Pearson Edexcel Level 3 Diploma in Polymer/Polymer Composite Operations

Specification

For first registration May 2011

Issue 3

Edexcel, BTEC and LCCI qualifications

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This specification is Issue 3. Key changes are listed in the summary table on the next page. We will inform centres of any changes to this issue. The latest issue can be found on the Pearson website: qualifications.pearson.com

This qualification was previously known as:

Pearson Edexcel Level 3 Diploma in Polymer/Polymer Composite Operations (QCF).

The QN remains the same.

References to third party material made in this specification are made in good faith. Pearson does not endorse, approve or accept responsibility for the content of materials, which may be subject to change, or any opinions expressed therein. (Material may include textbooks, journals, magazines and other publications and websites.)

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Summary of Pearson Edexcel Level 3 Diploma in Polymer/Polymer Composite Operations specification Issue 3 changes

Summary of changes made between previous issue and this current issue	Page number
All references to QCF have been removed throughout the specification	
Definition of TQT added	Page 1
Definition of sizes of qualifications aligned to TQT	Page 2
TQT value added	Page 6
Guided learning definition updated	Page 11
QCF references removed from unit titles and unit levels in all units	Page 12-86

Earlier issue(s) show(s) previous changes.

If you need further information on these changes or what they mean, contact us via our website at: qualifications.pearson.com/en/support/contact-us.html.

Contents

Introducing Pearson Edexcel NVQ/Competence-based qualifications

What are NVQ/Competence-based qualifications?

National Vocational Qualifications (NVQs)/Competence-based qualifications are work-based qualifications that give learners the opportunity to develop and demonstrate their competence in the area of work or job role to which the qualification relates.

NVQs/Competence-based qualifications are based on recognised occupational standards for the appropriate sector. Occupational standards define what employees, or potential employees, must be able to do and know, and how well they should undertake work tasks and work roles. These standards are written in broad terms to enable employers and providers to apply them to a wide range of related occupational areas.

NVQs/Competence-based qualifications are outcomes-based with no fixed learning programme, therefore allowing flexible delivery to meet the individual learner's needs. At Level 2 and above, these qualifications are recognised as approved training and development courses for employees that have been in the workplace for some time or as a way of inducting, training and developing new entrants into the workplace. Qualifications at Level 1 can be used in Traineeships, which enables progression to entry level employment or to Apprenticeship programmes.

Learners will work towards their qualification in the workplace or in settings that replicate the working environment as specified in the assessment requirements. Colleges, training centres and/or employers can offer these qualifications as long as they have access to appropriate physical and human resources and have the necessary quality assurance systems in place.

Sizes of NVQ/Competence-based qualifications

For all regulated qualifications, Pearson specify a total number of hours that it is estimated learners will require to complete and show achievement for the qualification – this is the Total Qualification Time (TQT). The TQT value indicates the size of a qualification.

Within the TQT, Pearson identifies the number of Guided Learning Hours (GLH) that we estimate a centre delivering the qualification might provide. Guided learning means activities, such as lessons, tutorials, online instruction, supervised study and giving feedback on performance, that directly involve tutors and assessors in teaching, supervising and invigilating learners. Guided learning includes the time required for learners to complete external assessment under examination or supervised conditions.

In addition to guided learning, other required learning directed by tutors or assessors will include private study, preparation for assessment and undertaking assessment when not under supervision, such as preparatory reading, revision and independent research.

As well as TQT and GLH, qualifications can also have a credit value – equal to one tenth of TQT, rounded to the nearest whole number.

TQT and credit values are assigned after consultation with users of the qualifications.

NVQ/Competence-based qualifications are available in the following sizes:

- Award – a qualification with a TQT value of 120 or less (equivalent to a range of 1–12 credits)
- Certificate – a qualification with a TQT value in the range of 121–369 (equivalent to a range of 13–36 credits)
- Diploma – a qualification with a TQT value of 370 or more (equivalent to 37 credits and above).

Qualification title covered by this specification

This specification gives you the information you need to offer the Pearson Edexcel Level 3 Diploma in Polymer/Polymer Composite Operations :

Qualification title	Qualification Number (QN)	Regulation start date	Operational start date
Pearson Edexcel Level 3 Diploma in Polymer/Polymer Composite Operations	600/1630/9	01/05/2011	01/05/2011

Qualifications eligible and funded for post-16-year-olds can be found on the Funding Hub. The Skills Funding Agency also publishes a funding catalogue that lists the qualifications available for 19+ funding.

You should use the Qualification Number (QN), when you wish to seek public funding for your learners. Each unit within a qualification will also have a unique unit reference number, which are listed in this specification.

The qualification title and unit reference numbers will appear on the learners' final certification document. Learners need to be made aware of this when they are recruited by the centre and registered with Pearson.

Key features of the Pearson Edexcel Level 3 Diploma in Polymer/Polymer Composite Operations

This qualification:

- is nationally recognised
- is based on the Polymer Processing and Related Operations National Occupational Standards (NOS). The NOS, assessment requirements/strategy and qualification structure(s) are owned by Cogent, the Sector Skills Council for the chemicals, pharmaceuticals, nuclear, oil, gas, petroleum and polymer industries.

The Pearson Edexcel Level 3 Diploma in Polymer/Polymer Composite Operations has been approved as a component for the Polymer Processing Operations Advanced Apprenticeship framework.

What is the purpose of this qualification?

The qualification provides the skills, competence and knowledge required by individuals working in the polymer and polymer composite sectors. The qualification has two pathways: Polymer Machine Operations and Polymer Hand-based Operations. The Polymer Machine Operations Pathway covers configuring and setting processing systems to meet production requirements and optimising operations which are under process control. The Polymer Hand-based Operations Pathway covers carrying out complex manual operations and evaluating and adjusting manual operations.

Who is this qualification for?

This qualification is for all learners aged 16 and above who are capable of reaching the required standards.

Pearson's policy is that the qualification should:

- be free from any barriers that restrict access and progression
- ensure equality of opportunity for all wishing to access the qualification.

What are the benefits of this qualification to the learner and employer?

The polymer processing industry employs approximately 400,000 people in the United Kingdom. The sector manufactures thousands of products that feature as part of our daily lives including, for example, compact discs and tyres. An Advanced Apprenticeship in Polymer Processing Operations forms an ideal route to employment in the polymer processing industry.

What are the potential job roles for those working towards this qualification?

Within the industry, there are many opportunities to progress to technician, supervisory or management roles. Potential job roles within the polymer processing industry include:

- production technician
- condition setter
- estimator
- product development technician
- production planner
- quality control technician
- production and technical managers
- polymer engineer
- laboratory assistants/technicians.

What progression opportunities are available to learners who achieve this qualification?

Within the industry there are many opportunities to progress to supervisory or management roles.

There are also opportunities for those wishing to continue their professional development. Learners can progress to further education and training within the sector including:

- higher education (honours degree)
- professional qualifications
- higher-level NVQs within the sector and/or related areas.

What is the qualification structure for the Pearson Edexcel Level 3 Diploma in Polymer/Polymer Composite Operations?

The Total Qualification Time (TQT) for this qualification is 390.

The Guided Learning Hours (GLH) for this qualification is 244.

For the Pearson Edexcel Level 3 Diploma in Polymer/Polymer Composite Operations) learners must achieve 7 units totalling a minimum of 39 credits by taking *one* of the following pathways:

- Polymer Machine Operations
- Polymer Hand-based Operations.

For the Polymer Machine Operations Pathway, learners must complete **two** Common Mandatory Units, **two** Pathway-specific Mandatory Units and **three** Optional Units.

Pearson Edexcel Level 3 Diploma in Polymer/Polymer Composite Operations (Polymer Machine Operations)			
Unit	**Common Mandatory Units – the following two units must be taken:**	**Credit**	**Level**
1	Meet Safety, Health and Environmental Requirements in the Workplace Within Polymer Processing and Related Environments	3	2
2	Rectify Process Problems Within Polymer Processing and Related Environments	8	3
Pathway-specific Mandatory Units – the following two units must be taken:			
3	Configure and Set Processing Systems to Meet Production Requirements Within Polymer Processing and Related Environments	6	3
4	Optimise Operations Which are Under Process Control Within Polymer Processing and Related Environments	7	3
Optional Units – three units must be taken (totalling a minimum of 15 credits):			
5	Provide Technical Support Within Polymer Processing and Related Environments	8	4
6	Carry Out Complex Sampling Operations Within Polymer Processing and Related Environments	7	3
7	Carry Out Complex Testing Operations Within Polymer Processing and Related Environments	4	3
8	Carry Out Routine Servicing Procedures on Polymer Process Plant and Equipment Within Polymer Processing and Related Environments	7	3
9	Plan Polymer Process Activities Within Polymer Processing and Related Environments	4	3

For the Polymer Hand-based Operations Pathway, learners must complete **two** Common Mandatory Units, **two** Pathway-specific Mandatory Units and **three** Optional Units.

Pearson Edexcel Level 3 Diploma in Polymer/Polymer Composite Operations (Polymer Hand-based Operations)			
Unit	**Common Mandatory Units – the following two units must be taken:**	**Credit**	**Level**
1	Meet Safety, Health and Environmental Requirements in the Workplace Within Polymer Processing and Related Environments	3	2
2	Rectify Process Problems Within Polymer Processing and Related Environments	8	3
Pathway-specific Mandatory Units – the following two units must be taken:			
10	Carry Out Complex Manual Operations Within Polymer Processing and Related Environments	6	3
11	Evaluate and Adjust Manual Operations Within Polymer Processing and Related Environments	7	3
Optional Units – three units must be taken (totalling a minimum of 15 credits):			
5	Provide Technical Support Within Polymer Processing and Related Environments	8	4
6	Carry Out Complex Sampling Operations Within Polymer Processing and Related Environments	7	3
7	Carry Out Complex Testing Operations Within Polymer Processing and Related Environments	4	3
8	Carry Out Routine Servicing Procedures on Polymer Process Plant and Equipment Within Polymer Processing and Related Environments	7	3
9	Plan Polymer Process Activities Within Polymer Processing and Related Environments	4	3

How is the qualification graded and assessed?

The overall grade for the qualification is a 'pass'. The learner must achieve all the required units within the specified qualification structure.

To pass a unit the learner must:

- achieve **all** the specified learning outcomes
- satisfy **all** the assessment criteria by providing sufficient and valid evidence for each criterion
- show that the evidence is their own.

The qualifications are designed to be assessed:

- in the workplace or
- in conditions resembling the workplace, as specified in the assessment requirements/strategy for the sector, or
- as part of a training programme.

Assessment requirements/strategy

The assessment requirements/strategy for this qualification have been included in *Annexe C*. They have been developed by Cogent in partnership with employers, training providers, awarding organisations and the regulatory authorities. The assessment strategy includes details on:

- criteria for defining realistic working environments
- roles and occupational competence of assessors, expert witnesses, internal verifiers and standards verifiers
- quality control of assessment
- evidence requirements.

Evidence of competence may come from:

- **current practice** where evidence is generated from a current job role
- a **programme of development** where evidence comes from assessment opportunities built into a learning/training programme whether at or away from the workplace
- the **Recognition of Prior Learning (RPL)** where a learner can demonstrate that they can meet the assessment criteria within a unit through knowledge, understanding or skills they already possess without undertaking a course of learning. They must submit sufficient, reliable and valid evidence for internal and standards verification purposes. RPL is acceptable for accrediting a unit, several units or a whole qualification
- a **combination** of these.

It is important that the evidence is:

Valid	relevant to the standards for which competence is claimed
Authentic	produced by the learner
Current	sufficiently recent to create confidence that the same skill, understanding or knowledge persist at the time of the claim
Reliable	indicates that the learner can consistently perform at this level
Sufficient	fully meets the requirements of the standards.

Types of evidence (to be read in conjunction with the assessment strategy in Annexe C)

To successfully achieve a unit the learner must gather evidence which shows that they have met the required standard in the assessment criteria. Evidence can take a variety of different forms including the examples below. Centres should refer to the assessment strategy for information about which of the following are permissible.

- direct observation of the learner's performance by their assessor (O)
- outcomes from oral or written questioning (Q&A)
- products of the learner's work (P)
- personal statements and/or reflective accounts (RA)
- outcomes from simulation, where permitted by the assessment strategy (S)
- professional discussion (PD)
- assignment, project/case studies (A)
- authentic statements/witness testimony (WT)
- expert witness testimony (EPW)
- evidence of Recognition of Prior Learning (RPL).

The abbreviations may be used for cross-referencing purposes.

Learners can use one piece of evidence to prove their knowledge, skills and understanding across different assessment criteria and/or across different units. It is, therefore, not necessary for learners to have each assessment criterion assessed separately. Learners should be encouraged to reference the assessment criteria to which the evidence relates.

Evidence must be made available to the assessor, internal verifier and Pearson standards verifier. A range of recording documents is available on the Pearson website qualifications.pearson.com. Alternatively, centres may develop their own.

Centre recognition and approval

Centre recognition

Centres that have not previously offered Pearson qualifications need to apply for and be granted centre recognition as part of the process for approval to offer individual qualifications. New centres must complete both a centre recognition approval application and a qualification approval application.

Existing centres will be given 'automatic approval' for a new qualification if they are already approved for a qualification that is being replaced by the new qualification and the conditions for automatic approval are met. Centres already holding Pearson approval are able to gain qualification approval for a different level or different sector via Edexcel online.

Approvals agreement

All centres are required to enter into an approvals agreement which is a formal commitment by the head or principal of a centre to meet all the requirements of the specification and any linked codes or regulations. Pearson will act to protect the integrity of the awarding of qualifications, if centres do not comply with the agreement. This could result in the suspension of certification or withdrawal of approval.

Quality assurance

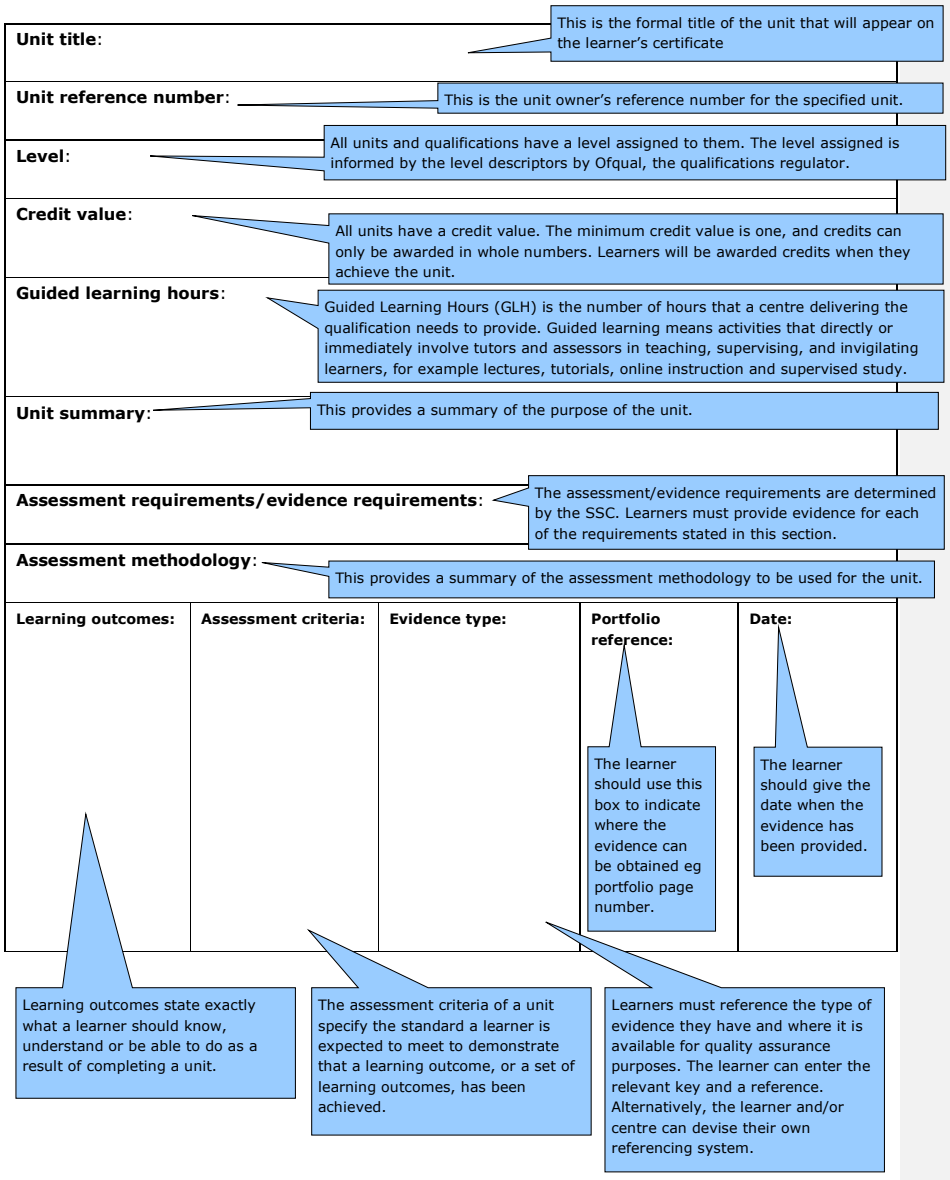
Detailed information on Pearson's quality assurance processes is given in *Annexe A*.

What resources are required?

Each qualification is designed to support learners working in the polymer processing and related operations sector. Physical resources need to support the delivery of the qualifications and the assessment of the learning outcomes and must be of industry standard.

Unit format

Each unit in this specification contains the following sections.



Units

Unit 1: Meet Safety, Health and Environmental Requirements in the Workplace Within Polymer Processing and Related Environments

Unit reference number: L/602/1611

Level: 2

Credit value: 3

Guided learning hours: 18

Assessment requirements/evidence requirements

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

The assumed pre-requisite is that the learner undertaking this unit will be an operator with a basic understanding of the processes and equipment relating to the industry.

Assessment Context

This unit is for those with responsibilities for meeting safety, health and environment requirements in the workplace. It is suitable for process industries' personnel who work within an organisational context which provides them with specifications to work to and criteria for choosing between possible causes and solutions to the sorts of problems that can arise.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices as they apply to the learner.

Regulations and guidelines include: maintaining all relevant health, safety and environmental requirements and regulations; work within the scope of the standard operating procedure or in accordance with organisational procedures and guidelines.

Personal protective equipment appropriate to the task includes: eye protection, hearing protection, safety gloves, safety footwear, hard hats, respirators and personal protective equipment for working in sterile areas.

Report hazards relate to: those that arise from fittings, fixtures and environmental factors in the workplace, the use and disposal of materials and substances, the use and care of equipment and machinery and accidental breakages and spillages.

Procedures and types of emergency relate to: fire, contamination (eg from leaks, spillages, gas emission), accident and injury to persons.

Assessment methodology

This unit is assessed in the workplace or in conditions resembling the workplace, simulation is permitted. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Know how to protect the environment	1.1	Identify the hazards to the environment that can arise from processing operations and how to recognise them			
		1.2	Explain how to comply with the environmental policy and objectives			
		1.3	Identify the environmental monitoring records that are kept			
2	Know how to ensure own safety	2.1	Describe the safety standards that apply to own working environment			
		2.2	Explain the principles of safe manual handling			
3	Be able to ensure own safety	3.1	Check that all guards and protective devices are in position and working before starting the equipment			
		3.2	Use all work items provided in the workplace correctly			
4	Know how to use and care for personal protective equipment	4.1	Identify the personal protective equipment that is appropriate to different tasks, and how to use and maintain it			
		4.2	Explain how to use noise control equipment and ear protection and why it is important			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
5	Be able to use and care for personal protective equipment	5.1	Use personal protective equipment correctly and keep it in a fit state for use			
		5.2	Report the loss or any obvious defects in personal protective equipment to the appropriate person immediately			
6	Know how to minimise and deal with hazards	6.1	Identify the hazards associated with own working environment and the risks they pose			
		6.2	Explain what risk control measures are in place and why it is important to comply with them			
		6.3	Identify who to report accidents, incidents, hazards and breaches of safety standards to			
7	Be able to minimise and deal with hazards	7.1	Identify hazards and take appropriate action			
		7.2	Follow the designated procedures to deal with hazards encountered at work			
		7.3	Report any accidents, potential hazards and hazardous incidents in the work area promptly to the responsible person			
		7.4	Conduct and present self in the workplace in ways that are safe and do not pose hazards for others			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
8	Know how to deal with emergencies	8.1	Describe how to prevent emergencies			
		8.2	Explain what actions to take in an emergency			
		8.3	Explain what the effects of emergency shutdown are			
		8.4	Identify when and how to use different types of emergency response equipment			
		8.5	Identify the location and, where appropriate, the use of fire-fighting equipment			
9	Know how to respond to emergency alarms	9.1	Identify the alarm systems that are used and when to use them			
		9.2	Describe the action taken on an alarm activation			
10	Be able to respond to emergency alarms	10.1	Comply fully and promptly with emergency response procedures if an emergency alert is given			
11	Be able to deal with accidents and incidents	11.1	Request appropriate assistance without delay on discovering an accident			
		11.2	Take steps, on discovering an accident, which will limit further injury or damage			
		11.3	Provide accurate and complete information on accidents and incidents in accordance with required procedures			
12	Be able to apply good housekeeping practices	12.1	Keep the work area in a safe, clean and tidy condition			
		12.2	Minimise the production of waste in the operation			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
13	Be able to suggest improvements to working practices	13.1	Contribute information and ideas to help improve safety, health and environmental management			
14	Know how to work to organisational and operational procedures	14.1	Identify own responsibilities in respect of Health and Safety and Environment and the limit of that responsibility			
		14.2	Describe the legal responsibility for own health and safety and the health and safety of others			
		14.3	Explain where to obtain details about safety, health and environmental protection			
15	Be able to work to organisational and operational procedures	15.1	Work safely at all times, complying with health and safety, environmental and other relevant regulations, legislation and guidelines			
		15.2	Use safe manual handling and lifting techniques			

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Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
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Unit 2: Rectify Process Problems Within Polymer Processing and Related Environments

Unit reference number: A/602/1622

Level: 3

Credit value: 8

Guided learning hours: 40

Assessment requirements/evidence requirements

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

The assumed pre-requisite is that the learner undertaking this unit will be a technician with relevant technical training, seeking accreditation for their skills and knowledge.

Assessment Context

This unit is for those with responsibility for rectifying process quality problems to ensure that processes run in an optimum manner. It is suitable for process industries' personnel who have responsibility for rectifying process quality problems. The unit demands effective problem-solving abilities.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices as they apply to the learner.

Regulations and guidelines include: maintaining all relevant health, safety and environmental requirements and regulations; work within the scope of the standard operating procedure or in accordance with organisational procedures and guidelines.

Problems relate to: faults or malfunctioning of the process equipment or system, faults or malfunctioning of the control system for the process, faults in the materials supplied to the process, deviations from process quality specifications, departure of process parameters from expected norms.

Problems fall into the following categories: problems that can be dealt with directly, problems that require the assistance of others, problems that must be notified to a superior or specialist colleague.

Actions and solutions include: making system adjustments and changes by self, seeking the assistance of others with particular expertise, reporting the problem to a superior.

Assessment methodology

This unit is assessed in the workplace or in conditions resembling the workplace, simulation is permitted. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

Learning outcomes and assessment criteria

Learning outcomes	Assessment criteria	Evidence type	Portfolio reference	Date
1 Know the procedures relating to the materials involved in the process	1.1 Explain how to interpret information relating to the type of material being processed 1.2 Explain how to identify any significant arrangements from the material safety data sheet 1.3 Explain why it is important to understand the type of material being processed and their characteristics and properties 1.4 Identify the materials being processed and their basic characteristics			
2 Know how to operate process equipment and systems	2.1 Explain what process control involves 2.2 Explain the main functions of process equipment and systems 2.3 Explain how the various parts of a system interact 2.4 Identify the types of services that are used by process equipment and systems			
3 Know how to minimise process environment risks	3.1 Assess the risks that are present in a process environment 3.2 Explain what risk control measures are in place and why it is important to comply with them			
4 Know how to diagnose process problems	4.1 Assess the sorts of problems that can arise with a process and what the early warning signs are 4.2 Explain how to investigate the causes of a problem			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
5	Be able to diagnose process problems	5.1	Identify promptly when a problem has occurred			
		5.2	Gather enough information to be able to identify the sort of problem that has occurred			
		5.3	Use the correct information to decide on the potential cause of the problem			
6	Know how to act according to the type of problem	6.1	Assess the interventions that should be applied			
		6.2	Assess when and by whom interventions should be applied			
7	Be able to act according to the type of problem	7.1	Use the correct information to decide whether the problem needs immediate action			
		7.2	Decide whether a problem can be allowed to continue until a more convenient time before dealing with it			
		7.3	Use all available information to help decide what action to take			
		7.4	Make decisions and set them in motion without any unnecessary delay			
		7.5	Choose a course of action which will safely limit unwanted effects on the system and process			
8	Know how to communicate the required information to resolve a problem	8.1	Explain what lines of communication and command should be followed in a given situation			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
9	Be able to communicate the required information needed to resolve the problem	9.1	Provide those carrying out remedial actions with enough detail to ensure that the problem is dealt with fully and effectively			
10	Be able to modify process parameters	10.1	Adjust process settings to be within set parameters and specification			
		10.2	Adjust process settings in accordance with the manufacturers' recommendations			
11	Know how to monitor the chosen solution to the problem	11.1	Identify the level of monitoring required by the process			
		11.2	Explain why it is important to follow specified monitoring procedures			
12	Be able to monitor chosen solution to the problem	12.1	Gather information to allow accurate monitoring of how effective a solution is in dealing with the problem			
		12.2	Carry out assessments according to how quickly the effects of the solution should be apparent			
		12.3	Continue with assessments until the problem has been fully resolved			
		12.4	Use the correct data in judging the effectiveness of the solution			
13	Be able to adjust the solution if necessary	13.1	Modify the actions taken if the problem changes or they do not work as intended			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
14	Know how to communicate information about process problems	14.1	Identify the sorts of records that are kept and how to complete them			
		14.2	Identify where information relating to the type of material being processed can be found			
15	Be able to communicate information about process problems	15.1	Keep accurate and complete records			
		15.2	Identify and report any information arising during monitoring which may affect the diagnosis and response to similar problems in the future			
16	Know how to work to organisational and operational procedures	16.1	Identify personal responsibilities with regard to health, safety and the environment in the working area			
		16.2	Identify the working practices and authorisations that apply and where to find out about these			
		16.3	Identify the safety standards that apply to the process environment			
		16.4	Identify the personal protective equipment requirements appropriate to the processing tasks			
17	Be able to work to organisational and operational procedures	17.1	Work safely at all times, complying with health and safety, environmental and other relevant regulations, legislation and guidelines			

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Learner signature: _____ Date:_____

Assessor signature: _____ Date:_____

Internal verifier signature: _____ Date:_____
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Unit 3: Configure and Set Processing Systems to Meet Production Requirements Within Polymer Processing and Related Environments

Unit reference number: A/602/1555

Level: 3

Credit value: 6

Guided learning hours: 32

Assessment requirements/evidence requirements

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

The assumed pre-requisite is that the learner undertaking this unit will be a technician seeking recognition of their skills and knowledge.

Assessment Context

This unit is for those with responsibility for configuring and setting processing systems to meet production requirements. It is suitable for process industries' personnel who work within an organisational context which requires them to achieve clearly defined specifications. The scope of the work is such that the individual would be expected to know when problems which might arise can be dealt with directly or when specialist assistance is required. The processing system may be for continuous or batch production and should include ancillary equipment.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices as they apply to the learner.

Regulations and guidelines include: maintaining all relevant health, safety and environmental requirements and regulations; work within the scope of the standard operating procedure or in accordance with organisational procedures and guidelines.

Configuration requirements relate to: the processing and ancillary equipment to be configured, the timescales and deadlines and the processing requirements and tolerances.

Information relates to: processing specification, product specification, production schedule.

Resources are: physical (eg tools, equipment, materials), human and energy.

Production requirements relate to: production schedule, rate of production, product specification.

Processing parameters relate to: temperature, pressure, rate, sequence.

Sources of information can be from: visual checks on products, reading from instruments, analysing sample test results, reading from process control logs, measuring process parameters directly, output rate.

Equipment relates to: material conditioning, material forming, finishing operations, packaging operations, monitoring production.

Data can come from: visual checks on output, reading from instruments, analysing sample test results, reading from process control logs, measuring process parameters directly, output rate.

Others relates to: process operators, quality control, personnel, maintenance and engineering staff, line management.

Assessment methodology

This unit is assessed in the workplace, simulation is not permitted. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

Learning outcomes and assessment criteria

Learning outcomes	Assessment criteria	Evidence type	Portfolio reference	Date
1 Know how to meet production requirements	1.1 Explain how to identify configuration requirements from specifications and schedules 1.2 Explain why safety inspections are important and how and when these should be carried out 1.3 Identify the safety protection devices and warning notices that are required and state how these should be positioned 1.4 Explain how specified settings may conflict with production requirements 1.5 Explain why it is important to meet production requirements			
2 Know how to prepare equipment to configure and set process systems	2.1 Identify the processing and ancillary equipment required to meet production requirements 2.2 Explain the importance of integrating process and ancillary equipment and how to achieve this 2.3 Explain how equipment configuration contributes to production requirements 2.4 Identify the tolerances that apply and how to set equipment to meet the specified tolerance limits 2.5 Explain the significance of not identifying defects in processing equipment 2.6 Explain the financial implications of replacement or equipment repair and lost production, if defects are not identified			

Learning outcomes	Assessment criteria	Evidence type	Portfolio reference	Date
	2.7 Explain how to use visual inspections, monitoring devices and test results to identify information about equipment settings 2.8 Explain how to identify deviations from the required settings from the visual inspections 2.9 Explain how to deal with defective equipment			
3 Be able to prepare to configure and set process systems	3.1 Make sure the necessary equipment, tools and people are available to complete the configuration safely within the specified timescale 3.2 Position safety devices and warning notices to protect both the process operators and people who work in the immediate area 3.3 Identify the materials being processed and their basic characteristics			
4 Know how to configure and set process systems	4.1 Explain the consequences of not achieving specified tolerances at the different stages of the processing operation 4.2 Identify the conditions and processing parameters required to produce the product within specification 4.3 Explain how to set and adjust the processing parameters to achieve the required specification 4.4 Explain why it is important to set and adjust processing parameters 4.5 Explain the importance of following the prescribed sequence for setting processing parameters and the implications of not doing so			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
5	Be able to configure and set process systems	5.1	Configure the equipment to function effectively and within set tolerances			
		5.2	Set and adjust processing parameters to comply with the processing specification			
		5.3	Integrate processing equipment and ancillary equipment to function as an effective and efficient system			
6	Know how to monitor process systems	6.1	Identify the level of monitoring that is required by different processing systems			
		6.2	Explain why it is important to gather sufficient information before reaching conclusions			
7	Be able to monitor the process system	7.1	Use visual inspections, monitoring devices and test results to check and verify equipment settings			
		7.2	Monitor the process system to identify variances from specification			
		7.3	Explain how to compare data with expected values			
		7.4	Test the system over a period of time to ensure consistency of performance			
		7.5	Take action to rectify variances and maximise efficiency and effectiveness of the system			
		7.6	Identify and report specified settings that appear to conflict with production requirements			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
8	Be able to identify and take appropriate action to deal with hazards	8.1	Carry out safety checks to ensure that equipment and the work area are safe and free from potential hazards			
		8.2	Deal with hazards effectively			
9	Know how to maintain records	9.1	Explain what sorts of records are kept and how to complete them			
		9.2	Explain the purpose of different records and the implications of not maintaining them effectively			
		9.3	Identify the information that needs to be gathered and when this should be done			
10	Be able to maintain records	10.1	Maintain the records needed to keep specifications up-to-date			
11	Be able to communicate information about the process system	11.1	Provide information to those who will run, maintain or quality assure the processing system			
12	Know how to work to organisational and operational procedures	12.1	Identify organisational Health and Safety, environmental and other policies that are relevant to own job role			
		12.2	Explain why these policies are important to self and the organisation			
		12.3	Explain the safe working practices that apply to own job role			
		12.4	Explain why it is important to work within the 'rules' of the organisation			

Learning outcomes	Assessment criteria	Evidence type	Portfolio reference	Date
	12.5 Identify when, which and how personal protective equipment should be used 12.6 Identify the lines of communication and command that should be followed in a given situation			
13 Be able to work to organisational and operational procedures	13.1 Work safely at all times, complying with health and safety, environmental and other relevant regulations, legislation and guidelines 13.2 Wear the correct personal protective equipment			

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Unit 4: Optimise Operations Which are Under Process Control Within Polymer Processing and Related Environments

Unit reference number: R/602/1559

Level: 3

Credit value: 7

Guided learning hours: 42

Assessment requirements/evidence requirements

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

The assumed pre-requisite is that the learner undertaking this unit will be a technician seeking recognition of their skills and knowledge.

Assessment Context

This unit is for those with responsibility for optimising operations which are under process control. It is suitable for process industries personnel who work within an organisational context which requires them to achieve clearly defined specifications. The work is such that the individual would be expected to solve problems which may arise both directly and/or by calling for specialist assistance. Standard process operations are routine, self-contained operations which have only a limited number of parameters to be taken into account and which are run on equipment and systems which are pre-determined.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices as they apply to the learner.

Regulations and guidelines include: maintaining all relevant health, safety and environmental requirements and regulations; work within the scope of the standard operating procedure or in accordance with organisational procedures and guidelines.

Problems to be dealt with include: those which can be dealt with directly, those that need to be reported and those where the assistance of a specialist is needed.

Data to be gathered includes: visual checks on products, readings from instruments, analysing sample test results, readings from process control logs, measuring process parameters directly, output rate.

Variances relate to: minor variances which take the product or process to the edges of acceptability, deviations which take the product or process out of specification but can be dealt with by adjustments at the time, deviations that require production to be halted until the specification can be restored.

The conclusion of a process operation relates to: end of a production run, for routine maintenance purposes, for urgent shut down.

Materials relate to: residual materials for recycling, waste materials for disposal.

Assessment methodology

This unit is assessed in the workplace, simulation is not permitted. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Know how to use the process specification	1.1	Explain why a specification is needed for a process and where to obtain the specification			
		1.2	Identify the information that is normally given in a process specification			
		1.3	Explain how to read and interpret a process specification			
2	Know how to work safely	2.1	Explain what precautions and procedures should be applied when handling materials at each stage of the process and in storage			
		2.2	Identify the materials used in different processes			
		2.3	Identify the safety standards that apply to the process environment			
		2.4	Explain the sorts of risks that are present in a process environment			
		2.5	Explain the risk control measures that are in place and why it is important to comply with them			
		2.6	Explain the parts of a system and its services that may need to be isolated			
3	Know the hazards that can affect people and the environment	3.1	Identify the potential hazards to the environment that can arise from processing operations			
		3.2	Identify the potential hazards to people and the environment that can arise from mishandling and misprocessing materials			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
4	Be able to prepare to optimise standard operations	4.1	Obtain accurate and complete details on the specification to be achieved			
		4.2	Check that everyone who will be involved in the operation is ready and knows what to do			
		4.3	Check and confirm that any services needed are operational			
5	Know how to ensure the correct functioning of equipment and systems	5.1	Explain how to check that the services needed by the equipment and system are operational			
		5.2	Explain how equipment and systems are set up to meet a given specification			
		5.3	Identify the main functions of process equipment and systems			
6	Know how to monitor the process operation	6.1	Explain what start-up checks should be carried out to ensure that the equipment and system are fit for use			
		6.2	Identify the routine checks and inspections that are carried out			
		6.3	Explain the level of monitoring that is required by own process			
		6.4	Explain why it is important to follow specified monitoring procedures			
7	Know how to detect faults	7.1	Describe how to recognise possible faults and defects in equipment and systems			
		7.2	Describe how to recognise possible spillages, leaks and emissions			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
8	Be able to monitor process operations to ensure correct operating conditions	8.1	Check and confirm that materials of the specified quality and amount are available			
		8.2	Confirm that equipment controls are to the settings needed for the operation to run to specification			
		8.3	Check whether the equipment and system have any faults and defects			
		8.4	Check that the process control system is operating properly			
9	Know how to interpret the results of monitoring data	9.1	Explain how to compare data with expected values			
		9.2	Explain how to read and analyse relevant data in tables, printouts and schematics			
		9.3	Identify the environmental monitoring records that are kept			
		9.4	Identify the units of measurement that are used and what they mean			
		9.5	Explain what information to gather and when			
10	Be able to monitor performance	10.1	Interpret data correctly to judge if the process and product are in specification and the operation is running optimally			
		10.2	Keep operational data up to date, accurate and complete			
		10.3	Complete the relevant records accurately			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
11	Know the reporting procedures	11.1	Explain what reporting procedures must be followed with regard to checks and inspections			
12	Know the limits of own authority	12.1	Identify which equipment and system adjustments and maintenance can be carried out by the operator and which need specialist attention			
		12.2	Explain which symptoms indicate a problem that needs maintenance attention			
13	Be able to optimise standard operations	13.1	Identify promptly when a process is not meeting optimum conditions and take appropriate action			
		13.2	Give clear instructions and information to others on what they need to do to optimise the operation			
		13.3	Make suitable adjustments to the process control system to make sure that specifications are met			
		13.4	Respond promptly to variances, taking whatever action is needed			
		13.5	Maximise the use of resources			
		13.6	Optimise the process and keep the product within specification			
		13.7	Ensure that, as far as possible, product schedules are maintained			
14	Be able to deal with problems	14.1	Take prompt and effective action to deal with any problems with the equipment, services and materials			
		14.2	Use the correct procedures to call for any maintenance needed			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
15	Know how to shut down standard operations	15.1	Describe the procedures that need to be followed to shut down a process			
		15.2	Explain why it is important that the correct procedure is followed			
		15.3	Explain why equipment and systems may need servicing before producing a product to a different specification			
16	Be able to shut down standard operations	16.1	Confirm with others that all aspects of the operation have been concluded			
		16.2	Shut down and isolate equipment under your control in the sequence and timings needed to maintain the safety of the entire system			
		16.3	Clear and clean equipment where this is needed before it can be used again			
		16.4	Ensure the process equipment and work area is ready for the next operation			
17	Know how to deal with waste	17.1	Explain why processed, part-processed materials, excess materials and recoverable by-products should be separated out as they are produced			
		17.2	Identify the sorts of containment and storage that are used for processed, part-processed materials, excess materials and recoverable by-products			
18	Be able to deal with waste	18.1	Remove residual and waste materials into suitable storage, handling them safely to avoid loss and contamination			

Learning outcomes	Assessment criteria	Evidence type	Portfolio reference	Date
19 Be able to work to organisational and operational procedures	19.1 Work safely at all times, complying with health and safety, environmental and other relevant regulations, legislation and guidelines 19.2 Follow the safety, health and environmental procedures for the operation, including shutdown			

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Unit 5: Provide Technical Support Within Polymer Processing and Related Environments

Unit reference number: J/602/1607

Level: 4

Credit value: 8

Guided learning hours: 40

Assessment requirements/evidence requirements

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

The assumed pre-requisite is that the learner undertaking this unit will be a technician seeking recognition of their skills and knowledge.

Assessment Context

This unit is for those who provide technical support to others. Technical support can be for information, services, advice, guidance or instruction on the use of materials and equipment. Such support will be sought in the event of defective materials and processes or fault identification. Part of the role involves updating technical information and/or adapting procedures to meet new requirements such as process alterations or changes in legislation.

Such technical support might be provided by a specialist department, such as a customer's technical services unit, or may be part of the job role of a technical specialist within a more general context.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices as they apply to the learner.

Regulations and guidelines include: maintaining all relevant health, safety and environmental requirements and regulations; work within the scope of the standard operating procedure or in accordance with organisational procedures and guidelines.

Requests can either be written and/or oral: from internal or external customers, colleagues, or any end user of the service.

Assistance can be: technical support for procedure; problem diagnosis and solution; advice and guidance.

Documentation relates to: relevant COSHH data sheets and risk assessments and to include: customer contact forms; job requests; proposed action plan; company archive information; standard reference sources; standard operating procedures; national and international standards; job files; work plans and schedules; written customer endorsement.

Information to be obtained relates to: organisational, national, European and International standards; instructions; operating procedures; organisational requirements.

Updating of information relates to: new standards; changes in legislation; new methods and techniques; findings from internal activities.

Meeting requirements include: trouble shooting a problem; updating a technical process following introduction of new equipment and processes; investigating a defective product or piece of equipment; evaluating the possible use of a new raw material within an existing process.

Sources of support can come from: colleagues, equipment, personnel, information, materials.

Evaluation criteria includes: customer specification; resources committed; effectiveness of strategy adopted.

Assessment methodology

This unit is assessed in the workplace, simulation is not permitted. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Know how to evaluate customer requests	1.1	Clarify the processes involved in establishing customer requests			
		1.2	Evaluate the processes involved in meeting customer requirements			
		1.3	Identify what the procedures for making requests are			
2	Be able to evaluate customer requests	2.1	Receive requests and respond to them correctly			
3	Know how to deal with materials and equipment in accordance with organisational procedures	3.1	Explain what materials and equipment are appropriate to the provision of technical services			
		3.2	Explain what the constraints of the processes and equipment are			
		3.3	Summarise what the properties of materials are			
4	Be able to structure the nature of the technical assistance	4.1	Evaluate the capacity to meet the required assistance			
		4.2	Design technical assistance in response to customer requests			
5	Know how to utilise information	5.1	Explain how to access information sources			
		5.2	Explain the methods used for obtaining, storing and retrieving information			
		5.3	Analyse what constitutes current and relevant information			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
6	Be able to obtain and update technical information	6.1	Obtain information that is accurate and sufficient			
		6.2	Check that comprehensive information is available to support the service provided			
		6.3	Interpret the information correctly			
		6.4	Apply the information to specific situations			
		6.5	Update the information sources as required			
7	Know how to provide technical support in accordance with organisational procedures	7.1	Explain what the legal consequences of breaches of quality procedures could be			
		7.2	Summarise what the standard operating procedures are			
		7.3	Explain the range of facilities and services which can be provided			
		7.4	Explain what resources are needed to deliver support			
		7.5	Explain the other sources of support that can be used			
8	Be able to provide technical support	8.1	Implement the strategy for meeting requirements			
		8.2	Modify or repeat the strategy as necessary			
		8.3	Use appropriate sources of support to provide assistance			
		8.4	Provide customers with appropriate information and feedback			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
9	Know how to evaluate outcomes	9.1	Analyse the evaluation criteria relevant to customer requirements			
		9.2	Evaluate methods used for feedback			
10	Be able to evaluate outcomes	10.1	Evaluate the final outcomes against defined success criteria			
11	Know how to record and report in accordance with organisational procedures	11.1	Clarify which documentation should be used and explain why it is important to complete it accurately			
		11.2	Evaluate methods used for recording outcomes			
		11.3	Explain the document control and reporting procedures that should be used			
12	Be able to record information accurately	12.1	Use the appropriate documentation to record information			
13	Know how to work to organisational and operational procedures	13.1	Explain what personal responsibilities with regard to health, safety and the environment in the working area are			
		13.2	Clarify what legal responsibility for personal health and safety is, and the health and safety of others			
14	Be able to work to organisational and operational procedures	14.1	Work safely at all times, complying with health and safety, environmental and other relevant regulations, legislation and guidelines			

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Unit 6: Carry Out Complex Sampling Operations Within Polymer Processing and Related Environments

Unit reference number: K/602/1602

Level: 3

Credit value: 7

Guided learning hours: 36

Assessment requirements/evidence requirements

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their skills and knowledge.

Assessment Context

This unit is for those with responsibility for carrying out complex sampling activities.

Complexity can be characterised in a number of ways depending upon the work context and occupational area. The activity may, for example, involve the performance of progressive and sequential operations that are operator and environment sensitive. Special conditions may apply to the sample taking and may have to be carefully monitored during sampling. Variations and contingencies may be critical to the successful taking of the sample with opportunities to make adjustments to the process as necessary. The consequences of error in terms of cost, danger or environmental impact may also have an effect on the level of complexity at work.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices as they apply to the learner.

Regulations and guidelines include: maintaining all relevant health, safety and environmental requirements and regulations; work within the scope of the standard operating procedure or in accordance with organisational procedures and guidelines.

The sampling purpose can be:

- sampling materials prior to post moulding
- measuring moulded components for tolerances and variances
- monitoring shrinkage parameters and variances
- sampling moulded components for stress factors
- conduct impact testing relevant to the components material and function.

Variability to be established relates to: location; time; stability; homogeneity; temperature.

Conditions to be taken into account are: access; location; timing; sampling points; frequency; duration; health and safety; environmental impact; hazards and risks.

Sampling plans and procedures relate to: time, frequency, duration, sequence and location.

Resources required for sampling are: equipment including personal protective equipment; materials; documentation.

Requirements for sample quality relate to: contamination; changing conditions; stability of sample; variability of source.

Appropriate action: action taken relating to materials, personnel and/or equipment within the limits of responsibility.

Information to be recorded relates to: relevant information concerning; time, conditions, locations, nature of sample, known hazards, required storage conditions, possible contamination sources.

Documentation relates to: appropriate sample taking records, labelling systems and quality assurance results.

Maintain the condition of the sample means by: preservation; transportation, packaging; documentation.

Assessment methodology

This unit is assessed in the workplace, simulation is not permitted. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

Learning outcomes and assessment criteria

Learning outcomes	Assessment criteria	Evidence type	Portfolio reference	Date
1 Know how to evaluate the requirements for sampling	1.1 Explain what the procedures for sampling are 1.2 Identify the principles of sampling systems and testing 1.3 Explain the purposes of sampling and the specific uses to which the sample may be put			
2 Be able to evaluate the requirements for sampling	2.1 Identify the purpose of sampling 2.2 Establish the variability inherent in the sample source and assess the implications on the purpose for which the sample is being taken 2.3 Evaluate the options to minimise the variables resulting from different sampling methods			
3 Know how to achieve the correct conditions for sampling	3.1 Explain how to control conditions when sampling and why it is important 3.2 Explain why it is important to maintain conditions when sampling 3.3 Identify the methods that should be used for sampling and their impact on the source and the sample taken from it			

Learning outcomes	Assessment criteria	Evidence type	Portfolio reference	Date
4 Be able to ensure the correct conditions for sampling	4.1 Select the optimum sampling procedure 4.2 Establish the criteria that will lead to the appropriate sample being taken which is fit for end purpose 4.3 Control the conditions for sampling to optimise sample quality 4.4 Amend sampling plans and procedures when necessary to suit conditions and to deal with contingencies 4.5 Sequence the sampling procedure correctly 4.6 Select sampling points and frequency to ensure an appropriate sample is provided			
5 Know how to prepare resources that are used for sampling	5.1 Identify the equipment that should be used for sampling, and what variability the equipment would introduce 5.2 Explain why calibration is important and how to check calibration 5.3 Explain how to identify defective equipment and the appropriate action to take to minimise risk to the source			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
6	Be able to prepare resources that are used for sampling	6.1	Ensure that the equipment selected is appropriate to sampling process			
		6.2	Prepare equipment in accordance with standard operating procedures			
		6.3	Check that the equipment is in serviceable condition and confirm calibration status as being current			
		6.4	Ensure that all required resources are ready and available			
7	Know how to take a sample	7.1	Summarise the essential features of a sampling plan			
		7.2	Explain what constitutes a representative sample for identified purposes			
		7.3	Identify the documentation and labelling systems that should be used to ensure traceability during sampling			
8	Be able to take a sample	8.1	Identify the conditions for sampling and take account of these when taking a sample			
		8.2	Ensure that the samples taken are representative of requirements			
		8.3	Ensure that the samples are taken following sampling plans and procedures			
		8.4	Label and identify the sample correctly			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
9	Know how to maintain the integrity of the sample	9.1	Identify the factors that influence the integrity of the sample			
		9.2	Explain the basic principles and techniques of maintaining sample integrity			
		9.3	Identify the factors that can affect sample quality			
		9.4	Explain methods that can be used to maintain, stabilise and store the sample			
		9.5	Explain the methods that can be used for dealing with the handling, storage and disposal of materials			
10	Be able to maintain the integrity of the sample	10.1	Record the conditions under which the sample is taken			
		10.2	Stabilise and maintain the condition of the sample			
		10.3	Protect the sample from sources of contamination			
11	Know how to prepare equipment for the next sampling operation	11.1	Identify the cleaning materials and methods that should be used			
		11.2	Identify when equipment should be disposed of			
12	Be able to prepare equipment for the next sampling operation	12.1	Clean the sampling equipment and materials to be re-used appropriately			
		12.2	Dispose of other equipment and materials according to working practice			

Learning outcomes	Assessment criteria	Evidence type	Portfolio reference	Date
13 Be able to record the information from the sampling operation	13.1 Record all information about the sample accurately using appropriate documentation to permit traceability 13.2 Record any deviations from set procedure or anticipated results and take appropriate action			
14 Be able to report abnormal results	14.1 Take the appropriate action in the event of abnormal occurrences affecting sample condition			
15 Know how to work to organisational and operational procedures	15.1 Explain what own responsibilities are with regard to health, safety and the environment in the working area 15.2 Identify the legal responsibility for personal health and safety, and the health and safety of others 15.3 Identify working practices that ensure the working environment is conducive to good health 15.4 Identify what the approved codes of practice/working practices are and why it is important to follow them			
16 Be able to work to organisational and operational procedures	16.1 Work safely at all times, complying with health and safety, environmental and other relevant regulations and guidelines			

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Unit 7: Carry Out Complex Testing Operations Within Polymer Processing and Related Environments

Unit reference number: T/602/1604

Level: 3

Credit value: 4

Guided learning hours: 24

Assessment requirements/evidence requirements

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

The assumed pre-requisite is that the learner undertaking this unit will be a technician seeking recognition of their skills and knowledge.

Assessment Context

This unit is for those with responsibility for carrying out complex testing activities. Tests can be one-off and are conducted following set procedures. They involve some operator control of test variables and checks on the test environment. A series of discrete tests may be required to provide the breadth and depth of the results needed. Contexts could involve lone working on site or where the operator has sole responsibility for the testing process.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices as they apply to the learner.

Regulations and guidelines include: maintaining all relevant health, safety and environmental requirements and regulations; work within the scope of the standard operating procedure or in accordance with organisational procedures and guidelines.

Conditions to be identified include: test environment; test criteria; safety factors; time recording systems; cleanliness and external influences giving rise to variations.

Testing requirements relate to: conducting an analysis of a sensitive material, matching against physical or chemical standards, measurement of shear strength parameters, spectroscopy/chromatography.

Documentation relates to: test plans and equipment requirements and inventories; calibration documentation; appropriate standard operating procedures, appropriate finished test sheets; standard operating procedures supported by performance reports, pass/fail sheets, test records and quality assurance results, documentary proof of safe disposal of hazardous waste.

Checks on testing equipment include: calibration; serviceability; cleanliness and preparation.

Resources relate to: materials; equipment including personal protective equipment; utilities; available time.

Controlled conditions to be established include: health and safety; environment; time; recording systems; cleanliness; external influences giving rise to variations.

Integrity to be checked includes: free from subsequent defects, damage and decomposition; homogeneity. The term sample may include specimens.

Standard operating procedures relate to: relevant organisational requirements, instructions, departmental procedures, codes of practice, organisational regulations, in house procedures, British, European and International standards.

Appropriate action is: action taken relating to either materials, personnel and/or equipment within the limits of responsibility.

Immediate environment relates to: operations; people; conditions under which test is conducted.

Information to be recorded includes: relevant information concerning: sample identification; results of tests; calculations and data processing; conditions of test.

Assessment methodology

This unit is assessed in the workplace, simulation is not permitted. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

Learning outcomes and assessment criteria

Learning outcomes	Assessment criteria	Evidence type	Portfolio reference	Date
1 Understand the requirements for testing operations	1.1 Explain the concepts of repeatability and reproducibility 1.2 Explain the potential impact of the test on health, safety and the environment			
2 Know how to achieve the correct conditions for testing operations	2.1 Explain the methods that can be used for controlling test variables 2.2 Identify the relevant testing methods that can be used to achieve the purpose of testing 2.3 Explain the principles and procedures for testing 2.4 Explain how to check calibration and why this is important			
3 Be able to ensure the correct conditions for testing operations	3.1 Establish the purpose of testing 3.2 Select the appropriate testing methods from standard procedures 3.3 Identify the conditions for testing 3.4 Make adjustments during the test to ensure the required conditions are maintained 3.5 Identify hazards and assess risks against testing requirements 3.6 Confirm the relevant controlled conditions for sample preparation 3.7 Establish criteria that ensure that test outcomes are fit for end purpose			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
4	Know how to identify defective equipment	4.1	Explain how to identify defective equipment			
		4.2	Identify the appropriate action to take if defective equipment is found			
5	Be able to prepare resources that are used for testing operations	5.1	Prepare the appropriate testing equipment			
		5.2	Check to ensure that testing equipment is in a serviceable condition and in calibration			
		5.3	Ensure that the equipment used to prepare the sample is operated in accordance with standard operating procedures			
		5.4	Ensure that all required resources are available and correctly prepared			
6	Know how to take a sample for testing	6.1	Explain how to check the sample identity and its integrity			
		6.2	Identify appropriate methods of safe storage that can be used			
		6.3	Identify the methods of sample preparation that can be used			
7	Be able to take a sample for testing	7.1	Select the appropriate materials and correctly prepare them according to test requirements			
		7.2	Carry out checks to ensure that the correct sample has been selected			
		7.3	Ensure the identity of the sample is established, its integrity is checked and it is stored correctly until required			

Learning outcomes	Assessment criteria	Evidence type	Portfolio reference	Date
	7.4 Use and handle samples safely in accordance with safety requirements adopting standard operating procedures			
8 Know how to carry out testing operations	8.1 Explain how to evaluate results 8.2 Identify the methods that can be used to calculate test results			
9 Be able to carry out testing operations	9.1 Prepare test samples in accordance with standard operating procedures 9.2 Confirm the properties to be tested 9.3 Carry out tests following standard operating procedures 9.4 Select the optimum test procedures and sequence 9.5 Ensure test variables are controlled or remain within acceptable limits 9.6 Make adjustments during the conduct of the test to ensure the required conditions are maintained to achieve a valid outcome 9.7 Take into account the effects of the test on the immediate environment and the environment on the test			
10 Know how to prepare for the next test	10.1 Summarise what cleaning materials should be used and the appropriate cleaning methods 10.2 Identify the methods that can be used for dealing with the handling, storage and disposal of materials			

Learning outcomes	Assessment criteria	Evidence type	Portfolio reference	Date
11 Be able to prepare for the next test	11.1 Clean the equipment and materials to be re-used and store them appropriately 11.2 Handle and dispose of other equipment and materials safely and correctly 11.3 Restore the working area to an appropriate condition			
12 Know how to record the information from the testing operation	12.1 Explain the standard recording and reporting procedures that should be used 12.2 Identify the correct documentation that should be used and why it is important to complete it accurately			
13 Be able to record the information from the testing operation	13.1 Record any deviations from set procedure or anticipated results and take the appropriate action 13.2 Complete the correct documentation and store in accordance with standard operating procedures			
14 Know how to respond to the test results	14.1 Identify the acceptable range of test results 14.2 Identify the actions that may need to be taken in the event of an abnormal result 14.3 Explain how to deal with deviations, including reporting lines and procedures			
15 Be able to respond to the test results	15.1 Evaluate the results of the test 15.2 Make recommendations appropriate to the test results			

Learning outcomes	Assessment criteria	Evidence type	Portfolio reference	Date
16 Know how to work to organisational and operational procedures	16.1 Explain what own responsibilities are with regard to health, safety and the environment in the working area 16.2 Identify what the approved codes of practice are and why it is important to follow them 16.3 Summarise the organisation's policy and procedures on safe working practices 16.4 Explain why it is important to follow safe operating procedures when using equipment and/or materials			
17 Be able to work to organisational and operational procedures	17.1 Identify safety, health and environmental requirements 17.2 Work safely at all times, complying with health and safety, environmental and other relevant regulations and guidelines 17.3 Ensure that all waste material is dealt with appropriately			

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Unit 8: Carry Out Routine Servicing Procedures on Polymer Process Plant and Equipment Within Polymer Processing and Related Environments

Unit reference number: H/602/1548

Level: 3

Credit value: 7

Guided learning hours: 36

Assessment requirements/evidence requirements

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

The assumed pre-requisite is that the learner undertaking this unit will be an operator, developing their role and seeking accreditation for their skills and knowledge.

Assessment Context

This unit is about showing competence in carrying out service and routine maintenance on plant and process equipment. The learner will be required to complete the servicing procedures in a timely manner by following procedures and completing the appropriate documentation. The learner will be following the organisation's safe working practices and if required, work within the work permit procedures.

Regulations and guidelines include: maintaining all relevant health, safety and environmental requirements and regulations; work within the scope of the standard operating procedure or in accordance with organisational procedures and guidelines.

The level and extent of responsibility involves the learner being responsible for ensuring the servicing procedures are carried out safely by following company defined procedures. The learner will be accountable for the integrity of the work and ensuring the work is recorded in a formal manner. Authorisation for proceeding with the work will follow organisational procedures.

The plant or equipment to be serviced relates to: polymer processing machines, primary equipment, downstream equipment, ancillary equipment, finishing equipment.

Maintenance schedules and related specifications would normally include:

- authorisation procedures
- product worksheets
- tests
- internal maintenance/servicing schedules
- safe working practices
- methods statements
- records
- timescales.

Servicing procedures and activities to be followed are fully defined within the company maintenance/service procedures.

The quality standards and accuracy to be achieved relate to: company quality assurance, quality control specifications.

Assessment methodology

This unit is assessed in the workplace, simulation is not permitted. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Know how to carry out routine services	1.1	Describe the maintenance schedules and related specifications that are to be worked to			
		1.2	Identify the servicing methods and procedures including the recording procedures			
		1.3	Identify personal responsibilities for the care and control of equipment			
2	Be able to carry out routine services	2.1	Follow the relevant maintenance schedules to carry out the required work			
		2.2	Carry out the maintenance activities within the limits of personal authority			
		2.3	Carry out the maintenance activities in the specified sequence and in an agreed time scale			
3	Be able to deal with problems	3.1	Report any instances where the maintenance activities cannot be fully met			
		3.2	Report identified defects outside the planned schedule			
4	Know how to record and report the required information	4.1	Describe personal responsibilities with regard to the reporting lines and procedures in own working environment			
5	Be able to record and report the required information	5.1	Complete relevant maintenance records accurately			
		5.2	Pass the records on to the appropriate person			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
6	Know how to work to organisational and operational procedures	6.1	Describe the relevant regulations and the safe working practices and procedures required within own work area			
		6.2	Explain the authorisation procedures that should be followed and limits of responsibility and authority in line with company and manufacturers' procedures			
		6.3	Identify personal responsibilities in respect of Health, Safety and Environment			
		6.4	Describe the legal responsibility for personal health and safety and the health and safety of others			
		6.5	Describe the appropriate methods and waste disposal procedures in relation to legislation, regulation and procedures for waste segregation			
7	Be able to work to organisational and operational procedures	7.1	Work safely at all times, complying with health and safety, environmental and other relevant regulations, legislation and guidelines			
		7.2	Dispose of waste materials in accordance with safe working practices and approved procedures			

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Unit 9: Plan Polymer Process Activities Within Polymer Processing and Related Environments

Unit reference number: J/602/1610

Level: 3

Credit value: 4

Guided learning hours: 30

Assessment requirements/evidence requirements

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their skills and knowledge.

Assessment Context

This unit is for those with responsibility for the management of the polymer process resources and equipment. It covers planning, by monitoring process schedules or checking the human resources are available.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices as they apply to the learner.

Activities can include: meeting productivity targets, providing support to a process, planning and overcoming production blockages.

Operations include: routine and non-routine processing activities.

Resources relate to: materials, equipment, people.

Assessment methodology

This unit is assessed in the workplace, simulation is not permitted. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Know the factors that affect the planning of polymer process activities	1.1	Identify the operations to be carried out			
		1.2	Explain the risk assessments necessary for the operation of the plan			
		1.3	Explain how to determine the sequence of tasks to carry out the plan			
		1.4	Describe how to establish the working methods to use			
		1.5	Summarise how to establish what resources are required and where to get them from			
		1.6	Identify any special requirements, eg prioritisation, sequencing rules, technical issues, safety issues, and state how to incorporate these into plans			
2	Be able to take account of the factors that affect the planning of polymer process activities	2.1	Collect the information needed to prepare for the activity			
		2.2	Identify the operations to be carried out and determine their sequence			
		2.3	Identify health and safety issues and safe procedures which must be followed			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
3	Know how to plan polymer process activities	3.1	Identify where to get the information needed to prepare a plan			
		3.2	Explain how to estimate timescales for the plan, including making allowances for delays			
		3.3	Identify who to inform when plans are complete			
		3.4	Explain how to communicate plans to those responsible for their implementation			
4	Be able to plan polymer process activities	4.1	Identify any special requirements and incorporate them in the activity			
		4.2	Estimate timescales required			
		4.3	Establish which methods are required and what resources are to be used			
5	Know how to communicate the plan to others	5.1	Explain the format of presentations for the plan			
		5.2	Clarify how to formally record plans			
6	Be able to communicate the plan to others	6.1	Record the activity in a logical way and using appropriate documentation			
		6.2	Inform the appropriate people when the activity is completed			
7	Know how to deal with problems	7.1	Explain own level of authority to deal with problems which affect planning activities, or may affect the implementation of plans			
		7.2	Identify who to report issues to which cannot be resolved, and the procedure for doing so			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
8	Be able to deal with problems	8.1	Deal effectively with problems within own control and report those that cannot be solved			
9	Know how to work to organisational and operational requirements	9.1	Identify the health and safety legislation, environmental regulations and safe working practices and procedures that apply			
		9.2	Describe the specific safe working practices or regulations which apply to the tasks necessary to meet the plan			
10	Be able to work to organisational and operational requirements	10.1	Plan the activity to comply with health and safety legislation, environmental regulations and safe working practices and procedures			

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Unit 10: Carry Out Complex Manual Operations Within Polymer Processing and Related Environments

Unit reference number: H/602/1565

Level: 3

Credit value: 6

Guided learning hours: 32

Assessment requirements/evidence requirements

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their skills and knowledge.

Assessment Context

This unit is concerned with producing process outcomes by carrying out complex manual operations. It is suitable for process industries' personnel who have responsibility for complex manual operations at any stage of the process, including complex manual packaging. During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices as they apply to the learner.

Regulations and guidelines include: maintaining all relevant health, safety and environmental requirements and regulations; work within the scope of the standard operating procedure or in accordance with organisational procedures and guidelines.

Equipment relates to: manual and powered tools.

Equipment maintenance should include: replacement of components, lubrication, tightening of connections and cleaning.

Specifications relate to: quantity, dimensions, quality.

Problems are: those that can be dealt with directly, those that require the assistance of another operator to solve, those that need to be reported and specialist assistance sought, those with an obvious probable cause, those with two or more possible causes, those with no obvious cause.

Actions relate to: repair and completing remedial work.

Assessment methodology

This unit is assessed in the workplace, simulation is not permitted. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

Learning outcomes and assessment criteria

Learning outcomes	Assessment criteria	Evidence type	Portfolio reference	Date
1 Know how to meet production requirements for complex manual operations	1.1 Identify the technical and production implications of the specifications to be met 1.2 Explain where to get the specification for a given job and the information it normally contains 1.3 Identify the units of measurement that are used and what they mean			
2 Know how to prepare equipment for complex manual operations	2.1 Identify the process equipment that is used in manual operations and where it is kept 2.2 Explain the differences between variances caused by equipment malfunction or failure, those caused by non-conforming materials and those caused by processing problems 2.3 Explain how to recognise possible faults and defects in equipment from their appearance, sound and smell 2.4 Describe the sort of adjustments that can be made to ensure the right outcomes in manual operations 2.5 Explain any specific environmental conditions to be taken into consideration			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
3	Know how to maintain equipment used in complex manual operations	3.1	Identify the possible problems with equipment that need maintenance attention			
		3.2	Explain the equipment adjustments and maintenance that can be carried out by the operator and which need specialist attention			
		3.3	Identify the adjustments that are made off-line and which are made under operational conditions			
		3.4	Explain why equipment may need to be dismantled and cleaned after use			
		3.5	Explain the procedures that should be followed to carry out basic maintenance of equipment			
4	Be able to prepare equipment for the production process	4.1	Select the correct equipment to achieve the specified outcomes and identify which configuration would be the most appropriate for safe and efficient operation			
		4.2	Check and confirm that the equipment to be used has no obvious faults and defects and is supplied with the correct services for safe and effective operation			
		4.3	Use the correct procedures to call for any equipment maintenance needed			
5	Know how to prepare materials for the production process	5.1	Identify the different materials that are used in processes, their characteristics and what happens to them as they are processed			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
6	Be able to prepare materials for the production process	6.1	Check and confirm that the materials for the operation meet the specifications			
		6.2	Ensure the materials are ready for the operation in a safe and secure manner			
7	Know how to produce products using complex manual operations	7.1	Identify safety limits that apply to different processing operations and the risks associated with making adjustments outside of these limits			
		7.2	Describe the circumstances when processing specifications need to be amended to reflect process parameter changes			
8	Be able to produce products by complex manual operations	8.1	Use complex hand-based techniques in a safe and effective manner			
		8.2	Meet production schedules and make economic use of materials and service			
		8.3	Pass on outputs which meet the specification to the next stage in production safely discarding any which do not			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
9	Be able to reinstate the work area	9.1	Remove any residual and waste materials into suitable storage, handling them safely to avoid loss and contamination			
		9.2	Clean any waste and contamination off the equipment and surrounding work area using specified cleaning materials and procedures			
		9.3	Return any removable components to the correct storage locations after use			
		9.4	Make sure that equipment is left in a suitable state after use			
		9.5	Carry out work activities to meet environmental requirements			
10	Know how to work safely when carrying out complex manual operations	10.1	Identify the safety standards that apply to the process environment			
		10.2	Identify the sorts of risks that are present in a process environment			
		10.3	Explain the risk control measures that are in place and why it is important to comply with them			
		10.4	Explain what hazards to people and the environment arise from mishandling and mis-processing materials			

Learning outcomes	Assessment criteria	Evidence type	Portfolio reference	Date
11 Know how to deal with problems	11.1 Explain what types of problem occur in manual operations and what the early warning signs are 11.2 Explain how to investigate the causes of problems 11.3 Analyse the interventions that could be applied 11.4 Explain the consequences of not dealing with a problem in a timely manner			
12 Be able to deal with problems	12.1 Recognise variations in the outcomes promptly and make adjustments as needed to optimise the achievement of specifications 12.2 Identify the probable causes of any problems which occur promptly 12.3 Take action to overcome the problem and achieve the required specification 12.4 Seek immediate advice from specialist colleagues if problems cannot be solved by direct intervention			
13 Be able to maintain quality	13.1 Monitor the operation so that an optimum outcome is achieved and in line with standard operating procedures 13.2 Demonstrate the level of control possible with manual operations			
14 Know how to maintain records	14.1 Describe how to read and analyse relevant data in tables, printouts and schematics			
15 Be able to maintain records	15.1 Make sure that process documentation and records are kept up to date, accurate, complete 15.2 Ensure that records are stored in the correct place			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
16	Know how to work to organisational and operational procedures	16.1	Explain what own personal responsibilities with regard to health, safety and the environment in the working area are			
		16.2	Identify the personal protective equipment requirements that are appropriate to different processing tasks			
		16.3	Summarise the precautions and procedures that should be applied when handling materials at each stage of the process and in storage			
17	Be able to work to organisational and operational procedures	17.1	Work safely at all times, complying with health and safety, environmental and other relevant regulations, legislation and guidelines			
		17.2	Follow the safety, health and environmental procedures for the operation			

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Unit 11: Evaluate and Adjust Manual Operations Within Polymer Processing and Related Environments

Unit reference number: H/602/1601

Level: 3

Credit value: 7

Guided learning hours: 40

Assessment requirements/evidence requirements

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

The assumed pre-requisite is that the learner undertaking this unit will be a technician seeking recognition of their skills and knowledge.

Assessment Context

This unit is about evaluating and adjusting manual operations to optimise production. It covers non-routine adjustments made to manual operations to improve quality of output and/or rate of production. It is suitable for process industries' personnel who work within an organisational context which requires them to achieve clearly defined specifications. The work is such that the individual would be expected to clarify and resolve processing issues either as the process operator, quality technician or in a 'trouble shooting' role.

Examples of production operations that might be involved include:

- laminating
- assembly
- welding/bonding
- fabrication
- re-treading tyres.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices as they apply to the learner.

Regulations and guidelines include: maintaining all relevant health, safety and environmental requirements and regulations; work within the scope of the standard operating procedure or in accordance with organisational procedures and guidelines.

Monitoring can relate to: equipment performance, materials performance, quality of output, quantity of output.

Sources of information relate to: visual inspections of products, equipment monitoring devices, test outcomes.

Variance relates to: quality of output, production rate.

Causes of variances can be: equipment malfunction or failure, non-conforming materials, processing problems.

Others relate to: co-workers, supervisor/line manager, technical specialists.

Specifications relate to the product and production.

Actions relate to: reporting changes to the person responsible for maintaining specifications, making changes to specifications within the limits of own authority.

Assessment methodology

This unit is assessed in the workplace, simulation is not permitted. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Understand the conditions needed for normal operating conditions	1.1	Explain the processing operations that are required to produce the product			
		1.2	Identify the sequence of processing operations required			
2	Know how to monitor systems to identify deviations from the process parameters	2.1	Explain why monitoring operations should be done over a period of time and not just on a single occasion			
		2.2	Identify the length of monitoring time appropriate for the process operations			
		2.3	Explain how to collect and collate data from different sources			
		2.4	Identify the quality checks that should be carried out			
		2.5	Explain how to identify variances and deviations from the quality checks			
3	Be able to monitor process operations to identify deviations from normal operating parameters	3.1	Monitor manual operations over a period of time using appropriate sources of information			
		3.2	Identify variances over a period of time sufficient to identify patterns and levels of variance			
		3.3	Carry out prescribed quality checks to assess deviations from the product specification			
		3.4	Record all test results and assessments in sufficient detail to enable decisions to be made by interested parties			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
4	Know how to determine the cause of deviations	4.1	Explain the differences between variances caused by equipment malfunction or failure, those caused by non-conforming materials and those caused by processing problems			
		4.2	Identify who to consult when there is uncertainty about the cause and effects of deviations from specification			
		4.3	Explain how to analyse output against specifications			
5	Be able to determine the cause of deviations	5.1	Analyse output patterns against specifications to clarify the nature of the problem			
		5.2	Identify the cause and effects of deviations from specification			
		5.3	Investigate the problem thoroughly to identify the likely cause of the problem			
		5.4	Seek advice from others when the cause of deviations or the appropriate corrective actions are uncertain			
6	Know how to modify the process parameters	6.1	Explain how to adjust operations to achieve the required specifications			
		6.2	Explain how to follow the prescribed sequence for adjusting operations and the implications of making adjustments out of sequence			
		6.3	Identify safety limits that apply to different processing operations and the risks associated with making adjustments outside of these limits			

Learning outcomes	Assessment criteria	Evidence type	Portfolio reference	Date
	6.4 Judge the circumstances when processing specifications need to be amended to reflect process parameter changes 6.5 Explain the organisational procedures for amending specifications			
7 Be able to modify process parameters	7.1 Adjust the operation as necessary, to optimise the efficiency and effectiveness of the production process 7.2 Adjust the operations in the correct sequence and at the appropriate stage in the process to achieve the required specifications			
8 Know how to communicate information about deviations and modifications	8.1 Identify the sorts of records that are kept and how to complete them 8.2 Explain the purpose of different records and the implications of not maintaining them effectively 8.3 Explain how to present test results and assessments to decide what corrective actions to take 8.4 Identify the lines of communication and command that should be followed in a given situation			
9 Be able to communicate information about deviations and modifications	9.1 Record any changes made to the operations and take appropriate action to amend the processing specification 9.2 Record information about the nature and effects of deviations, and the remedial actions taken, in the required format			

Learning outcomes	Assessment criteria	Evidence type	Portfolio reference	Date
	9.3 Pass information to the appropriate people within the specified timescale in accordance with organisational procedures			
10 Know how to work to organisational and operational procedures	10.1 Identify the safety limits that apply to different processing operations 10.2 Identify the risks associated with making adjustments outside of these safety limits 10.3 Identify the agreed workplace health and safety procedures that relate to controlling risks to health and safety in the process environment 10.4 Explain what safe working practices apply to own job role in evaluating and adjusting manual processing operations			
11 Be able to work to organisational and operational procedures	11.1 Work safely at all times, complying with health and safety, environmental and other relevant regulations, legislation and guidelines 11.2 Report any equipment malfunction or failure to the appropriate person promptly			

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Further information and useful publications

To get in touch with us visit our 'Contact us' pages:

- Edexcel, BTEC and Pearson Work Based Learning contact details: qualifications.pearson.com/en/support/contact-us.html
- books, software and online resources for UK schools and colleges: www.pearsonschoolsandfecolleges.co.uk

Key publications

- *Adjustments for candidates with disabilities and learning difficulties, Access and Arrangements and Reasonable Adjustments, General and Vocational qualifications* (Joint Council for Qualifications (JCQ))
- *Supplementary guidance for reasonable adjustments and special consideration in vocational internally assessed units* (Pearson)
- *General and Vocational qualifications, Suspected Malpractice in Examination and Assessments: Policies and Procedures* (JCQ)
- *Equality Policy* (Pearson)
- *Recognition of Prior Learning Policy and Process* (Pearson)
- *UK Information Manual* (Pearson)
- *Pearson Edexcel NVQs, SVQs and competence-based qualifications – Delivery Requirements and Quality Assurance Guidance* (Pearson)

All of these publications are available on our website: qualifications.pearson.com

Further information and publications on the delivery and quality assurance of NVQ/Competence-based qualifications are available at our website on the Delivering BTEC pages. Our publications catalogue lists all the material available to support our qualifications. To access the catalogue and order publications, please go to the resources page of our website.

How to obtain National Occupational Standards

To obtain the National Occupational Standards go to www.ukstandards.org.uk.

Professional development and training

Pearson supports UK and international customers with training related to NVQ and BTEC qualifications. This support is available through a choice of training options offered in our published training directory or through customised training at your centre.

The support we offer focuses on a range of issues including:

- planning for the delivery of a new programme
- planning for assessment and grading
- developing effective assignments
- building your team and teamwork skills
- developing student-centred learning and teaching approaches
- building functional skills into your programme
- building effective and efficient quality assurance systems.

The national programme of training we offer can be viewed on our website (qualifications.pearson.com). You can request customised training through the website or by contacting one of our advisers in the Training from the Pearson team via Customer Services to discuss your training needs.

The training we provide:

- is active
- is designed to be supportive and thought provoking
- builds on best practice
- may be suitable for those seeking evidence for their continuing professional development.

Annexe A: Quality assurance

Key principles of quality assurance

- A centre delivering Pearson qualifications must be an Pearson-recognised centre and must have approval its qualifications.
- The centre agrees, as part of gaining recognition, to abide by specific terms and conditions relating to the effective delivery and quality assurance of assessment. The centre must abide by these conditions throughout the period of delivery.
- Pearson makes available to approved centres a range of materials and opportunities to exemplify the processes required for effective assessment and provide examples of effective standards. Approved centres must use the guidance on assessment to ensure that staff who are delivering Pearson qualifications are applying consistent standards.
- An approved centre must follow agreed protocols for: standardisation of assessors; planning, monitoring and recording of assessment processes; internal verification and recording of internal verification processes and dealing with special circumstances, appeals and malpractice.

Quality assurance processes

The approach to quality assured assessment is made through a partnership between a recognised centre and Pearson. Pearson is committed to ensuring that it follows best practice and employs appropriate technology to support quality assurance processes where practicable. The specific arrangements for working with centres will vary. Pearson seeks to ensure that the quality-assurance processes it uses do not inflict undue bureaucratic processes on centres, and works to support them in providing robust quality-assurance processes.

The learning outcomes and assessment criteria in each unit within this specification set out the standard to be achieved by each learner in order to gain each qualification. Pearson operates a quality-assurance process, designed to ensure that these standards are maintained by all assessors and verifiers.

For the purposes of quality assurance, all individual qualifications and units are considered as a whole. Centres offering these qualifications must be committed to ensuring the quality of the units and qualifications they offer, through effective standardisation of assessors and internal verification of assessor decisions. Centre quality assurance and assessment processes are monitored by Pearson.

The Pearson quality-assurance processes will involve:

- gaining centre recognition and qualification approval if a centre is not currently approved to offer Pearson qualifications
- annual visits to centres by Pearson for quality review and development of overarching processes and quality standards. Quality review and development visits will be conducted by a Pearson quality development reviewer
- annual visits by occupationally competent and qualified Pearson Standards Verifiers for sampling of internal verification and assessor decisions for the occupational sector
- the provision of support, advice and guidance towards the achievement of National Occupational Standards.

Centres are required to declare their commitment to ensuring quality and appropriate opportunities for learners that lead to valid and accurate assessment outcomes. In addition, centres will commit to undertaking defined training and online standardisation activities.

Annexe B: Centre certification and registration

Pearson Standards Verifiers will provide support, advice and guidance to centres to achieve Direct Claims Status (DCS). Pearson will maintain the integrity of Pearson NVQs/competence qualifications through ensuring that their awarding is secure. Where there are quality issues identified in the delivery of programmes, Pearson will exercise the right to:

- direct centres to take action
- limit or suspend certification
- suspend registration.

The approach of Pearson in such circumstances is to work with the centre to overcome the problems identified. If additional training is required, Edexcel will aim to secure the appropriate expertise to provide this.

What are the access arrangements and special considerations for the qualifications in this specification?

Centres are required to recruit learners to Pearson qualifications with integrity.

Appropriate steps should be taken to assess each applicant's potential and a professional judgement should be made about their ability to successfully complete the programme of study and achieve the qualification. This assessment will need to take account of the support available to the learner within the centre during their programme of study and any specific support that might be necessary to allow the learner to access the assessment for the qualification. Centres should consult Pearson's policy on learners with particular requirements.

Pearson's policy on access arrangements and special considerations for Pearson qualifications aims to enhance access to the qualifications for learners with disabilities and other difficulties (as defined by the 2010 Equality Act) without compromising the assessment of skills, knowledge, understanding or competence. Please refer to *Access Arrangements and Special Considerations for BTEC and Pearson Edexcel NVQ Qualifications* for further details. qualifications.pearson.com.

Annexe C: Assessment requirements/strategy

1) Introduction

This Assessment Strategy presents a single overarching strategy for competence based qualifications within the Cogent sector.

a. The UKCG guidance on assessment strategies requires SSCs to develop strategic guidance on the principles which Awarding Bodies shall follow when designing and implementing N/SVQs in their sectors.

b. With the introduction of the new 'Qualifications and Credit Framework' in England, Wales and Northern Ireland the scope of the Cogent Assessment Strategy has also been extended to include any competence related qualifications, approved within the QCF, with the following purpose:

- to demonstrate that an individual has the necessary skills and/or knowledge to perform a given job role competently
- to demonstrate that an individual has the necessary skills and/or knowledge to perform a specific function(s) or task(s) competently.

c. The requirements have been brought together in this single document in order to avoid repetition and they represent a key part of the assessment process.

d. This strategy is supplemented by award-specific assessment requirements which identify appropriate forms of evidence for the particular competence being assessed.

e. This assessment strategy shall apply to all new qualification frameworks and awards submitted after approval by UKCG.

f. Awarding Bodies representing the four nations have all been involved with the development of this assessment strategy and provided supporting letters.

g. Awarding Bodies will ensure that all practices related to assessment of Cogent S/NVQs will be conducted in accordance with the codes of practice and guidelines as set out in QCA's 'NVQ Criteria and Codes of Practice' and SQA Accreditation's 'Approved Awarding Body Criteria (2007)'

h. This strategy is set out in terms of four components, each of which is given below. They are:

- requirements for mandatory use of evidence from workplace performance;
- aspects of the standards for which the use of simulation is to be permitted and design characteristics which those simulations must address;
- definitions of the occupational competence requirements of assessors and verifiers; and
- the recommended approach to external quality control.

2) Mandatory use of evidence from workplace performance

i. Unless the use of simulation is expressly permitted within the qualification or unit specific evidence requirements, evidence must demonstrate the candidate's competence in a real or realistic environment.

j. Knowledge and Understanding will be assessed via (pre-set and/or free form) questions, or by inference from performance, which cover three primary types of knowledge:

- knowledge of facts and procedures
- understanding of principles, concepts and underpinning procedures
- how to apply principles and procedures in specific contexts.

All questions must be asked by the assessor at appropriate moments throughout the assessment process, preferably linked to observed activity and/or review of documentary evidence. The questions asked of, and answers provided by, the candidate must be recorded.

k. In England and Wales, where the candidate is undertaking an NVQ within the context of an Apprenticeship/Foundation Modern Apprenticeship for which there is no Technical Certificate component the knowledge and understanding requirements must be separately assessed, recorded and evidenced. This must be done through the use of written question and answer evidence which is externally verified by the relevant Awarding Body. Alternative arrangements can be made for those candidates with special needs where appropriate. Examples of these Apprenticeships are L2 Apprenticeships/Foundation Modern Apprenticeship in Radiation Protection, Signmaking and Polymer Processing.

3) Use of Simulation

l. The qualification or unit specific assessment requirements will define where evidence from simulation is acceptable, and in which contexts. A full summary of these requirements for existing N/SVQs can be found in Appendix A of Cogent's Assessment Strategy for the Chemical, Pharmaceutical, Nuclear, Oil and Gas, Petroleum and Polymer Industries (www.cogent-ssc.com).

m. The requirements for any new qualifications accredited to the QCF from August 2008 onwards will be added to Appendix B of Cogent's Assessment Strategy for the Chemical, Pharmaceutical, Nuclear, Oil and Gas, Petroleum and Polymer Industries (www.cogent-ssc.com) on an incremental basis.

n. Simulation, where permissible, may be used to provide evidence in two different scenarios:

Scenario 1 – (applicable to any competence related qualifications, including N/SVQs) in order to demonstrate particular competences/units that would be difficult or dangerous to demonstrate directly

Scenario 2 – (only applicable to NVQs) in order to demonstrate the acquisition of knowledge and skills where the achievement of a competence based qualification is not possible (eg as the basis for year 1 of an Advanced/Modern Apprenticeship – England and Wales only). This qualification would be Process Engineering Maintenance L2.

o. Scenario 1 – Where simulation is used to demonstrate particular competences/units that would be difficult or dangerous to demonstrate directly (eg in dealing with emergencies).

N.B. This scenario is applicable to any competence related qualifications, including N/SVQs.

Simulation should be used only where direct evidence of candidate performance cannot be obtained. Under these circumstances simulation may be used for summative assessment. Reasons for the use of simulation should be made clear to and agreed by the External Verifier and should include the following details:

- which competence (and standards) the simulation was designed to assess;
- the kind of equipment, facilities and physical environment proposed for the simulation of performance. It is unlikely that the External Verifier will approve a simulation if it does not involve real plant and equipment;
- how the simulated activity relates to the candidate's normal work context in terms of the pressures of time, access to resources and access to information, and the communication media; and
- how the simulation was set up and conducted, preferably supported by physical evidence such as photographs or inspection of a test rig.

Assessors, internal verifiers and external verifiers should monitor the proportion of evidence generated via simulations to ensure that it is not the primary source of a candidate's claim to competence.

p. Under these circumstances simulations are reserved for aspects of competence illustrated by the following contexts:

- where demonstration of emergency shutdown and related safety procedures would be: dangerous and/or disruptive to plant/environment/individuals; too costly such as total plant shutdown or dealing with spillage of dangerous substances; where issues of confidentiality restrict access to real work opportunities;
- demonstrating specific aspects of the operation which rarely or never occur due to effective QA systems;
- the capacity to integrate disparate knowledge to cope with unforeseen events and to solve problems; or
- aspects of working relationships and communications for which no opportunity has presented for the use of naturally occurring workplace evidence of candidate performance.

q. Simulation must enable the individual to demonstrate competence in a real or realistic work environment. In this context this means in specialist centres which replicate the workplace in terms of equipment and environment, reflect normal working situations and use relevant industrial or commercial standards and procedures. Short work placements or non-realistic work environments which do not replicate the pressures and requirements of normal commercial or industrial activities will not be acceptable. The bulk of the candidate's evidence should be drawn from their normal working activity and not consist of artificially contrived opportunities for one-off demonstration of

competence. Similarly equipment must be that used in current commercial and industrial contexts. Procedures and standards used should be those which are nationally or internationally recognised or devised by specific companies as standard operating procedure.

r. Scenario 2 – Where simulation is used to demonstrate the acquisition of knowledge and skills where the achievement of a competence based qualification is not possible. In England and Wales, an apprentice who is registered on a Cogent Advanced Apprenticeship/Modern Apprenticeship may use simulation on the NVQ L2 Process Engineering Maintenance as part of the basic apprenticeship training. For any person completing this qualification that fails to complete the Advanced Apprenticeship/Modern Apprenticeship it will state on their completion certificate that this qualification was assessed in a simulated environment.

The development of the Cogent 'Community Apprenticeship' model has highlighted the need to make NVQ L2 Process Engineering Maintenance available for completion through a college or other training provider 'off-site'. This is to enable the candidate to begin acquiring the skills and knowledge required to work in the Cogent industries prior to undertaking the NVQ level 3 with an employer in the normal way. Under these circumstances simulation may be used, with the prior agreement of the External Verifier, for summative assessment across the whole qualification.

s. Simulation must enable the individual to acquire his/her skills and knowledge in a realistic work environment. In this context this means in specialist centres which replicate the workplace in terms of equipment and environment, it reflects normal working situations and uses relevant industrial or commercial standards and procedures. Where possible providers should attempt to replicate the pressures and requirements of normal commercial or industrial activities. Equipment must be that used in current commercial and industrial contexts. Procedures and standards used should be those which are nationally or internationally recognised or devised by specific companies as standard operating procedure.

t. Circumstances outside of scenarios 1 and 2 above may also be considered suitable for the use of simulation with the agreement of the External Verifier, Awarding Body and Sector Skills Council. Under these circumstances simulation may be used for formative assessment only.

4) Occupational competence of assessor and verifiers

u. Assessors:

- must be competent in the units they are assessing. This is shown through the assessor having achieved the award they are assessing OR providing quality evidence to the external verifier that they are able to make valid judgements of the competence of candidates. This could be done through a combination of a) personal interview, b) review of employment histories and/or c) examination of the assessor's judgement during assessments.
- must have a working knowledge of awards and a full understanding of that part of the award for which they have responsibility.

- should hold or be working towards suitable qualifications for assessment, as defined by the Qualification Regulator(s). Organisations should consult with the relevant awarding organisation regarding approval for exemptions.

v. Internal verifiers:

- must be either working in the appropriate sector itself OR they must be able to demonstrate they possess practical and up-to-date knowledge of current working practices appropriate to the sector in which they are carrying out verification practices; and
- must be appointed by an approved centre
- must have a working knowledge of the awards they are internally verifying
- should hold or be working towards suitable qualifications for verification, as defined by the Qualification Regulator(s). Organisations should consult with the relevant awarding organisation regarding approval for exemptions.

w. External Verifiers:

- must be familiar with the industry, and have an understanding of the technical processes and terminology used. The Awarding Body, through examination of relevant CVs and references, will confirm this.
- should hold or be working towards suitable qualifications for verification, as defined by the Qualification Regulator(s).

5) External Quality Control

x. The external quality control of assessment is to be ensured, in this highly regulated and safety-critical sector, through the use of competent external verifiers.

y. External quality control will be undertaken by one of two methods to be selected at the choice of the Awarding Body. These are:

- Statistical Monitoring in which the risk rating of centres is determined through the collection of a range data types. Awarding Bodies delivering the awards should provide arrangements for fulfilling these requirements.

OR

- Enhanced External Verification in which one critical unit (identified by the standards-setting body) is to be sampled at all external verification events. Where there have been no candidates assessed in a centre for this unit, the external verifier will duly record this fact. This enhanced external verification model will cover the evidence assessed by each assessor involved in the assessment of the safety-critical unit over a twelve month period.

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