

ST0249: Level 3 Science Industry Maintenance Technician

Role profile

A Science Industry Maintenance Technician contributes to the fault free and safe operation of science industry plant by the installation, maintenance, testing and repair of mechanical, electrical equipment and instrumentation. They will be proactive in finding solutions to problems and identifying areas for improving their work environment.

As well as core engineering skills, maintenance technicians need to understand and follow working practices that are specific to the safety critical science industry. They may work in varied conditions including using specialist safety equipment, shift work and on sites running 365 day operations. They will be expected to work both individually and as part of a maintenance team. They will be able to work with minimum supervision, taking responsibility for the quality and accuracy of the work they undertake. They may be part of in house maintenance teams or engineering maintenance contractor teams who work for different companies across the science industry.

Science industry Maintenance Technicians work in a wide range of companies, including, but not exclusively, chemical, petrochemical, polymer, primary and secondary pharmaceutical, biotechnology, formulated products, engineering and nuclear manufacturing. In either case employers are subject to inspection by the regulator for their industry, for example, Health and Safety Executive or Medicines and Healthcare Products Regulatory Agency. As companies operate under highly regulated conditions a premium is placed on appropriate attitudes and behaviours to ensure apprentices comply with organisational safety and regulatory requirements at all times.

End-Point Assessment

The Science Industry Maintenance Technician standard is assessed through formal End-Point Assessment which includes:

- A review of the final Behaviours Evaluation Log (this is graded by the Employer before Gateway acceptance)
- Synoptic Assessment Test (SAT)
- Vocational Competence Discussion (VCD)
- Scenario Case Study (SCS)

Apprentices must spend a minimum of 36 months on programme, with most typically spending 42 months (not including 3 months post Gateway for EPA). Once the employer is satisfied that the Apprentice is consistently working at or above the level set out in the Standard, and that all the Gateway requirements have been met, the Apprentice can proceed to their End-Point Assessment (EPA).

Gateway requirements before End-Point Assessment

- Level 3 or above Qualification –

The Apprentice must complete a qualification that is recognised for EngTech by a professional engineering institution, e.g.

- BTEC Level 3 Diploma in Operations and Maintenance Engineering (QCF)
- BTEC Level 3 Diploma in Engineering (Specialist: Operations and Maintenance) (QCF)
- BTEC Level 3 Diploma in Electrical/ Electronic Engineering (QCF)

A range of qualifications may be used to fulfil the requirement for the knowledge component of the apprenticeship standard. This allows employers the flexibility to tailor the apprenticeship to meet their specific local needs, whilst meeting the minimum requirements of the apprenticeship standard. The application of theoretical knowledge will be tested during the formal End-Point Assessment. The qualification will not contribute to the grading of the apprenticeship award.

- Maths & English at Level 2 (GCSE equivalent grade A-C / 4-9)
- Vocational Competence Evaluation log
- Behaviours Evaluation review

Marshall Assessment will provide the following documents which should be used as part of the Gateway process:

- Gateway Declaration – Training Provider
- Gateway Declaration and conflict statement – Employer Registered Assessor
- Gateway Declaration – Employer
- Gateway Declaration – Apprentice
- Behaviours Evaluation Log – template
- Vocational Competence Evaluation Log – this should be used to track progress on-programme, which must be submitted once signed off by the nominated Employer Registered Assessor at Gateway.

The EPA must be completed within a 3-month period following successful gateway approval.

A summary of the assessment methods and how Marshall Assessment deliver them has been provided below. Further support can be found in the following documents which will be provided as part of our EPA support and customer / Apprentice engagement pack.

- **Synoptic Assessment Test (SAT) - Guidance & SAT planning template** giving guidance on what the Apprentice needs to be able to demonstrate to meet the required criteria for the observation.
- **Vocational Competence Discussion (VCD) guidance** – detailed guidance to help the Apprentice prepare for the discussion including what needs to be evidenced to meet and exceed the Knowledge, Skills and Behaviours being assessed.
- **Scenario Case Study** – guidance and mock paper with marking rationale

Synoptic Assessment Test (SAT)

Laptop / PC with webcam with audio and video capabilities will be required for remote delivery.

Teams link and set up will be tested prior to the assessment date if required.

Arrangements for onsite assessment will be confirmed in writing beforehand with the employer, IA and apprentice.

SAT must be completed before the VCD element of the EPA.

Duration: Between 2 - 4 hours

Grading outcomes:
Pass or Fail

- The purpose of the SAT is to validate the Apprentice's competence by observing them carrying out their job role in a normal working environment, under normal conditions.
- The Apprentice will need to be able to demonstrate an understanding of the practices and procedures for planning to maintain systems and equipment, relevant to a single specialist discipline or a number of disciplines (mechanical, electrical, instrumentation) as required by the job role whilst following applicable quality build plans, codes and standards.
- The following will need to be demonstrated: Working safely, Following procedures/work instructions, Complying with regulations, Following quality systems, Using appropriate vocational skills
- The SAT will be assessed by an Independent Assessor (IA – also referred to as External Assurer) from Marshall Assessment and an Employer Registered Assessor (ERA) nominated from the employer site.
- The Marshall IA will introduce themselves to the Apprentice and put them at ease. It will be confirmed the Apprentice understands how the assessment will be carried out and what is required of them.
- The Apprentice will confirm their name and show their Photographic Identification.
- Both the Marshall IA and the nominated Employer Registered Assessor will take notes on Marshall Assessment's evidence recording paperwork and map what they see to the required competencies for this element.
- Start and end times, and any breaks must be recorded on the evidence paperwork by the IA and the ERA.
- At the end of the SAT, the apprentice must review the evidence notes and sign to say they are a true reflection of what they have demonstrated.
- A grade is agreed between the IA and ERA, if an agreement cannot be met, it will be referred to Marshall Assessment for a final decision.
- The apprentice must NOT be notified of the outcome at this point.
- Original SAT paperwork must then be retained by Marshall Assessment.
- Remote assessment may be requested for this element – Marshall Assessment will provide guidance on remote delivery protocols if the request is approved by the External Quality Assurance Provider. Remote assessment is delivered via Microsoft Teams.

Vocational Competence Discussion

Laptop / PC with webcam with audio and video capabilities will be required for remote delivery.

Timescale - between 1 – 1.5 hours max.

Takes place in a quiet place, free from distractions and interruptions.

GDPR policy will be shared with learner before EPA as the assessment session will be recorded.

Grading outcomes: Fail / Pass / Distinction

- The Marshall IA will lead a professional discussion on a 1:1 basis with the apprentice either remotely over Microsoft Teams, or face to face.
- The discussion will cover all elements of the apprenticeship standard, and the Apprentice may draw on evidence from the SAT and evidence generated during the vocational competence evaluation process to support their responses.
- The discussion will provide the opportunity for presentation of evidence to support specific elements from the standard that it has not been possible to demonstrate during the SAT.
- Criteria fully met in the SAT will not be reassessed in the discussion except to provide the opportunity to evidence the “Exceeds” criteria.
- Before starting the test, the IA will ensure that the learner understands the VCD process, the possible outcomes and how it is graded.
- A minimum of 8 open questions will be asked covering 12 topic areas, as outlined in the VCD guidance.
- Detailed guidance on what is expected in Apprentice’s responses to questions on these areas has been provided in the VCD guidance document.
- The Apprentice can have access to their OneFile or e-portfolio and competence evaluation log and can use any evidence contained in this to support the discussion.
- The Marshall IA will take notes during the discussion and the assessment will be recorded to ensure fair marking and quality assurance of the responses given.
- The VCD is graded out of 80.
- Grading outcomes: Fail (39 or below/80), Pass (40 to 59/80) and Distinction (60 or above/80)

Remote Assessments - any breaks in connectivity will be dealt with in the following way:

- A short break of up to 10 mins will be acceptable, this must be recorded by the IA and they will confirm the test can continue once connectivity has resumed.
- If there is a break in connectivity once a question has been asked, once resumed, the IA will ask a different question.
- If the break is during a response – the Apprentice will be allowed to continue as long as the break is less than 5 minutes. More than this, a new question will be asked.

Scenario Case Study

Laptop / PC with webcam with audio and video capabilities will be required if remote delivery.

Takes place in a quiet place, free from distractions and influence.

Test to be taken under exam conditions.

Spare blank paper, pens and a highlighter pen are recommended if taking paper-based version.

Timescale - up to 2.5 hours available.

All questions must be answered. The apprentice can complete before this time, but the invigilator will stop the test at 2.5 hours.

GDPR policy available as session may be recorded for QA & training.

Grading outcomes:
Fail, Pass or
Distinction.

- Assessment will require an on-site invigilator which can be the Marshall IA (for onsite delivery of the assessment) or nominated ERA (for remote delivery).
- If onsite delivery, the Marshall IA will provide the assessment paperwork.
- Alternatively, the test can be taken using Marshall Assessments online assessment platform. Login details will be provided for access to a mock paper and for the live assessment.
- If remote delivery, the IA will contact the Apprentice and ERA using Microsoft Teams at the agreed time of the test. The ERA (or previously agreed person from the workplace) will be required to invigilate.
- The Apprentice will be required to answer a set of questions based on the provided scenario to test the depth of their knowledge and understanding of core elements included in the Science Manufacturing Technician Standard, with the emphasis on demonstrating how well they can transfer and apply their understanding of the principles of working safely, following quality procedures and complying with regulations, to a new setting.
- The Case Study will focus on the knowledge for the following areas of the Occupational Standard:
 - Work safely in a science manufacturing environment, understanding personal responsibility for Health, Safety and the Environment and principles of risk management
 - Understand and follow quality procedures to meet the requirements of quality standards relevant to the workplace.
 - Understand the internal and external regulatory environment pertinent to the sector and the employer and comply with regulations proficiently.
 - Understand and apply problem solving techniques
 - Safely use all necessary equipment, following the appropriate engineering techniques, procedures and methods of relevance to complete the maintenance activity.
 - Understand and apply the practices and procedures for planning to maintain systems and equipment, relevant to a single specialist discipline or a number of disciplines (mechanical, electrical, instrumentation) as required by the job role whilst following applicable codes and standards.
 - Understand and apply techniques to identify faults in plants, systems and components to achieve satisfactory solutions.
 - Reinstate the work area after completing the maintenance of plant, systems and components.
 - Understand and apply technical knowledge relevant to a single specialist discipline or a number of disciplines (mechanical, electrical, instrumentation) as required by the job role.
- For each question, the marks available are clearly shown in the answer booklet.
- The SCS is scored out of 20 and is graded: Fail (less than 10/20), Pass (between 10-14 /20) and Distinction (15 or above /20)

Grading outcomes

The Apprentice must, as a minimum, PASS each element to achieve their apprenticeship certificate. If any 1 element is graded a FAIL, the overall grade result will be a FAIL. If the Apprentice is awarded a PASS in the SAT and a Distinction in the VCD, SCS and Behaviour Evaluation, they will be awarded an overall DISTINCTION grade.

All evidence is submitted for Internal Quality Assurance before confirmation of results, which will be released to the Training Provider by Marshall Assessment. Following confirmation of results from Marshall Assessment, the Apprentice or Training Provider have 10 working days to request a review of the grade awarded. Appeals policy also available at <https://www.marshall-assessment.com/our-policies>. If no request is made, the certificate claim will then be submitted to the Apprenticeship Service (this may take up to 4 weeks to arrive following a claim being made and will be sent directly to the employer unless otherwise specified)

All relevant policies relating to End-Point Assessment are available to download from Marshall-assessment.com

Link to IfATE & Assessment Plan:

<https://www.instituteforapprenticeships.org/apprenticeship-standards/science-industry-maintenance-technician-v1-0>

The Knowledge, Skills and Behaviours required to be met for this Standard are listed in the assessment plan and also below. A detailed guidance pack with assessment criteria, amplifications, exemplifications, mock material where appropriate and support to prepare for EPA will be provided on registration with Marshall Assessment as the EPAO.

| Knowledge & Skills | |
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| S1 | Work safely in a science manufacturing environment, understanding personal responsibility for Health, Safety and the Environment and principles of risk management |
| S2 | Understand and follow quality procedures to meet the requirements of quality standards relevant to the workplace. |
| S3 | Understand the internal and external regulatory environment pertinent to the sector and the sponsoring company and comply with regulations proficiently |
| General workplace Health and Safety | |
| 1 | Understand and comply with foundations of health and safety including responsibility for health and safety under HASWA |
| 2 | Understand the procedures for first aid relevant to your workplace |
| 3 | Understand and comply with risk assessment & control |
| 4 | Appropriate use of personal protective equipment i.e. respirators, breathing air hoods, PVC suits |
| 5 | Understand and practice site/plant safety requirements including for example: Fire, COSHH, Working at Height, COMAH, Confined Spaces, Permits to work |
| Process Safety | |

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| 6 | Understand foundations of process safety |
| 7 | Understand the safe operating conditions of the plant |
| 8 | Work safely in a process environment or in a bio-manufacturing environment |
| 9 | Describe common risks and control measures |
| 10 | Understand systems to prevent loss of containment within your area of responsibility |
| 11 | Carry out key plant integrity checks within own area of responsibility |
| 12 | Understand and comply with emergency response procedures participating in exercises pertinent to role |
| 13 | Understand Hazardous area classification & DSEAR regulations and how they apply within area of responsibility |
| Environmental & Resource Management | |
| 14 | Understand the foundations of environmental management |
| 15 | Understand the principles of control of emissions |
| 16 | Understand Management and control of waste |
| 17 | Understand environmental risk assessments (impact assessment) |
| 18 | Understand the concepts of resource efficiency applied to energy, water and waste |
| 19 | Identify, organise and use resources effectively to complete tasks, with consideration for cost, quality, safety and environmental impact |
| 20 | Operate and act responsibly, taking account of the need to progress environmental, social and economic outcomes simultaneously |
| Product Quality | |
| 21 | Maintain product quality throughout manufacture |
| 22 | Understand management of change principles and the impact of change on product quality |
| Regulatory Environment | |
| 23 | Understand the internal regulations pertinent to the sponsoring company & relative specialism in which they operate |
| 24 | Understand the external regulatory environment pertinent to the sponsoring company & relative specialism in which they operate (e.g. COMAH, NII, MHRA) |
| 25 | Demonstrate compliance with internal and external regulations pertinent to the sponsoring company & relative specialism in which they operate |
| 26 | Work reliably and effectively without close supervision, to the appropriate codes of practice |
| S4 | Understand and apply problem solving techniques |
| 27 | Demonstration of one or more problem solving techniques |
| 28 | Address routine and non-routine problems with equipment, plant, systems and components, within defined areas |
| 29 | Identify problems and apply appropriate methods to identify causes and achieve satisfactory solutions |
| S5 | Participate in continuous performance improvement. |
| 30 | Demonstrate the application of principles of continuous improvement to own performance |
| 31 | Participate in improving systems and processes within your work environment or demonstrate where you have personally improved and become more efficient |
| S6 | Understand the business environment in which the company operates including personal role within the organisation, ethical practice and codes of conduct |
| 32 | Understand the business environment (customers, competitors etc.) in which the company operates |
| 33 | Understand personal role in the company and industry and those of others |
| S7 | Safely use all necessary equipment, following the appropriate engineering techniques, procedures and methods of relevance to complete the maintenance activity. |
| 34 | Demonstrate the safe use of engineering hand tools and tools and equipment specific to each trade |
| 35 | Use engineering knowledge and understanding to apply technical and practical skills |
| 36 | Use appropriate scientific, technical or engineering principles |
| 37 | Manage and apply safe systems of work |
| S8 | Prepare the work area for maintenance of plant, systems or components. |
| 38 | Prepare work areas for maintenance in line with Standard Operating Procedures |

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| 39 | Determine and undertake equipment preparation, ensuring the security of tools and equipment that are used |
| S9 | Carry out planned routine and non-routine maintenance activities, effectively, efficiently and safely |
| 40 | Confirm and define the condition of the engineering products or assets in accordance with specifications |
| 41 | Carry out maintenance activities in line with Standard Operating Procedures |
| 42 | Decontaminate plant equipment where appropriate |
| 43 | Accept responsibility for work of self or others |
| 44 | Accept, allocate and supervise, as appropriate, technical and other tasks |
| S10 | Understand and apply the practices and procedures for planning to maintain systems and equipment, relevant to a single specialist discipline or a number of disciplines (mechanical, electrical, instrumentation) as required by the job role whilst following applicable codes and standards. |
| 45 | Understand and apply the principles of planned maintenance and routine calibration in asset care |
| 46 | Understand the principles of change management |
| S11 | Understand and apply techniques to identify faults in plants, systems and components to achieve satisfactory solutions. |
| 47 | Identify problems and apply diagnostic methods to identify causes and achieve satisfactory solutions |
| S12 | Reinstate the work area after completing the maintenance of plant, systems and components. |
| 48 | Restore the work areas to a safe condition in accordance with agreed requirements and schedules |
| 49 | Update maintenance management systems |
| S13 | Conduct safe and effective exchange of plant and equipment to others and accept and confirm responsibility for the plant and equipment within the work area. |
| 50 | Carry out handover of process engineering plant and equipment |
| 51 | Understand permit to work systems and demonstrate compliance with local system |
| S14 | Manufacture or assemble components within skill set. |
| 52 | Use engineering tools, appliances and equipment to manufacture items and components to specification |
| S15 | Understand how to identify obsolescence and end-of-life issues |
| 53 | Identify components that are worn, broken and that have no further use |
| 54 | Discard of components in line with local rules and environmental guidelines |
| S16 | Understand and apply information extracted from engineering drawings, specification diagrams and maintenance manuals and/or computer database systems including accurate data input. |
| 55 | Use appropriate documentation in planned maintenance activities, during fault finding and for ordering replacement components and parts |
| 56 | Prepare and update drawings and diagrams as per trade discipline |
| 57 | Display clear understanding of Electrical, Mechanical and Instrumentation diagrams |
| 58 | Basic knowledge of relevant software packages e.g. MS WORD, EXCEL, LIMS where appropriate to role |
| S17 | Understand and apply technical knowledge relevant to a single specialist discipline or a number of disciplines (mechanical, electrical, instrumentation) as required by the job role. |
| 59 | Understand and apply technical knowledge relevant to a single specialist discipline or a number of disciplines (mechanical, electrical, instrumentation) as required by the job role. |
| 60 | Demonstrate cross discipline knowledge where required by organisation |
| S18 | Develop and apply theoretical knowledge of engineering and its application to the required sector & job role. This should be acquired through a qualification set at level 3 (or above) that is approved by a licensed professional engineering institution. |
| 61 | Undertake and successfully complete a technical qualification relative to trade and approved by professional engineering institution |
| S19 | Demonstrate the required attitudes, behaviours and interpersonal skills associated with the professional workplace |

Behaviours

Personal Responsibility:

Demonstrate personal responsibility towards safety systems (Incl. risk management and environment)

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| Communication: Communicate effectively using a full range of skills: speaking; listening; writing; body language; presentation |
| Team work: Work and interact effectively within a team |
| Independence and responsibility: Work independently and take responsibility for initiating and completing tasks |
| Impact of work: Understand impact of work on others, especially where related to diversity and equality |
| Time management: Accepts responsibility for managing own time and workload within a given plan to complete work to schedule |
| Change management: Ability to handle change and respond to change management processes |