

**Process Industry Manufacturing Technician
Level 3 Apprenticeship Standard (ST1407)
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.

Version History

Version	Updates
1.0	This document relates to assessment plan version 1.0

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Objective

The aim of this End-Point Assessment (EPA) is to ensure that the apprentice is occupationally competent against the knowledge, skills and behaviours outlined in the assessment plan for this standard.

Process industry technicians are found in process manufacturing industries.

They run processes involving high hazard inputs to produce products that meet specifications. This may include chemical-based products, stabilised crude, ethane, butane, methane, and hydrogen. The working environment is highly controlled due to the use of high hazard chemicals. Technicians must follow high-level safety systems. Typically, production is on a large scale using a continuous process. This usually means operations are 24 hours per day, seven days per week. Technicians may be required to work shifts.

Technicians run and maintain the process or processes in line with operational parameters. They conduct quality assurance, resolving or escalating any issues, and complete records. Maintaining workplace safety by following health, safety and environmental risk and management systems is a vital part of the role. Preparing equipment for maintenance and bringing equipment back on line is also part of the role. They also support risk assessment, improvement activities, and audits.

On a daily basis, they work with other members of the process team. They also have contact with people in other teams for example, laboratory, maintenance, process engineering, supply chain, and warehouse. They may also have contact with external people such as, customers, service providers, and regulators.

They must ensure that the process and products meet quality specifications and are produced to schedule. They must work to external manufacturing regulations to protect the process, product, plant and equipment, company employees, and the environment. They must also consider sustainability. They may need to wear specialist PPE to protect the product or themselves. This may include, safety glasses, chemical resistant gloves, suits, and footwear, and breathing apparatus. They may work alone or part of a team. They work with minimal supervision, taking responsibility for the quality and accuracy of their work.

Prior Learning and Qualifications

Employers will set their own entry requirements. Typically, they require applicants to have GCSE science grade C or 4. An employer may require applicants to have a health screening to ensure suitability for working in some work environments.

Overview

A full-time process industry manufacturing technician apprentice typically spends 36 months on-programme. 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 EPA should be completed within an EPA period lasting typically 3 months.

The apprentice must complete their training and meet the gateway requirements before starting their EPA. The EPA will assess occupational competence.

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 the 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 EPA. Confirmation from the employer that the apprentice is fully competent is needed before 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 is occupationally competent. That is, they are deemed to be working at or above the level set out in the apprenticeship standard and ready to undertake the EPA. 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.

They must:

- confirm they are ready to take the EPA
- have achieved English and mathematics qualifications in line with the apprenticeship funding rules
- submit a portfolio of evidence for the interview underpinned by a portfolio of evidence

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.

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. It gives the apprentice the opportunity to demonstrate the KSBs mapped to this assessment method.

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

The end-point assessor must 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 apprentice conducting the following during the observation:

- organise work
- maintain the work area
- run and maintain process
- conduct process industry quality assurance
- complete process documentation
- communicate with others

The following KSBs may be assessed using simulation if they do not occur naturally:

- K16: Main factors influencing quality assurance in industrial process industries.
- S13: Apply quality assurance procedures. For example, density checks, contaminant check, and take samples for laboratory testing.
- S20: Apply signage and access restriction measures.
- B4: Take responsibility for the quality of their own work.

SIAS must make arrangements for this with the employer if required.

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 questions is to assess the 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 5 questions. To remain as unobtrusive as possible, the end-point assessor should ask questions during natural stops between tasks and after completion of work rather than disrupting the apprentice's flow. The end-point assessor must 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. They must record:

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

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
Organise work K11 S1 S2	<p>P1 Reviews instructions or information to understand the task's requirements. (S1)</p> <p>P2 Plans tasks and identifies and organises resources required to complete it using planning, prioritising, and time management techniques with consideration for safety, environmental impact, quality, and cost. (K11, S2)</p>	<p>D1 The balance of safety, environmental impact, quality, and cost factors in their planning decisions is justified. (K11, S2)</p>
Maintain the work area K5 K8 S3 S4 S18 B1	<p>P3 Identifies health and safety and environmental hazards and risks in the workplace, and personal safety and mitigation measures with consideration of hierarchy of control.</p> <p>P4 Prioritises and applies health, safety, and environmental procedures in compliance with regulations, standards and guidance mitigating against risks including use of personal protective equipment.</p> <p>P5 Stores tools and equipment safety in line with company procedures.</p> <p>(K5, K8, S3, S4, S18, B1)</p>	<p>D2 Explains the importance of applying health, safety and environmental procedures in their work. (K5, K8, S4)</p>
Run and maintain process K14 K25 K26 S8 S10 S11 S20	<p>P6 Checks equipment in line with company procedures.</p> <p>P7 Monitors process or processes and sets and adjusts processing parameters on process industry equipment,</p>	<p>D3 Justifies their approach for monitoring and setting and adjusting process parameters in terms of effectiveness or efficiencies of practice and the impact of their</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
	<p>using process control system and its constituent components, to meet standard operating conditions in line with standard operating procedures.</p> <p>(K14, K25, K26, S8, S10, S11)</p> <p>P8 Applies signage and access restriction measures in line with task requirements and company procedures. (S20)</p>	<p>actions on others. (S10, S11)</p>
<p>Conduct process industry quality assurance K16 S13 B4</p>	<p>P9 Takes responsibility for the quality of their own work by applying quality assurance procedures in line with quality standards that take account of the main factors influencing quality assurance in industrial process industries. (K16, S13, B4)</p>	<p>D4 Explains the importance of applying quality assurance procedures to support quality standards. (K16, S13)</p>
<p>Complete process documentation K15 S33</p>	<p>P10 Records or enters data for work tasks - paper based or electronic - in line with company procedures for documentation control and auditable records. (K15, S33)</p>	<p>None</p>
<p>Communicate with others K43 S42</p>	<p>P11 Uses verbal communication techniques suitable for the context. (K43, S42)</p>	<p>None</p>

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

Observation with Questions - Knowledge, Skills and Behaviours

Ref	KSB Statement
Knowledge	
K5	Science process manufacturing safety hazards – risks they pose and their management: temperature, pressure, and vapours. Risk assessment and safe systems of work. Personal Protective Equipment (PPE) requirements
K8	Environmental hazards that can arise from process. Hierarchy of control.
K11	Planning, prioritising, and time management techniques.
K14	Standard operating conditions (SOC) - what they are and why they are important.
K15	Documentation requirements: documentation control, auditable records.
K16	Main factors influencing quality assurance in industrial process industries. Quality standards.
K25	Purpose and operation of process industry equipment.
K26	Process control systems and their constituent components.
K43	Verbal communication techniques.
Skills	
S1	Review instructions or information to understand the task.
S2	Plan tasks. Identify and organise resources with consideration for safety, environmental impact, quality, and cost.
S3	Identify hazards and risks in the workplace and personal safety and mitigation measures.
S4	Apply health, safety, and environmental procedures in compliance with regulations, standards, and guidance.
S8	Check equipment.
S10	Set and adjust processing parameters such as temperature, pressure, speed or time, distance.
S11	Monitor process for example, take readings and conduct walk-arounds.
S13	Apply quality assurance procedures. For example, density checks, contaminant check, and take samples for laboratory testing.
S18	Store tools and equipment.
S20	Apply signage and access restriction measures.
S33	Record or enter information - paper based or electronic.
S42	Communicate with others verbally for example, colleagues and stakeholders.
Behaviours	
B1	Prioritise health, safety, and environment.
B4	Take responsibility for the quality of their own work.

Assessment Method 2: 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.

Portfolio of Evidence

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: process, quality assurance
- workplace policies and procedures
- witness statements
- annotated photographs
- video clips with a maximum total duration of 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 will review the portfolio of evidence to prepare questions for the interview. They are not required to provide feedback after this review.

Gateway evidence must be submitted to SIAS, along with any organisation specific policies and procedures requested by them.

Interview

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 of the end-point assessor's questions is to assess the apprentice against the following themes:

- role and responsibilities

- emergency procedures
- sustainability
- process industry operations
- shutting down for maintenance
- bringing back from maintenance
- problem solving and fault finding
- continuous improvement
- written communication
- information and digital technology
- teamwork
- 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 8 questions. The end-point assessor must 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 will keep accurate records of the assessment. They 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 must 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.

Question and resource development

SIAS must develop a purpose-built assessment specification and question bank. It is recommended this is done in consultation with employers of this occupation. SIAS must maintain the security and confidentiality of EPA materials when consulting with employers. The assessment specification and question bank must be reviewed at least once a year to ensure they remain fit-for-purpose.

The assessment specification must be relevant to the occupation and demonstrate how to assess the KSBs mapped to this assessment method. SIAS must ensure that questions are

refined and developed to a high standard. The questions must be unpredictable. A question bank of sufficient size will support this.

SIAS must ensure that the apprentice has a different set of questions in the case of re-sits or re-takes.

SIAS must produce the following materials to support the interview underpinned by a portfolio of evidence:

independent assessor assessment materials which include:

- training materials
- administration materials
- moderation and standardisation materials
- guidance materials
- grading guidance
- question bank
- EPA guidance for the apprentice and the employer

SIAS must ensure that the EPA materials are subject to quality assurance procedures including standardisation and moderation.

Interview Underpinned by a 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
Role and responsibilities K2 S37 B5	<p>P1 Describes their role as a science process manufacturing technician including their limits of responsibility, how they escalate issues, and how they respond and adapt to work demands in line with organisational requirements.</p> <p>P2 Outlines the impact of an operator’s competence on product quality.</p> <p>P3 Outlines change control requirements and why they are important.</p> <p>(K2, S37, B5)</p>	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
Emergency procedures K6 S5	P4 Describes what they would do in an environmental emergency situation in line with company procedures. (K6, S5)	None
Sustainability K10 S6 B2	P5 Describes how they consider and apply the principles of sustainability and the circular economy when using resources and carrying out processes including resource efficiency, reuse of materials, and recycling and control of emissions and waste. (K10, S6, B2)	D1 Explains how they have supported the development or implementation of sustainability practice in the workplace beyond their role for example, through promoting good practice to others, identifying improvement to practice. (S6, B2)
Process industry operations K13 S7 S9 S12 S14 S15 S16	<p>P6 Describes how they select, check, and prepare raw materials for process in line with task requirements and SOPs.</p> <p>P7 Describes how they conduct the control of product streams to maintain specifics in line with task requirements and SOPs.</p> <p>P8 Describes how they manage waste streams in line with SOPs.</p> <p>P9 Describes how they clean equipment in line with SOPs.</p> <p>P10 Describes how they apply intermediate or post-manufacturing procedures in line with task requirements.</p>	D2 Evaluates the impact of non-conformity in applying SOPs within role and wider organisation. (K13, S7)

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
	(K13, S7, S9, S12, S14, S15, S16)	
Shutting down for maintenance K23 S19 S21 S22 S23 S24	P11 Describes how they prepare for shutting down for maintenance in line with their company's procedures, including: <ul style="list-style-type: none"> • identifying equipment for handover • shutting down the process and equipment • isolating process and systems • completing isolation checks • emptying equipment (K23, S19, S21, S22, S23, S24)	None
Bringing back from maintenance K24 S25 S26 S27 S28 S29 S30 S31 S32	P12 Describes how they bring equipment back from maintenance in line with their company's procedures including: <ul style="list-style-type: none"> • purging, filling, pressurising and leak testing • completing post maintenance equipment checks • lining-up equipment • connecting service connections • de-isolating process, mechanical and electrical systems • completing pre-start up checks • starting-up plant and equipment 	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
	<ul style="list-style-type: none"> re-starting process (K24, S25, S26, S27, S28, S29, S30, S31, S32) 	
Problem solving and fault finding K19 K20 S36 S38	P13 Describes how they identify issues and apply problem solving and fault-finding techniques to establish the root cause of common faults in processing including flow, blockages, instrumentation failures, seals, and human factors. (K19, K20, S36, S38)	D3 Assesses the value of specific fault-finding and problem solving techniques for different issues. (K19, K20, S36, S38)
Continuous improvement K21 S39	P14 Describes how they have applied continuous improvement (CI) techniques and a made a viable suggestion for improvement in their work to support CI systems. (K21, S39)	D4 Justifies the potential impact of the improvement suggestion with consideration to benefits and any potential risks. (K21, S39)
Written communication K42 S41	P15 Describes how they apply written communication and report writing techniques to produce communications in their work suitable for context. (K42, S41)	None
Information and digital technology K40 S40	P16 Describes how they use information and digital technology in work tasks in compliance with cyber security requirements. (K40, S40)	None
Teamwork K44 S43 B3	P17 Describes how they apply team working principles to meet work goals in line with their company's	D5 Justifies how their team focus approach helped to achieve a positive outcome

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
	policy on equality, diversity, and inclusion. (K44, S43, B3)	in a team activity. (K44, S43, B3)
Continued professional development S44 B6	P18 Describes the planned and unplanned learning and development (CPD) activities they have carried out and recorded to meet personal development needs, showing a commitment to future CPD. (S44, B6)	None

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

Interview Underpinned by a Portfolio of Evidence - Knowledge, Skills and Behaviours

Ref	KSB Statement
Knowledge	
K2	Role and limits of responsibility. Escalation procedures. Impact of operators' competence on product quality. Change control requirement.
K6	Emergency procedures.
K10	Principles of sustainability and circular economy. Resource (energy, water, and waste) efficiency and reuse of materials. Principles of control and management of emissions and waste.
K13	Standard operating procedures (SOP) - what they are and why they are important.
K19	Common faults and causes in processing: flow, blockages, instrumentation failures, seals and human factors.
K20	Problem solving and fault-finding techniques: root cause analysis, 5-Whys
K21	Continuous improvement (CI) systems and techniques.
K23	Requirements for shutting down and preparing for maintenance.
K24	Requirements for bringing equipment back from maintenance.
K40	Information and digital technology to support process industry operations. Cyber security requirements.
K42	Written communication techniques. Technical report writing techniques.
K44	Principles of team working. Principles of equality, diversity, and inclusion in the workplace.
Skills	
S5	Follow environment emergency procedures. For example, make area safe, evacuate.
S6	Apply sustainability principles for example, minimising waste.
S7	Apply standard operating procedures (SOPs).

S9	Select, check, and prepare raw materials for process for example, weighing, measuring, control and blending, conditioning, dissolving, and sanitisation.
S12	Conduct the control of product streams to maintain specifics.
S14	Apply intermediate or post-manufacturing procedure for example, labelling, packing, storage, visual inspection, discharge.
S15	Manage waste streams.
S16	Clean equipment for example, boil-outs, steam-outs, bake-outs, steam in place SIP, clean in place (CIP).
S19	Identify equipment for handover.
S21	Shut down the process and equipment.
S22	Isolate process and systems.
S23	Complete isolation checks.
S24	Empty equipment for example, drain, purge, vent, and de-pressure.
S25	Purge, fill, pressurise and leak test.
S26	Complete post maintenance equipment checks.
S27	Line-up equipment.
S28	Connect service connections such as water, electrical, pneumatic, hydraulic for chemical or petrochemical processing.
S29	De-isolate process, mechanical and electrical systems.
S30	Complete pre-start up checks.
S31	Start-up plant and equipment.
S32	Re-start process.
S36	Identify issues for example, defects, deviations, process variance, and maintenance requirements.
S37	Escalate issues outside limits of responsibility.
S38	Apply problem solving and fault-finding techniques.
S39	Apply continuous improvement techniques. Make a suggestion for improvement.
S40	Use information and digital technology for example, management information systems, human machine interfaces, word processing, spreadsheet, email, virtual learning platforms, document sharing platforms. Comply with cyber security requirements.
S41	Produce written documents for example, handover notes or emails, non-conformances, design change requests.
S43	Apply team working principles.
S44	Plan how to meet personal development needs. Carry out and record planned and unplanned learning and development (CPD) activities.
Behaviours	
B2	Consider sustainability when using resources and carrying out processes.
B3	Team-focus to meet work goals including support for equality, diversity and inclusion.
B5	Respond and adapt to work demands.
B6	Committed to continued professional development.

Assessment Method 3: 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.

The multiple-choice test must 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 must have four options, including one correct answer.

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

The apprentice must have 60 minutes to complete the test.

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

The following equipment is allowed to be used during the test:

- a scientific calculator

The test must be taken in the presence of an invigilator who is the responsibility of 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 must verify the apprentice's identity and ensure invigilation of the apprentice for example, with 360-degree cameras and screen sharing facilities.

SIAS is responsible for the security of the test including the arrangements for on-line testing. SIAS must 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 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.

Multiple-Choice Test - Grading Boundaries

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

Multiple-Choice Test - Knowledge, Skills and Behaviours

Ref	KSB Statement
Knowledge	
K1	Science process manufacturing sector awareness: range of products, manufacturing environments, types of customers.
K3	Health and safety regulations, standards, and guidance: Control of Substances Hazardous to Health (COSHH), Dangerous Substances and Explosive Atmospheres Regulations (DSEAR), Electrical safety and compliance, 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 in confined spaces, and Working at height.
K4	Control of Major Accident Hazards (COMAH) regulation and impact on workplaces.
K7	Health and safety management systems; key performance indicators (KPIs) and learning from incidents.
K9	Environmental management systems standard. Environmental Protection Act. Environmental signage and notices.
K12	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. Overall Equipment Effectiveness (OEE). Stock control. Current Good Manufacturing Practice (cGMP).
K17	Principles of laboratory quality procedures: calibration requirements for quality control, representative sampling, and common methods of analysis.
K18	How customer feedback can be used to assess quality performance. Purpose of audits. Non-conformance reports (NCR). Corrective Action Preventive Action (CAPA).
K22	Different types of maintenance activities: preventative and reactive.
K27	Uses of water in and around the plant. Types of water: raw, treated, demineralized; uses, differences, and composition. Water purification requirements and methods.
K28	Common process manufacturing principles: distillation, phase separation, crystallisation, and drying.
K29	The thermal and flow properties of solids, liquids, and gases.
K30	The structure of atoms, elements, and compounds - chemical symbols that represent them.

K31	Fundamental scientific laws to the construction and use of balanced chemical equations.
K32	Solutions, solubility, and solubility curves.
K33	The application and importance of electrochemical principles.
K34	The structure, classification, and properties of carbon compounds and polymers.
K35	The structure and properties of elements, mixtures, compounds, crystals, and alloys.
K36	The importance of chemical equilibrium and energy changes in reactions involved in manufacturing processes.
K37	Electrochemical principles - electrolysis and galvanic corrosion, their applications and importance.
K38	Numerical approximations and unit conversion tables. Areas, volumes, and pressure and flow rates calculations. Statistical data.
K39	Conventions for drawings and graphical information.
K41	General data protection regulation (GDPR).
Skills	
S17	Conduct calculations for example, conversions, tare weight, charge weights, yield calculations.
S34	Interpret data for example, process data, quality control and test procedure data.
S35	Interpret drawings and graphs.

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 other two assessment methods. To achieve an overall EPA distinction, the apprentice must achieve a distinction in the observation with questions, a distinction in the 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-takes and re-sits

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 End-Point Assessment 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 End-Point Assessment outcome notification.

Failed assessment methods must be re-sat or re-taken within a 6-month period from the End-Point Assessment outcome notification, otherwise the entire End-Point Assessment 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 End-Point Assessment grade of pass if they need to re-sit or re-take one or more assessment methods, unless the EPAO 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 Questions	O
Interview Underpinned by a Portfolio of Evidence	I
Multiple-Choice Test	MCT

Ref	KSB to be assessed	Assessment Method
Knowledge		
K1	Science process manufacturing sector awareness: range of products, manufacturing environments, types of customers.	MCT
K2	Role and limits of responsibility. Escalation procedures. Impact of operators’ competence on product quality. Change control requirement.	I
K3	Health and safety regulations, standards, and guidance: Control of Substances Hazardous to Health (COSHH), Dangerous Substances and Explosive Atmospheres Regulations (DSEAR), Electrical safety and compliance, 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 in confined spaces, and Working at height.	MCT
K4	Control of Major Accident Hazards (COMAH) regulation and impact on workplaces.	MCT
K5	Science process manufacturing safety hazards – risks they pose and their management: temperature, pressure, and vapours. Risk assessment and safe systems of work. Personal Protective Equipment (PPE) requirements.	O
K6	Emergency procedures.	I

Ref	KSB to be assessed	Assessment Method
K7	Health and safety management systems; key performance indicators (KPIs) and learning from incidents.	MCT
K8	Environmental hazards that can arise from process. Hierarchy of control.	O
K9	Environmental management systems standard. Environmental Protection Act. Environmental signage and notices.	MCT
K10	Principles of sustainability and circular economy. Resource (energy, water, and waste) efficiency and reuse of materials. Principles of control and management of emissions and waste.	I
K11	Planning, prioritising, and time management techniques.	O
K12	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. Overall Equipment Effectiveness (OEE). Stock control. Current Good Manufacturing Practice (cGMP).	MCT
K13	Standard operating procedures (SOP) - what they are and why they are important.	I
K14	Standard operating conditions (SOC) - what they are and why they are important.	O
K15	Documentation requirements: documentation control, auditable records.	O
K16	Main factors influencing quality assurance in industrial process industries. Quality standards.	O
K17	Principles of laboratory quality procedures: calibration requirements for quality control, representative sampling, and common methods of analysis.	MCT
K18	How customer feedback can be used to assess quality performance. Purpose of audits. Non-conformance reports (NCR). Corrective Action Preventive Action (CAPA).	MCT
K19	Common faults and causes in processing: flow, blockages, instrumentation failures, seals and human factors.	I
K20	Problem solving and fault-finding techniques: root cause analysis, 5-Whys.	I
K21	Continuous improvement (CI) systems and techniques.	I
K22	Different types of maintenance activities: preventative and reactive.	MCT
K23	Requirements for shutting down and preparing for maintenance.	I

Ref	KSB to be assessed	Assessment Method
K24	Requirements for bringing equipment back from maintenance.	I
K25	Purpose and operation of process industry equipment.	O
K26	Process control systems and their constituent components.	O
K27	Uses of water in and around the plant. Types of water: raw, treated, demineralized; uses, differences, and composition. Water purification requirements and methods.	MCT
K28	Common process manufacturing principles: distillation, phase separation, crystallisation, and drying.	MCT
K29	The thermal and flow properties of solids, liquids, and gases.	MCT
K30	The structure of atoms, elements, and compounds - chemical symbols that represent them.	MCT
K31	Fundamental scientific laws to the construction and use of balanced chemical equations.	MCT
K32	Solutions, solubility, and solubility curves.	MCT
K33	The application and importance of electrochemical principles.	MCT
K34	The structure, classification, and properties of carbon compounds and polymers.	MCT
K35	The structure and properties of elements, mixtures, compounds, crystals, and alloys.	MCT
K36	The importance of chemical equilibrium and energy changes in reactions involved in manufacturing processes.	MCT
K37	Electrochemical principles - electrolysis and galvanic corrosion, their applications and importance.	MCT
K38	Numerical approximations and unit conversion tables. Areas, volumes, and pressure and flow rates calculations. Statistical data.	MCT
K39	Conventions for drawings and graphical information.	MCT
K40	Information and digital technology to support process industry operations. Cyber security requirements.	I
K41	General data protection regulation (GDPR).	MCT
K42	Written communication techniques. Technical report writing techniques.	I
K43	Verbal communication techniques.	O
K44	Principles of team working. Principles of equality, diversity, and inclusion in the workplace.	I
Skills		

Ref	KSB to be assessed	Assessment Method
S1	Review instructions or information to understand the task.	O
S2	Plan tasks. Identify and organise resources with consideration for safety, environmental impact, quality, and cost.	O
S3	Identify hazards and risks in the workplace and personal safety and mitigation measures.	O
S4	Apply health, safety, and environmental procedures in compliance with regulations, standards, and guidance.	O
S5	Follow environment emergency procedures. For example, make area safe, evacuate.	I
S6	Apply sustainability principles for example, minimising waste.	I
S7	Apply standard operating procedures (SOPs).	I
S8	Check equipment.	O
S9	Select, check, and prepare raw materials for process for example, weighing, measuring, control and blending, conditioning, dissolving, and sanitisation.	I
S10	Set and adjust processing parameters such as temperature, pressure, speed or time, distance.	O
S11	Monitor process for example, take readings and conduct walk-arounds.	O
S12	Conduct the control of product streams to maintain specifics.	I
S13	Apply quality assurance procedures. For example, density checks, contaminant check, and take samples for laboratory testing.	O
S14	Apply intermediate or post-manufacturing procedure for example, labelling, packing, storage, visual inspection, discharge.	I
S15	Manage waste streams.	I
S16	Clean equipment for example, boil-outs, steam-outs, bake-outs, steam in place SIP, clean in place (CIP).	I
S17	Conduct calculations for example, conversions, tare weight, charge weights, yield calculations.	MCT
S18	Store tools and equipment.	O
S19	Identify equipment for handover.	I

Ref	KSB to be assessed	Assessment Method
S20	Apply signage and access restriction measures.	O
S21	Shut down the process and equipment.	I
S22	Isolate process and systems.	I
S23	Complete isolation checks.	I
S24	Empty equipment for example, drain, purge, vent, and de-pressure.	I
S25	Purge, fill, pressurise and leak test.	I
S26	Complete post maintenance equipment checks.	I
S27	Line-up equipment.	I
S28	Connect service connections such as water, electrical, pneumatic, hydraulic for chemical or petrochemical processing.	I
S29	De-isolate process, mechanical and electrical systems.	I
S30	Complete pre-start up checks.	I
S31	Start-up plant and equipment.	I
S32	Re-start process.	I
S33	Record or enter information - paper based or electronic.	O
S34	Interpret data for example, process data, quality control and test procedure data.	MCT
S35	Interpret drawings and graphs.	MCT
S36	Identify issues for example, defects, deviations, process variance, and maintenance requirements.	I
S37	Escalate issues outside limits of responsibility.	I
S38	Apply problem solving and fault-finding techniques.	I
S39	Apply continuous improvement techniques. Make a suggestion for improvement.	I
S40	Use information and digital technology for example, management information systems, human machine interfaces, word processing, spreadsheet, email, virtual learning platforms, document sharing platforms. Comply with cyber security requirements.	I
S41	Produce written documents for example, handover notes or emails, non-conformances, design change requests.	I

Ref	KSB to be assessed	Assessment Method
S42	Communicate with others verbally for example, colleagues and stakeholders.	O
S43	Apply team working principles.	I
S44	Plan how to meet personal development needs. Carry out and record planned and unplanned learning and development (CPD) activities.	I
Behaviours		
B1	Prioritise health, safety, and environment.	O
B2	Consider sustainability when using resources and carrying out processes.	I
B3	Team-focus to meet work goals including support for equality, diversity and inclusion.	I
B4	Take responsibility for the quality of their own work.	O
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