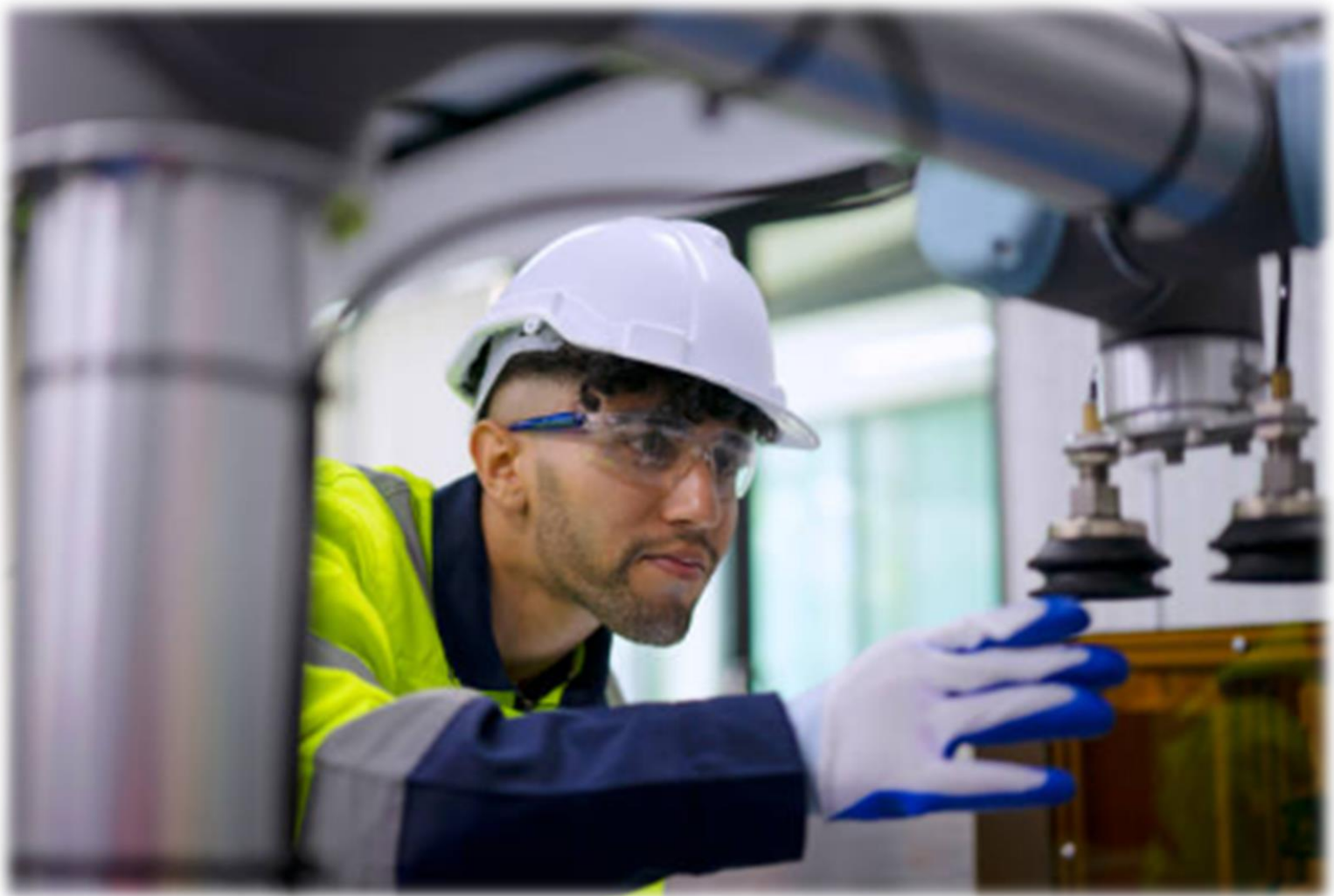


**Polymer Processing Technician
Level 3 Apprenticeship Standard (ST1328)
Specification**



This guide describes the different types of End-Point Assessment tests, the test rules and who should be involved. Preparing for End-Point Assessment and working with SIAS are also covered.

SIAS is the science industry assessment service. It is part of the Cogent Skills Group. For further information about apprenticeship standards and Trailblazers please contact info@siasuk.com.

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Qualification Objective

The aim of this qualification is to ensure that the apprentice is occupationally competent against the knowledge, skills and behaviours outlined in the assessment plan for this standard.

This occupation is found in the process manufacturing sector.

A polymer is a substance or material made of long repeating chains of molecules. There are several types of polymers. They have different properties: light, heavy, strong, tough, and flexible, depending on the type of molecules bonded and how they are bonded. They are used for a wide variety of purposes in both everyday consumer products and highly demanding technical applications. Elastomer and rubber for example, are used for tyres and components such as seals and gaskets. PVC is used for water pipes, window frames, and cable insulation. Nylon and polyester are used in clothing. And plastics are used in mobile phones, computer hardware, automotive, medical devices, aerospace, disability aides, water bottles, and vacuum cleaners.

Polymer processing technicians produce polymer products to a specification. They work in a production facility - often on a large scale, using a range of machinery, control systems and engineering equipment. Products are made using continuous or in batch processes. Polymer processing technicians set up or configure equipment and tooling and prepare materials for processing. They run and monitor the process, adjusting parameters. They use unique technologies and processes such as extrusion, blow moulding, thermoforming, rotational moulding, injection moulding, internal mixing, and calendaring. They undertake quality control, complete work records, and participate in improvement. They may also complete preventative maintenance and prepare polymer process equipment for maintenance and overhaul.

They work with other members of the production team. They also have contact with people from other functions such as, process engineers, maintenance engineers, laboratory staff, supply chain staff, and warehouse staff. They may also have contact with external people such as customers, service providers, suppliers, and regulators. They usually report to a production manager.

They must ensure that the process and products meet quality specifications and are produced to schedule. They must comply with health and safety regulations and procedures including wearing personal protection equipment (PPE). They also need to meet environmental and sustainability regulations and procedures – minimising waste and recycling materials. They may work as part of a small or large manufacturing team. They work with minimal supervision and are responsible for the quality of their own work. They may work shifts.

Prior Learning and Qualifications

There are no statutory/regulatory or other typical entry requirements.

Overview

A full-time polymer processing technician apprentice typically spends 36 months on-programme (this means in training before the gateway). The apprentice must spend at least

12 months on-programme and complete the required amount of off-the-job training in line with the apprenticeship funding rules.

The apprentice must complete their training and meet the gateway requirements before starting their end-point assessment (EPA). The EPA will assess occupational competence.

The EPA is taken in the EPA period. The EPA period starts when SIAS confirms the gateway requirements have been met and is typically 3 months.

This EPA has 3 assessment methods.

The grades available for each assessment method are below.

Assessment method 1 - observation with questions:

- fail
- pass
- distinction

Assessment method 2 - interview underpinned by a portfolio of evidence:

- fail
- pass
- distinction

Assessment method 3 - multiple-choice test:

- fail
- pass

The result from each assessment method is combined to decide the overall apprenticeship grade. The following grades are available for this apprenticeship:

- fail
- pass
- merit
- distinction

Competence Evaluation

During the apprenticeship, regular evaluation of the competence of the apprentice against the apprenticeship standard will help to ensure that they achieve full occupational competence by the end of their training, and they are ready for the EPA. Confirmation from the employer that the apprentice is fully competent is needed before the EPA can take place.

As competence evaluation is an in-programme activity, the process that is used for this has not been mandated. It is for the employer supported by their training provider to decide how they wish to do this. To help with this SIAS has produced the SIAS Competence Tracker.

Gateway Requirements

The apprentice's employer must be content that the apprentice has attained sufficient KSBs to complete the apprenticeship. The employer may take advice from the apprentice's training

provider, but the employer must make the decision. The apprentice will then enter the gateway.

The apprentice must meet the gateway requirements before starting their EPA.

The apprentice must:

- confirm they are ready to take the EPA
- have achieved English and mathematics qualifications in line with the apprenticeship funding rules

For the interview underpinned by a portfolio of evidence, the apprentice must submit a portfolio of evidence.

The apprentice must submit the gateway evidence to SIAS, including any organisation specific policies and procedures requested by SIAS.

Assessment Methods

This EPA has 3 assessment methods:

- observation with questions
- interview underpinned by a portfolio of evidence
- multiple-choice test

The assessment methods can be delivered in any order. The result of one assessment method does not need to be known before starting the next.

Assessment Method 1: Observation with questions

In the observation with questions, an end-point assessor observes the apprentice in their workplace and asks questions. The apprentice completes their day-to-day duties under normal working conditions. Simulation is not allowed. It gives the apprentice the opportunity to demonstrate the KSBs mapped to this assessment method.

This assessment method is being used because:

- this is a practical role.
- it can assess KSBs holistically.
- it should give employers assurance about an apprentice's competence as it takes place in a real work setting.
- the familiar environment should allow the apprentice to perform at their best.
- it is cost effective, tasks completed during the observation should contribute to workplace productivity and it makes use of the employer's resources and equipment.
- it allows for the assessment of KSBs that relate to interaction with colleagues.

The observation with questions must be structured to give the apprentice the opportunity to demonstrate the KSBs mapped to this assessment method to the highest available grade.

An end-point assessor must conduct and assess the observation with questions.

The end-point assessor must only observe one apprentice at a time to ensure quality and rigour. They must be as unobtrusive as possible.

SIAS must give the apprentice 2 weeks' notice of the observation with questions.

The observation must take 3 hours. The end-point assessor can increase the time of the observation with questions by up to 10%. This time is to allow the apprentice to complete a task or respond to a question if necessary.

The observation may be split into discrete sections held on the same working day.

SIAS must manage invigilation of the apprentice during the assessment, to maintain security of the EPA, in line with SIAS' malpractice policy. This includes breaks and moving between locations.

The end-point assessor will explain to the apprentice the format and timescales of the observation with questions before it starts. This does not count towards the assessment time.

The end-point assessor should observe the following during the observation:

- prepare polymer equipment and materials for processing.
- maintain the work area including risk assessment.
- set up, run, and monitor polymer processing.
- complete secondary operations.
- conduct quality assurance and control.
- complete preventative maintenance.
- communicate verbally.
- complete process documentation - digital or paper-based.

Activities may relate to the same or different processes or products. These activities provide the apprentice with the opportunity to demonstrate the KSBs mapped to this assessment method.

The end-point assessor must ask questions. Questioning can occur both during and after the observation.

The purpose of the questioning is to assess the apprentice's level of competence against the grading descriptors.

The time for questioning is included in the overall assessment time. The end-point assessor must ask at least 6 questions. To remain as unobtrusive as possible, the end-point assessor will ask questions during natural stops between tasks and after completion of work rather than disrupting the apprentice's flow. The end-point assessor will use the questions from SIAS' question bank or create their own questions in line with SIAS' training. Follow-up questions are allowed where clarification is required.

The end-point assessor must ask questions about KSBs that were not observed to gather assessment evidence. These questions are in addition to the above set number of questions for the observation with questions and should be kept to a minimum.

The end-point assessor must make the grading decision. The end-point assessor must assess the observation and responses to questions holistically when deciding the grade.

The end-point assessor must keep accurate records of the assessment and will record:

- the KSBs observed.
- the apprentice’s answers to questions.
- the KSBs demonstrated in answers to questions.
- the grade achieved.

The observation with questions must take place in the apprentice’s normal place of work for example, their employer’s premises or a customer’s premises. Equipment and resources needed for the observation must be provided by the employer and be in good and safe working condition.

Questioning that occurs after the observation should take place in a quiet room, free from distractions and influence.

Observation with Questions – Grading Descriptors

Theme KSBs	Pass The apprentice must demonstrate all of the pass descriptors	Distinction The apprentice must demonstrate all of the pass descriptors and all of the distinction descriptors
Work preparation K39 S1 S2	Reviews instructions or information to understand the task's requirements. (S1) Plans the task and identifies and organises resources required to complete it using planning, prioritising, and time management techniques with consideration for safety, environmental impact, security, quality and cost. (K39, S2)	Justifies the balance of cost, quality, safety, security, and environmental factors in planning decisions. (K39, S2)
Maintain the work area: health, safety, and environment K4 S3 S4 S6 B1	Identifies and documents hazards and risks in the workplace. (S3) Prioritises and applies health, safety, and environmental procedures in compliance with regulations and standards	Justifies complying with and prioritising health, safety, and environmental procedures in their work. (K4, S4, B1)

Theme KSBs	Pass The apprentice must demonstrate all of the pass descriptors	Distinction The apprentice must demonstrate all of the pass descriptors and all of the distinction descriptors
	mitigating against risks including segregating resources for reuse, recycling, and waste handling in line with company procedure. (K4, S4, S6, B1)	
Tools and equipment S8 S9 S10 S11	<p>Selects, configures, and checks mould tools, formers, dies, or other process equipment in line with procedures ensuring suitability for the task. (S8)</p> <p>Checks the installation and function of processing equipment for the process ensuring suitability for the task. (S9)</p> <p>Connects service connections in line with procedures ensuring suitability for the task. (S10)</p> <p>Checks hand tools, equipment, and machinery in line with procedures ensuring suitability for the task including checking calibration record if applicable. (S11)</p>	<p>Completes procedures efficiently for example, performs activities simultaneously to save time, avoids issues with no need to back-track. (S8, S9, S10, S11)</p>
Materials K24 S7	<p>Selects, checks, and prepares materials considering formulations, drying, weighing, conveying, mixing, blending and colouring of polymers in line with specification. (K24, S7)</p>	<p>Minimises waste in the preparation process for example, ensures bag is empty, only mixes what they need. Explains why it is important to follow the material preparation procedures. (K24, S7)</p>
Polymer processing and secondary operations	<p>Sets or checks machine settings using instructions.</p>	<p>Applies techniques in the manufacturing process to</p>

Theme KSBs	Pass The apprentice must demonstrate all of the pass descriptors	Distinction The apprentice must demonstrate all of the pass descriptors and all of the distinction descriptors
K27 S12 S13 S14 S15 S16 S22	<p>Adjusts machine settings for the speeds, positions, pressure, speed or time, distance to meet product specification.</p> <p>Starts up manufacturing processes in line with SOP.</p> <p>Monitors process feedback and adjusts process parameters to maintain specification.</p> <p>Shuts down manufacturing processes in line with SOP.</p> <p>Applies post processing techniques in line with SOP.</p> <p>(S12, S13, S14, S15, S16, S22)</p> <p>Outlines how SOPs support the tasks and why they are important, and how they are developed and maintained in their workplace. (K27)</p>	<p>achieve production efficiencies for example, minimises defects, operates above standard cycle speed parameters, quickly establishes correct operating conditions from test runs. (S12, S13, S14, S15, S16, S22)</p>
Quality assurance K29 S23 S24 S25 B3	<p>Takes responsibility for the quality of their own work by applying quality assurance processes and control checks, identifying and resolving issues in line with procedures. (K29, S23, S24, S25, B3)</p>	<p>Justifies the use of quality assurance and quality control methods for polymer manufacturing. (K29, S23, S24, S25, B3)</p>
Preventative maintenance K32 S27	<p>Applies preventative maintenance practices in line with strategy and</p>	<p>Explains the benefits of preventative maintenance practices. (K32, S27)</p>

Theme KSBs	Pass The apprentice must demonstrate all of the pass descriptors	Distinction The apprentice must demonstrate all of the pass descriptors and all of the distinction descriptors
	company practice. (K32, S27)	
Verbal communication K41 S30	Uses verbal communication techniques suitable for the context. (K41, S30)	None
Documentation K30 S31	Records or enters data for work tasks - paper based or electronic - in line with company procedures for documentation control and auditable records. (K30, S31)	None

Fail – An apprentice will fail where they do not demonstrate all the pass descriptors.

Observation with Questions – Knowledge, Skills and Behaviours

Ref	Grading descriptor
Knowledge	
K4	Health, safety, and environmental practice. Polymer manufacturing safety hazards – risks they pose and their management: temperature, pressure, and fumes. Polymer processing safety guidance. Risk assessment and safe systems of work. Personal Protective Equipment (PPE) requirements. Resource reuse, recycling, and waste handling procedures.
K24	Polymer processing material preparation requirements: formulations, drying, weighing, conveying, mixing, blending, and colouring of polymers.
K27	Standard operating procedures: their purpose and why they are important, how they are developed and maintained.
K29	Quality assurance, testing, inspection, and sampling methods. Process and control systems.
K30	Documentation requirements: documentation control, auditable records.
K32	Preventative maintenance strategy and practice.
K39	Planning, prioritising, and time management techniques.
K41	Verbal communication techniques.
Skills	
S1	Review instructions or information. For example, work instructions, sampling requirements, drawings dimensioning, labelling, formulations, machine settings.
S2	Plan task and identify and organise resources with consideration for safety, environmental impact, security, quality and cost.
S3	Identify and document hazards and risks in the workplace.
S4	Apply health, safety, and environmental procedures in compliance with regulations and standards. For example, daily machine checks, wearing personal protective equipment.
S6	Segregate resources for reuse, recycling, and handling.

S7	Select, check, and prepare materials for polymer processing for example, weighing, control and blending, and conditioning.
S8	Select, configure (for example, replace or change inserts) and check mould tools, formers, dies or other process equipment.
S9	Check installation and function of processing equipment for the process.
S10	Connect service connections such as water, electrical, pneumatic, hydraulic.
S11	Check hand tools, equipment and machinery including calibration record where applicable.
S12	Set or check machine settings using instructions such as temperature, pressure, speed or time, distance.
S13	Adjust machine setting for the speeds, positions, pressures and safety of the mould tool, former or die movement to meet product specification.
S14	Start up manufacturing processes.
S15	Monitor process feedback and adjust process parameters.
S16	Shut down manufacturing processes.
S22	Apply post processing techniques for example, assembly, printing, decorating, cooling operations, packing, and labelling.
S23	Follow quality assurance processes during manufacture.
S24	Perform quality control checks. For example, conduct parameter checks (size, colour, weight), and take samples.
S25	Identify quality issues and resolve for example, defects, maintenance requirements.
S27	Apply preventative maintenance practices. For example, checking guarding, lubrication, cleaning of tooling, safety checks, and inspection for wear and tear.
S30	Communicate with others verbally for example, colleagues and stakeholders.
S31	Record or enter information - paper based or electronic. For example, process and production records, traceability records, and quality assurance records.
Behaviours	
B1	Prioritise health, safety, and the environment.
B3	Take responsibility for the quality of their own work.

Interview underpinned by a portfolio of evidence

In the interview, an end-point assessor asks the apprentice questions. It gives the apprentice the opportunity to demonstrate the KSBs mapped to this assessment method.

The apprentice can refer to and illustrate their answers with evidence from their portfolio of evidence.

This assessment method is being used because:

- it tests KSBs holistically.
- it allows for assessment of KSBs that do not occur on a predictable or regular basis.
- it allows for testing of responses where there are a range of potential answers.
- it can be conducted remotely, potentially reducing cost.

The interview must be structured to give the apprentice the opportunity to demonstrate the KSBs mapped to this assessment method to the highest available grade.

An end-point assessor must conduct and assess the interview.

The purpose is to assess the following themes:

- polymer technician's role
- establishing a new process
- sustainability
- using data
- problem solving
- continuous improvement
- written communication
- information technology
- team working
- presenting information
- continued professional development

SIAS must give an apprentice 2 weeks' notice of the interview.

The end-point assessor must have at least 2 weeks to review the supporting documentation.

The apprentice must have access to their portfolio of evidence during the interview.

The apprentice can refer to and illustrate their answers with evidence from their portfolio of evidence however, the portfolio of evidence is not directly assessed.

The interview must last for 60 minutes. The end-point assessor can increase the time of the interview by up to 10%. This time is to allow the apprentice to respond to a question if necessary.

The end-point assessor must ask at least 11 questions. The end-point assessor will use the questions from SIAS' question bank or create their own questions in line with SIAS' training. Follow-up questions are allowed where clarification is required.

The end-point assessor must make the grading decision.

The end-point assessor must keep accurate records of the assessment and will record:

- the apprentice's answers to questions.
- the KSBs demonstrated in answers to questions.
- the grade achieved.

The interview must take place in a suitable venue selected by SIAS for example, the employer's premises.

The interview can be conducted by video conferencing. SIAS will have processes in place to verify the identity of the apprentice and ensure the apprentice is not being aided.

The interview should take place in a quiet room, free from distractions and influence.

Portfolio of evidence requirements

The apprentice must compile a portfolio of evidence during the on-programme period of the apprenticeship. It should only contain evidence related to the KSBs that will be assessed by this assessment method. It will typically contain 10 discrete pieces of evidence. Evidence must be mapped against the KSBs. Evidence may be used to demonstrate more than one KSB; a qualitative as opposed to quantitative approach is suggested.

Evidence sources may include:

- workplace documentation and records, for example: production records
- workplace policies and procedures
- witness statements
- annotated photographs
- video clips (maximum total duration 10 minutes); the apprentice must be in view and identifiable

This is not a definitive list; other evidence sources can be included.

The portfolio of evidence should not include reflective accounts or any methods of self-assessment. Any employer contributions should focus on direct observation of performance (for example, witness statements) rather than opinions. The evidence provided should be valid and attributable to the apprentice; the portfolio of evidence should contain a statement from the employer and apprentice confirming this.

SIAS will not assess the portfolio of evidence directly as it underpins the interview. The end-point assessor should review the portfolio of evidence to prepare questions for the interview. They are not required to provide feedback after this review.

The apprentice must submit the gateway evidence to SIAS, including any organisation specific policies and procedures requested by SIAS.

Interview underpinned by Portfolio of Evidence – Grading Descriptors

Theme KSBs	Pass Apprentices must demonstrate all of the pass descriptors	Distinction Apprentices must demonstrate all of the pass descriptors and all of the distinction descriptors
Polymer technician's role K2 K28 S26 B5	Outlines their role as a polymer technician including their limits of responsibility, how they escalate issues, and how they respond and adapt to work demands in line with organisational requirements including quality, cost and	None

Theme KSBs	Pass Apprentices must demonstrate all of the pass descriptors	Distinction Apprentices must demonstrate all of the pass descriptors and all of the distinction descriptors
	delivery (QCD) standards. (K2, K28, S26, B5)	
Sustainability K6 S5 B2	Describes how they consider and apply the principles of sustainability and the circular economy including energy efficiency, reuse of polymers, and control of emissions and waste. (K6, S5, B2)	Supports the development of environmental and sustainability practice in the workplace for example, through promoting good practice to others, identifying improvement to practice. (K6, S5, B2)
Establishing a new process K25 S17 S18 S19	Describes how they devise, test and evaluate, and select machine settings including temperature, pressure, speed or timings, and distance for new or modified equipment, tooling or material to meet specification, resolving issues. (K25, S17, S18, S19)	Explains how they make adjustments to determine the optimum settings for the process. Explains how adjustments influence the final product. (K25, S17, S18, S19)
Using data K35 S20	Describes how they interpret data and use it to inform actions using data analysis methods and techniques. (K35, S20)	Explains the impact data collection and interpretation has on quality control. (K35, S20)
Problem solving K36 S21	Describes how they identify and resolve process faults using a simple root cause analysis technique for example, 5 Whys. (K36, S21)	Explains their use of a more advanced technique to verify solution for example, six-sigma tools or design of experiments. (K36, S21)
Continuous improvement K37 S28	Describes how they have applied continuous improvement techniques including lean, KAIZEN, 5S, and workplace organisation, to devise a viable suggestion for improvement to a polymer related issue or process. (K37, S28)	Evaluates the potential impact of the improvement suggestion. (K37, S28)
Written communication K42 S33	Describes how they apply written communication and report writing techniques to	None

Theme KSBs	Pass Apprentices must demonstrate all of the pass descriptors	Distinction Apprentices must demonstrate all of the pass descriptors and all of the distinction descriptors
	produce communications in their work suitable for context. (K42, S33)	
Information technology K38 S34	Describes how they use information technology in work tasks in compliance with GDPR and organisational cyber security regulations and policies. (K38, S34)	None
Team working K40 S29 B4	Describes how they apply team working principles to meet work goals in line with their company's policy on equality, diversity, and inclusion. (K40, S29, B4)	Explains how their team focus and commitment to inclusivity extends to wider teams or stakeholders. (K40, S29, B4)
Presenting information K43 S32	Describes how they present information using presentation techniques suitable for the context. (K43, S32)	None
Continued professional development S35 B6	Describes the planned and unplanned continued professional development (CPD) activities they have carried out and recorded to meet personal development needs, showing a commitment to future CPD. Evaluates what the impact of their CPD has been and how it has benefited the business. (S35, B6)	None

Fail – An apprentice will fail where they do not demonstrate all the pass descriptors.

Interview underpinned by Portfolio of Evidence – Knowledge, Skills and Behaviours

Ref	Grading descriptor
Knowledge	
K2	Polymer process technician’s role. Limits of responsibility. Escalation procedures.
K6	Principles of sustainability and circular economy. Energy efficiency and reuse of polymers. Principles of control and management of emissions and waste.

K25	Machine operating parameters: temperature, pressure, speed or timings, and distance. Impact of changes on the quality of the components. Adjustments required to resolve issues.
K28	Quality, cost, and delivery (QCD) standards and their importance in the workplace.
K35	Data analysis methods and techniques.
K36	Problem solving and fault-finding techniques: root cause analysis, 5-Whys.
K37	Continuous improvement (CI) methodologies and tools: lean, KAIZEN, 5S, workplace organisation.
K38	Information and digital technology. Document sharing platforms, email, management information systems, spreadsheet, virtual learning platforms, word processing, process and control systems, presentation software. General data protection regulation (GDPR). Cyber security.
K40	Principles of team working. Equality, diversity and inclusion.
K42	Written communication techniques. Report writing techniques.
K43	Presentation techniques.
Skills	
S5	Apply sustainability principles for example, in choice of materials, minimising waste.
S17	Devise machine settings such as temperature, pressure, speed or time, distance for new or modified equipment, tooling or material.
S18	Test and evaluate machine settings for new or modified equipment, tooling or material.
S19	Select and apply optimal machine settings for new or modified equipment, tooling or material (for example, capability study).
S20	Interpret data for example, process data, quality control and test procedure data. Use data to inform action.
S21	Identify process faults and resolve.
S26	Escalate issues outside limits of responsibility.
S28	Apply continuous improvement techniques. Devise suggestions for improvement. For example, improving the effectiveness of existing production, improving the energy consumption or waste profile of processes and procedures to improve the sustainability or carbon footprint of a product, process or task.
S29	Apply team working principles.
S32	Present information.
S33	Communicate in written form in the workplace for example, handover notes or emails, non-conformances, design change requests, technical reports.
S34	Use information and digital technology. Comply with GDPR and cyber security regulations and policies.
S35	Plan how to meet personal development needs. Carry out and record planned and unplanned continued professional development (CPD) activities. Evaluate CPD against plans made.
Behaviours	
B2	Consider the environment and sustainability when using resources and carrying out processes.

B4	Team-focus to meet work goals including a commitment to equality and diversity.
B5	Respond and adapt to work demands.
B6	Committed to continued professional development.

Multiple-Choice Test

In the multiple-choice test, the apprentice answers questions in a controlled and invigilated environment. It gives the apprentice the opportunity to demonstrate the knowledge mapped to this assessment method.

This assessment method is being used because:

- it can assess knowledge.
- it is easy to administer.
- it can be conducted remotely and administered to multiple apprentices at the same time, potentially reducing cost.

The multiple-choice test will be structured to give the apprentice the opportunity to demonstrate the knowledge mapped to this assessment method to the highest available grade.

The test can be computer or paper based.

The test will consist of 40 multiple-choice questions.

Multiple-choice questions will have four options, including one correct answer.

The apprentice must have 60 minutes to complete the test.

The apprentice must be given at least 2 weeks' notice of the date and time of the test.

The test is closed book which means that the apprentice cannot refer to reference books or materials whilst taking the test.

The test must be taken in the presence of an invigilator who is the responsibility SIAS.

SIAS must have an invigilation policy setting out how the test must be conducted. It must state the ratio of apprentices to invigilators for the setting and allow the test to take place in a secure way.

SIAS is responsible for the security of the test including the arrangements for on-line testing. SIAS will ensure that their security arrangements maintain the validity and reliability of the test.

The test must be marked by an end-point assessor or marker employed by SIAS. They must follow a marking scheme produced by SIAS. Marking by computer is allowed where question types support this.

A correct answer gets 1 mark.

Any incorrect or missing answers get zero marks.

SIAS is responsible for overseeing the marking, standardisation and moderation of the test.

The apprentice must take the test in a suitably controlled and invigilated environment that is a quiet room, free from distractions and influence. SIAS must check the venue is suitable.

The test could take place remotely if the appropriate technology and systems are in place to prevent malpractice. SIAS must verify the apprentice’s identity and ensure invigilation of the apprentice for example with, and not limited to, 360-degree cameras and screen sharing facilities.

Knowledge Test – Grading Boundaries

Grade	Minimum marks required	Maximum marks required
Fail	0	27
Pass	28	40

Knowledge Test – Knowledge, Skills and Behaviours

Ref	Grading descriptor
Knowledge	
K1	Polymer industry awareness: range of polymer products, manufacturing environments, types of customers.
K3	Health and safety regulations, standards, and guidance. Control of Substances Hazardous to Health (COSHH). Electrical safety and compliance. Emergency procedures. Fire safety. Health and Safety at Work Act – responsibilities. Incident and near miss reporting and investigation. Lifting Operations and Lifting Equipment Regulations (LOLER). Legionella. Lone working. Management of health and safety at work. Manual handling. Noise regulation. Permits to work. Provision and Use of Work Equipment Regulations (PUWER). Safety signage and purpose. Slips trips and falls. The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR). Working at Height.
K5	Environmental and sustainability regulations, standards, and guidance. Environmental hazards that can arise from polymer operations. Environmental management systems standard. Environmental Protection Act. Environmental signage and notices. Carbon footprint of different types of polymers and materials used in production: how that can be mitigated for by selection and whole of lifecycle considerations.
K7	Chemical terms associated with polymers: element, atomic mass, molecule, functional group, monomer, oligomer, polymer, polymerisation, molecular weight, molecular weight distribution, bonding, and tacticity.
K8	Polymerisation processes: addition polymerisation, condensation polymerisation, catalyst, conditions. Sources of chemical materials; crude oil derived and bio-materials.
K9	Thermal characteristics of polymers: glass transition temperature, melting temperature, processing temperature, specific heat, heat capacity, heat distortion temperature, melt density, thermal stability.
K10	Classes of material: thermoplastics, thermosets, elastomers, rubbers, thermoplastic elastomers, commodity, engineering and high-performance materials, molecular structure, blends, and alloys.

K11	Rheology behaviour: viscosity, shear stress, shear rate, newtonian flow, non-newtonian flow, viscosity-temperature relationships, flow measurement methods and indexes.
K12	Key differences in processing different classes of polymers: melt processing, malleable state forming, cooling, and curing processes, importance and influence of controlling cooling and curing aspects of polymer processing.
K13	Influence of morphology on physical and mechanical properties of polymers.
K14	Polymer materials: definition, classifications, properties, applications, products, and terminology.
K15	Factors affecting the glass transition temperature of polymers.
K16	Factors affecting the degree of crystallinity of polymers: molecular and processing.
K17	Material data sheets, understanding test methods and data reported; physical, mechanical, thermal, optical, electrical, flammability properties of polymers.
K18	Formulating ingredients: reinforcing and non-reinforcing fillers (glass fibre, carbon black), mineral oils, plasticisers, flame retardants, additives (antioxidants, UV absorbers, antiozonants, slip additives, lubricants, anti-static agents, anti-fog), thermal stabilisers, processing aids, curing agents (sulphur, peroxides, phenolics), colourants, flame retardants, impact modifiers, coupling agents, release agents, anti-microbial, fungicides and biocides, scavengers, detectable, anti-counterfeit, and biodegradable. Purpose, benefits, and limitations.
K19	The impact of re-used and re-cycled polymers on the processing conditions and final product properties.
K20	Continuous and batch techniques. Production requirements: product specification, processing specification, rate of production. Material safety data sheet, product labelling and product codes; the importance of identifying non-conforming materials and products. Manufacturing control. Overall Equipment Effectiveness (OEE). Stock control.
K21	The basic parts and functions of polymer processing plant and equipment: pneumatic and hydraulic systems and components, mechanical systems, electrical and electronic systems and components, heating and cooling arrangements, machine controls, material delivery and collection systems, guards and safety devices, cutting and forming, and service supply and connection methods, and support services.
K22	Types of mould tools, formers and dies: purpose, features, construction, materials, damage and non-conformance checking requirements, and mounting methods (bolts, clamps, quick release).
K23	Polymer processes and techniques: extrusion (polymer compounding, profile, film, filament, sheet, wire, and cable) injection moulding, blow moulding, compression moulding, rotational moulding, processing of polyurethane, thermoforming, internal mixing of polymer compounds, milling (two roll mill), calendaring, manual and automated layup techniques for elastomers, 3D Printing.
K26	Polymer post processing techniques: assembling, printing, decorating, cooling operations, packing, and labelling.
K31	Purpose of audits and why they are important.

K33	British standards for engineering representations, drawings, and graphical information.
K34	Application of digital systems to support manufacture: CAD (computer-aided design), CAM (computer-aided manufacturing), CMM (coordinate measuring machine), and 3D printing.

Final Grade

Performance in the EPA determines the overall grade of:

- fail
- pass
- merit
- distinction

An end-point assessor must individually grade the observation with questions and interview underpinned by a portfolio of evidence in line with this EPA plan.

SIAS must combine the individual assessment method grades to determine the overall EPA grade.

If the apprentice fails one assessment method or more, they will be awarded an overall fail.

To achieve an overall pass, the apprentice must achieve at least a pass in all the assessment methods. To achieve an overall EPA merit, the apprentice must achieve a distinction in one assessment method (observation with questions or interview underpinned by a portfolio of evidence) and a pass in the multiple-choice test. To achieve an overall EPA distinction, the apprentice must achieve a distinction in the observation with questions and interview underpinned by a portfolio of evidence, and a pass in the multiple-choice test.

Grades from individual assessment methods must be combined in the following way to determine the grade of the EPA overall.

Observation with questions	Interview underpinned by a portfolio of evidence	Multiple-choice test	Overall Grading
Any grade	Any grade	Fail	Fail
Any grade	Fail	Any grade	Fail
Fail	Any grade	Any grade	Fail
Pass	Pass	Pass	Pass
Distinction	Pass	Pass	Merit
Pass	Distinction	Pass	Merit
Distinction	Distinction	Pass	Distinction

Moderation

Assessment organisations will undertake moderation of End-Point Assessor decisions through observations and examination of documentation on a risk sampling basis. Results cannot be confirmed until moderation has been completed.

Re-sits and re-takes

If the apprentice fails one assessment method or more, they can take a re-sit or a re-take at their employer's discretion. The apprentice's employer needs to agree that a re-sit or re-take is appropriate. A re-sit does not need further learning, whereas a re-take does. The apprentice should have a supportive action plan to prepare for a re-sit or a re-take.

The employer and SIAS should agree the timescale for a re-sit or re-take. A re-sit is typically taken within 2 months of the EPA outcome notification. The timescale for a re-take is dependent on how much re-training is required and is typically taken within 4 months of the EPA outcome notification.

Failed assessment methods must be re-sat or re-taken within a 6-month period from the EPA outcome notification, otherwise the entire EPA will need to be re-sat or re-taken in full.

Re-sits and re-takes are not offered to an apprentice wishing to move from pass to a higher grade.

The apprentice will get a maximum EPA grade of pass for a re-sit or re-take, unless SIAS determines there are exceptional circumstances.

Certification

The outcomes from the End-Point Assessment will be reviewed and a grade conferred by SIAS in accordance with SIAS QA procedures, which are available from SIAS. SIAS will notify the employer of the outcome of each of the assessments.

SIAS will apply for the apprentice's certificate, which will be sent by ESFA. The certificate confirms that the apprentice has passed the End-Point Assessment, has demonstrated full competency across the standard and is job-ready.

Assessment Specification

The assessment specification can be found in the published assessment plan for the standard. Details of which elements of the apprenticeship standard will be tested by each test are given in the Mapping knowledge, skills, and behaviours section of this guide.

Mapping of knowledge, skills, and behaviours

Key:	
Observation with question	O
Interview underpinned by a portfolio of evidence	I
Multiple-choice test	MCT

Ref	KSB to be assessed	Assessment Method
Knowledge		
K1	Polymer industry awareness: range of polymer products, manufacturing environments, types of customers.	MCT
K2	Polymer process technician’s role. Limits of responsibility. Escalation procedures.	I
K3	Health and safety regulations, standards, and guidance. Control of Substances Hazardous to Health (COSHH). Electrical safety and compliance. Emergency procedures. Fire safety. Health and Safety at Work Act – responsibilities. Incident and near miss reporting and investigation. Lifting Operations and Lifting Equipment Regulations (LOLER). Legionella. Lone working. Management of health and safety at work. Manual handling. Noise regulation. Permits to work. Provision and Use of Work Equipment Regulations (PUWER). Safety signage and purpose. Slips trips and falls. The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR). Working at Height.	MCT
K4	Health, safety, and environmental practice. Polymer manufacturing safety hazards – risks they pose and their management: temperature, pressure, and fumes. Polymer processing safety guidance. Risk assessment and safe systems of work. Personal Protective Equipment (PPE) requirements. Resource reuse, recycling, and waste handling procedures.	O
K5	Environmental and sustainability regulations, standards, and guidance. Environmental hazards that can arise from polymer operations. Environmental management systems standard. Environmental Protection Act. Environmental signage and notices. Carbon footprint of different types of polymers and materials used in production: how that can be mitigated for by selection and whole of lifecycle considerations.	MCT
K6	Principles of sustainability and circular economy. Energy efficiency and reuse of polymers. Principles of control and management of emissions and waste.	I
K7	Chemical terms associated with polymers: element, atomic mass, molecule, functional group, monomer, oligomer, polymer, polymerisation, molecular weight, molecular weight distribution, bonding, and tacticity.	MCT
K8	Polymerisation processes: addition polymerisation, condensation polymerisation, catalyst, conditions. Sources of chemical materials; crude oil derived and bio-materials.	MCT

Ref	KSB to be assessed	Assessment Method
K9	Thermal characteristics of polymers: glass transition temperature, melting temperature, processing temperature, specific heat, heat capacity, heat distortion temperature, melt density, thermal stability.	MCT
K10	Classes of material: thermoplastics, thermosets, elastomers, rubbers, thermoplastic elastomers, commodity, engineering and high-performance materials, molecular structure, blends, and alloys.	MCT
K11	Rheology behaviour: viscosity, shear stress, shear rate, newtonian flow, non-newtonian flow, viscosity-temperature relationships, flow measurement methods and indexes.	MCT
K12	Key differences in processing different classes of polymers: melt processing, malleable state forming, cooling, and curing processes, importance and influence of controlling cooling and curing aspects of polymer processing.	MCT
K13	Influence of morphology on physical and mechanical properties of polymers.	MCT
K14	Polymer materials: definition, classifications, properties, applications, products, and terminology.	MCT
K15	Factors affecting the glass transition temperature of polymers.	MCT
K16	Factors affecting the degree of crystallinity of polymers: molecular and processing.	MCT
K17	Material data sheets, understanding test methods and data reported; physical, mechanical, thermal, optical, electrical, flammability properties of polymers.	MCT
K18	Formulating ingredients: reinforcing and non-reinforcing fillers (glass fibre, carbon black), mineral oils, plasticisers, flame retardants, additives (antioxidants, UV absorbers, antiozonants, slip additives, lubricants, anti-static agents, anti-fog), thermal stabilisers, processing aids, curing agents (sulphur, peroxides, phenolics), colourants, flame retardants, impact modifiers, coupling agents, release agents, anti-microbial, fungicides and biocides, scavengers, detectable, anti-counterfeit, and biodegradable. Purpose, benefits, and limitations.	MCT
K19	The impact of re-used and re-cycled polymers on the processing conditions and final product properties.	MCT
K20	Continuous and batch techniques. Production requirements: product specification, processing specification, rate of production. Material safety data sheet, product labelling and product codes; the importance of identifying non-conforming materials and products. Manufacturing control. Overall Equipment Effectiveness (OEE). Stock control.	MCT

Ref	KSB to be assessed	Assessment Method
K21	The basic parts and functions of polymer processing plant and equipment: pneumatic and hydraulic systems and components, mechanical systems, electrical and electronic systems and components, heating and cooling arrangements, machine controls, material delivery and collection systems, guards and safety devices, cutting and forming, and service supply and connection methods, and support services.	MCT
K22	Types of mould tools, formers and dies: purpose, features, construction, materials, damage and non-conformance checking requirements, and mounting methods (bolts, clamps, quick release).	MCT
K23	Polymer processes and techniques: extrusion (polymer compounding, profile, film, filament, sheet, wire, and cable) injection moulding, blow moulding, compression moulding, rotational moulding, processing of polyurethane, thermoforming, internal mixing of polymer compounds, milling (two roll mill), calendaring, manual and automated layup techniques for elastomers, 3D Printing.	MCT
K24	Polymer processing material preparation requirements: formulations, drying, weighing, conveying, mixing, blending, and colouring of polymers.	O
K25	Machine operating parameters: temperature, pressure, speed or timings, and distance. Impact of changes on the quality of the components. Adjustments required to resolve issues.	I
K26	Polymer post processing techniques: assembling, printing, decorating, cooling operations, packing, and labelling.	MCT
K27	Standard operating procedures: their purpose and why they are important, how they are developed and maintained.	O
K28	Quality, cost, and delivery (QCD) standards and their importance in the workplace.	I
K29	Quality assurance, testing, inspection, and sampling methods. Process and control systems.	O
K30	Documentation requirements: documentation control, auditable records.	O
K31	Purpose of audits and why they are important.	MCT
K32	Preventative maintenance strategy and practice.	O
K33	British standards for engineering representations, drawings, and graphical information.	MCT
K34	Application of digital systems to support manufacture: CAD (computer-aided design), CAM (computer-aided manufacturing), CMM (coordinate measuring machine), and 3D printing.	MCT

Ref	KSB to be assessed	Assessment Method
K35	Data analysis methods and techniques.	I
K36	Problem solving and fault-finding techniques: root cause analysis, 5-Whys.	I
K37	Continuous improvement (CI) methodologies and tools: lean, KAIZEN, 5S, workplace organisation.	I
K38	Information and digital technology. Document sharing platforms, email, management information systems, spreadsheet, virtual learning platforms, word processing, process and control systems, presentation software. General data protection regulation (GDPR). Cyber security.	I
K39	Planning, prioritising, and time management techniques.	O
K40	Principles of team working. Equality, diversity and inclusion.	I
K41	Verbal communication techniques.	O
K42	Written communication techniques. Report writing techniques.	I
K43	Presentation techniques.	I
Skills		
S1	Review instructions or information. For example, work instructions, sampling requirements, drawings dimensioning, labelling, formulations, machine settings.	O
S2	Plan task and identify and organise resources with consideration for safety, environmental impact, security, quality and cost.	O
S3	Identify and document hazards and risks in the workplace.	O
S4	Apply health, safety, and environmental procedures in compliance with regulations and standards. For example, daily machine checks, wearing personal protective equipment.	O
S5	Apply sustainability principles for example, in choice of materials, minimising waste.	I
S6	Segregate resources for reuse, recycling, and handling.	O
S7	Select, check, and prepare materials for polymer processing for example, weighing, control and blending, and conditioning.	O
S8	Select, configure (for example, replace or change inserts) and check mould tools, formers, dies or other process equipment.	O
S9	Check installation and function of processing equipment for the process.	O
S10	Connect service connections such as water, electrical, pneumatic, hydraulic.	O

Ref	KSB to be assessed	Assessment Method
S11	Check hand tools, equipment and machinery including calibration record where applicable.	O
S12	Set or check machine settings using instructions such as temperature, pressure, speed or time, distance.	O
S13	Adjust machine setting for the speeds, positions, pressures and safety of the mould tool, former or die movement to meet product specification.	O
S14	Start up manufacturing processes.	O
S15	Monitor process feedback and adjust process parameters.	O
S16	Shut down manufacturing processes.	O
S17	Devise machine settings such as temperature, pressure, speed or time, distance for new or modified equipment, tooling or material.	I
S18	Test and evaluate machine settings for new or modified equipment, tooling or material.	I
S19	Select and apply optimal machine settings for new or modified equipment, tooling or material (for example, capability study).	I
S20	Interpret data for example, process data, quality control and test procedure data. Use data to inform action.	I
S21	Identify process faults and resolve.	I
S22	Apply post processing techniques for example, assembly, printing, decorating, cooling operations, packing, and labelling.	O
S23	Follow quality assurance processes during manufacture.	O
S24	Perform quality control checks. For example, conduct parameter checks (size, colour, weight), and take samples.	O
S25	Identify quality issues and resolve for example, defects, maintenance requirements.	O
S26	Escalate issues outside limits of responsibility.	I
S27	Apply preventative maintenance practices. For example, checking guarding, lubrication, cleaning of tooling, safety checks, and inspection for wear and tear.	O
S28	Apply continuous improvement techniques. Devise suggestions for improvement. For example, improving the effectiveness of existing production, improving the energy consumption or waste profile of processes and procedures to improve the sustainability or carbon footprint of a product, process or task.	I
S29	Apply team working principles.	I

Ref	KSB to be assessed	Assessment Method
S30	Communicate with others verbally for example, colleagues and stakeholders.	O
S31	Record or enter information - paper based or electronic. For example, process and production records, traceability records, and quality assurance records.	O
S32	Present information.	I
S33	Communicate in written form in the workplace for example, handover notes or emails, non-conformances, design change requests, technical reports.	I
S34	Use information and digital technology. Comply with GDPR and cyber security regulations and policies.	I
S35	Plan how to meet personal development needs. Carry out and record planned and unplanned continued professional development (CPD) activities. Evaluate CPD against plans made.	I
Behaviours		
B1	Prioritise health, safety, and the environment.	O
B2	Consider the environment and sustainability when using resources and carrying out processes.	I
B3	Take responsibility for the quality of their own work.	O
B4	Team-focus to meet work goals including a commitment to equality and diversity.	I
B5	Respond and adapt to work demands.	I
B6	Committed to continued professional development.	I

Further Information

For information about SIAS policies, quality assurance, re-sits, appeals, complaints and general enquiries please see our website: www.siasuk.com

or contact:

SIAS – 01925515211 - info@siasuk.com



Floor 1, 720 Mandarin Court
Centre Park, WARRINGTON
WA1 1GG

T: 01925 515211
E: info@siasuk.com
W: www.siasuk.com