SIAS

Science Manufacturing Process Operative (ST0422)

Level 2 Apprenticeship Standard

End-Point Assessment Specification

Endorsed by the Science Industry Partnership

SIP

Contents

This specification describes the end-point assessment tests, the test rules and who should be involved. Preparing for end-point assessment including gateway requirements 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.

In this guide, the term "employer" is used to refer to the host employer, which is the company where the apprentice gains their competency experience. It does not refer to an organisation such as an Apprenticeship Training Agency (ATA) that has the employment contract with the apprentice.

Qualification Objective

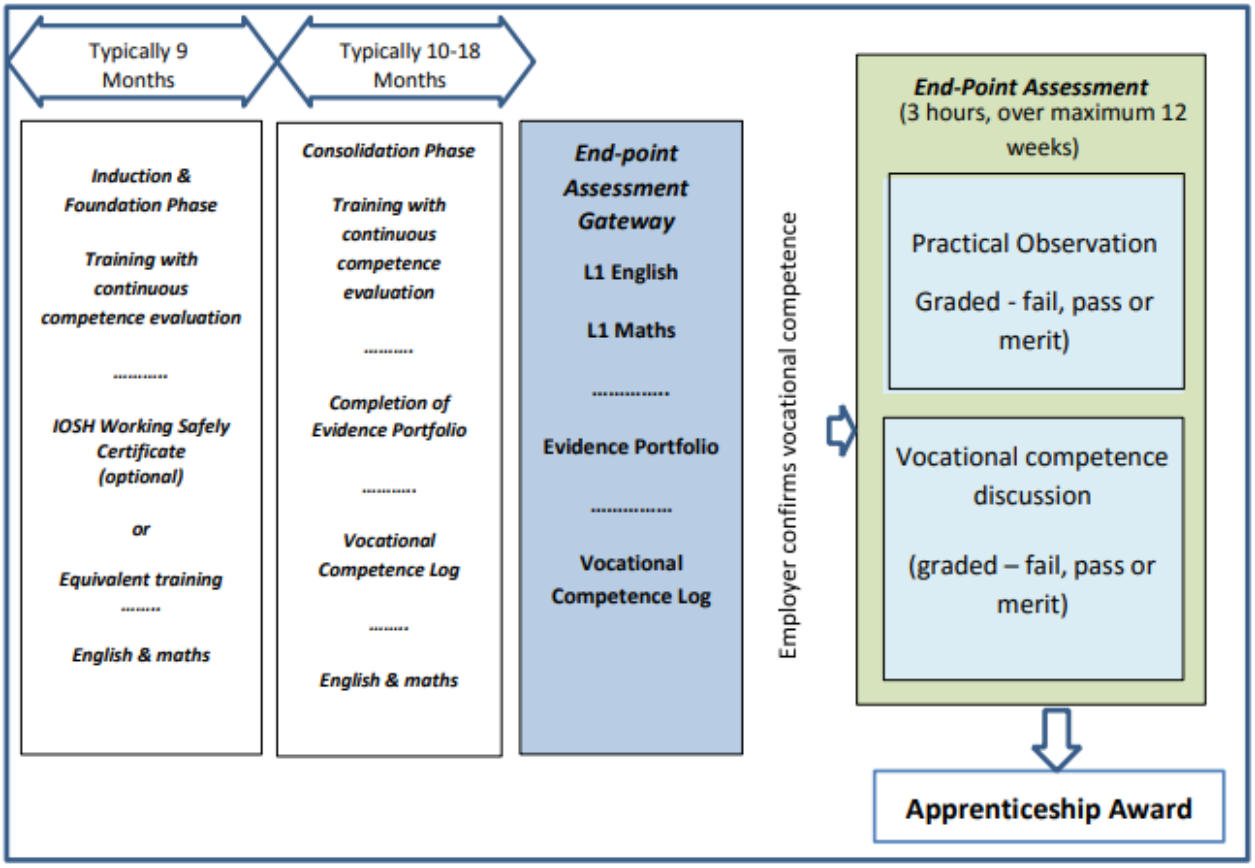
The aim of this qualification is to ensure that the apprentice is occupationally competent against the knowledge, skills and behaviours outlined in the assessment plan for this standard.

Science manufacturing process operatives are employed across the science sector. The sector includes companies working in Nuclear, Petrochemical, Pharmaceutical, Biotechnology, Formulated Products, Packaging and Polymers. A science manufacturing process operative will undertake basic operations and monitoring of plant and equipment, including pumps, valves, temperature gauges, filtration equipment, tanks, vessels**,** and production / processing machinery; or they will safely operate machines to process / manufacture, assemble and finish component parts or finished products by hand, appropriate to their level of responsibility.

Prior Learning and Qualifications

There are no requirements for previous knowledge or qualifications before a learner begins this qualification.

A Summary of Science Manufacturing Process Operative End-Point Assessment



About 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 End-Point Assessment. Confirmation from the employer that the apprentice is fully competent is needed before End-Point Assessment can take place.

Competence Evaluation Log (CEL)

The evidence that the apprentice is ready for end-point assessment is the signed SIAS Competence Evaluation Log (CEL). The CEL covers the knowledge, skills and behaviours specified in the apprenticeship standard. The signed log shows that the apprentice has demonstrated to the employer they are fully competent at the end of their training. It has the same status as a qualification certificate. Along with the qualification certificates, a signed completed CEL is one of the requirements for Gateway to prove the apprentice has satisfactorily completed training covering the knowledge, skills and behaviours as described in the standard.

Readiness for End-Point Assessment (EPA) - Gateway

Before going forward for the EPA, the employer must be satisfied that the apprentice has:

- English & maths: apprentices without English and mathematics at level 2 must achieve level 1 English and mathematics and take the tests for level 2 prior to taking their EPA
- Evidence Portfolio (portfolio)
- Vocational competence evaluation log (CEL)

End-Point Assessment

There are two graded tests for end-point assessment:

- Practical Skills Observation (PO), with questioning
- Vocational Competence Discussion (VCD), underpinned by the portfolio

The order in which apprentices can take assessments is not fixed.

Practical Observation, with questioning

A practical observation, with questioning will assess the apprentice holistically against a range of knowledge and skills in their workplace setting.

The independent assessor following discussion with the employer should select the 2 contexts to be observed as part of the PO, in either a batch or continuous process, from the following:

1. Prepare
2. Start-up
3. Perform
4. Shut down
5. Assemble & finish

The PO will be assessed by an independent assessor. During or after the observed activities, the independent assessor will ask the apprentice 6-8 open questions to assess knowledge and understanding relating to the observed activities and any contexts not observed. They may ask follow-up questions to seek clarification where required.

Example questions:

What is the science behind the process / s used in the observed task / s?

Describe the function and operating features of the manufacturing plant and equipment used for the task(s)

What is the relationship of the task to the overall manufacturing process?

The PO will be conducted in the apprentice's workplace under the following conditions:

a. PO carried out one-on-one by an independent assessor, supported by a technical expert
b. A timescale of at least 1.5 hours and a maximum of 2 hours, to reflect operational context(s), to include the observed activity and questioning; the time-period does not

have to be continuous.

c. no coaching or mentoring from colleagues / technical expert
d. in the normal working environment
e. previously planned to ensure that the proposed activity / activities meet practical observation specification
f. the outcomes are documented using EPAO documentation
g. the independent assessor must grade the PO using the grading criteria in the assessment plan (given below)

Vocational Competence Discussion, underpinned by the portfolio

Apprentices will take part in a VCD on a one-to- one basis with an independent assessor. This will be a structured discussion supported by the portfolio with 4 questions, one from each of these areas from the standard:

- Working safely
- Regulatory compliance
- Problem solving
- Process manufacturing improvement techniques

Questioning will explore underpinning behaviours and the independent assessor may ask follow-up questions for clarification. The apprentice must support their response with reference to the evidence held in their portfolio.

Example questions:

- Tell me about a time when there has been a problem in the manufacturing process, what was the problem, what action did you take and why?
- Tell me how you would shut down a science manufacturing process, what do you need to do and why?
- How do you comply with the requirements of the Health, Safety and Environmental regulations, including correct use of Personal Protective Equipment?
- What is your role in the quality control process, including sampling and testing procedures and compliance with your company's quality procedures?
- Explain how you work to and meet the requirements of standard operating procedures relevant to your scope of work.

The VCD will be conducted under the following conditions:

1. Be in the format of a 1:1 discussion with the independent assessor
2. Comprise 4 questions
3. Last no more than 1 hour
4. Take place in a room, free from distractions with no other people present; it is permissible for the VCD to be conducted using technology e.g., video-conferencing
5. Be documented or recorded electronically by the independent assessor
6. The independent assessor must grade the VCD using the grading criteria in the assessment plan (given below)

Reflective Portfolio

During the on-programme period the apprentice must compile an evidence portfolio. It must contain evidence mapped against the standard's KSBs, with at least one piece of evidence mapped to each KSB. Evidence may be mapped against more than one KSB. Evidence sources may include, performance reviews, training records / certificates, photographs, production reports or appropriate documents; this list is not definitive. During the VCD the apprentice will have the opportunity to refer to the portfolio.

End-Point Assessment grading

Performance in the EPA will determine the apprenticeship grade - fail, pass or merit. The assessment methods have equal weighing in determining the EPA grade. A fail will be awarded where the apprentice fails one or more assessment method. A pass will be awarded to individuals that achieve at least a pass in both of the assessment methods. A merit will be awarded to individuals that achieve a merit in both assessment methods.

Practical Observation Grade	VCD Grade	Apprenticeship Grade
Fail	Fail	Fail
Fail	Pass	Fail
Pass	Pass	Pass
Pass	Merit	Pass
Merit	Pass	Pass
Merit	Merit	Merit

Re-takes / re-sits

Apprentices who fail an EPA method(s) will be offered the opportunity to take a re-sit / re-take. A resit does not require further learning, whereas a re-take does. The employer will need to agree that a re-sit / re-take is an appropriate course of action. Any EPA component re-sit / re-take must be taken within 2 months of the issuing of the EPA result; otherwise, the entire EPA must be retaken. They are not offered to apprentices wishing to move from pass to merit. Re-sits / re-takes will not be awarded a grade higher than pass, unless SIAS determines there were exceptional circumstances accounting for the fail. Apprentices should have a supportive action plan to prepare for the re-sit / re-take.

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 assessment.

SIAS will apply for the apprentice's certificate, which will be sent to the employer. 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 Assessment Tests section of this document.

The Assessment Tests

Knowledge, Skills and Behaviours to be assessed

Key	
Practical Observation	PO
Vocational Competence Discussion	VCD

Knowledge

No	Standard Competency Statement	Assessment	
1	Science manufacturing industry plant and equipment, including: pumps, valves, temperature gauges, filtration equipment, tanks, vessels and production / processing machinery such as automated production lines and assembly operations	PO	VCD
2	How to operate the above plant and equipment, to process / manufacture, assemble and finish industry component parts or finished products and materials in a science manufacturing environment.	PO	
3	Process manufacturing improvement techniques for example 5S Methodology and Good House Keeping improvements and their application in a science manufacturing environment.		VCD
4	The organisational structure of their science manufacturing company and their role within it.		VCD
5	Their organisation's ethical practices and codes of conduct.		VCD
6	Regulatory compliance and policies typically required by science manufacturing employers, for example external GMP and internal polices required for 'clean room' practices.		VCD
7	The hazards and risks associated with the science manufacturing plant operation and environment and the use of correct personal protective equipment (PPE) and safety equipment to ensure safe plant operation and safety in the workplace.		VCD

Skills

No	Standard Competency Statement	Assessment	
8	Prepare science manufacturing materials, plant, and equipment, for hand or machine-based process operations, typically using pumps, valves, temperature gauges, filtration equipment, tanks, and vessels; including checking availability and quality of materials, correct conditions, and safety checks according to standard operating procedures.	PO	
9	Start-up a basic science manufacturing machine based or hand-based processes, typically using equipment as above, following process operating instructions.	PO	
10	Perform operations and monitor basic science manufacturing process according to company safe working practices as directed by line manager.	PO	
11	Produce a representative sample of science manufacturing product for quality test purposes and inspect products to ensure quality is maintained in line with company quality procedures	PO	

No	Standard Competency Statement	Assessment	
12	Carry out assembly and finishing operations for a machine or hand-based process operation in science manufacturing process.	PO	
13	Make simple adjustments to the science manufacturing process to remedy problems, reporting any problems or abnormal conditions when unable or unauthorised to resolve.		VCD
14	Shut down / complete a basic science manufacturing process following process operating instructions.	PO	
15	Comply with the Health, Safety and Environmental regulations, including correct use of PPE.	PO	
16	Comply with and meet the requirements of their company quality standards	PO	
17	Work to and meet the requirements of standard operating procedures relevant to their scope of work.	PO	
18	Comply with instructions pertaining to the internal and external regulatory requirements set by the relevant competent authority and / or specified by the company.	PO	
19	Complete routine documentation such as quality inspection sheets and production records.	PO	
20	Perform simple calculations associated with the operation, for example raw material quantity and production calculations.		VCD
21	Support process manufacturing improvement activities, for example implementing plant improvements as directed and responding to plant and process change requirements.		VCD

Behaviours

No	Standard Competency Statement	Assessment	
22	Communicates appropriately to support the working of the team	PO	VCD
23	Accepts responsibility of own work and the impact of own work on others		VCD
24	Displays a willingness to contribute to the work of others		VCD
25	Shows respect for others, having regard for diversity and equality	PO	VCD
26	Manages own time, being punctual, reliable and completes work to agreed schedule		VCD
27	Responds positively to change in the working environment		VCD

Practical Skills Observation assessment criteria

Fail Criteria Apprentice does not demonstrate one or more of the following:	Pass Criteria Apprentice must demonstrate all of the following:	Merit Criteria Apprentice must meet all of the pass criteria and in addition demonstrate all of the following
All tasks are completed in line with standard operating procedures	All tasks are completed in line with standard operating procedures	Working to the operating plan and understands the escalation process when issues occur
Planning and methodology are done in a logical order without the need to undo or redo any work already completed	Planning and methodology are done in a logical order without the need to undo or redo any work already completed	Understands the impact on other any omissions or transgressions in safe working practices
Working practices ensure the health & safety of self and others	Working practices ensure the health & safety of self and others	The impact of process output and product quality to the wider business effectiveness
Product or process output meets manufacturing requirements	Product or process output meets manufacturing requirements	Explains the science behind the process / s and a wider science understanding of the overall manufacturing process
Completes any required documentation fully and accurately	Completes any required documentation fully and accurately	Can respond to and provide or recommend corrective actions to maintain safe operation
Maintains a clean and tidy working environment	Maintains a clean and tidy working environment	
Provides an accurate explanation of how the non-observed context activities should be conducted	Provides an accurate explanation of how the non-observed context activities should be conducted	
Explains the science behind the process / s	Explains the science behind the process / s	
Correctly identifies and safely operates the manufacturing plant and equipment used for the tasks in accordance to operating procedures	Correctly identifies and safely operates the manufacturing plant and equipment used for the tasks in accordance to operating procedures	

Professional Discussion assessment criteria

Area of Standard	Fail Criteria	Pass Criteria	Merit Criteria (in addition to the Pass Criteria)
Working Safely	Cannot explain the hazards and risks associated with science manufacturing industry plant and equipment and the manufacturing process.	Explains the hazards and risks associated with science manufacturing industry plant and equipment and the manufacturing process Supports explanation with example of working safely from own practice E.g., use of personal protective equipment.	Explains the reasons for safe working practices showing knowledge of how these link to legislation and the implications of not following these for the organisation.
Regulatory Compliance	Cannot explain the organisational structure of their science manufacturing company and their role within it	Explains the organisational structure of their science manufacturing company and their role within it.	Explains how compliance with legislative and regulatory, process, safety, and environment control impacts on the manufacturing process.
	Cannot explain their organisation's ethical practices and codes of conduct.	Explains their organisation's ethical practices and codes of conduct.	Supports explanation with example of impact on the wider business.
	Cannot explain the legislative and regulatory requirements pertaining to their area of operation.	Explains the legislative and regulatory requirements pertaining to their area of operation.	
		Provides example from own practice of compliance with regulatory policies and procedures e.g., Clean / Sterile room practices, PPE requirements, Good Manufacturing Practice (GMP), Good Laboratory Practice (GLP) and Good Documentation Practice (GDP).	

Area of Standard	Fail Criteria	Pass Criteria	Merit Criteria (in addition to the Pass Criteria)
Problem Solving	Cannot explain how to make simple adjustments to the science manufacturing process to remedy problems	Explains how to make simple adjustments to the science manufacturing process to remedy problems.	Explains how proactive problem-solving practices benefit the manufacturing process and impacts on the wider business.
		Supports explanation with example from own practice	Supports explanation with example of simple calculations associated with the operation that shows impact on the manufacturing process.
		Provides examples of performing simple calculations associated with the operation.	
Process manufacturing improvement techniques	Cannot provide an example of supporting process manufacturing improvement activities.	Explains simple process manufacturing improvement activities supported by example from own practice of responding to plant and / or process change requirements.	Explains how continuous improvement and change management processes are used within the organisation.
		Explains how process manufacturing improvement systems can be used to maintain efficient and safe manufacturing.	
		Supports explanation with example from own practice, e.g., good housekeeping, 5 Ss, other change management procedures	

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:

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