those that cannot be solved
- P7 check that the installation is complete and that all components are free from damage

## Knowledge and understanding

*You need to know and understand:*

- K1 the specific safety practices and procedures that you need to observe when working with marine ancillary plant and equipment (including any specific legislation, regulations/codes of practice for the activities, equipment or materials)
- K2 the procedures to be carried out before starting work on the installation (such as obtaining permits to work, obtaining and complying with risk assessments and other health and safety requirements)
- K3 the health and safety requirements of the work area where you are carrying out the activities and the responsibility these requirements place on you
- K4 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)
- K5 the hazards associated with installing marine ancillary plant and equipment and with the tools and equipment used and how they can be minimised
- K6 the protective equipment that you need to use for both personal protection (PPE) and protection of the equipment
- K7 the interpretation of drawings, standards, quality control procedures and specifications used for the installation (including BS and ISO schematics, symbols and terminology)
- K8 how to carry out currency/issue checks of the specifications you are working with
- K9 the basic operating principles of the marine ancillary plant and equipment being installed
- K10 the components to be installed and their function within the particular processing plant/system
- K11 the various mechanical fasteners that will be used and their method of installation (such as keys, keyways, threaded fasteners, special securing devices)
- K12 the importance of using the specified fasteners for the particular installation and why you must not substitute others
- K13 why securing devices need to be locked and the different methods that are used
- K14 the torque loading requirements on the fasteners and what to do if these loadings are exceeded or not achieved
- K15 the quality control procedures to be followed during the installation operations
- K16 procedures for ensuring that you have the correct tools, equipment, components and fasteners for the activities
- K17 the techniques used to position, align, adjust and secure the components to the vessel without damage

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- K18 methods of lifting, handling and supporting the components/equipment during the installation activities
- K19 the use of seals, sealants and adhesives and the precautions to be taken
- K20 why electrical bonding is critical and why it must be both mechanically and electrically secure
- K21 the procedure for the safe disposal of waste materials
- K22 how to conduct any necessary checks to ensure the system integrity, functionality, accuracy and quality of the installation
- K23 how to recognise installation defects (such as, poor seals, misalignment, ineffective fasteners or contamination)
- K24 the importance of ensuring that the completed installation is free from foreign object debris and that any exposed components or pipe ends are correctly covered/protected
- K25 the tools and equipment used in the installation activities and their calibration/care and control procedures
- K26 why tool/equipment control is critical
- K27 the problems that can occur with the installation operations and how these can be overcome
- K28 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
- K29 the extent of your own responsibility and whom you should report to if you have problems that you cannot resolve

## Additional Information

### Scope/range related to performance criteria

*You must be able to:*

1. Carry out **all** of the following during the installation of the marine ancillary plant and equipment:
  - 1.1. use the correct issue of the vessel or craft installation drawings and planning documentation
  - 1.2. use copies of relevant COSHH sheets, risk assessment and marine standards
  - 1.3. check the calibration dates of tools and equipment to be used
  - 1.4. obtain clearance to work on the equipment and observe the power isolation procedures
  - 1.5. return all tools and equipment to the correct location on completion of the installation
  - 1.6. leave the work area in a safe condition and to the prescribed category of cleanliness
  
2. Install all required machinery for **one** set of marine processing plant and equipment from the following:
  - 2.1. garbage compactor, garbage disposal unit and incinerator
  - 2.2. hospital or sickbay and dentist
  - 2.3. sewage treatment plant
  - 2.4. reverse osmosis plant
  - 2.5. evaporator
  - 2.6. laundry
  - 2.7. other specific marine plant and equipment
  
3. Install **six** of the following types of components:
  - 3.1. pre-heater
  - 3.2. drain cooler
  - 3.3. fresh water pump
  - 3.4. sea water pump
  - 3.5. mechanical controls
  - 3.6. compressor
  - 3.7. instrumentation
  - 3.8. pipework
  - 3.9. mechanical stops
  - 3.10. air ejector
  - 3.11. exhaust
  - 3.12. safety trips
  - 3.13. macerator

- 3.14. tank
  - 3.15. compactor mechanism
  - 3.16. press
  - 3.17. furnace
  - 3.18. electro-mechanical trips
  - 3.19. washing machine
  - 3.20. tumble drier
  - 3.21. sink/slucice
  - 3.22. isolating valve
  - 3.23. damper
  - 3.24. x-ray machine
4. Use **twelve** of the following installation methods and techniques:
- 4.1. marking/setting out of locating and securing positions
  - 4.2. preparing holes (such as drilling, cleaning out threads)
  - 4.3. positioning equipment/components
  - 4.4. levelling of equipment
  - 4.5. aligning of equipment
  - 4.6. assembly/connection of components or sub-assemblies
  - 4.7. setting timings
  - 4.8. setting and adjusting equipment operating parameters
  - 4.9. torque setting of mechanical fasteners
  - 4.10. earth bonding
  - 4.11. making pipe connections
  - 4.12. shaft coupling (to compressor or pump)
  - 4.13. lifting and handling
  - 4.14. making flexible hose connections
  - 4.15. connecting wires and cables
  - 4.16. securing by using mechanical fixings
  - 4.17. securing by using adhesives
  - 4.18. lubricating
  - 4.19. sealing
  - 4.20. flushing
  - 4.21. bracketing
  - 4.22. applying screw fastener locking devices
  - 4.23. ensuring the system cleanliness (such as covering exposed pipe ends or components)
5. Use **six** of the following types of fasteners and securing devices:
- 5.1. swing bolts
  - 5.2. screws
  - 5.3. dowels
  - 5.4. quick-release fasteners
  - 5.5. studs with nuts
  - 5.6. wing nuts
  - 5.7. bolts

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- 5.8. flexible bellows
  - 5.9. locking devices (such as split, parallel, clevis or taper pin)
  - 5.10. keys/keyways (such as slotted, semi-circular, woodruff, taper)
6. Produce installations which comply with **one** of the following standards:
- 6.1. BS or ISO standards and procedures
  - 6.2. customer (contractual) standards and requirements
  - 6.3. company standards and procedures
  - 6.4. specific system requirements
  - 6.5. recognised compliance agency/body's standards
  - 6.6. other accepted international standards
7. Complete the relevant paperwork, to include **one** from the following and pass it to the appropriate people:
- 7.1. installation records
  - 7.2. acceptance documentation
  - 7.3. work acceptance documentation
  - 7.4. job card
  - 7.5. time sheet
  - 7.6. system log
  - 7.7. other specific recording method

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### Installing marine ancillary plant and equipment

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