National Occupational Standards

Sector: Lift industry

Occupation: Lift Maintenance, Service & Repairs Specialist

MQF Level: MQF 4

Units:

LMT1 - Unit 1 Statutory Regulations, Lift Standards and Safety Requirements

LMT2 - Unit 2 Using drawings and documents in maintenance activities

LMT3 - Unit 3 Fault Diagnosis and checking lift function

LMT4 - Unit 4 Rectifying faults & Replacement of major parts e.g. ropes, lift doors, buffers, sheaves, hydraulic oil and hydraulic components

LMT5 – Unit 5 Emergency evacuation of trapped passengers

LMT6 – Unit 6 Control Panels

LMT7 – Unit 7 Health and Safety in the Lift Industry

LMT1 - Unit 1 Statutory Regulations, Lift Standards and Safety Requirements

This unit lists the knowledge and skills needed by a person holding this position to carry out work in compliance with health and safety requirements, in conformity to EN81 Lift Standards and in line with current applicable legislation 2014/33/EU & Legal Notice 231 of 2007. Upon completion of this unit, the person carrying out this work will possess the necessary knowledge and skills to follow procedures which ensure that their actions do not create health and safety risks to self or others, and the repairs or service is done in line with applicable EN81 standards and current legislation.

Performance Criteria

The candidate must have the necessary knowledge and skills to:

1. Identify the specific standards from the EN81 family of lift standards governing the lift industry and their application.
2. Deal with hazard and risk in a lift maintenance context
3. Deal with associated hazards while carrying out maintenance and fault diagnosis on lifts
4. Be responsible for utilising personal protective equipment (PPE) that one needs to use for measuring and setting out activities and electrical installations
5. Ensure to take specific safety precautions that are to be taken before and during installation to reduce typical risk
6. Deal with hazards associated with the tools and equipment used, and how they can be minimised
7. Comply with the procedures that are to be carried out before starting work on the repair and service work including any specific legislation, regulations or codes of practice for the activities, equipment or materials
8. Comply with health and safety regulations when manually handling heavy loads and carrying techniques
9. Collaborate with co-workers by using effective communication methods and skills that facilitate safety
10. Collaborate on tasks related to the safe isolation of electrical components
11. Deal with safety components of lifts correctly
12. Ensure that one handles *hazardous materials* such as oils correctly and disposes of such materials in accordance with health and safety procedures

13. Ensure that one implements safety precautionary measures that are required when one is working at heights
14. Ensure that the work area is safe and free from foreign objects and debris
15. Ensure that one immediately informs designated personnel of problems that cannot be resolved
16. Collaborate during the isolation and lock-off procedure

Required Knowledge

The Lift Maintenance Specialist must know and explain:

1. Their responsibilities under the Occupational Health and Safety Act
2. What constitutes hazards and risks during repair and service work
3. The personal protective equipment (PPE) that one needs to use for measuring and setting out activities and electrical installations
4. The specific safety precautions that are to be taken before and during lift repair work
5. The hazards associated with the tools and equipment used, and how they can be minimised
6. The procedures to be carried out before starting work on repair works including any specific legislation, regulations or codes of practice for the activities, equipment or materials
7. How to apply correct manual lifting and carrying techniques
8. Communication methods and skills that facilitate safety in lift installation
9. On how to identify and operate safely electrical isolating components
10. Safety components for lifts
11. How the various *hazardous materials* on a work site should be correctly handled and disposed of in accordance with health and safety procedures
12. The safety precautionary measures required when working at heights or on a scaffold system
13. On how to safely isolate services, in order to provide safe access and working arrangements for the repair work to be carried out
14. On how to leave the work area in a safe condition and free from foreign objects and debris
15. On how to connect equipment to power supplies
16. The isolation and lock-off procedure.
17. Procedures on how to carry out repair work in conformity to applicable EN81 Lift Standards
18. Working application of lift standards (typically EN81-20, EN81-21, EN81-70 and EN81-28) and their requirements.

Required Skills

The Lift Maintenance Specialist must be able to:

1. Their responsibilities under the Occupational Health and Safety Act
2. What constitutes hazards and risks in lift repair work
3. The personal protective equipment (PPE) that one needs to use for measuring and setting out activities and electrical installations
4. The specific safety precautions that are to be taken before and during repair and service work
5. The hazards associated with the tools and equipment used, and how they can be minimised
6. The procedures to be carried out before starting repair work including any specific legislation, regulations or codes of practice for the activities, equipment or materials
7. How to apply correct manual lifting and carrying techniques
8. Communication methods and skills that facilitate safety
9. On how to identify and operate safely electrical isolating components
10. Safety components for lifts
11. How the various *hazardous materials* on a work site should be correctly handled and disposed of in accordance with health and safety procedures
12. The safety precautionary measures required when working at heights or on a scaffold system
13. On how to safely isolate services, in order to provide safe access and working arrangements
14. On how to leave the work area in a safe condition and free from foreign objects and debris
15. On how to reconnect equipment to power supplies
16. The isolation and lock-off procedures
17. The procedures on how to carry out repair work in conformity to applicable EN81 Lift Standards
18. The application of lift standards (typically EN81-20, EN81-21, EN81-70 and EN81-28) and their requirements.

LMT2 - Unit 2 Using drawings and documents in maintenance activities

This unit lists the knowledge and skills needed by a person holding this position to carry out repair and service work on a lift. Upon completion of this unit, the person carrying out this work will possess the necessary knowledge to understand the principles on the use of drawings and technical documents in maintenance activities.

Performance Criteria

The candidate must have the necessary knowledge and skills to:

1. Describe on how to obtain and interpret information from job instructions and other documents needed in the servicing process such as drawings, specifications, manufacturers' manuals, servicing schedules
2. Use lift installation drawings showing installed electrical wiring and lift components
3. Extract information from drawings and specifications to carry out lift repair work
4. Carry out service tasks on the lift according to drawings and specifications
5. Understand how the lift installation conforms to lift standards in order to maintain conformity
6. Describe the importance of servicing documentation and/or reports following the servicing activity, and how to generate them
7. Describe the equipment operating and control procedures to be applied during the servicing activity

Required Knowledge

The Lift Maintenance Specialist must know and explain:

1. The lift information such as drawings, manufactures' manuals and circuit diagrams are used as reference during repair and service tasks
2. Drawings and describe the sequence of work for a given repair task on a lift
3. The lift's main mechanical, hydraulic and electrical components as shown on the drawings
4. The functions of the various components making up the safety circuit as shown on the drawings
5. The typical features of the electrical installation for a lift from a maintenance perspective
6. On how to apply distances and tolerances as given in the documentation for repair tasks which include part replacement
7. The importance of servicing documentation and/or reports following the servicing activity, and how to generate them
8. The equipment operating and control procedures to be applied during the servicing activity.

Required Skills

The Lift Maintenance Specialist must be able to:

1. Demonstrate on how to obtain and interpret information from job instructions and other documents needed in the servicing process such as drawings, specifications, manufacturers' manuals, servicing schedules
2. Demonstrate how the lift's main mechanical, hydraulic and electrical components function as shown on drawings
3. Plan & install the electrical wiring for the repair / replacement of the lift components
4. Demonstrate how to carry out the appropriate electrical safety checks according to instructions
8. Use manufactures manuals, circuit diagrams, drawings and other relevant documents when planning a given repair and service task
9. Apply distances and tolerances as given in the documentation for repair tasks which include part replacement
10. Demonstrate the importance of servicing documentation and/or reports following the servicing activity, and how to generate them
11. Demonstrate the equipment operating and control procedures to be applied during the servicing activity.

LMT3 - Unit 3 Fault Diagnosis and checking lift function

This unit lists the knowledge and skills needed by a person holding this position to carry out fault diagnosis including functionality tests on a lift. Upon completion of this unit, the person carrying out this work will possess the necessary knowledge to examine assess the performance of a lift.

Performance Criteria

1. To describe how to obtain and interpret information to follow for the checking of the lift
2. To operate diagnostic aids such as manuals, flow charts, troubleshooting guides and maintenance records
3. functions from job instructions and other documents needed in the servicing process
4. To describe the inspection and safety checks that are applied, and the importance of following them exactly during servicing operations
5. To describe the methods of checking that components are fit for purpose, and how to identify defects and wear characteristics
6. To describe the basic principles of how the equipment functions, its operating sequence, the working purpose of individual units/components and how they interact
7. To describe the different drive systems, their operation, and associated components
8. To describe the uses of mechanical and electrical measuring devices used to determine functionality of the lift components (e.g. determination of lift speed and door force limiter values)
9. To describe on how to make adjustments to components/assemblies to ensure that they function correctly setting working clearance, setting travel, running and sliding conditions
10. To describe the importance of making checks before running the equipment under power
11. To describe on how to check that tools and equipment are free from damage or defects, are in a safe and usable condition, and are configured correctly for the intended purpose
12. To describe the equipment operating and control procedures to be applied during the servicing activity
13. To describe the things that can go wrong when carrying out servicing of lifts, and what to do if they occur.
14. To define and undertake the fault location process to cause minimal disruption to the customer
15. To set, use and apply diagnostic techniques, tools and aids to locate faults using information gathered from the person who reported the fault, including the customer, fault finding techniques such as six point, half-split, input/output, unit substitution.

Required Knowledge

The Lift Maintenance Specialist must know and explain:

1. How to obtain and interpret information to follow for the checking of the lift functions from job instructions and other documents needed in the servicing process
2. How to operate diagnostic aids such as manuals, flow charts, troubleshooting guides and maintenance records
3. The inspection and safety checks that are applied, and the importance of following them exactly during servicing operations
4. The methods of checking that components are fit for purpose, and identify defects and wear characteristics
5. The basic principles of how the equipment functions, its operating sequence, the working purpose of individual units/components and their interaction
6. The different drive systems, their operation, and associated components
7. The uses of mechanical and electrical measuring devices used to determine functionality of the lift components (e.g. determination of lift speed and door force limiter values)
8. How to make adjustments to components/assemblies to ensure that they function correctly setting working clearance, setting travel, running and sliding conditions
9. The importance of making checks before running the equipment under power
10. How to check that tools and equipment are free from damage or defects, are in a safe and usable condition, and are configured correctly for the intended purpose
11. The operating and control procedures to be applied during the servicing activity
12. Action to be taken when things go wrong when carrying out the servicing of lifts, and what to do if they occur
13. To define and undertake the fault location process to cause minimal disruption to the customer

14. To set, use and apply diagnostic techniques, tools and aids to locate faults using information gathered from the person who reported the fault, including the customer, fault finding techniques such as six point, half-split, input/output, unit substitution.
15. To determine the implications of the fault for other work and for safety considerations
16. The use of inspecting techniques such as checking for breakages, wear/deterioration, overheating, missing parts and loose fittings
17. On how to use the evidence gained to draw valid conclusions about the nature and probable cause of the fault
18. On how to record details on the extent and location of the faults in an appropriate format
19. How to provide a record of the outcomes of the fault location, using one of the following:
    a. step-by-step outcome analytical report
    b. service record card
    c. company-specific documentation
    d. corrective action report

Required Skills

The Lift Maintenance Specialist must be able to:

1. Obtain and interpret information to follow for the checking of the lift functions from job instructions and other documents needed in the servicing process
2. To operate diagnostic aids such as manuals, flow charts, troubleshooting guides and maintenance records
3. Carry out inspection and safety checks that are applied during servicing operations
4. Apply the methods of checking that components are fit for purpose, and identify defects and wear characteristics
5. Apply the basic principles of how the equipment functions, its operating sequence, the working purpose of individual units/components and how they interact
6. Explain the different drive systems, their operation, and associated components
7. Use mechanical and electrical measuring devices used to determine functionality of the lift components (e.g. determination of lift speed and door force limiter values)
8. Carry out adjustments to components/assemblies to ensure that they function correctly setting working clearance, setting travel, running and sliding conditions
9. Carry out checks before running the equipment under power

10. Check that tools and equipment are free from damage or defects, are in a safe and usable condition, and are configured correctly for the intended purpose
11. Apply the equipment operating and control procedures to be applied during the servicing activity
12. Implement measures when things go wrong whilst carrying out servicing of lifts
13. Define and undertake the fault location process to cause minimal disruption to the customer
14. Set, use and apply diagnostic techniques, tools and aids to locate faults using information gathered from the person who reported the fault, including the customer, fault finding techniques such as six point, half-split, input/output, unit substitution
15. Define the implications of the fault for other work and for safety considerations
16. Define inspecting techniques such as checking for breakages, wear/deterioration, overheating, missing parts and loose fittings
17. Define on how to use evidence gained to draw valid conclusions about the nature and probable cause of the fault
18. Record details on the extent and location of the faults in an appropriate format
19. Provide a record of the outcomes of the fault location, using one of the following:
    a. step-by-step outcome analytical report
    b. service record card
    c. company-specific documentation
    d. corrective action report

LMT4 - Unit 4 Rectifying faults & Replacement of major parts e.g. ropes, lift doors, buffers, sheaves, hydraulic oil and hydraulic components

This unit lists the knowledge and skills needed by a person holding this position to carry out repair works which includes the replacement of various lift components. Upon completion of this unit, the person carrying out this work will possess the necessary knowledge to carry out such rectification work.

Performance Criteria

1. Identify the methods, techniques and company procedures to be followed for repairing / replacing components for lifts
2. Identify the lubrication requirements
3. Identify the inspection and safety checks that are applied, and the importance of following them exactly during replacement/repair operation
4. Identify the methods and techniques used to dismantle / assemble lift equipment
5. Identify the methods of checking that components are fit for purpose, how to identify defects and wear characteristics, and the need to replace items such as oil seals
6. Identify how to make adjustments to components/assemblies to ensure that they function correctly setting working clearance, setting travel, running and sliding conditions
7. Identify the implications of the fault for other work and for safety considerations
8. List the various electrical safety devices and applications
9. How to install the Over-speed governor switch, re-set switch and rope tension switch

10. How to install the Ascending car over-speed switch
11. How to install the Slack rope/ chain switch (positive drive switch)
12. How to install the Stop switch as part of the safety circuit
13. How to install the landing door controls
14. How to install door contacts
15. How to install the Inspection and emergency door interlocks
16. How to install the car door contact switch car door lock
17. How to install the A3 device on hydraulic lifts
18. How to install maintenance inspection control box
19. How to install the suspension rope tension equalizing device switch
20. How to install the safety gear including switches
21. How to install the switch on anti-rebound device
22. How to install the buffer return switch (emergency dissipation device) reduced stroke buffer switch
23. How to install the final limit switches
24. How to install the proving device for slowdown
25. How to install the levelling/ re-levelling limit switch
26. How to replace hydraulic oil fluid
27. How to install and calibrate the rupture valve
28. How to service and install hydraulic head
29. How to install load sensing devices
30. How to install door detection devices
31. How to install guide shoes
32. How to program auto dialling devices.

Required Knowledge

The Lift Maintenance Specialist must know and explain:

1. The methods, techniques and company procedures to be followed for repairing / replacing components for lifts
2. Identify the lubrication requirements
3. The inspection and safety checks that are applied, and the importance of following them exactly during replacement/repair operation
4. The methods and techniques used to dismantle / assemble lift equipment

5. The methods of checking that components are fit for purpose, how to identify defects and wear characteristics, and the need to replace items such as oil seals
6. How to make adjustments to components/assemblies to ensure that they function correctly setting working clearance, setting travel, running and sliding conditions
7. The implications of the fault for other work and for safety considerations
8. The various electrical safety devices and applications
9. On how to install the Main isolator circuit breaker control switch
10. On how to install the Removable hand-winding wheel switch
11. On how to install the Over-speed governor switch
12. On how to install the Over-speed governor re-set switch
13. On how to install the Ascending car over-speed switch
14. On how to install the Slack rope/ chain switch (positive drive switch)
15. On how to install the Stop switch in pulley room
16. On how to install the Landing door controls
17. On how to install the Slave door contacts
18. On how to install the Inspection and emergency door interlocks
19. On how to install the Car door contact switch Car door lock
20. On how to install the Car docking operation stop switch
21. On how to install the Car emergency door/ trap door interlock
22. On how to install the Stop switch(es) on car top
23. On how to install the Suspension rope/ chain tension equalizing device switch
24. On how to install the safety gear including switches
25. On how to install the Stop switch in pit
26. On how to install the Switch on compensating sheave
27. On how to install the Switch on anti-rebound device
28. On how to install the Over-speed governor rope tension switch
29. On how to install the buffer return switch (emergency dissipation device) reduced stroke buffer switch
30. On how to install the final limit switches
31. On how to install the proving device for slowdown
32. On how to install the levelling/ re-levelling limit switch
33. On how to replace guide shoes
34. On how to program and test auto dialling devices.

Required Skills

The Lift Maintenance Specialist must be able to:

1. Explain the methods, techniques and company procedures to be followed for repairing / replacing components for lifts
2. Explain the lubrication requirements
3. Carry out the inspection and safety checks that are applied, and the importance of following them exactly during replacement/repair operation
4. Explain the methods and techniques used to dismantle / assemble lift equipment
5. Explain the methods of checking that components are fit for purpose, how to identify defects and wear characteristics, and the need to replace items such as oil seals
6. Explain how to make adjustments to components/assemblies to ensure that they function correctly setting working clearance, setting travel, running and sliding conditions
7. Explain the implications of the fault for other work and for safety considerations
8. Describe the various electrical safety devices and applications
9. Install the Main isolator circuit breaker control switch
10. Install the Removable hand-winding wheel switch
11. Install the Over-speed governor switch
12. Install the Over-speed governor re-set switch
13. Install the Ascending car over-speed switch
14. Install the Slack rope/ chain switch (positive drive switch)
15. Install the Stop switch in pulley room
16. Install the Landing door controls
17. Install the Slave door contacts
18. Install the Inspection and emergency door interlocks
19. Install the Car door contact switch Car door lock
20. Install the Car docking operation stop switch
21. Install the Car emergency door/ trap door interlock
22. Install the Stop switch(es) on car top
23. Install the Suspension rope/ chain tension equalizing device switch
24. Install the safety gear including switches
25. Install the Stop switch in pit
26. Install the Switch on compensating sheave
27. Install the Switch on anti-rebound device
28. Install the Over-speed governor rope tension switch

29. Install the buffer return switch (emergency dissipation device) reduced stroke buffer switch
30. Install the final limit switches
31. Install the proving device for slowdown
32. Install the levelling/ re-levelling limit
33. Install guide shoes
34. Program and test auto dialling devices.

LMT5 – Unit 5 Emergency evacuation of trapped passengers

This unit lists the knowledge and skills needed by a person holding this position to carry out emergency evacuation of trapped passengers inside lifts. Upon completion of this unit, the person carrying out this work will possess the necessary knowledge to carry out such evacuation work.

Performance Criteria

The candidate must have the necessary knowledge and skills to:

1. Distinguish on the type of lift installed
2. Locate the machine room
3. Follow evacuation procedures

Required Knowledge

The Lift Maintenance Specialist must know and explain:

1. On how to identify the type of lift installed
2. On how to locate the machine room
3. On how to carry out evacuation procedure for the type of model installed

Required Skills

The Lift Maintenance Specialist must be able to:

1. Identify the type of lift installed
2. Locate the machine room
3. Follow evacuation procedures and communicate with the trapped passengers.

4. Isolate the lift from operation

LMT6 – Unit 6 Control Panels (Optional)

This unit lists the knowledge and skills needed by a person holding this position to carry out repair works which includes an understanding of the basic components of a control panel. Upon completion of this unit, the person carrying out this work will possess the necessary knowledge to understand the function of the various components of a control panel and how to replace certain components.

Performance Criteria

The candidate must have the necessary knowledge and skills to:

1. Identify the main components making up a control panel and describe their functionality
2. Identify the main difference between analogue and digital panels
3. Understand programming parameters
4. Describe functionality of safety circuit
5. Use of electrical drawings to identify wiring and components
6. Understand the functionality of a VVVF drive
7. Describe the components and their functionality found on a typical PCB
8. Explain the functionality of each type of PCB.
9. Describe functionality tests for a panel
10. Describe the function of each MCB, Circuit Breakers, and Contactor.

Required Knowledge

The Lift Maintenance Specialist must know and explain:

1. The main components making up a control panel and describe their functionality
2. The main difference between relay based and electronic based panels
3. Programming parameters
4. Functionality of the safety circuit
5. The use of electrical drawings to identify wiring and components
6. The functionality of a VVVF drive
7. The components and their functionality found on a typical PCB
8. The functionality of each type of PCB
9. How to carry out functionality tests of panel
10. The function of each MCB, Circuit Breakers, and Contactor.

Required Skills

The (MQF level, occupation) must be able to:

1. Explain the main components making up a control panel and describe their functionality

2. Explain the main difference between analogue and digital panels
3. Explain programming parameters
4. Explain the functionality of safety circuit
5. How to use electrical drawings to identify wiring and components
6. Explain the functionality of a VVVF drive
7. Explain the components and their functionality found on atypical PCB
8. Explain the functionality of each type of PCB
9. Carry out functionality tests on the panel
10. Explain the function of each MCB, Circuit Breakers, and Contactor.

LMT7 Unit 7: Health and Safety in the Lift Industry

This unit lists the knowledge and skills needed by a person holding this position to carry out work in compliance with health and safety requirements. Upon completion of this unit, the person carrying out this work will possess the necessary knowledge and skills to follow health and safety procedures which ensure that their actions do not create health and safety risks to self or others.

Performance Criteria

The candidate must have the necessary knowledge and skills to:

17. Deal with hazard and risk in a lift installation and maintenance context
18. Deal with associated hazards while carrying out installations, maintenance and fault diagnosis on lifts
19. Be responsible for utilising personal protective equipment (PPE) that one needs to use for measuring and setting out activities and electrical installations
20. Ensure to take specific safety precautions that are to be taken before and during installation to reduce typical risk
21. Deal with hazards associated with the tools and equipment used, and how they can be minimised
22. Comply with the procedures that are to be carried out before starting work on the installation including any specific legislation, regulations or codes of practice for the activities, equipment or materials
23. Comply with health and safety regulations when manually handling heavy loads and carrying techniques

24. Collaborate with co-workers by using effective communication methods and skills that facilitate safety in lift installation
25. Collaborate with qualified personnel on tasks related to the safe isolation of electrical components
26. Deal with safety components of lifts correctly
27. Ensure that one handles *hazardous materials* on a work site correctly and disposes of such materials in accordance with health and safety procedures
28. Ensure that one implements safety precautionary measures that are required when one is working at heights and scaffold system
29. Collaborate with qualified personnel to safely isolate services during installation to provide safe access and working arrangements for the installation area
30. Ensure that the work area is safe and free from foreign objects and debris
31. Collaborate with qualified personnel to connect equipment to power supplies
32. Ensure that one immediately informs designated personnel of problems that cannot be resolved
33. Collaborate with qualified personnel during the isolation and lock-off procedure

Required Knowledge

The (MQF level, occupation) must know and explain:

19. Their responsibilities under the Occupational Health and Safety Act
20. What constitutes hazards and risks in a lift installation
21. The hazards associated whilst carrying out installations
22. The personal protective equipment (PPE) that one needs to use for measuring and setting out activities and electrical installations
23. The specific safety precautions that are to be taken before and during installation
24. The hazards associated with the tools and equipment used, and how they can be minimised
25. The procedures to be carried out before starting work on the installation including any specific legislation, regulations or codes of practice for the activities, equipment or materials
26. How to apply correct manual lifting and carrying techniques
27. And communication methods and skills that facilitate safety in lift installation
28. On how to identify and operate safely electrical isolating components under supervision
29. Safety components for lifts
30. How the various *hazardous materials* on a work site should be correctly handled and disposed of in accordance with health and safety procedures

31. The safety precautionary measures required when working at heights or on a scaffold system
32. On how to assist qualified personnel on how to safely isolate services during installation, in order to provide safe access and working arrangements for the installation area
33. On how to leave the work area in a safe condition and free from foreign objects and debris
34. On how to assist qualified personnel to connect equipment to power supplies
35. The isolation and lock-off procedure while assisting qualified personnel.

Required Skills

The (MQF level, occupation) must be able to:

1. List the associated hazards whilst carrying out installations and take the necessary precautions
2. Source personal protective equipment (PPE) that one needs to use
3. Apply specific safety precautions that are to be taken before and during installation
4. Select and safely use the tools and equipment required for the lift installation
5. Apply the correct procedures before starting work on the installation including any specific legislation, regulations or codes of practice for the activities, equipment or materials
6. Select and apply the correct manual lifting and carrying techniques
7. Apply effective communication methods and skills that facilitate safety in lift installation
8. Identify and operate safely electrical isolating components under supervision
9. Show how safety components for lifts work
10. Demonstrate how the various *hazardous materials* on a work site should be correctly handled and disposed of in accordance with health and safety procedures
11. Apply safety precautionary measures required when working at heights and on scaffold system
12. Practice safe isolation of services during installation to provide safe access and working arrangements for the installation area
13. Prepare the work area to create a safe working environment, that is free from foreign objects and debris
14. Demonstrate how to assist qualified personnel in connecting equipment to power supplies
15. Identify the isolation and lock-off procedures whilst assisting qualified personnel.
16. Discuss best practice that facilitates collaboration with team members in an installation
17. Identify various *hazardous materials* on a work site and how they can be correctly handled and disposed of in accordance to health and safety procedures.