



ETCAL Level 3 NVQ Diploma in Installation and Commissioning  
601/7649/0  
Assessment

## Diploma - Assessment Principles

### Introduction

ETA qualifications are developed in conjunction with the industries and employers they service. They are designed to add value and deliver multidimensional outputs that provide impact for both learners and employers.

It is therefore important that the assessment requirements of ETA qualifications are robust whilst not containing unnecessary and over-burdensome challenges that detract from the intended outcomes and impact. These assessment principles are prepared with that in mind and are applicable to this qualification:

Level 3 NVQ Diploma in Installation and Commissioning

### Principles

There are four key principles to underpin assessment delivery:

1. Assessment should contribute to developing a learner's knowledge and/or skills and provide relevant and current development as the related industry requires.
2. Systems for capturing evidence of competence should be integrated and efficient. Assessment practices for both competence-based and knowledge-based aspects of qualifications should, where possible, be integrated with industry driven standards and requirements.
3. Assessment methods must be appropriate for the level and nature of the qualification units to be assessed. Methods of assessing achievement against learning outcomes and assessment principles must be accommodating and flexible, whilst remaining appropriate for both the level being assessed and industry expectations of learners at that level.
4. Evidence of knowledge and understanding must be recorded and be clearly attributable to the learner. This can be delivered using task based activity with questions and answer sessions, supported by assessor observation.

The choice and application of assessment methods must be consistent with these principles and will generally include:

- Direct Observation
- Written evidence (portfolio/workbook)
- Centre set assignment
- Centre set coursework
- Oral examination
- Professional/open discussion

## **Delivery Team Requirements**

### ***Tutors / Assessors***

- Tutors / Assessors should have a detailed knowledge of, and be competent in, the occupational requirements of the units
- Tutors / Assessors should hold or be working towards the related professional qualifications for delivery and assessment as required
- This competence will have been acquired either in direct employment in the occupational role to which the unit relates, or in employment as a manager, supervisor or in-house trainer of employees carrying out the role
- It is unlikely that occupational competence will have been achieved in less than twelve months of employment but individuals with less experience could be considered as assessors if sufficiently occupationally competent

### ***Internal Quality Assurers (IQAs)***

- IQAs must have a thorough understanding of the structure, content and occupational requirements of the units that they are internally quality assuring. This understanding will have been acquired while either working directly within or delivering within the relevant occupational area in either an operational or a support function
- The level of understanding must be sufficient to allow the IQA to judge whether the assessor has fully assessed learners against all the principles within the unit
- It is unlikely that a person could have gained this level of understanding in less than twelve months of being employed but individuals with less experience could be considered as IQAs if they have the required level of experience, knowledge and understanding.

### ***Technical / Expert Witness***

Expert witnesses can be drawn from a wide range of people who can observe, 'measure and examine performance against the industry and qualification principles. These can include line managers and experienced individuals within a related sector-based organisation. The Technical Expert Witnesses should have proven practical experience and knowledge relating to the content of the principles being assessed.

It is unlikely that someone could become an expert in their entire job role in less than twelve months of being employed in their industry. They could, however, very quickly become an expert in the content of a single unit if this was the focus of their job role. The assessor should make a

judgement as to the level of expertise held by a potential Technical Expert Witness and, where necessary, this should be confirmed with the awarding organisation.

### **Assessment Materials**

ETC Awards Ltd. (ETA) Assessment Materials are protected by copyright and are supplied only to Approved Centres for use solely for the purpose of the assessment of ETA learners.

### ***Instructions for Conducting Assessment***

the Approved Centre must either:

- secure approval of in-house assessment material by ETA's External Quality Assurance team prior to use
- use ETA Assessment Materials
- we recognise that reasonable adjustments may be considered at the time of assessment, please refer to the ETA Reasonable adjustments and considerations policy

All approved centres must then handle and store securely all Assessment Materials in accordance with the following:

- Assessment Material must be accessible to learners only during their programme
- The Approved Centre must not make public in any format the contents of any materials either in part or in full.
- Materials must be securely handled and under no circumstances shared with third party organisations or individuals
- The Approved Centre must seek permission from ETA through the External Quality Assurance team if they want to convert Material for alternative storage, retrieval and delivery in electronic formats.

All centre based assessment material must be agreed with ETA prior to use and will be subject to robust monitored during sampling and verification activity.



Level 3 Unit – Complying with Statutory Regulations and  
Organisational Safety Requirements

## Unit aim

This unit covers the skills and knowledge needed to prove the competences required to deal with statutory regulations and organisational safety requirements. It does not deal with specific safety regulations or detailed requirements, it does, however, cover the more general health and safety requirements that apply to working in an industrial environment.

The learner will be expected to comply with all relevant regulations that apply to their area of work, as well as their general responsibilities as defined in the Health and Safety at Work Act. The learner will need to be able to identify the relevant qualified first aiders and know the location of the first aid facilities. The learner will have a knowledge and understanding of the procedures to be adopted in the case of accidents involving injury and in situations where there are dangerous occurrences or hazardous malfunctions of equipment, processes or machinery. The learner will also need to be fully conversant with their organisation's procedures for fire alerts and the evacuation of premises.

The learner will also be required to identify the hazards and risks that are associated with their job. Typically, these will focus on their working environment, the tools and equipment that they use, the materials and substances that they use, any working practices that do not follow laid-down procedures, and manual lifting and carrying techniques.

## Unit introduction

The learner's responsibilities will require them to comply with all relevant statutory and organisational policy and procedures for health and safety in the workplace. The learner must act in a responsible and safe manner at all times and present themselves in the workplace suitably prepared for the activities to be undertaken. The learner will be expected to report any problems with health and safety issues, to the relevant authority.

The learner's knowledge will provide a good understanding of the relevant statutory regulations and organisational requirements associated with their work and will provide an informed approach to the procedures used. The learner will need to understand their organisation's health and safety requirements and their application, in adequate depth to provide a sound basis for carrying out their activities in a safe and competent manner.

### Assessment

To achieve this unit, the learner needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit through a variety of assessment methods appropriate to the delivery environment.

<b>Unit Reference Number</b>		A/601/5013
<b>Qualification Framework</b>		RQF
<b>Title</b>		Complying with statutory regulations and organisational safety requirements
<b>Unit Level</b>		Level 4
<b>Guided Learning Hours</b>		35
<b>Unit Credit Value</b>		5
<b>Unit Grading Structure</b>		Pass / Fail

<b>Learning Outcome</b>		<b>Assessment Criteria - The learner can</b>	
1.	Complying with statutory regulations and organisational safety requirements	1.1	Comply with their duties and obligations as defined in the Health and Safety at Work Act
		1.2	Demonstrate their understanding of their duties and obligations to health and safety by: <ul style="list-style-type: none"> <li>• applying in principle their duties and responsibilities as an individual under the Health and Safety at Work Act</li> <li>• identifying, within their organisation, appropriate sources of information and guidance on health and safety issues, such as: <ul style="list-style-type: none"> <li>• eye protection and personal protective equipment (PPE)</li> <li>• COSHH regulations</li> <li>• Risk assessments</li> </ul> </li> <li>• identifying the warning signs and labels of the main groups of hazardous or dangerous substances</li> <li>• complying with the appropriate statutory regulations at all times</li> </ul>
		1.3	Present themselves in the workplace suitably prepared for the activities to be undertaken
		1.4	Follow organisational accident and emergency procedures
		1.5	Comply with emergency requirements, to include: <ul style="list-style-type: none"> <li>• identifying the appropriate qualified first aiders and the location of first aid facilities</li> <li>• identifying the procedures to be followed in the event of injury to themselves or others</li> <li>• following organisational procedures in the event of fire and the evacuation of premises</li> <li>• identifying the procedures to be followed in the event of dangerous occurrences or hazardous malfunctions of equipment</li> </ul>



	1.6	Recognise and control hazards in the workplace
	1.7	Identify the hazards and risks that are associated with the following: <ul style="list-style-type: none"><li>• their working environment</li><li>• the equipment that they use</li><li>• materials and substances (where appropriate) that they use</li><li>• working practices that do not follow laid down procedures</li></ul>
	1.8	Use correct manual lifting and carrying techniques
	1.9	Demonstrate one of the following methods of manual lifting and carrying: <ul style="list-style-type: none"><li>• lifting alone</li><li>• with assistance of others</li><li>• with mechanical assistance</li></ul>
	1.0	Apply safe working practices and procedures to include: <ul style="list-style-type: none"><li>• maintaining a tidy workplace, with exits and gangways free from obstruction</li><li>• using equipment safely and only for the purpose intended</li><li>• observing organisational safety rules, signs and hazard warnings</li><li>• taking measures to protect others from any harm resulting from the work that they are carrying out</li></ul>



Level 3 Unit – Using and Interpreting Engineering Data  
and Documentation

## Unit aim

This unit covers the skills and knowledge needed to prove the competences required to make effective use of text, numeric and graphical information, by interpreting and using technical information extracted from documents such as engineering drawings, technical manuals, reference tables, specifications, technical sales/marketing documentation, charts or electronic displays, in accordance with approved procedures. The learner will be required to extract the necessary information from the various documents, in order to establish and carry out the work requirements, and to make valid decisions about the work activities based on the information extracted.

## Unit introduction

The learner's responsibilities will require them to comply with organisational policy and procedures for obtaining and using the documentation applicable to the activity. They will be expected to report any problems with the use and interpretation of the documents that they cannot personally resolve, or are outside their permitted authority, to the relevant people. They will be expected to work to instructions if necessary, with an appropriate level of supervision or as a member of a team and take personal responsibility for their own actions and for the quality and accuracy of the work that they carry out.

The learner's underpinning knowledge will provide a good understanding of the types of documentation used and will provide an informed approach to applying instructions and procedures. They will be able to read and interpret the documentation used and will know about the conventions, symbols and abbreviations, in adequate depth to provide a sound basis for carrying out the activities to the required specification.

## Assessment

To achieve this unit, the learner needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit through a variety of assessment methods appropriate to the delivery environment.

<b>Unit Reference Number</b>		Y/601/5012
<b>Qualification Framework</b>		RQF
<b>Title</b>		Using and interpreting engineering data and documentation
<b>Unit Level</b>		Level 3
<b>Guided Learning Hours</b>		25
<b>Unit Credit Value</b>		5
<b>Unit Grading Structure</b>		Pass / Fail

<b>Learning Outcome</b>		<b>Assessment Criteria - The learner can</b>	
1.	Using and interpreting engineering data and documentation	1.1	Use the approved source to obtain the required data and documentation
		1.2	Use the data and documentation and carry out <b>all</b> of the following: <ul style="list-style-type: none"> <li>• check the currency and validity of the data and documentation used</li> <li>• exercise care and control over the documents at all times</li> <li>• correctly extract all necessary data in order to carry out the required tasks</li> <li>• seek out additional information where there are gaps or deficiencies in the information obtained</li> <li>• deal with or report any problems found with the data and documentation</li> <li>• make valid decisions based on the evaluation of the engineering information extracted from the documents</li> <li>• return all documents to the approved location on completion of the work</li> <li>• complete all necessary work related documentation such as production documentation, installation documentation, maintenance documentation, planning documentation</li> </ul>
		1.3	Correctly identify, interpret and extract the required information
		1.4	Extract information that includes <b>three</b> of the following: <ul style="list-style-type: none"> <li>• materials or components required</li> <li>• dimensions</li> <li>• tolerances</li> <li>• build quality</li> <li>• installation requirements</li> <li>• customer requirements</li> <li>• time scales</li> <li>• financial information</li> <li>• operating parameters</li> </ul>

		<ul style="list-style-type: none"> <li>• surface texture requirements</li> <li>• location/orientation of parts</li> <li>• process or treatments required</li> <li>• dismantling/assembly sequence</li> <li>• inspection/testing requirements</li> <li>• number/volumes required</li> <li>• repair/service methods</li> <li>• method of manufacture</li> <li>• weld type and size</li> <li>• operations required</li> <li>• connections to be made</li> <li>• surface finish required</li> <li>• shape or profiles</li> <li>• fault finding procedures</li> <li>• safety/risk factors</li> <li>• environmental controls</li> <li>• specific data (such as component data, maintenance data, electrical data, fluid data)</li> <li>• resources (such as tools, equipment, personnel)</li> <li>• utility supply details (such as electricity, water, gas, air)</li> <li>• location of services, including standby and emergency backup systems</li> <li>• circuit characteristics (such as pressure, flow, current, voltage, speed)</li> <li>• protective arrangements and equipment (such as containment, environmental controls, warning and evacuation systems and equipment)</li> <li>• other specific related information</li> </ul>
	1.5	Use the information obtained to ensure that work output meets the specification
	1.6	<p>Use information extracted from documents to include <b>one</b> from the following:</p> <ul style="list-style-type: none"> <li>• drawings (such as component drawings, assembly drawings, modification drawings, repair drawings, welding/fabrication drawings, distribution and installation drawings)</li> <li>• diagrams (such as schematic, fluid power diagrams, piping, wiring/circuit diagrams)</li> <li>• manufacturers manuals/drawings</li> <li>• approved sketches</li> <li>• technical illustrations</li> <li>• photographic representations</li> <li>• visual display screen information</li> <li>• technical sales/marketing documentation</li> <li>• contractual documentation</li> </ul>

		<ul style="list-style-type: none"> <li>• other specific drawings/documents</li> </ul>
	1.7	<p>Use information extracted from related documentation, to include <b>two</b> from the following:</p> <ul style="list-style-type: none"> <li>• instructions (such as job instructions, drawing instructions, manufacturers' instructions)</li> <li>• specifications (such as material, finish, process, contractual, calibration)</li> <li>• reference materials (such as manuals, tables, charts, guides, notes)</li> <li>• schedules</li> <li>• operation sheets</li> <li>• service/test information</li> <li>• planning documentation</li> <li>• quality control documents</li> <li>• company specific technical instructions</li> <li>• national, international and organisational standards</li> <li>• health and safety standards relating to the activity (such as COSHH)</li> <li>• other specific related documentation</li> </ul>
	1.8	Deal promptly and effectively with any problems within their control and report those which cannot be solved
	1.9	Report any inaccuracies or discrepancies in documentation and specifications



Level 3 Unit – Working Efficiently and Effectively in Engineering

## Unit aim

This unit covers the skills and knowledge needed to prove the competences required to work efficiently and effectively in the workplace, in accordance with approved procedures and practices. Prior to undertaking the engineering activity, the learner will be required to carry out all necessary preparations within the scope of their responsibility. This may include preparing the work area and ensuring that it is in a safe condition to carry out the intended activities, ensuring they have the appropriate job specifications and instructions and that any tools, equipment, materials and other resources required are available and in a safe and usable condition.

On completion of the engineering activity, the learner will be required to return their immediate work area to an acceptable condition before recommencing further work requirements. This may involve placing completed work in the correct location, returning and/or storing any tools and equipment in the correct area, identifying any waste and/or scrapped materials and arranging for their disposal, and reporting any defects or damage to tools and equipment used.

In order to be efficient and effective in the workplace, the learner will also be required to demonstrate that they can create and maintain effective working relationships with colleagues and line management. The learner will also be expected to review objectives and targets for their personal development and make recommendations to, and communicate any opportunities for, improvements that could be made to working practices and procedures.

## Unit introduction

The learner's responsibilities will require them to comply with organisational policy and procedures for the engineering activities undertaken, and to report any problems with the activities, or the tools and equipment that are used that they cannot personally resolve, or are outside their permitted authority, to the relevant people. The learner will be expected to take personal responsibility for their own actions and for the quality and accuracy of the work that they carry out.



The learner's knowledge will provide a good understanding of their work and will provide an informed approach to working efficiently and effectively in an engineering environment. The learner will understand the need to work efficiently and effectively, and will know about the areas they need to consider when preparing and tidying up the work area, how to contribute to improvements, deal with problems, maintain effective working relationships and agree their development objectives and targets, in adequate depth to provide a sound basis for carrying out the activities safely and correctly.

The learner will understand the safety precautions required when carrying out engineering activities. The learner will be required to demonstrate safe working practices throughout and will understand the responsibility they owe to themselves and others in the workplace.

### Assessment

To achieve this unit, the learner needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit through a variety of assessment methods appropriate to the delivery environment.

<b>Unit Reference Number</b>		K/601/5055
<b>Qualification Framework</b>		RQF
<b>Title</b>		Working Efficiently and Effectively in Engineering
<b>Unit Level</b>		Level 3
<b>Guided Learning Hours</b>		25
<b>Unit Credit Value</b>		5
<b>Unit Grading Structure</b>		Pass / Fail

<b>Learning Outcome</b>		<b>Assessment Criteria - The learner can</b>	
1.	Working Efficiently and Effectively in Engineering	1.1	Work safely at all times, complying with health and safety and other relevant regulations and guidelines
		1.2	Prepare the work area to carry out the engineering activity
		1.3	Prepare to carry out the engineering activity, taking into consideration <b>all</b> of the following, as applicable to the work to be undertaken: <ul style="list-style-type: none"> <li>• the work area is free from hazards and is suitably prepared for the activities to be undertaken</li> <li>• any required safety procedures are implemented</li> <li>• any necessary personal protection equipment is obtained and is in a usable condition</li> <li>• tools and equipment required are obtained and checked that they are in a safe and useable condition</li> <li>• all necessary drawings, specifications and associated documentation is obtained</li> <li>• job instructions are obtained and understood</li> <li>• the correct materials or components are obtained</li> <li>• storage arrangements for work are appropriate</li> <li>• appropriate authorisation to carry out the work is obtained</li> </ul>
		1.4	Check that there are sufficient supplies of materials and/or consumables and that they meet work requirements
		1.5	Ensure that completed products or resources are stored in the appropriate location on completion of the activities
		1.6	Complete work activities, to include <b>all</b> of the following: <ul style="list-style-type: none"> <li>• completing all necessary documentation accurately and legibly</li> <li>• returning tools and equipment</li> <li>• returning drawings and work instructions</li> <li>• identifying, where appropriate, any unusable tools, equipment or components</li> <li>• arranging for disposal of waste materials</li> </ul>

	1.7	Tidy up the work area on completion of the engineering activity
	1.8	Deal promptly and effectively with problems within their control and report those that cannot be resolved
	1.9	Deal with problems affecting the engineering process, to include <b>two</b> of the following: <ul style="list-style-type: none"> <li>• materials</li> <li>• tools and equipment</li> <li>• drawings</li> <li>• job specification</li> <li>• quality</li> <li>• people</li> <li>• timescales</li> <li>• safety</li> <li>• activities or procedures</li> </ul>
	1.10	Contribute to and communicate opportunities for improvement to working practices and procedures
	1.11	Make recommendations for improving to <b>two</b> of the following: <ul style="list-style-type: none"> <li>• working practices</li> <li>• working methods</li> <li>• quality</li> <li>• safety</li> <li>• tools and equipment</li> <li>• supplier relationships</li> <li>• internal communication</li> <li>• customer service</li> <li>• training and development</li> <li>• teamwork</li> <li>• other</li> </ul>
	1.12	Maintain effective working relationships with colleagues to include <b>two</b> of the following: <ul style="list-style-type: none"> <li>• colleagues within own working group</li> <li>• colleagues outside normal working group</li> <li>• line management</li> <li>• external contacts</li> </ul>
	1.13	Review personal training and development as appropriate to the job role
	1.14	Review personal development objectives and targets to include <b>one</b> of the following: <ul style="list-style-type: none"> <li>• dual or multi-skilling</li> <li>• training on new equipment / technology</li> <li>• increased responsibility</li> <li>• understanding of company working practices, procedures, plans and policies</li> <li>• other specific requirements</li> </ul>



Level 3 Unit – Handing Over and Confirming Completion  
of Installation or Commissioning Activities

## Unit aim

This unit covers the skills and knowledge needed to prove the competences required to hand over equipment that has been installed or commissioned, to the appropriate person, prior to it entering service. Following the installation activity, the learner will be required to either set up the equipment and hand it over to another person to complete the required commissioning activities, or to complete the commissioning operation themselves. In either of these cases, this will involve checking that all the equipment and safety devices are operable and correctly set and/or calibrated, and that the equipment functions, safely and correctly, to the required specification. Following commissioning, and in addition to the above, checks for full operational requirements and production specifications, including run rate, are to be carried out before final handover to the appropriate person.

On handing over the equipment, the learner will be expected to highlight any unusual or changed operating features of the equipment, and to inform the appropriate person of any possible future maintenance requirements. The learner must also ensure that they receive documented confirmation that everyone involved in the handover accepts that the equipment is in a satisfactory condition to be put into service.

## Unit introduction

The learner's responsibilities will require them to comply with organisational policy and procedures for the handover activities undertaken, and to report any problems with the handover procedure that they cannot personally resolve, or are outside their permitted authority, to the relevant people. The learner will be expected to work with a minimum of supervision, taking personal responsibility for their own actions and for the quality and accuracy of the work that they carry out.

The learner's knowledge will provide a good understanding of their work and will provide an informed approach to applying handover procedures following installation and commissioning. The learner will understand the equipment being handed over, and its application, and will know about the operating procedures and potential problems, in adequate depth to provide a sound basis for carrying out the activities safely and correctly.

The learner will understand the safety precautions required when carrying out the final commissioning and handover activities, especially those for isolating the equipment. The learner will be required to demonstrate safe working practices throughout and will understand their responsibility for taking the necessary safeguards to protect themselves and others in the workplace.

### Assessment

To achieve this unit, the learner needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit through a variety of assessment methods appropriate to the delivery environment.

<b>Unit Reference Number</b>		D/601/0547
<b>Qualification Framework</b>		RQF
<b>Title</b>		Handing Over and Confirming Completion of Installation or Commissioning Activities
<b>Unit Level</b>		Level 3
<b>Guided Learning Hours</b>		35
<b>Unit Credit Value</b>		20
<b>Unit Grading Structure</b>		Pass / Fail

<b>Learning Outcome</b>		<b>Assessment Criteria - The learner can</b>	
1.	Hand Over and Confirm Completion of Installation or Commissioning Activities	1.1	Work safely at all times, complying with health and safety and other relevant regulations and guidelines
		1.2	Confirm that the equipment is ready for handover, by carrying out all of the following checks, as applicable to the equipment being handed over: <ul style="list-style-type: none"> <li>the installation and/or commissioning activity has been completed and the equipment functions to specification</li> <li>all safety systems are functioning correctly</li> <li>any waste materials, safety barriers and warning signs used specifically for installation/commissioning activities have been removed</li> <li>any auxiliary systems or equipment involved are connected and operable</li> <li>environmental controls are operable</li> <li>others involved in using the equipment are aware of impending start-up/handover</li> </ul>
		1.3	Carry out all of the following during the handover procedures: <ul style="list-style-type: none"> <li>run the installed and/or commissioned equipment through a complete cycle, in the presence of the appropriate person</li> <li>confirm that the other person accepts that the equipment functions satisfactorily, to specification</li> <li>highlight to the appropriate person any modifications or unusual features in the operating procedure</li> <li>hand over all documentation relating to operating instructions, service/maintenance requirements</li> <li>obtain agreement from the other person that they now accept responsibility for the equipment being handed over</li> <li>complete any necessary handover documentation</li> <li>confirm that the other person knows who to contact, and how, for future maintenance requirements</li> </ul>
		1.4	Carry out the correct handover procedures for one type of equipment/service from the following: <ul style="list-style-type: none"> <li>manual</li> <li>semi-automatic</li> <li>fully automatic</li> <li>process/control</li> </ul>

			<ul style="list-style-type: none"> <li>• computer controlled</li> <li>• engineering services</li> <li>• other specific equipment</li> </ul>
		1.5	Confirm that everyone involved accepts the product or asset is in a satisfactory condition for handover to take place
		1.6	Clearly identify any unusual features of the condition of the product or asset
		1.7	Make the handover and obtain agreement between everyone involved on the precise moment of transfer of responsibility
		1.8	Carry out handover procedures to one of the following people: <ul style="list-style-type: none"> <li>• commissioning engineer</li> <li>• production/process supervisor</li> <li>• maintenance supervisor</li> <li>• other specific person</li> </ul>
		1.9	Deal promptly and effectively with problems within their control and report those that they cannot solve
		1.10	Make sure that clear, accurate and complete records of the handover are made
		1.11	Complete all relevant paperwork from the following, and pass it to the appropriate people: <ul style="list-style-type: none"> <li>• job card</li> <li>• installation report</li> <li>• commissioning report</li> <li>• other handover paperwork</li> </ul>
2.	Know how to Hand Over and Confirm Completion of Installation or Commissioning Activities	2.1	Explain the health and safety requirements of the area in which the handover is to take place, and the responsibility they place on them
		2.2	Describe the isolation and lock-off procedure or permit-to-work procedure that applies to the equipment being installed/commissioned
		2.3	Explain the specific health and safety precautions to be applied during the handover procedure, and their effects on others
		2.4	Explain the importance of wearing protective clothing and other appropriate safety equipment during the handover, and where it may be obtained
		2.5	Describe the checking process to be followed before handing over the equipment (eg, are the safety and quality systems operable, does the equipment function to specification, run rate)
		2.6	Explain the appropriate handover procedure, depending on the activity carried out (installation, commissioning)
		2.7	Explain the procedure for involving the appropriate people when starting up the equipment during the handover
		2.8	Explain the need to highlight any unusual or changed operating features of the equipment
		2.9	Explain the importance of informing the appropriate person of any future maintenance requirements
		2.10	Explain the need to confirm that the other person understands the equipment operating procedures
		2.11	Explain the need to ensure that the person they are handing over the equipment to accepts that it is functioning correctly



		2.12	Explain what organisational documentation procedures are applicable to the handover
		2.13	Explain how to create and maintain effective working relationships with appropriate people (encouraging, helping, politeness, open discussions both ways)
		2.14	Describe the problems that can occur during handover, and explain how they can be overcome
		2.15	Describe the extent of their own authority and to whom they should report if they have problems that they cannot resolve



## Level 3 Unit – Commissioning Process Controller Equipment and Systems

## Unit aim

This unit covers the skills and knowledge needed to prove the competences required to carry out commissioning activities on process controller equipment and systems, in accordance with approved procedures. The learner will be required to commission equipment controlled by a process or sequential controller, such as programmable logic controller (PLC), or personal computer (PC), which is working in an integrated system involving two or more interactive technologies, such as mechanical, electrical or fluid power. This unit does not involve the commissioning of items of equipment that are simple, self-contained items requiring the minimum of commissioning, such as printers or remote PCs.

The learner will be expected to check that the equipment has been installed correctly, to specification, and then to carry out a planned and logical commissioning process, in accordance with company policy and manufacturers' instructions. This will involve the application of a range of commissioning methods and techniques, including checking peripheral components, communication links and loading/downloading of process controller programs before starting up the equipment, checking and editing programs, creating back-up copies of completed final programs, operating the equipment to prove its function, and making full operational trials. The commissioning process will also require the learner to confirm operational links to mechanical, electrical, fluid power, PLC control, services and external units/equipment such as monitoring devices, sensors and actuators. The learner will also be required to either make a full report of any defects or deviations found, or to resolve any problems and rectify faults at component or unit level.

## Unit introduction

The learner's responsibilities will require them to comply with organisational policy and procedures for the commissioning activities undertaken, and to report any problems with these activities or the tools and equipment used, that they cannot personally resolve or are outside their permitted authority, to the relevant people. The learner must ensure that all tools, equipment and materials used in the commissioning activities are removed from the work area on completion of the activities, and that all necessary documentation is completed accurately and legibly.

The learner's knowledge will provide a good understanding of their work and will provide an informed approach to applying procedures for the commissioning of process control equipment. The learner will understand the commissioning methods, techniques and procedures, and their application. The learner will know how the equipment functions, the purpose of the individual components and any associated defects, in adequate depth to provide a sound basis for carrying out the commissioning activities and, where appropriate, correcting faults and solving functional problems, ensuring that the equipment performs to the required specification.

The learner will understand the safety precautions required when carrying out the commissioning activities, especially those for applying power in incremental stages. The learner will also understand their responsibilities for safety, and the importance of taking the necessary safeguards to protect themselves and others in the workplace.

### Assessment

To achieve this unit, the learner needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit through a variety of assessment methods appropriate to the delivery environment.

<b>Unit Reference Number</b>		R/601/0576
<b>Qualification Framework</b>		RQF
<b>Title</b>		Commissioning Process Controller Equipment and Systems
<b>Unit Level</b>		Level 3
<b>Guided Learning Hours</b>		224
<b>Unit Credit Value</b>		118
<b>Unit Grading Structure</b>		Pass / Fail

Learning outcomes - the learner will...		Assessment criteria - the learner can...	
1.	Commission Process Controller Equipment and Systems	1.1	Work safely at all times, complying with health and safety and other relevant regulations and guidelines
		1.2	Carry out all of the following during the commissioning activities: <ul style="list-style-type: none"> <li>• plan the commissioning activities to minimise disruption to normal working</li> <li>• ensure the currency of all documentation/programmes used in the commissioning activities</li> <li>• adhere to risk assessment, COSHH and other relevant safety standards</li> <li>• ensure the safe isolation of equipment during commissioning (such as mechanical, electricity, gas, air, fluids)</li> <li>• ensure that all tools and equipment used are within current calibration dates</li> <li>• obtain clearance to carry out the commissioning activities</li> <li>• provide safe access and working arrangements for the commissioning area</li> <li>• dispose of any waste items in a safe and environmentally acceptable manner</li> <li>• leave the work area in a safe condition and free from foreign object debris</li> </ul>
		1.3	Follow all relevant setting up and operating specifications for the products or assets being configured
		1.4	Gather information required to undertake the commissioning, to include six of the following: <ul style="list-style-type: none"> <li>• client requirements</li> <li>• equipment specifications</li> <li>• manufacturer's manuals/settings</li> <li>• regulations and guidelines</li> <li>• environmental requirements</li> <li>• installation reports</li> <li>• commissioning procedures</li> <li>• product/process specifications</li> <li>• resources necessary to carry out the commissioning (such as manpower, supplies, time constraints)</li> </ul>
		1.5	Follow the defined procedures and set up the equipment correctly ensuring that all operating parameters are achieved

		<p>1.6 Carry out commissioning on one of the following types of process control installations:</p> <ul style="list-style-type: none"> <li>• monitoring system</li> <li>• safety system</li> <li>• diagnostic system</li> <li>• combination system</li> <li>• process/product control system</li> <li>• business management system</li> </ul> <p>Which must include one of the following:</p> <ul style="list-style-type: none"> <li>• fixed I/O units</li> <li>• rack-mount controller units</li> <li>• modular controller units</li> </ul> <p>Plus four of the following types of PLC peripheral equipment:</p> <ul style="list-style-type: none"> <li>• sensors</li> <li>• actuators</li> <li>• switches</li> <li>• motor starters</li> <li>• electrical wire and cable connections</li> <li>• modems</li> <li>• printers</li> <li>• signal transmission components/cables</li> <li>• overload protection devices</li> <li>• PC peripheral devices</li> </ul>
		<p>1.7 Carry out eight the following checks prior to initial start-up:</p> <ul style="list-style-type: none"> <li>• electrostatic precautions are used when handling sensitive components and circuit boards</li> <li>• check for damage to pipework/wiring/equipment following the installation</li> <li>• the equipment has been installed and secured in position according to specification</li> <li>• all utilities are connected and operative</li> <li>• all connections have been made correctly (mechanical, electrical, fluid power, PLC)</li> <li>• all input and output devices are connected and operative</li> <li>• communications links are ready for start-up</li> <li>• all wiring/cables/pipework are clear of moving parts</li> <li>• labels, safety and warning signs are attached in the correct locations</li> <li>• all guards, fences and safety systems are in position and operable</li> </ul>
		<p>1.8 Use all of the following commissioning techniques, methods and procedures:</p> <ul style="list-style-type: none"> <li>• carry out start-up procedures, and confirm that the equipment/system meets specifications</li> <li>• run the equipment at reduced power/speed/flow</li> <li>• check for leaks during operations</li> <li>• make sensory checks (sight, sound, smell, touch)</li> <li>• run through the operating sequence, and check for correct functioning</li> </ul>

		<ul style="list-style-type: none"> <li>• load the system incrementally, and make any necessary adjustments to settings to achieve the specification parameters (such as timing, sequence)</li> <li>• conduct a trial run of the equipment at full power/speed/flow</li> <li>• monitor and record measurements and observations</li> <li>• shut down/isolate equipment/installations to a safe condition</li> </ul>
	1.9	<p>During commissioning, carry out seven of the following programming activities:</p> <ul style="list-style-type: none"> <li>• select and use appropriate programming devices (such as terminals, hand-held programmers, PCs)</li> <li>• programme by computer-based authoring (to include subroutines)</li> <li>• use ladder logic, statement lists, or system flowcharts</li> <li>• produce back-ups of completed programs</li> <li>• edit, enter and remove contacts from lines of logic</li> <li>• carry out on-line monitoring of programs</li> <li>• use 'on-' and 'off-line' programming</li> <li>• use single-step mode of operation</li> <li>• load, read and save programs</li> <li>• alter counter and timer settings</li> <li>• force contacts on and off</li> </ul>
	1.10	<p>Use three of the following instruments/devices during the commissioning activities:</p> <ul style="list-style-type: none"> <li>• multimeter</li> <li>• watt meter</li> <li>• voltmeter</li> <li>• programming devices</li> <li>• ammeter</li> <li>• insulation resistance tester</li> <li>• signal generator</li> <li>• earth-loop impedance tester</li> <li>• monitoring devices</li> <li>• other specific test equipment</li> </ul>
	1.11	<p>Deal with two of the following conditions during the commissioning process:</p> <ul style="list-style-type: none"> <li>• installations with no faults</li> <li>• partial equipment/programme malfunction</li> <li>• complete malfunction of equipment/programme</li> </ul>
	1.12	<p>Deal, in one of the following ways, with installations that do not meet specification requirements: Either: for equipment being controlled by the process controller, produce a report of the commissioning activities that includes all of the following:</p> <ul style="list-style-type: none"> <li>• checks and tests undertaken</li> <li>• where the installation fails to meet the specification requirements</li> <li>• probable causes/sources of the defect</li> <li>• recommended actions to correct the fault</li> </ul>

		<p>Or: for faults in the process controller or associated peripheral equipment, rectify the faults as part of the commissioning process, to include carrying out all of the following:</p> <ul style="list-style-type: none"> <li>• identifying the source of the fault, using appropriate fault finding techniques and/or diagnostic aids</li> <li>• isolating and dismantling the equipment to unit, sub-assembly or component level</li> <li>• replacing damaged or defective items</li> <li>• re-running the commissioning checks to confirm correct operation is now achieved</li> </ul> <p>Or: for faults in the process controller programme, rectify the faults as part of the commissioning process, to include carrying out all of the following:</p> <ul style="list-style-type: none"> <li>• rewriting or editing the programme to correct the fault</li> <li>• re-running the commissioning checks and programme to confirm that correct operation is now achieved</li> </ul>
		1.13 Deal promptly and effectively with problems within their control and report those that cannot be solved
		1.14 Check that the configuration is complete and that the equipment operates to specification
		1.15 Check that the commissioned equipment complies with two of the following standards: <ul style="list-style-type: none"> <li>• equipment manufacturer's operating spec/range</li> <li>• BS7671/IEE wiring regulations</li> <li>• BS and/or ISO standards</li> <li>• health, safety and environmental requirements</li> <li>• customer standards and requirements</li> <li>• company standards and procedures</li> </ul>
		1.16 Complete all relevant documentation accurately and legibly
		1.17 Complete the relevant paperwork, to include one of the following, and pass it to the appropriate people: <ul style="list-style-type: none"> <li>• corrective action report</li> <li>• commissioning log/report</li> <li>• job sheet</li> <li>• customer specific documentation</li> <li>• handover report</li> </ul>
2.	Know how to Commission Process Controller Equipment and Systems	2.1 Explain the specific safety practices and procedures that they need to observe when commissioning PLC equipment (including any specific legislation, regulations or codes of practice for the activities, equipment or materials)
		2.2 Explain the procedures to be carried out before starting work on the commissioning activities (such as obtaining permits to work, obtaining and complying with risk assessments and other health and safety requirements)
		2.3 Explain the specific health and safety precautions to be applied during the commissioning procedure, and their effects on others
		2.4 Describe the hazards associated with carrying out commissioning activities on PLC equipment (such as unexpected programme operation, out of sequence operations), and explain how to minimise them
		2.5 Explain the importance of wearing personal protective equipment (PPE) during the commissioning process, and where it can be obtained



	2.6	Explain how to obtain and interpret drawings, specifications, manufacturers' manuals and instructions (including BS and ISO schematics, BS7671/IEE regulations, symbols and terminology)
	2.7	Explain how to carry out currency/issue checks on the specifications they are working with
	2.8	Explain the procedures to be applied during the commissioning activity
	2.9	Describe the equipment to be commissioned, its operating procedures and function
	2.10	Explain the procedures for using computer-based authoring software for design and development
	2.11	Explain the numbering system and codes used for identification inputs and outputs
	2.12	Explain the programming techniques and codes used (interlocking, timers, counters, sub-routines, etc)
	2.13	Explain the techniques involved in editing, entering and removing contacts from lines of logic and, where applicable, the procedure to be followed for 'on-' and 'off-line' programming
	2.14	Explain what checks need to be carried out on the equipment/circuit prior to undertaking the commissioning operations (such as installation damage, I/O function, electrical connections, components are free from moving parts, all guards and safety devices are in place)
	2.15	Explain how to make adjustments to components/assemblies to ensure that they function correctly (such as timing, sequencing)
	2.16	Describe the fault diagnostic techniques that can be used to help identify problems with the equipment
	2.17	Describe the uses of measuring/test equipment, such as multimeters, signal generators, and other measuring devices or monitoring devices
	2.18	Describe the calibration/care and control procedures for the tools and equipment used during commissioning
	2.19	Explain the procedure for obtaining replacement parts, materials and other consumables necessary for the commissioning
	2.20	Describe the methods and techniques used to dismantle equipment in order to replace defective components (such as isolation procedure, forcing contacts on and off, proofmarking of components, removal of components by de-soldering)
	2.21	Explain how to re-assemble the removed components and, where necessary, how to adjust them to meet the operating specification
	2.22	Explain what recording and/or reporting documentation needs to be completed for the activities undertaken
	2.23	Describe the types of problem associated with the commissioning activity, and explain how they can be overcome
	2.24	Describe the organisational procedures to be adopted for the safe disposal of waste of all types of materials
	2.25	Describe the extent of their own authority, and explain whom they should report to if they have a problem that they cannot resolve



Level 3 Unit – Carrying Out Fault Diagnosis on Lift Installations

## Unit aim

This unit covers the skills and knowledge needed to prove the competences required to carry out fault diagnosis on lift installations, in accordance with approved procedures. The learner will be required to diagnose faults on a lift involving two or more of the following interactive technologies: mechanical, electrical, fluid power or electronics, both at assembly and sub-assembly/component level. The learner will be expected to use a variety of fault diagnosis methods and techniques, and to utilise a number of diagnostic aids and equipment. From the evidence gained, the learner will be expected to identify the fault and its probable cause, and to suggest suitable action to remedy the problem.

## Unit introduction

The learner's responsibilities will require them to comply with organisational policy and procedures for the fault diagnostic activities undertaken, and to report any problems with these activities, or the tools and equipment used that they cannot personally resolve, or are outside their permitted authority, to the relevant people. The learner will be expected to work with a minimum of supervision, taking personal responsibility for their own actions and for the quality and accuracy of the work that they carry out.

The learner's knowledge will provide a good understanding of their work and will provide an informed approach to applying fault diagnosis procedures on lift equipment. The learner will understand the various fault diagnosis methods and techniques used, and their application. The learner will know how to apply and interpret information obtained from diagnostic aids and equipment, in adequate depth to provide a sound basis for carrying out the activities, identifying faults or conditions that are outside the acceptable specification. The learner will know about the interaction of the other associated integrated technologies and will have adequate knowledge to carry out effective fault diagnosis of the lift installation.

The learner will understand the safety precautions required when carrying out the fault diagnosis activities, especially those for isolating the equipment. The learner will be required to demonstrate safe working practices throughout and will understand their responsibility for taking the necessary safeguards to protect themselves and others in the workplace.

## Assessment

To achieve this unit, the learner needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit through a variety of assessment methods appropriate to the delivery environment.

<b>Unit Reference Number</b>		F/601/0573
<b>Qualification Framework</b>		RQF
<b>Title</b>		Carrying Out Fault Diagnosis on Lift Installations
<b>Unit Level</b>		Level 3
<b>Guided Learning Hours</b>		60
<b>Unit Credit Value</b>		50
<b>Unit Grading Structure</b>		Pass / Fail

<b>Learning outcomes - the learner will...</b>		<b>Assessment criteria - the learner can...</b>	
1.	Carry Out Fault Diagnosis on Lift Installations	1.1	Work safely at all times, complying with health and safety and other relevant regulations and guidelines
		1.2	Carry out all of the following during the fault diagnostic activities: <ul style="list-style-type: none"> <li>• plan the fault diagnosis to cause minimum disruption to normal working</li> <li>• use the correct issue of company and/or manufacturers' drawings and installation documentation</li> <li>• adhere to risk assessment, COSHH and other relevant safety standards</li> <li>• ensure the safe isolation of the equipment (such as mechanical, electricity, or fluids)</li> <li>• ensure safe access and working arrangements for the installation area</li> <li>• carry out the fault diagnostic activities using approved techniques and procedures</li> <li>• identify the fault and determine appropriate corrective action</li> <li>• dispose of waste items in safe and environmentally acceptable manner, and leave the work area in a safe condition</li> </ul>
		1.3	Carry out fault diagnosis on three of the following aspects of the lift system: <ul style="list-style-type: none"> <li>• mechanical</li> <li>• fluid power</li> <li>• electrical</li> <li>• electronic</li> </ul>
		1.4	Review and use all relevant information on the symptoms and problems associated with the products or assets
		1.5	Collect evidence regarding the fault from two of the following sources: <ul style="list-style-type: none"> <li>• monitoring equipment</li> <li>• sensory input (such as sight, sound, smell, touch)</li> <li>• recording devices</li> <li>• operation of the equipment</li> </ul>
		1.6	Find faults that have resulted in two of the following: <ul style="list-style-type: none"> <li>• intermittent problem</li> <li>• partial failure/out-of-specification operation</li> </ul>

		<ul style="list-style-type: none"> <li>complete malfunction</li> </ul>
		1.7 Select, use and apply diagnostic techniques, tools and aids to locate faults
		1.8 Use a range of fault diagnostic techniques, to include: <ul style="list-style-type: none"> <li>half-split technique</li> </ul> Plus two more from the following: <ul style="list-style-type: none"> <li>emergent problem sequence</li> <li>six point technique</li> <li>unit substitution</li> <li>function testing</li> <li>injection and sampling</li> <li>input/output technique</li> </ul>
		1.9 Use a variety of diagnostic aids and equipment, to include two of the following: <ul style="list-style-type: none"> <li>manufacturer's manual</li> <li>algorithms</li> <li>probability charts/reports</li> <li>equipment self-diagnostics</li> <li>circuit diagrams/specifications</li> <li>logic diagrams</li> <li>flow charts</li> <li>fault analysis charts (such as fault trees)</li> <li>troubleshooting guides</li> </ul>
		1.10 Use two of the following types of test equipment to help in the fault diagnosis: <ul style="list-style-type: none"> <li>mechanical measuring equipment (such as measuring instruments, dial test indicators, torque instruments)</li> <li>electrical/electronic measuring instruments (such as multimeters, logic probes, special test instruments)</li> <li>fluid power test equipment (such as test rigs, flow meters, pressure gauges)</li> </ul>
		1.11 Investigate and establish the most likely causes of the faults
		1.12 Complete the fault diagnosis within the agreed time and inform the appropriate people when this cannot be achieved
		1.13 Determine the implications of the fault for other work and for safety considerations
		1.14 Use the evidence gained to draw valid conclusions about the nature and probable cause of the fault
		1.15 Record details on the extent and location of the faults in an appropriate format
		1.16 Provide a record of the outcome of the fault diagnosis, using one of the following: <ul style="list-style-type: none"> <li>step-by-step analytical report</li> <li>corrective action report</li> <li>company-specific reporting procedure</li> </ul>
2.	Know how to Carry Out Fault Diagnosis on Lift Installations	2.1 Explain the health and safety requirements of the area in which they are carrying out the fault diagnosis activities
		2.2 Explain the specific safety precautions to be taken when carrying out the fault diagnosis of lift equipment

	2.3	Describe the isolation and lock-off procedures or permit-to-work procedure that applies
	2.4	Explain the importance of wearing protective clothing and other appropriate safety equipment during the fault diagnosis process; the type of equipment to be used, and where to obtain it
	2.5	Describe the hazards associated with carrying out fault diagnosis on lifts (such as handling oils/greases, stored pressure/force, electrical contact, process controller interface, using faulty or damaged tools and equipment, using practices/procedures that do not follow laid-down procedures), and explain how they can be minimised
	2.6	Explain 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, and methods of first aid resuscitation)
	2.7	Explain where to obtain, and how to interpret, drawings, circuit diagrams, specifications, manufacturers' manuals and other documents needed in the fault diagnosis activities
	2.8	Describe the various fault finding techniques that can be used, and how they are applied (such as half-split, input/output, emergent problem sequence, six point technique, function testing, unit substitution, injection and sampling techniques and equipment self-diagnostics)
	2.9	Explain how to evaluate the various types of information available for fault diagnosis (such as reports, monitoring equipment, sensory inputs, installation records, and operation of the lift)
	2.10	Explain how to evaluate sensory information (from sight, sound, smell, touch)
	2.11	Explain the procedures to be followed for investigating faults, and how to deal with intermittent conditions
	2.12	Explain how to use the various aids and reports available for fault diagnosis
	2.13	Describe the type of equipment that can be used to aid fault diagnosis (such as mechanical measuring instruments, electrical measuring instruments, test rigs and pressure and flow devices), how to check it is calibrated or configured correctly for the intended use and that it is free from damage and defects
	2.14	Explain how to analyse and evaluate possible characteristics and causes of specific faults/problems
	2.15	Explain how to relate previous reports/records of similar fault conditions
	2.16	Explain how to evaluate the likely risk of running the equipment with the displayed fault, and the effects the fault could have on the overall operation
	2.17	Explain how to prepare a report which complies with the company policy on fault diagnosis
	2.18	Describe the extent of their own responsibility, and explain whom they should report to if they have problems that they cannot resolve



Level 3 Unit – Measuring and Setting Out Lift Installations



## Unit aim

This unit covers the skills and knowledge needed to prove the competences required to measure and set out the lift well and machine room/space for the subsequent installation of lift equipment, in accordance with approved procedures. The learner will be required to measure and set out for new or reconstructed traction or hydraulic lift equipment.

This will require the learner to assess the site for the proposed installation, and to make the necessary arrangements to have the required tools and equipment, so that the measuring and setting out can be carried out safely and efficiently. The learner will be required to plumb, measure, check and set out a number of lift well features, including 'plumbing' the lift well to establish vertical references, measuring and recording lift well dimensions, accurately marking datum lines with plumb lines, marking the car guide centre line and guides, marking the positions of ancillary components, checking that there are safe and adequate running clearances, and that the lift can be installed to the design and specification.

The learner will also be required to measure and set out a number of machine room space features, including overall machine room/space dimensions, projecting and marking the car/counterweight guide centre lines to the machine room/space, marking the line of the driving sheave and diverting pulley, marking the position of the supporting steels, marking the rope/chain pick up points, marking the position of the machine room/space components, and confirming that the equipment will be able to be installed safely.

The learner will be required to select the appropriate tools and equipment to use, based on the measuring and setting out operations to be carried out. The learner will be expected to use appropriate tools and techniques to measure and set out the lift well and machine room/space to meet the required specification. The measuring and setting out activities will include making all necessary checks and adjustments to ensure that the lift features and components will be correctly positioned and aligned, and have appropriate working clearances, in-order that the installation will meet the required specification.

## Unit introduction

The learner's responsibilities will require them to comply with organisational policy and procedures for the measuring and setting out activities undertaken, and to report any problems with the activities, tools or equipment used that they cannot personally resolve, or are outside their permitted authority, to the relevant people. The learner must ensure that all tools, equipment and materials used are removed from the work area on completion of the work, and that all necessary job/task documentation is completed accurately and legibly.

The learner will be expected to work with minimal supervision, taking personal responsibility for their own actions and for the quality and accuracy of the work that they carry out. The measuring and setting out activity may be carried out as a team effort, but the learner must be able to demonstrate a significant personal contribution to the activities, in order to satisfy the requirements of the standard. Competence in all the areas required by the standard must be demonstrated.

The learner's knowledge will provide a good understanding of their work and will provide an informed approach to applying measuring and setting out techniques and procedures to lift well and machine rooms/space. The learner will know about the equipment being installed, its installation requirements, the correct function of the equipment and associated measuring and setting out problems, in adequate depth to provide a sound basis for carrying out the measuring and setting out activities safely and effectively. The learner will also understand the installation methods and procedures used, and their applications in sufficient depth to be able to carry out the measuring and setting out activities, identify and resolve any problems, and ensure that the measuring and setting out meets the specification.

The learner will understand the safety precautions required when carrying out the measuring and setting out activities, especially those safeguards to protect themselves and others in the workplace. The learner will be required to demonstrate safe working practices throughout.

## Assessment

To achieve this unit, the learner needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit through a variety of assessment methods appropriate to the delivery environment.

<b>Unit Reference Number</b>		J/601/0574
<b>Qualification Framework</b>		RQF
<b>Title</b>		Measuring and Setting Out Lift Installations
<b>Unit Level</b>		Level 3
<b>Guided Learning Hours</b>		63
<b>Unit Credit Value</b>		23
<b>Unit Grading Structure</b>		Pass / Fail

<b>Learning outcomes - the learner will...</b>		<b>Assessment criteria - the learner can...</b>	
1.	Measure and Setting Out Lift Installations	1.1	Work safely at all times, complying with health and safety and other relevant regulations and guidelines
		1.2	Carry out all of the following activities during the measuring and setting out activity: <ul style="list-style-type: none"> <li>• use the correct general arrangement drawings</li> <li>• use the correct contractual drawings</li> <li>• interpret dimensions accurately</li> <li>• check that tools to be used are within their calibration dates</li> <li>• relay the site instructions to management</li> <li>• reconcile any site difficulties</li> <li>• establish the final positions of the lift shaft and lift motor equipment</li> </ul>
		1.3	Obtain and use the correct information for marking out
		1.4	Obtain the appropriate marking out equipment and check that it is in a usable condition
		1.5	Use four of the following when measuring and setting out lift installations: <ul style="list-style-type: none"> <li>• plumb lines</li> <li>• rule/tapes</li> <li>• engineer's level</li> <li>• carpenter's level</li> <li>• engineer's square</li> <li>• laser equipment</li> </ul>
		1.6	Prepare suitable datums and marking out surfaces
		1.7	Mark out using appropriate methods
		1.8	Plumb, measure and set out all of the following lift well features: <ul style="list-style-type: none"> <li>• 'plumb' the lift well to establish vertical references</li> <li>• measure and record the lift well dimensions</li> <li>• accurately mark datum lines with plumb lines</li> <li>• ensure safe and adequate running clearances</li> </ul>

		<ul style="list-style-type: none"> <li>• establish and mark the car guide centre line</li> <li>• establish and mark the positions of lift car guides</li> <li>• mark out the routes of all trunking and conduit within the well</li> <li>• mark out positions of ancillary components (such as buffers, landing frame, switches, push boxes, indicators)</li> <li>• check that the lift can be installed to the design and specification</li> </ul>
		1.9 Measure and set out the lift machine room/space, to include all the following: <ul style="list-style-type: none"> <li>• measure the machine room/space dimensions</li> <li>• confirm that equipment can be installed safely</li> <li>• using plumb lines, project and mark the car/counterweight guide centre lines up to the machine room/space</li> <li>• mark the line of the driving sheave and diverting pulley</li> <li>• mark the position of the supporting steels</li> <li>• mark the rope/chain pick up points (where appropriate)</li> <li>• mark the position of the lifting machine, motor generator, floor selector, overspeed governor and controller</li> </ul>
		1.10 Check that the marking out complies with the specification to include two of the following: <ul style="list-style-type: none"> <li>• British Standards including BS EN 81</li> <li>• BS 7255 (code of practice)</li> <li>• customer standards and requirements</li> <li>• company standards and procedures</li> </ul>
		1.11 Deal promptly and effectively with problems within their control and report those that cannot be resolved
		1.12 Complete the relevant paperwork, to include one of the following, and pass it to the appropriate people: <ul style="list-style-type: none"> <li>• installation records</li> <li>• job card</li> <li>• company specific documentation</li> </ul>
2.	Know how to Measure and Setting Out Lift Installations	2.1 Explain the specific safety practices and procedures that they need to observe when measuring and setting out lift installations (including any specific legislation, regulations or codes of practice for the activities, equipment or materials)
		2.2 Explain the procedures to be carried out before starting the measuring and setting out (such as obtaining permits to work, obtaining and complying with risk assessments and other health and safety requirements)
		2.3 Explain the health and safety requirements of the work area where they are carrying out the measuring and setting out activities, and the responsibility these requirements place on them
		2.4 Describe the hazards associated with measuring and setting out lift installations, and with the tools and equipment used, and explain how they can be minimised
		2.5 Explain what personal protective equipment (PPE) they need to use for the measuring and setting out activities, and where it can be obtained
		2.6 Explain how to interpret the drawings, standards, quality control procedures and specifications used for the installation (including BS and ISO schematics, symbols and terminology)
		2.7 Explain how to carry out currency/issue checks on the specifications they are working with

	2.8	Explain the importance of working to the correct specifications when measuring and setting out the lift well and machine room/space
	2.9	Explain what preparations need to be carried out on the lift well and machine room/space prior to the measuring and setting out
	2.10	Describe the lift equipment to be installed, its operating procedures and function
	2.11	Describe the features that have to be marked out in the lift well and machine room/space (including ancillary components)
	2.12	Explain the procedures for ensuring that they have the correct equipment for the measuring and setting out activities
	2.13	Describe the types of equipment used to measure and set out the lift well and machine room/space (such as plumb lines, rules/tapes, engineer's and carpenter's levels, engineer's square and laser devices)
	2.14	Describe the methods and techniques used to measure and set out the lift well and machine room/space
	2.15	Explain how to set up and correctly use plumb lines to establish datum lines
	2.16	Explain the importance of taking measurements in three planes (front to back, side to side, and top to bottom) when making sure the lift well will accommodate the lift
	2.17	Describe the points in the lift well where dimensions should be taken (such as at every floor level, and where there are deviations or projections)
	2.18	Describe the calibration/care and control procedures for the tools and equipment used during the measuring and setting activities
	2.19	Describe the problems that can occur with measuring and setting out the lift well and machine room/space, and explain how these can be overcome
	2.20	Explain what recording documentation needs to be completed for the measuring and setting out activities undertaken
	2.21	Describe the organisational procedures to be adopted for the safe disposal of waste of all types of materials
	2.22	Describe the extent of their own authority, and explain whom they should report to if they have a problem that they cannot resolve



Level 3 Unit – Installing Lift Well and Ancillary Equipment

## Unit aim

This unit covers the skills and knowledge needed to prove the competences required to install lift well and ancillary equipment, in accordance with approved procedures. This will require the learner to assess the site for the proposed installation, and to make the necessary arrangements to have the required lifting and handling equipment, installation tools and any specified components and site services available, so that the installation can be carried out safely and efficiently. The learner will be required to install a range of lift well and ancillary components, such as guide brackets, safety gear, car frame, guide shoes/rollers, isolation and multiplying pulleys, counterweight structure, filler weights, car enclosure panels, landing push boxes, indicator panels, buffers, well switches and cams, floor selector devices and decorative finishes.

This unit does not involve maintenance/repair type activities, such as removal and replacement of existing equipment.

The learner will be required to select the appropriate tools and equipment to use, based on the operations to be performed and the equipment and components to be worked on during the installation. The learner will be expected to use appropriate tools and techniques to position, level and align the equipment, and to make all necessary connections, to the required specification. The installation activities will include making all necessary checks and adjustments, to ensure that the components are correctly positioned and aligned, have appropriate working clearances, are tightened to the correct torque, and that the installation meets the required specification.

## Unit introduction

The learner's responsibilities will require them to comply with organisational policy and procedures for the installation activities undertaken, and to report any problems with the activities, tools or equipment used that they cannot personally resolve, or are outside their permitted authority, to the relevant people. The learner must ensure that all tools, equipment and materials used in the installation activities are removed from the work area on completion of the work, and that all necessary job/task documentation is completed accurately and legibly.



The learner will be expected to work with a minimum of supervision, taking personal responsibility for their own actions and for the quality and accuracy of the work that they carry out. The installation activity may be carried out as a team effort, but the learner must be able to demonstrate a significant personal contribution to the installation activities, in order to satisfy the requirements of the standard. Competence in all the areas required by the standard must be demonstrated.

The learner's knowledge will provide a good understanding of their work and will provide an informed approach to applying installation procedures for lift well and ancillary equipment. The learner will know about the equipment being installed, its installation requirements, the correct function of the equipment and any associated problems, in adequate depth to provide a sound basis for carrying out the installation process safely and effectively. The learner will also understand the installation methods and procedures used, and their application, in sufficient depth to be able to carry out the installation activities, identify and resolve any installation problems, and ensure that the installed equipment meets the specification.

The learner will understand the safety precautions required when carrying out the installation activities, especially those for ensuring the safe isolation of services. The learner will be required to demonstrate safe working practices throughout, taking the necessary safeguards to protect themselves and others in the workplace.

## Assessment

To achieve this unit, the learner needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit through a variety of assessment methods appropriate to the delivery environment.

<b>Unit Reference Number</b>		L/601/0575
<b>Qualification Framework</b>		RQF
<b>Title</b>		Installing Lift Well and Ancillary Equipment
<b>Unit Level</b>		Level 3
<b>Guided Learning Hours</b>		84
<b>Unit Credit Value</b>		25
<b>Unit Grading Structure</b>		Pass / Fail

<b>Learning outcomes - the learner will...</b>		<b>Assessment criteria - the learner can...</b>	
1.	Install Lift Well and Ancillary Equipment	1.1	Work safely at all times, complying with health and safety and other relevant regulations and guidelines
		1.2	Carry out all of the following during the installation activities: <ul style="list-style-type: none"> <li>• plan the installation activities to minimise disruption to normal working</li> <li>• ensure that they have the correct installation documentation (such as drawings, instructions, manufacturer's data, settings and other documentation)</li> <li>• adhere to risk assessment, COSHH and other relevant safety standards</li> <li>• obtain clearance to carry out the installation activities</li> <li>• ensure that electrical supplies have been isolated</li> <li>• ensure safe access and working arrangements for the installation area</li> <li>• carry out the installation activities using appropriate techniques and procedures</li> <li>• dispose of waste items in a safe and environmentally acceptable manner</li> <li>• leave the work area in a safe condition and free from foreign object debris</li> </ul>
		1.3	Confirm that all of the following conditions have been met, prior to installing the lift equipment: <ul style="list-style-type: none"> <li>• the site is suitably prepared for the installation to take place</li> <li>• appropriate utilities are available (such as gas, water, air, electricity)</li> <li>• the site is accessible, and free from obstructions or hazards</li> <li>• any required installation consumables are available</li> <li>• safety and environmental conditions can be met</li> </ul>
		1.4	Follow all relevant drawings and specifications for the installation being carried out
		1.5	Use the correct tools and equipment for the installation operations and check that they are in a safe and usable condition
		1.6	Move and position equipment, using two of the following: <ul style="list-style-type: none"> <li>• slings</li> </ul>

		<ul style="list-style-type: none"> <li>• portable lifting equipment</li> <li>• block and tackle</li> <li>• manual handling</li> </ul>
	1.7	<p>Use two of the following instruments/devices during the installation activities:</p> <ul style="list-style-type: none"> <li>• straight edges</li> <li>• engineer's levels</li> <li>• mechanical measuring instruments/devices</li> <li>• electrical measuring instruments</li> <li>• laser equipment</li> <li>• self-diagnosis equipment</li> </ul>
	1.8	Install, position and secure the equipment and components in accordance with the specification
	1.9	<p>Install twelve of the following types of lift well components and ancillary equipment:</p> <ul style="list-style-type: none"> <li>• guide brackets</li> <li>• car frame</li> <li>• safety gear</li> <li>• guide shoes/rollers</li> <li>• filler weights</li> <li>• landing push boxes</li> <li>• indicator panels</li> <li>• buffers</li> <li>• well switches and cams</li> <li>• floor selector devices</li> <li>• decorative finishes</li> <li>• isolation and multiplying pulleys</li> <li>• conduit or trunking</li> <li>• cables and wires</li> <li>• counterweight structure and shoes/rollers</li> <li>• car enclosure panels (such as roof, sides and back)</li> </ul>
	1.10	<p>Apply the correct installation methods and techniques for nine of the following:</p> <ul style="list-style-type: none"> <li>• drilling and hole preparation</li> <li>• positioning and securing equipment</li> <li>• aligning of equipment</li> <li>• levelling of equipment</li> <li>• shimming and packing</li> <li>• lifting and supporting</li> <li>• removing protective coatings and burrs</li> <li>• dressing guide joints</li> <li>• connecting electrical wires and cables</li> <li>• securing by using mechanical fixings</li> </ul>

			<ul style="list-style-type: none"> <li>• securing by using masonry fixings</li> <li>• applying screw fastening locking devices</li> </ul>
		1.11	<p>Carry out the necessary checks, and adjust/rectify where appropriate, to include all of the following:</p> <ul style="list-style-type: none"> <li>• working clearance is correct</li> <li>• fluid/oil reservoirs are at an appropriate level</li> <li>• making 'off-load' checks</li> <li>• level and alignment are correct</li> <li>• electrical wiring is encased and secure</li> <li>• electrical continuity is achieved</li> <li>• visual (for completeness and freedom from damage)</li> <li>• other sensory checks (sound, smell, touch)</li> <li>• moving parts are clear of obstruction and guarded</li> <li>• torque setting of fasteners is correct</li> <li>• locking devices are fitted to fasteners (if appropriate)</li> </ul>
		1.12	Check that all necessary connections to the equipment are complete
		1.13	<p>Produce installations which comply with two of the following:</p> <ul style="list-style-type: none"> <li>• equipment manufacturer's operating spec/range</li> <li>• BS and/or ISO standards (including BS EN 81, ISO 9000)</li> <li>• BS 7255 (code of practice)</li> <li>• the Lift Regulations</li> <li>• customer standards and requirements</li> <li>• company standards and procedures</li> </ul>
		1.14	Deal promptly and effectively with problems within their control and report those that cannot be solved
		1.15	Check that the installation is complete and that all components are free from damage
		1.16	<p>Complete the relevant paperwork, to include one of the following, and pass it to the appropriate people:</p> <ul style="list-style-type: none"> <li>• installation records</li> <li>• company specific documentation</li> <li>• job card</li> </ul>
2.	Know how to Install Lift Well and Ancillary Equipment	2.1	Explain the specific safety practices and procedures that they need to observe when installing lift well and ancillary equipment (including any specific legislation, regulations or codes of practice for the activities, equipment or materials)
		2.2	Explain 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)
		2.3	Explain the health and safety requirements of the work area where they are carrying out the installation activities, and the responsibility these requirements place on them
		2.4	Describe the hazards associated with installing lift well and ancillary equipment, and with the tools and equipment used, and how they can be minimised

	2.5	Explain what personal protective equipment (PPE) they need to use for the installation activities, and where it can be obtained
	2.6	Explain how to interpret the drawings, standards, quality control procedures and specifications used for the installation (including BS and ISO schematics, symbols and terminology)
	2.7	Explain how to carry out currency/issue checks on the specifications they are working with
	2.8	Explain what preparations need to be carried out on the equipment prior to installation
	2.9	Describe the equipment to be installed, its operating procedures and function
	2.10	Describe the various mechanical fasteners that will be used, and explain their method of installation (including threaded fasteners, special securing devices, masonry fixing devices)
	2.11	Explain the importance of applying the correct torque loading on the fasteners, and what can happen if these loadings are exceeded or not achieved
	2.12	Explain the procedures for ensuring that they have the correct tools, equipment, and fasteners for the installation activities
	2.13	Describe the types of tools and instruments used to position, secure and align the equipment (such as spanners, torque wrenches, engineer's levels and laser devices)
	2.14	Describe the techniques used to position, align, level, adjust and secure the equipment
	2.15	Describe the methods of lifting, handling and supporting the equipment during the installation activities (such as portable lifting equipment, block and tackle, slings and manual handling)
	2.16	Explain the importance of electrical bonding, why it is critical, and why it must be both mechanically and electrically secure
	2.17	Explain what electrical checks must be carried out
	2.18	Describe the procedure for the safe disposal of waste materials
	2.19	Explain how to conduct any necessary checks and adjustments to ensure the equipment integrity, accuracy and quality of the installation
	2.20	Explain how to recognise installation defects (such as leaks, poor seals, misalignment, levels, ineffective fasteners, damage, or contamination)
	2.21	Explain the importance of ensuring that the completed installation is free from dirt, damage and defects
	2.22	Describe the calibration/care and control procedures for the tools and equipment used during the installation activities
	2.23	Describe the problems that can occur with the installation operations, and explain how these can be overcome
	2.24	Explain what recording documentation needs to be completed for the activities undertaken
	2.25	Describe the organisational procedures to be adopted for the safe disposal of waste of all types of materials
	2.26	Describe the extent of their own authority, and explain whom they should report to if they have a problem that they cannot resolve



Level 3 Unit – Installing Traction Lift Equipment

## Unit aim

This unit covers the skills and knowledge needed to prove the competences required to install traction lift equipment in accordance with approved procedures. This will require the learner to assess the site for the proposed installation, and to make the necessary arrangements to have the required lifting and handling equipment, installation tools and any specified components and site services available, so that the installation can be carried out safely and efficiently. The learner will be required to install a range of traction lift equipment, such as lifting machine, traction sheave, diverting pulley, over-speed governor, controller and lift machine isolation pads.

This unit does not involve maintenance/repair type activities, such as removal and replacement of existing equipment.

The learner will be required to select the appropriate tools and equipment to use, based on the operations to be performed and the equipment and components to be worked on during the installation. The learner will be expected to use appropriate tools and techniques to position, level and align the equipment, and to make all necessary connections, to the required specification. The installation activities will include making all necessary checks and adjustments to ensure the components are correctly positioned and aligned, have appropriate working clearances and are tightened to the correct torque, and that the installation meets the required specification.

## Unit introduction

The learner's responsibilities will require them to comply with organisational policy and procedures for the installation activities undertaken, and to report any problems with the activities, tools or equipment used that they cannot personally resolve, or are outside their permitted authority, to the relevant people. The learner must ensure that all tools, equipment and materials used in the installation activities are removed from the work area on completion of the work, and that all necessary job/task documentation is completed accurately and legibly.

The learner will be expected to work with a minimum of supervision, taking personal responsibility for their own actions and for the quality and accuracy of the work that they carry out. The installation activity may be carried out as a team effort, but the learner must be able to demonstrate a significant personal contribution to the installation activities, in order to satisfy the requirements of the standard. Competence in all the areas required by the standard must be demonstrated.

The learner's knowledge will provide a good understanding of their work and will provide an informed approach to applying installation procedures for traction lift equipment. The learner will know about the equipment being installed, its installation requirements, the correct function of the equipment and any associated problems, in adequate depth to provide a sound basis for carrying out the installation process safely and effectively. The learner will also understand the installation methods and procedures used, and their application, in sufficient depth to be able to carry out the installation activities, identify and resolve any problems, and ensure that the installed equipment meets the required specification.

The learner will understand the safety precautions required when carrying out the installation activities, especially those for ensuring the safe isolation of services. The learner will be required to demonstrate safe working practices throughout and will understand their responsibility for taking the necessary safeguards to protect themselves and others in the workplace.

## Assessment

To achieve this unit, the learner needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit through a variety of assessment methods appropriate to the delivery environment.



<b>Unit Reference Number</b>		R/601/0576
<b>Qualification Framework</b>		RQF
<b>Title</b>		Installing Traction Lift Equipment
<b>Unit Level</b>		Level 3
<b>Guided Learning Hours</b>		84
<b>Unit Credit Value</b>		25
<b>Unit Grading Structure</b>		Pass / Fail

<b>Learning outcomes - the learner will...</b>		<b>Assessment criteria - the learner can...</b>	
1.	Install Traction Lift Equipment	1.1	Work safely at all times, complying with health and safety and other relevant regulations and guidelines
		1.2	Carry out all of the following during the installation activities: <ul style="list-style-type: none"> <li>• plan the installation activities to minimise disruption to normal working</li> <li>• ensure that they have the correct installation documentation (such as, drawings, instructions, manufacturer's data, settings and other documentation)</li> <li>• adhere to risk assessment, COSHH and other relevant safety standards</li> <li>• obtain clearance to carry out the installation activities</li> <li>• ensure that electrical supplies have been isolated</li> <li>• ensure safe access and working arrangements for the installation area</li> <li>• carry out the installation activities using appropriate techniques and procedures</li> <li>• dispose of waste items in a safe and environmentally acceptable manner</li> <li>• leave the work area in a safe condition and free from foreign object debris</li> </ul>
		1.3	Confirm that all of the following conditions have been met, prior to installing the lift equipment: <ul style="list-style-type: none"> <li>• the site is suitably prepared for the installation to take place</li> <li>• appropriate utilities are available (such as gas, water, air, electricity)</li> <li>• the site is accessible and free from obstructions or hazards</li> <li>• any required installation consumables are available</li> <li>• safety and environmental conditions can be met</li> </ul>
		1.4	Follow all relevant drawings and specifications for the installation being carried out
		1.5	Use the correct tools and equipment for the installation operations and check that they are in a safe and usable condition
		1.6	Move and position equipment using two of the following: <ul style="list-style-type: none"> <li>• slings</li> <li>• portable lifting equipment</li> </ul>

		<ul style="list-style-type: none"> <li>• block and tackle</li> <li>• manual handling and moving of loads</li> </ul>
	1.7	<p>Use two of the following instruments/devices during the installation activities:</p> <ul style="list-style-type: none"> <li>• straight edges</li> <li>• engineer's levels</li> <li>• dial test indicators</li> <li>• mechanical measuring instruments/devices</li> <li>• electrical measuring instruments</li> <li>• self-diagnostic equipment</li> </ul>
	1.8	Install, position and secure the equipment and components in accordance with the specification
	1.9	<p>Install all of the following types of traction lift equipment:</p> <ul style="list-style-type: none"> <li>• lifting machine</li> <li>• over-speed governor</li> <li>• diverting pulley</li> <li>• traction sheave</li> <li>• lift controller equipment</li> <li>• lift machine isolation pads</li> <li>• conduit/trunking</li> <li>• cables and wires</li> </ul>
	1.10	<p>Apply the correct installation methods and techniques for nine of the following:</p> <ul style="list-style-type: none"> <li>• drilling and hole preparation</li> <li>• positioning and securing the equipment</li> <li>• aligning equipment to plumb lines and marked dimensions</li> <li>• aligning pulley with sheave and counterweight</li> <li>• plumbing with rope pick-up points</li> <li>• aligning governor with rope anchorage and tension frame</li> <li>• levelling the equipment</li> <li>• shimming and packing</li> <li>• lifting and supporting</li> <li>• protecting the installation from weather</li> <li>• connecting electrical wires and cables</li> <li>• securing by using mechanical fixings</li> <li>• applying screw fastening locking devices</li> </ul>
	1.11	<p>Carry out all necessary checks, and adjust/rectify where appropriate, to include all of the following:</p> <ul style="list-style-type: none"> <li>• working clearance is appropriate</li> <li>• correct application of oils and greases</li> <li>• making 'off-load' checks</li> <li>• level and alignment are correct</li> <li>• electrical wiring is encased and secure</li> </ul>

		<ul style="list-style-type: none"> <li>• electrical continuity is achieved</li> <li>• visual (for completeness and freedom from damage)</li> <li>• other sensory checks (sound, smell, touch)</li> <li>• moving parts are guarded and clear of obstruction</li> <li>• torque setting of fasteners is correct</li> <li>• locking devices are fitted to fasteners (where appropriate)</li> </ul>
		1.12 Check that all necessary connections to the equipment are complete
		1.13 Produce installations which comply with two of the following: <ul style="list-style-type: none"> <li>• equipment manufacturer's operating spec/range</li> <li>• BS and/or ISO standards (including BS EN 81)</li> <li>• BS 7255 (code of practice)</li> <li>• customer standards and requirements</li> <li>• company standards and procedures</li> <li>• the Lift Regulations</li> </ul>
		1.14 Deal promptly and effectively with problems within their control and report those that cannot be solved
		1.15 Check that the installation is complete and that all components are free from damage
		1.16 Complete the relevant paperwork, to include one of the following, and pass it to the appropriate people: <ul style="list-style-type: none"> <li>• installation records</li> <li>• company specific documentation</li> <li>• job card</li> </ul>
2.	Know how to Install Traction Lift Equipment	2.1 Explain the specific safety practices and procedures that they need to observe when installing traction lift equipment (including any specific legislation, regulations or codes of practice for the activities, equipment or materials)
		2.2 Explain 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)
		2.3 Explain the health and safety requirements of the work area where they are carrying out the installation activities, and the responsibility these requirements place on them
		2.4 Describe the hazards associated with installing traction lift equipment, and with the tools and equipment used, and explain how they can be minimised
		2.5 Explain what personal protective equipment (PPE) they need to use for the installation activities, and where it can be obtained
		2.6 Explain how to interpret the drawings, standards, quality control procedures and specifications used for the installation (including BS and ISO schematics, symbols and terminology)
		2.7 Explain how to carry out currency/issue checks on the specifications they are working with
		2.8 Explain what preparations need to be carried out on equipment prior to installation
		2.9 Describe the equipment to be installed, its operating procedures and function
		2.10 Describe the various mechanical fasteners that will be used, and explain their method of installation (including, threaded fasteners, special securing devices)

	2.11	Explain the importance of applying the correct torque loading on the fasteners, and what can happen if these loadings are exceeded or not achieved
	2.12	Explain the procedures for ensuring that they have the correct tools, equipment, and fasteners for the installation activities
	2.13	Describe the types of tools and instruments used to position, secure and align the equipment (such as spanners, torque wrenches, engineer's levels)
	2.14	Describe the techniques used to position, align, level, adjust and secure the equipment
	2.15	Describe the methods of lifting, handling and supporting the equipment during the installation activities (such as portable lifting equipment, block and tackle, slings and manual handling)
	2.16	Explain what electrical checks need to be carried out on the traction lift equipment
	2.17	Explain how to conduct any necessary checks and adjustments to ensure the equipment integrity, accuracy and quality of the installation (including the fitting of guards to all moving parts and covers on electrical connections)
	2.18	Explain how to recognise installation defects (such as leaks, poor seals, misalignment, ineffective fasteners, damage)
	2.19	Explain the lubrication requirements, and methods for protecting equipment from mechanical and weather damage
	2.20	Explain the importance of ensuring that the completed installation is free from dirt and damage, and that components are correctly covered/protected
	2.21	Describe the calibration/care and control procedures for the tools and equipment used during the installation activities
	2.22	Describe the problems that can occur with the installation operations, and explain how these can be overcome
	2.23	Explain what recording documentation needs to be completed for the activities undertaken
	2.24	Describe the organisational procedures to be adopted for the safe disposal of waste of all types of materials
	2.25	Describe the extent of their own authority, and explain whom they should report to if they have a problem that they cannot resolve



Level 3 Unit – Installing Lift Ropes and Chains

## Unit aim

This unit covers the skills and knowledge needed to prove the competences required to install lift ropes and chains, in accordance with approved procedures. This will require the learner to assess the site for the proposed installation, and to make the necessary arrangements to have the required lifting and handling equipment, installation tools and any specified components and site services available, so that the installation can be carried out safely and efficiently. The learner will be required to install a range of lift ropes and chains, such as suspension ropes and chains, safety ropes and chains, governor ropes and chains.

This unit does not involve maintenance/repair type activities, such as removal and replacement of existing equipment.

The learner will be required to select the appropriate tools and equipment to use, based on the operations to be performed and the equipment and components to be worked on during the installation. The learner will be expected to use appropriate tools and techniques to position, level, align and tension the equipment, and to make all necessary connections, to the required specification. The installation activities will include making all necessary checks and adjustments to ensure the components are correctly positioned and aligned, have appropriate tension or working clearances, are tightened to the correct torque, and that the installation meets the required specification.

## Unit introduction

The learner's responsibilities will require them to comply with organisational policy and procedures for the installation activities undertaken, and to report any problems with the activities, tools or equipment used that they cannot personally resolve, or are outside their permitted authority, to the relevant people. The learner must ensure that all tools, equipment and materials used in the installation activities are removed from the work area on completion of the work, and that all necessary job/task documentation is completed accurately and legibly.

The learner will be expected to work with a minimum of supervision, taking personal responsibility for their own actions and for the quality and accuracy of the work that they carry out. The installation activity may be carried out as a team effort, but the learner must be able to demonstrate a significant personal contribution to the installation activities, in order to satisfy the requirements of the standard. Competence in all the areas required by the standard must be demonstrated.

The learner's knowledge will provide a good understanding of their work and will provide an informed approach to applying installation procedures for lift ropes and chains. The learner will know about the equipment being installed, its installation requirements, the correct function of the equipment and any associated problems, in adequate depth to provide a sound basis for carrying out the installation process safely and effectively. The learner will also understand the installation methods and procedures used, and their application, in sufficient depth to be able to carry out the installation activities, identify and resolve any installation problems, and ensure that the installed equipment meets the required specification.

The learner will understand the safety precautions required when carrying out the installation activities, especially those for ensuring the safe isolation of services. The learner will be required to demonstrate safe working practices throughout and will understand their responsibility for taking the necessary safeguards to protect themselves and others in the workplace.

## Assessment

To achieve this unit, the learner needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit through a variety of assessment methods appropriate to the delivery environment.

<b>Unit Reference Number</b>		R/601/0626
<b>Qualification Framework</b>		RQF
<b>Title</b>		Installing Lift Ropes and Chains
<b>Unit Level</b>		Level 3
<b>Guided Learning Hours</b>		84
<b>Unit Credit Value</b>		25
<b>Unit Grading Structure</b>		Pass / Fail

<b>Learning outcomes - the learner will...</b>		<b>Assessment criteria - the learner can...</b>	
1.	Install Lift Ropes and Chains	1.1	Work safely at all times, complying with health and safety and other relevant regulations and guidelines
		1.2	Carry out all of the following during the installation activities: <ul style="list-style-type: none"> <li>plan the installation activities to minimise disruption to normal working</li> <li>ensure that they have the correct installation documentation (such as, drawings, instructions, manufacturer's data, settings and other documentation)</li> <li>adhere to risk assessment, COSHH and other relevant safety standards</li> <li>obtain clearance to carry out the installation activities</li> <li>ensure that electrical supplies have been isolated</li> <li>ensure safe access and working arrangements for the installation area</li> <li>carry out the installation activities, using appropriate techniques and procedures</li> <li>dispose of waste items in a safe and environmentally acceptable manner</li> <li>leave the work area in a safe condition and free from foreign object debris</li> </ul>
		1.3	Confirm that all of the following conditions have been met, prior to installing the lift ropes and chains: <ul style="list-style-type: none"> <li>the site is suitably prepared for the installation to take place</li> <li>appropriate utilities are available (such as gas, water, air, electricity)</li> <li>the site is accessible and free from obstructions or hazards</li> <li>any required installation consumables are available</li> <li>safety and environmental conditions can be met</li> </ul>
		1.4	Follow all relevant drawings and specifications for the installation being carried out
		1.5	Use the correct tools and equipment for the installation operations and check that they are in a safe and usable condition
		1.6	Move and position equipment, using two of the following: <ul style="list-style-type: none"> <li>slings</li> <li>portable lifting equipment</li> </ul>



		<ul style="list-style-type: none"> <li>• block and tackle</li> <li>• manual handling and moving of loads</li> </ul>
	1.8	Install, position and secure the equipment and components in accordance with the specification
	1.9	Install all of the following types of lift ropes and chains: <ul style="list-style-type: none"> <li>• suspension ropes</li> <li>• suspension chains</li> <li>• safety ropes</li> <li>• safety chains</li> <li>• governor ropes</li> <li>• governor chains</li> </ul>
	1.10	Apply suitable installation methods and techniques, to include all of the following: <ul style="list-style-type: none"> <li>• measuring the position of the car, counterweight or jack crosshead</li> <li>• calculating chain length (including allowances for stretching, overrun/run-by)</li> <li>• calculating rope length (including allowances for stretching, overrun/run-by)</li> <li>• cutting ropes</li> <li>• cutting chains</li> <li>• terminating ropes</li> <li>• terminating chains</li> <li>• positioning and securing ropes</li> <li>• positioning and securing chains</li> <li>• aligning and tensioning ropes</li> <li>• aligning and tensioning chains</li> <li>• lifting and supporting</li> <li>• securing using mechanical fixings</li> </ul>
	1.11	Carry out all relevant checks, and adjust/rectify where appropriate, to include all the following: <ul style="list-style-type: none"> <li>• working clearance is appropriate</li> <li>• rope tension and length are correct</li> <li>• chain tension and length are correct</li> <li>• correct application of oils and greases</li> <li>• travel limits are set</li> <li>• alignment is correct</li> <li>• visual (for completeness and freedom from damage)</li> <li>• visual (ropes are installed correctly)</li> <li>• visual (chains are installed correctly)</li> <li>• moving parts are guarded and clear of obstruction</li> <li>• torque setting of fasteners is correct (where appropriate)</li> <li>• locking devices are fitted to fasteners (where appropriate)</li> </ul>
	1.12	Check that all necessary connections to the equipment are complete

		1.13	Produce installations which comply with two of the following: <ul style="list-style-type: none"> <li>• equipment manufacturer's operating spec/range</li> <li>• British Standard BS EN 81</li> <li>• customer standards and requirements</li> <li>• company standards and procedures</li> </ul>
		1.14	Deal promptly and effectively with problems within their control and report those that cannot be solved
		1.15	Check that the installation is complete and that all components are free from damage
		1.16	Complete the relevant paperwork, to include one of the following, and pass it to the appropriate people: <ul style="list-style-type: none"> <li>• installation records</li> <li>• company specific documentation</li> <li>• job card</li> <li>• rope test certificate</li> </ul>
2.	Know how to Install Lift Ropes and Chains	2.1	Explain the specific safety practices and procedures that they need to observe when installing lift ropes and chains (including any specific legislation, regulations or codes of practice for the activities, equipment or materials)
		2.2	Explain 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)
		2.3	Explain the health and safety requirements of the work area where they are carrying out the installation activities, and the responsibility these requirements place on them
		2.4	Describe the hazards associated with installing lift ropes and chains, and with the tools and equipment used, and explain how they can be minimised
		2.5	Explain the safe use of rope/chain cutting equipment, in accordance with company and statutory legislation
		2.6	Explain what personal protective equipment (PPE) they need to use for the installation activities, and where it can be obtained
		2.7	Explain how to interpret the drawings, standards, quality control procedures and specifications used for the installation (including BS and ISO schematics, symbols and terminology)
		2.8	Explain how to carry out currency/issue checks on the specifications they are working with
		2.9	Explain what preparations need to be carried out on the various ropes and chains prior to installation
		2.10	Describe the different ropes and chains to be installed, their construction and operating parameters
		2.11	Describe the different types of rope and chain terminations used
		2.12	Explain how to calculate the correct chain/rope length (including allowances for stretching, overrun/run-by)
		2.13	Describe the measuring equipment used to ensure ropes and chains are the correct length
		2.14	Explain how the length of suspension, safety and governor ropes/chains are calculated from measurements of the relative positions of the lift car counterweight or jack/ram cross head
		2.15	Describe the various mechanical fasteners that will be used, and explain their method of installation (including, threaded fasteners, special securing devices)
		2.16	Explain the importance of applying the correct torque loading on the fasteners, and what can happen if these loadings are exceeded or not achieved

	2.17	Explain the procedures for ensuring that they have the correct tools, equipment, and fasteners for the installation activities
	2.18	Describe the types of tools and instruments used to position, secure and align the equipment (such as spanners, torque wrenches)
	2.19	Describe the techniques used to position, align, adjust, tension and secure the equipment
	2.20	Describe the methods of lifting, handling and supporting the equipment during the installation activities (such as portable lifting equipment, block and tackle, slings and manual handling)
	2.21	Explain how to conduct any necessary checks to ensure the equipment integrity, accuracy and quality of the installation
	2.22	Explain how to recognise installation defects (such as misalignment, ineffective fasteners, damage, broken strands, kinks)
	2.23	Explain the importance of ensuring that the completed installation is free from dirt and damage
	2.24	Describe the calibration/care and control procedures for the tools and equipment used during the installation activities
	2.25	Describe the problems that can occur with the installation operations, and explain how these can be overcome
	2.26	Explain what recording documentation needs to be completed for the activities undertaken
	2.27	Describe the organisational procedures to be adopted for the safe disposal of waste of all types of materials
	2.28	Describe the extent of their own authority, and explain whom they should report to if they have a problem that they cannot resolve



## Level 3 Unit – Installing Lift Doors, Frames and Ancillary Components

## Unit aim

This unit covers the skills and knowledge needed to prove the competences required to install lift doors and frames, and ancillary components, in accordance with approved procedures. This will require the learner to assess the site for the proposed installation, and to make the necessary arrangements to have the required lifting and handling equipment, installation tools and any specified components and site services available, so that the installation can be carried out safely and efficiently. The learner will be required to install a range of lift doors, frames and ancillary components, such as power operated doors, manual doors, collapsible gates, bi-parting doors, shutter gates, landing door frame, lift car door frame, landing sill, locks and rollers, door hangers, fire trim and architraves, door operators and safety devices, coupler/skate and door guide shoes. This unit does not involve maintenance/repair type activities, such as removal and replacement of existing equipment.

The learner will be required to select the appropriate tools and equipment to use, based on the operations to be performed and the equipment and components to be worked on during the installation. The learner will be expected to use appropriate tools and techniques to position, level and align the equipment, and to make all necessary connections, to the required specification. The installation activities will include making all necessary checks and adjustments to ensure the components are correctly positioned and aligned, have appropriate tension or working clearances, are tightened to the correct torque, and that the installation meets the required specification.

## Unit introduction

The learner's responsibilities will require them to comply with organisational policy and procedures for the installation activities undertaken, and to report any problems with the activities, tools or equipment used that they cannot personally resolve, or are outside their permitted authority, to the relevant people. The learner must ensure that all tools, equipment and materials used in the installation activities are removed from the work area on completion of the work, and that all necessary job/task documentation is completed accurately and legibly.

The learner will be expected to work with a minimum of supervision, taking personal responsibility for their own actions and for the quality and accuracy of the work that they carry out. The installation activity may be carried out as a team effort, but the learner must be able to demonstrate a significant personal contribution to the installation activities, in order to satisfy the requirements of the standard. Competence in all the areas required by the standard must be demonstrated.

The learner's knowledge will provide a good understanding of their work and will provide an informed approach to applying installation procedures. The learner will know about the equipment being installed, its installation requirements, its correct function and any associated problems, in adequate depth to provide a sound basis for carrying out the installation process safely and effectively.

The learner will also understand the installation methods and procedures used, and their application, in sufficient depth to be able to carry out the installation activities, identify and resolve any installation problems, and to ensure that the installed equipment meets the required specification.

The learner will understand the safety precautions required when carrying out the installation activities, especially those for ensuring the safe isolation of services. The learner will be required to demonstrate safe working practices throughout and will understand their responsibility for taking the necessary safeguards to protect themselves and others in the workplace.

## Assessment

To achieve this unit, the learner needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit through a variety of assessment methods appropriate to the delivery environment.

<b>Unit Reference Number</b>		Y/601/0627
<b>Qualification Framework</b>		RQF
<b>Title</b>		Installing Lift Doors, Frames and Ancillary Components
<b>Unit Level</b>		Level 3
<b>Guided Learning Hours</b>		84
<b>Unit Credit Value</b>		25
<b>Unit Grading Structure</b>		Pass / Fail

<b>Learning outcomes - the learner will...</b>		<b>Assessment criteria - the learner can...</b>	
1.	Install Lift Doors, Frames and Ancillary Components	1.1	Work safely at all times, complying with health and safety and other relevant regulations and guidelines
		1.2	Carry out all of the following during the installation activities: <ul style="list-style-type: none"> <li>• plan the installation activities to minimise disruption to normal working</li> <li>• ensure that they have the correct installation documentation (such as, drawings, instructions, manufacturer's data, settings and other documentation)</li> <li>• adhere to risk assessment, COSHH and other relevant safety standards</li> <li>• obtain clearance to carry out the installation activities</li> <li>• ensure that electrical supplies have been isolated</li> <li>• ensure safe access and working arrangements for the installation area</li> <li>• carry out the installation activities, using appropriate techniques and procedures</li> <li>• dispose of waste items in a safe and environmentally acceptable manner</li> <li>• leave the work area in a safe condition and free from foreign object debris</li> </ul>
		1.3	Confirm that all of the following conditions have been met, prior to installing the lift equipment: <ul style="list-style-type: none"> <li>• the site is suitably prepared for the installation to take place</li> <li>• appropriate utilities are available (such as gas, water, air, electricity)</li> <li>• the site is accessible and free from obstructions or hazards</li> <li>• any required installation consumables are available</li> <li>• safety and environmental conditions can be met</li> </ul>
		1.4	Follow all relevant drawings and specifications for the installation being carried out
		1.5	Use the correct tools and equipment for the installation operations and check that they are in a safe and usable condition
		1.6	Use all of the following instruments/devices during the installation activities: <ul style="list-style-type: none"> <li>• straight edges</li> <li>• gap gauges</li> </ul>

		<ul style="list-style-type: none"> <li>• engineer's levels</li> <li>• mechanical measuring instruments/devices</li> <li>• electrical measuring instruments</li> </ul>
	1.7	Install, position and secure the equipment and components in accordance with the specification
	1.8	<p>Install all of the following door frames and ancillary components:</p> <ul style="list-style-type: none"> <li>• landing door frame</li> <li>• lift car door frame</li> <li>• landing sill</li> <li>• door guide shoes</li> <li>• door locks and rollers</li> <li>• door hangers</li> <li>• fire trim and architraves</li> <li>• cables and wires</li> <li>• door operators</li> <li>• door safety devices</li> <li>• coupler/skate</li> </ul>
	1.9	<p>Install all of the following types of lift door:</p> <ul style="list-style-type: none"> <li>• power operated doors</li> <li>• manual doors</li> <li>• collapsible gates</li> <li>• bi-parting doors</li> <li>• shutter gates</li> </ul>
	1.10	<p>Apply installation methods and techniques for seven of the following:</p> <ul style="list-style-type: none"> <li>• drilling and hole preparation</li> <li>• positioning and secure doors and frames</li> <li>• aligning of equipment</li> <li>• levelling of equipment</li> <li>• shimming and packing</li> <li>• lifting and supporting</li> <li>• removing protective coverings</li> <li>• connecting electrical wires and cables</li> <li>• securing by using mechanical fixings</li> <li>• applying screw fastening locking devices</li> </ul>
	1.11	<p>Carry out all relevant checks, and adjust/rectify where appropriate, to include all the following:</p> <ul style="list-style-type: none"> <li>• working clearance is suitable</li> <li>• correct application of oils and greases</li> <li>• travel limits are set</li> <li>• making 'off-load' checks</li> <li>• level and alignment are correct</li> </ul>



		<ul style="list-style-type: none"> <li>• electrical wiring is encased and secure</li> <li>• electrical continuity is achieved</li> <li>• visual (for completeness and freedom from damage)</li> <li>• other sensory checks (sound, smell, touch)</li> <li>• moving parts are guarded and clear of obstruction</li> <li>• torque setting of fasteners is correct</li> <li>• locking devices are fitted to fasteners (where appropriate)</li> </ul>
		1.12 Check that all necessary connections to the equipment are complete
		1.13 Produce installations which comply with two of the following: <ul style="list-style-type: none"> <li>• equipment manufacturer's operating spec/range</li> <li>• British Standard BS EN 81</li> <li>• customer standards and requirements</li> <li>• company standards and procedures</li> </ul>
		1.14 Deal promptly and effectively with problems within their control and report those that cannot be solved
		1.15 Check that the installation is complete and that all components are free from damage
		1.16 Complete the relevant paperwork, to include one of the following, and pass it to the appropriate people: <ul style="list-style-type: none"> <li>• installation records</li> <li>• job card</li> <li>• company specific documentation</li> </ul>
2.	Know how to Install Lift Doors, Frames and Ancillary Components	2.1 Explain the specific safety practices and procedures that they need to observe when installing lift doors, frames and ancillary components (including any specific legislation, regulations/codes of practice for the activities, equipment or materials)
		2.2 Explain 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)
		2.3 Explain the health and safety requirements of the work area where they are carrying out the installation activities, and the responsibility these requirements place on them
		2.4 Describe the hazards associated with installing lift doors and frames, and with the tools and equipment used, and explain how they can be minimised
		2.5 Explain what personal protective equipment (PPE) they need to use for the installation activities, and where it can be obtained
		2.6 Explain how to interpret the drawings, standards, quality control procedures and specifications used for the installation (including BS and ISO schematics, symbols and terminology)
		2.7 Explain how to carry out currency/issue checks on the specifications they are working with
		2.8 Explain what preparations need to be carried out on the equipment prior to installation
		2.9 Describe the equipment to be installed, its operating procedures and function
		2.10 Explain the application of the different types of door (including why they have been selected)
		2.11 Explain the different types of door operating systems

	2.12	Describe the various mechanical fasteners that will be used, and explain their method of installation (including, threaded fasteners, special securing devices)
	2.13	Explain the importance of applying the correct torque loading on the fasteners, and what can happen if these loadings are exceeded or not achieved
	2.14	Explain the procedures for ensuring that they have the correct tools, equipment, and fasteners for the installation activities
	2.15	Describe the types of tools and instruments used to position, secure and align the equipment (such as spanners, torque wrenches, engineer's levels)
	2.16	Describe the techniques used to position, align, level, adjust and secure the equipment
	2.17	Describe the methods of lifting, handling and supporting the equipment during the installation activities (such as portable lifting equipment, block and tackle, slings and manual handling)
	2.18	Explain the importance of carrying out electrical checks on lift doors and ancillary components
	2.19	Explain how to conduct any necessary checks and adjustments to ensure the equipment integrity, accuracy and quality of the installation
	2.20	Explain how to recognise installation defects (such as jamming, misalignment, ineffective fasteners, damage)
	2.21	Explain the lubrication requirements, and methods for protecting equipment from damage
	2.22	Explain the importance of ensuring that the completed installation is free from dirt and damage, and of ensuring that any exposed components are correctly covered/protected
	2.23	Describe the tools and equipment used in the installation activities, and explain their calibration/care and control procedures
	2.24	Describe the problems that can occur with the installation operations, and explain how these can be overcome
	2.25	Explain what recording documentation to be completed for the activities undertaken
	2.26	Describe the organisational procedures to be adopted for the safe disposal of waste of all types of materials
	2.27	Describe the extent of their own authority, and explain whom they should report to if they have a problem that they cannot resolve



Level 3 Unit – Checking and Setting Lift Installations

## Unit aim

This unit covers the skills and knowledge needed to prove the competences required to carry out checks on lift installations, in accordance with approved procedures. The learner will be required to carry out a number of checks on various lift components, such as safety circuits, ropes and chains, trailing cables, door operators, alarm systems, lift controller, safety mechanisms, lift machine, hydraulic pump and gearbox. The learner will also be expected to carry out checks on the lift sequence and ride quality. The learner will check that the lift has been installed to the required specification by carrying out checks in a planned and logical sequence. This will involve adjusting, functional checking, resolving problems and rectifying faults at component or sub-assembly level, in accordance with company policy and manufacturer's instructions.

The learner will be expected to apply a range of installation checking methods and techniques, such as checking settings, aligning and adjusting components, torque loading components, making 'off-load' checks, and running the lift at reduced and full speed. Following successful completion of these activities, the learner will be responsible for handing over the equipment to the appropriate people.

## Unit introduction

The learner's responsibilities will require them to comply with organisational policy and procedures for the checking activities undertaken, and to report any problems with these activities or the tools and equipment used, that they cannot personally resolve or are outside their permitted authority, to the relevant people. The learner must ensure that all tools, equipment and materials used in the checking activities are removed from the work area on completion of the activities, and that all necessary handover documentation is completed accurately and legibly. The learner will be expected to work with a minimum of supervision, taking personal responsibility for their own actions and for the quality and accuracy of the work that they carry out.

The learner's knowledge will provide a good understanding of their work and will provide an informed approach to applying procedures for the checking of lift installations. The learner will understand the checking methods, techniques and procedures, and their application.

The learner will know how the lift functions, the purpose of the individual components and any associated defects, in adequate depth to provide a sound basis for carrying out the checking activities and solving functional problems, ensuring that the equipment performs to the required specification. In addition, the learner will have sufficient in-depth knowledge to ensure that all components are fit for purpose and meet the specifications.

The learner will understand the safety precautions required when carrying out the checking activities, especially those for isolating the equipment. The learner will also understand their responsibilities for safety and the importance of taking the necessary safeguards to protect themselves and others in the workplace.

### Assessment

To achieve this unit, the learner needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit through a variety of assessment methods appropriate to the delivery environment.

<b>Unit Reference Number</b>		D/601/0628
<b>Qualification Framework</b>		RQF
<b>Title</b>		Checking and Setting Lift Installations
<b>Unit Level</b>		Level 3
<b>Guided Learning Hours</b>		77
<b>Unit Credit Value</b>		25
<b>Unit Grading Structure</b>		Pass / Fail

<b>Learning outcomes - the learner will...</b>		<b>Assessment criteria - the learner can...</b>	
1.	Check and Set Lift Installations	1.1	Work safely at all times, complying with health and safety and other relevant regulations and guidelines
		1.2	Carry out all of the following during the checking activities: <ul style="list-style-type: none"> <li>• use the correct issue of drawings, job instructions and installation specifications</li> <li>• adhere to risk assessment, COSHH and other relevant safety standards</li> <li>• ensure safe access and working arrangements when checking lift installations</li> <li>• check calibration dates of the tools and measuring instruments to be used</li> <li>• carry out the checks on lift installations using the appropriate techniques and procedures</li> <li>• leave the work area in a safe condition</li> <li>• handover the lift installation and documentation to the appropriate people</li> </ul>
		1.3	Follow and make appropriate use of the specifications for the product or asset being checked
		1.4	Check lift installations using all of the following information: <ul style="list-style-type: none"> <li>• customer requirements</li> <li>• equipment specifications</li> <li>• installation data</li> <li>• installation standards</li> </ul>
		1.5	Use all the correct tools and inspection equipment and check that they are in useable condition
		1.6	Use two of the following instruments/devices when checking the lift installation: <ul style="list-style-type: none"> <li>• linear measuring devices</li> <li>• multimeter</li> <li>• pressure testing devices</li> <li>• specific diagnostic aids</li> </ul>
		1.7	Carry out the checks in an appropriate sequence using approved methods and procedures
		1.8	Carry out installation checks on one of the following types of lift equipment:

		<ul style="list-style-type: none"> <li>• hydraulic</li> <li>• traction</li> </ul>
	1.9	<p>Carry out all of the following checks prior to initial start-up:</p> <ul style="list-style-type: none"> <li>• the lift is free from obstructions/hazards, and safety/environmental conditions have been met</li> <li>• check for damage to lift assemblies following the installation</li> <li>• the lift has been installed and positioned according to specification</li> <li>• all connections have been made correctly (mechanical, electrical, fluid power)</li> <li>• all lubricants and grease have been applied before start-up</li> <li>• all moving parts are clear of obstructions</li> <li>• all fluid levels are correct before start-up</li> <li>• all labels, safety and warning signs are placed in the correct locations</li> <li>• all guarding and safety systems are in position and operable</li> </ul>
	1.10	<p>Use all of the following checking techniques, methods and procedures:</p> <ul style="list-style-type: none"> <li>• carry out start-up procedures and confirm that the lift and associated equipment meets specifications</li> <li>• run the lift equipment at reduced speed</li> <li>• check for leaks during operations</li> <li>• make sensory checks (sight, sound, smell, touch)</li> <li>• check the lift operation/sequence including door opening/closing</li> <li>• identify any functional problems</li> <li>• monitor and record measurements and/or observations</li> <li>• shut down/isolate lift to a safe condition</li> </ul>
	1.11	<p>Carry out all the following installation checks, and adjust where appropriate:</p> <ul style="list-style-type: none"> <li>• supply phases and connections to motors</li> <li>• rope terminations</li> <li>• chain terminations</li> <li>• rope tension</li> <li>• chain tension</li> <li>• trailing cables are looped correctly</li> <li>• lubrication points are oiled/greased to specification</li> <li>• gearbox or hydraulic oil levels</li> </ul>
	1.12	<p>Carry out all the following checks, and adjust/rectify where appropriate to include:</p> <ul style="list-style-type: none"> <li>• safety circuits</li> <li>• door operators</li> <li>• overrun/run-by</li> <li>• door closing protection devices</li> <li>• lift machine/hydraulic pump unit</li> <li>• lift controller equipment</li> <li>• alarm systems</li> <li>• lift car travel</li> </ul>

			<ul style="list-style-type: none"> <li>• ancillary equipment</li> <li>• counterweight operates correctly (traction lifts only)</li> </ul>
		1.13	<p>Check that the lift installation complies with two of the following standards:</p> <ul style="list-style-type: none"> <li>• BS standards and procedures (such as BS EN 81)</li> <li>• customer standards and requirements</li> <li>• company standards and procedures</li> <li>• specific system requirements</li> <li>• the Lift Regulations</li> </ul>
		1.14	Identify and assess any defects or variations from the specification and take appropriate action
		1.15	<p>Rectify faults as part of the checking process, to include carrying out all of the following:</p> <ul style="list-style-type: none"> <li>• identifying the source of the fault</li> <li>• dismantling equipment to unit, sub-assembly or component level</li> <li>• proof marking/labelling components to aid re-assembly</li> <li>• replacing or repairing damaged or defective components</li> <li>• setting, aligning and adjusting replaced components</li> <li>• tightening fastenings to the required torque</li> <li>• replenishing oils and greases (where appropriate)</li> <li>• re-running the checks to confirm that correct operation is now achieved</li> </ul>
		1.16	Report completion of compliance activities in line with organisational procedures
		1.17	<p>Complete the relevant paperwork, to include one of the following, and pass it to the appropriate people:</p> <ul style="list-style-type: none"> <li>• job card</li> <li>• installation report</li> <li>• company specific documentation</li> </ul>
2.	Know how to Check and Set Lift Installations	2.1	Explain the specific safety practices and procedures that they need to observe when checking lift installations (including any specific legislation, regulations or codes of practice for the activities and lift equipment)
		2.2	Explain the procedures to be carried out before checking the lift installation (such as obtaining permits to work, obtaining and complying with risk assessments and other health and safety requirements)
		2.3	Explain the specific health and safety precautions to be applied during the checking procedure, and their effects on others
		2.4	Describe the hazards associated with carrying out checks on lift installations (handling oils, greases, stored pressure/force, misuse of tools, using damaged or badly maintained tools and equipment, not following laid-down checking procedures), and explain how to minimise them
		2.5	Explain the importance of wearing personal protective equipment (PPE) during the checking process, and where it can be obtained
		2.6	Explain how to obtain and interpret drawings, specifications, manufacturers' manuals, instructions, and other documents needed in the checking process
		2.7	Explain how to carry out currency/issue checks on the specifications they are working with
		2.8	Explain the principles of how the equipment functions, its operating sequence, the working purpose of



		individual units/components and how they interact
	2.9	Explain what checks need to be carried out prior to starting up the lift (including installation damage, lift obstructions, mechanical and electrical connections, gearbox/hydraulic oil levels, lubrication points, rope and chain terminations and tension)
	2.10	Explain what functional checks need to be carried out at reduced speed (including door operators, overrun/run-by, safety systems, alarm system, lift machine/hydraulic pump, lift controller, counterweight and lift car travel)
	2.11	Explain the equipment operating and control procedures to be applied during the checking activity
	2.12	Explain the importance of making 'off-load' checks before running the equipment under power
	2.13	Explain the importance of running the equipment at reduced speed to ensure satisfactory performance
	2.14	Explain how to make adjustments to lift components/assemblies to ensure that they function correctly
	2.15	Describe the fault diagnostic techniques that can be used to help identify problems with the running of the equipment
	2.16	Describe the measuring equipment used when checking lift installations (such as linear measuring devices, electrical measuring instruments, pressure testing devices and self-diagnostic aids)
	2.17	Explain how to check that tools and equipment are free from damage or defects, are in a safe and usable condition
	2.18	Explain what recording and/or reporting documentation needs to be completed for the activities undertaken
	2.19	Describe the types of problem associated with the checking activity, and explain how they can be overcome
	2.20	Describe the organisational procedure(s) to be adopted for the safe disposal of waste of all types of materials
	2.21	Describe the extent of their own authority, and explain whom they should report to if they have a problem that they cannot resolve



Level 3 Unit – Installing Hydraulic Lift Equipment

## Unit aim

This unit covers the skills and knowledge needed to prove the competences required to install hydraulic lift equipment, in accordance with approved procedures. This will require the learner to assess the site for the proposed installation, and to make the necessary arrangements to have the required lifting and handling equipment, installation tools and any specified components and site services available, so that the installation can be carried out safely and efficiently. The learner will be required to install a range of hydraulic lift equipment, such as the cylinder base plate, hydraulic cylinder, jack assembly, pump unit, hydraulic pipes and hoses, cylinder and jack brackets and guides, and lift controller equipment.

This unit does not involve maintenance/repair type activities, such as removal and replacement of existing equipment.

The learner will be required to select the appropriate tools and equipment to use, based on the operations to be performed and equipment and components that need to be worked on during the installation. The learner will be expected to use appropriate tools and techniques to position, level, align and tension the equipment, and to make all necessary connections to the required specification. The installation activities will include making all necessary checks and adjustments to ensure the components are correctly positioned and aligned, have appropriate tension or working clearances, are tightened to the correct torque, and that the installation meets the required specification.

## Unit introduction

The learner's responsibilities will require them to comply with organisational policy and procedures for the installation activities undertaken, and to report any problems with the activities, tools or equipment used that they cannot personally resolve, or are outside their permitted authority, to the relevant people. The learner must ensure that all tools, equipment and materials used in the installation activities are removed from the work area on completion of the work, and that all necessary job/task documentation is completed accurately and legibly.

The learner will be expected to work with a minimum of supervision, taking personal responsibility for their own actions and for the quality and accuracy of the work that they carry out. The installation activity may be carried out as a team effort, but the learner must be able to demonstrate a significant personal contribution to the installation activities, in order to satisfy the requirements of the standard. Competence in all the areas required by the standard must be demonstrated.

The learner's knowledge will provide a good understanding of their work and will provide an informed approach to applying installation procedures for hydraulic lift equipment. The learner will know about the equipment being installed, its installation requirements, the correct function of the equipment and any associated problems, in adequate depth to provide a sound basis for carrying out the installation process safely and effectively.

The learner will also understand the installation methods and procedures used, and their application, in sufficient depth to be able to carry out the installation activities, identify and resolve any installation problems, and ensure that the installed equipment meets the required specification.

The learner will understand the safety precautions required when carrying out the installation activities, especially those for ensuring the safe isolation of services. The learner will be required to demonstrate safe working practices throughout and will understand their responsibility for taking the necessary safeguards to protect themselves and others in the workplace.

## Assessment

To achieve this unit, the learner needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit through a variety of assessment methods appropriate to the delivery environment.

<b>Unit Reference Number</b>		R/601/0674
<b>Qualification Framework</b>		RQF
<b>Title</b>		Installing Hydraulic Lift Equipment
<b>Unit Level</b>		Level 3
<b>Guided Learning Hours</b>		84
<b>Unit Credit Value</b>		25
<b>Unit Grading Structure</b>		Pass / Fail

Learning outcomes - the learner will...		Assessment criteria - the learner can...	
1.	Install Hydraulic Lift Equipment	1.1	Work safely at all times, complying with health and safety and other relevant regulations and guidelines
		1.2	Carry out all of the following during the installation activities: <ul style="list-style-type: none"> <li>• plan the installation activities to minimise disruption to normal working</li> <li>• ensure that they have the correct installation documentation (such as, drawings, instructions, manufacturer's data, settings and other documentation)</li> <li>• adhere to risk assessment, COSHH and other relevant safety standards</li> <li>• obtain clearance to carry out the installation activities</li> <li>• ensure that electrical supplies have been isolated</li> <li>• ensure safe access and working arrangements for the installation area</li> <li>• carry out the installation activities, using appropriate techniques and procedures</li> <li>• dispose of waste items in a safe and environmentally acceptable manner</li> <li>• leave the work area in a safe condition and free from foreign object debris</li> </ul>
		1.3	Confirm that all of the following conditions have been met, prior to installing the hydraulic lift equipment: <ul style="list-style-type: none"> <li>• the site is suitably prepared for the installation to take place</li> <li>• appropriate utilities are available (such as gas, water, air, electricity)</li> <li>• the site is accessible and free from obstructions or hazards</li> <li>• any required installation consumables are available</li> <li>• safety and environmental conditions can be met</li> </ul>
		1.4	Follow all relevant drawings and specifications for the installation being carried out
		1.5	Use the correct tools and equipment for the installation operations and check that they are in a safe and usable condition
		1.6	Move and position equipment, using two of the following: <ul style="list-style-type: none"> <li>• slings</li> <li>• portable lifting equipment</li> </ul>

		<ul style="list-style-type: none"> <li>• block and tackle</li> <li>• manual handling and moving of loads</li> </ul>
	1.7	<p>Use two of the following instruments during the installation activities:</p> <ul style="list-style-type: none"> <li>• straight edges</li> <li>• engineer's levels</li> <li>• mechanical measuring instruments/devices</li> <li>• electrical measuring instruments</li> </ul>
	1.8	Install, position and secure the equipment and components in accordance with the specification
	1.9	<p>Install both types of hydraulic lifts:</p> <ul style="list-style-type: none"> <li>• direct acting</li> <li>• indirect acting</li> </ul>
	1.10	<p>Install all of the following types of hydraulic lift equipment:</p> <ul style="list-style-type: none"> <li>• cylinder base plate</li> <li>• hydraulic cylinder</li> <li>• pump unit</li> <li>• valve block</li> <li>• jack/ram assembly</li> <li>• hydraulic pipes and hoses</li> <li>• over-speed governor</li> <li>• ram head pulley</li> <li>• cylinder, jack/ram brackets and guides</li> <li>• hydraulic controller equipment</li> </ul>
	1.11	<p>Apply installation methods and techniques to include nine of the following:</p> <ul style="list-style-type: none"> <li>• drilling and hole preparation</li> <li>• positioning and securing equipment to plumbed set-out lines</li> <li>• aligning of equipment</li> <li>• bleeding the fluid power system</li> <li>• topping up fluid/oil reservoirs</li> <li>• levelling of equipment</li> <li>• shimming and packing</li> <li>• lifting and supporting</li> <li>• protecting the installation from weather</li> <li>• connecting electrical wires and cables</li> <li>• securing by using mechanical fixings</li> <li>• securing by using masonry fixings</li> <li>• applying screw fastening locking devices</li> </ul>
	1.12	<p>Carry out all necessary checks, and adjust/rectify where appropriate, to include all the following:</p> <ul style="list-style-type: none"> <li>• working clearance is appropriate</li> <li>• making 'off-load' checks</li> </ul>

			<ul style="list-style-type: none"> <li>• level and alignment is correct</li> <li>• fluid/oil reservoirs are at an appropriate level</li> <li>• the system is leak free</li> <li>• electrical wiring is encased and secure</li> <li>• electrical continuity is achieved</li> <li>• rotation of the pump is correct</li> <li>• connections are correctly made (mechanical, hydraulic)</li> <li>• the cylinder and jack/ram extend parallel to the car guide</li> <li>• visual (for completeness and freedom from damage)</li> <li>• other sensory checks (sound, smell, touch)</li> <li>• moving parts are guarded and clear of obstruction</li> <li>• torque setting of fasteners is correct</li> <li>• locking devices are fitted to fasteners (where appropriate)</li> </ul>
		1.13	Check that all necessary connections to the equipment are complete
		1.14	Produce installations which comply with two of the following: <ul style="list-style-type: none"> <li>• equipment manufacturer's operating spec/range</li> <li>• BS and/or ISO standards (including BS EN 81, ISO 9000)</li> <li>• BS7255 (code of practice)</li> <li>• the Lift Regulations</li> <li>• customer standards and requirements</li> <li>• company standards and procedures</li> </ul>
		1.15	Deal promptly and effectively with problems within their control and report those that cannot be solved
		1.16	Check that the installation is complete and that all components are free from damage
		1.17	Complete the relevant paperwork, to include one of the following, and pass it to the appropriate people: <ul style="list-style-type: none"> <li>• installation records</li> <li>• company specific documentation</li> <li>• job card</li> </ul>
2.	Know how to Install Hydraulic Lift Equipment	2.1	Explain the specific safety practices and procedures that they need to observe when installing hydraulic lift equipment (including any specific legislation, regulations or codes of practice for the activities, equipment or materials)
		2.2	Explain 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)
		2.3	Explain the health and safety requirements of the work area where they are carrying out the installation activities, and the responsibility these requirements place on them
		2.4	Describe the hazards associated with installing hydraulic lift equipment, and with the tools and equipment used, and explain how they can be minimised
		2.5	Explain what personal protective equipment (PPE) they need to use for the installation activities, and where it can be obtained

	2.6	Explain how to interpret the drawings, standards, quality control procedures and specifications used for the installation (including BS and ISO schematics, symbols and terminology)
	2.7	Explain how to carry out currency/issue checks on the specifications they are working with
	2.8	Explain what preparations need to be carried out on the equipment prior to installation
	2.9	Describe the equipment to be installed, its operating procedures and function
	2.10	Describe the various mechanical fasteners that will be used, and explain their method of installation (including, threaded fasteners, special securing devices, masonry fixing devices)
	2.11	Explain the importance of applying the correct torque loading on the fasteners, and what can happen if these loadings are exceeded or not achieved
	2.12	Explain the procedures for ensuring that they have the correct tools, equipment, and fasteners for the installation activities
	2.13	Describe the tools and instruments used to position, secure and align the equipment (such as spanners, crow bars, torque wrenches, engineer's levels)
	2.14	Describe the techniques used to position, align, level, adjust and secure the equipment
	2.15	Explain the techniques used during installation of hydraulic equipment (release of pressures/force, cylinder/valve movement, sequencing)
	2.16	Describe the methods of lifting, handling and supporting the equipment during the installation activities (such as portable lifting equipment, block and tackle, slings and manual handling)
	2.17	Explain the importance of carrying out the appropriate electrical checks on hydraulic lift equipment
	2.18	Explain how to conduct any necessary checks and adjustments to ensure the equipment integrity accuracy and quality of the installation (including the fitting of guards and covers on electrical connections)
	2.19	Explain how to recognise installation defects (such as leaks, poor seals, misalignment, ineffective fasteners, damage)
	2.20	Explain the lubrication requirements, and methods for protecting equipment from mechanical and weather damage
	2.21	Explain the importance of ensuring that the completed installation is free from dirt and damage, and of ensuring that any exposed components are correctly covered/protected
	2.22	Describe the tools and equipment used in the installation activities, and explain their calibration/care and control procedures
	2.23	Describe the problems that can occur with the installation operations, and explain how these can be overcome
	2.24	Explain what recording documentation needs to be completed for the activities undertaken
	2.25	Describe the organisational procedures to be adopted for the safe disposal of waste of all types of materials
	2.26	Describe the extent of their own authority, and explain whom they should report to if they have a problem that they cannot resolve