

SIAS

Apprenticeship Standard

Science Manufacturing Technician

Work Based Learning Guide

March 2018



Purpose of document

This work based learning guide contains the detailed specification of the skills, knowledge and behaviours required to achieve occupational competence in the development phase of the apprenticeship Science Manufacturing Technician.

The work based learning guide has been developed by employers and will be maintained to reflect any future changes that are needed to maintain world class levels of quality and ensure that the credibility and consistency of the apprenticeship outcome is maintained. The apprenticeship outcome is described in apprenticeship standard Science Manufacturing Technician.

The mandatory assessment process that leads to the apprenticeship award is available from info@siasuk.com.

Text Amendments

| | | |
|------------|---------|--|
| March 2018 | page 20 | added specialism – bulk liquid storage terminals |
| March 2018 | page 8 | re-worded specialisms narrative |

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| CORE COMPETENCES | |
|---------------------------|--|
| Std Ref | Competences that need to be achieved by anyone being trained for the occupation. All elements are mandatory except those marked as optional, which should be included only when required for a specific job role or sector. |
| S1 | Both independently and within a team, start-up a manufacturing batch or continuous process in line with appropriate Standard Operating Procedures (SOP), understanding the principles of operation. |
| S2 | Both independently and within a team, operate a manufacturing batch or continuous process in line with appropriate Standard Operating Procedures, understanding the principles of operation. |
| S3 | Both independently and within a team, shut down/complete a run of the manufacturing batch or continuous process in line with appropriate Standard Operating Procedures, understanding the principles of operation. |
| Process Operations | |
| 1 | Understand the principles of the operating environment that may include specialist environments and conditions appropriate to job role, for example Flammable Atmospheres, lone working, confined spaces, containment and aseptic conditions |
| 2 | Prepare process materials or feeds for start-up and between production stages according to work instructions |
| 3 | Clean and prepare items of plant, facility and equipment |
| 4 | Prepare to start up a process/batch or prepare the area and process equipment |
| 5 | Start up a process/batch or plant and systems in accordance with any SOPs and communicate, if required, with relevant personnel |
| 6 | Monitor and control process or plant and equipment and resolve problems or correct abnormal conditions |
| 7 | Access, use and interpret documentation and logs, and pass on information, for example during handover |
| 8 | Prepare to shut down a process/batch or prepare the area and process equipment |
| 9 | Complete/shutdown a process/batch or plant and systems in accordance with any SOPs |
| 10 | Separate & dispose of by-products and waste as appropriate |

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| Maintenance & Calibration | | |
|--|---|----------|
| 11 | Follow procedures for handover of the processes for maintenance | |
| 12 | Prepare work areas for maintenance in line with Standard Operating Procedures | |
| 13 | Undertake maintenance activities within own areas of responsibility | |
| 14 | Reinstate the working area after completing maintenance | |
| 15 | Understand the principles of planned maintenance and routine calibration in asset care | Optional |
| 16 | Understand the principles of change management | Optional |
| 17 | Decontaminate plant equipment where appropriate | Optional |
| 18 | Calibrate plant and equipment within own areas of responsibility | Optional |
| S4 | Work safely in a science manufacturing environment, understanding personal responsibility for Health, Safety and the Environment and principles of risk management | |
| S5 | Understand and follow quality procedures to meet the requirements of quality standards relevant to the workplace. | |
| S6 | Understand the internal and external regulatory environment pertinent to the sector and the employer and comply with regulations proficiently | |
| General workplace Health and Safety | | |
| 19 | Understand and comply with foundations of health and safety including responsibility for health and safety under HASWA | |
| 20 | Understand the procedures for first aid relevant to your workplace | |
| 21 | Understand and comply with risk assessment & control | |
| 22 | Appropriate use of personal protective equipment e.g. respirators, breathing air hoods, PVC suits | |
| 23 | Understand and practise site/plant safety requirements including for example: | |

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| | | |
|----|--|----------|
| | <ul style="list-style-type: none"> • Fire • COSHH • Working at Height • Confined Spaces • Permits to work | |
| | Process Safety | |
| 24 | Understand foundations of process safety | |
| 25 | Understand the safe operating conditions of the plant | |
| 26 | Work safely in a process environment or in a bio-manufacturing environment | |
| 27 | Describe common risks and control measures | |
| 28 | Understand systems to prevent loss of containment within your area of responsibility | |
| 29 | Carry out key plant integrity checks within own area of responsibility | |
| 30 | Understand and comply with emergency response procedures participating in exercises pertinent to role | |
| 31 | Understand Hazardous area classification & DSEAR regulations and how they apply within area of responsibility | Optional |
| | Environmental Management | |
| 32 | Understand the foundations of environmental management | |
| 33 | Understand the principles of control of emissions | |
| 34 | Understand Management and control of waste | |
| 35 | Understand environmental risk assessments (impact assessment) | |
| 36 | Understand the concepts of resource efficiency applied to energy, water and waste | |

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| | |
|-----------|--|
| | Product Quality |
| 37 | Maintain product quality throughout manufacture |
| 38 | Understand management of change principles and the impact of change on product quality |
| | Regulatory Environment |
| 39 | Understand the internal regulations pertinent to the sponsoring company & relative specialism in which they operate |
| 40 | Understand the external regulatory environment pertinent to the sponsoring company & relative specialism in which they operate (e.g. COMAH, NII, MHRA) |
| 41 | Demonstrate compliance with internal and external regulations pertinent to the sponsoring company & relative specialism in which they operate |
| S7 | Control and monitor a process or plant and equipment, effectively, efficiently and securely, and resolve problems or correct abnormal conditions. |
| 42 | Monitor and control a process or plant and equipment |
| 43 | Identify and resolve abnormal process conditions |
| 44 | Demonstration of one or more problem solving techniques |
| S8 | Complete documentation relevant to the manufacturing process including relevant calculations. |
| 45 | Complete documentation proficiently including relevant calculations |
| 46 | Understand correction techniques and error reporting |
| S9 | Understand the business environment in which the company operates including personal role within the organisation, ethical practice and codes of conduct. |
| 47 | Understand the business environment (customers, competitors etc.) in which the company operates |
| 48 | Understand personal role in the company and industry and those of others |

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| | | |
|------------|---|----------|
| S10 | Participate in continuous performance improvement. | |
| 49 | Demonstrate the application of principles of continuous improvement to own performance | |
| 50 | Understand the principles of continuous improvement and the techniques that may be used | optional |
| 51 | Participate in the application of a continuous improvement technique | optional |
| 52 | Basic knowledge of relevant software packages e.g. MS WORD, EXCEL, LIMS where appropriate to role | optional |
| S11 | Develop and apply theoretical knowledge of relevant science and technology and its application to the required sector & job role. | |
| 53 | Theoretical knowledge of the relevant science or technology required for the role i.e. Chemistry, Science, Engineering to a named qualification | |
| S12 | Demonstrate the required attitudes, behaviours and interpersonal skills associated with the professional workplace | |
| | To meet Behaviours Evaluation Assessment Criteria | |

SPECIALISMS

In addition to the core competences, specialisms are specific to a work context. Mapped to the core competences, they articulate how these may be interpreted for anyone being trained for a job role in that work context. The following specialisms are included:

- SMT - Biotechnology
- SMT - Pharmaceutical/Formulation
- SMT - Process + 1st Line Maintenance
- SMT - Chemical/Petrochemical
- SMT - Polymers
- SMT - Aseptic Pharmaceuticals
- SMT - Coatings
- SMT - Bulk Liquid Storage Terminal Technician

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Science manufacturing technician - Biotechnology

| Std Ref | A | SMT- Biotechnology Specialism – Competences |
|---------|----|--|
| 6 | A1 | Understand the principles of operating in aseptic or clean room conditions |
| 1,2,3 | A2 | Understand and be able to carry out bio-technology operations using one or more of the following techniques such as: |
| | | <ul style="list-style-type: none"> • preparing culture media and solutions |
| | | <ul style="list-style-type: none"> • producing biomaterial using bioreactors |
| | | <ul style="list-style-type: none"> • transferring materials |
| | | <ul style="list-style-type: none"> • sampling biomaterial into sterile containers |
| | | <ul style="list-style-type: none"> • separating biomaterial using continuous flow centrifugation or normal filtration |
| | | <ul style="list-style-type: none"> • obtaining biomaterial using lysis of cells |
| | | <ul style="list-style-type: none"> • concentrating and dia-filtrating biomaterials using tangential flow filtration |
| | | <ul style="list-style-type: none"> • purifying harvested biomaterial using chromatography |
| | | <ul style="list-style-type: none"> • measure, weigh and prepare compounds and solutions |
| | | <ul style="list-style-type: none"> • fill containers with processed biomaterials using automated machinery |
| | | <ul style="list-style-type: none"> • pack filled biomaterial containers by manual methods |
| | | <ul style="list-style-type: none"> • assist with the routine maintenance, cleaning, disinfecting and calibration of equipment |

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Science manufacturing technician – Pharmaceutical/Formulation

| Std Ref | B | SMT – Pharmaceutical/Formulation Specialism – Competences |
|---------|----|--|
| 6 | B1 | A theoretical knowledge of the regulatory requirements and business environment for manufacture of industry specific formulated products |
| 11 | B2 | A theoretical knowledge of the scientific and technical aspects for manufacture of formulated products for specific industry applications |
| 10 | B3 | Understand and be able to contribute to the use of one or more specific techniques used within the industry such as: |
| | | <ul style="list-style-type: none"> • perform simple quality control (qc) and standard analytical tests on formulated products according to industry norms or international standards (e.g. ISO) |
| | | <ul style="list-style-type: none"> • interpret the results from simple quality control (qc) and standard analytical tests |
| | | <ul style="list-style-type: none"> • make decisions on how to modify the formulated product based on the interpretation of the process or quality data |
| | | <ul style="list-style-type: none"> • apply the principles of experimental design |
| | | <ul style="list-style-type: none"> • assist in commissioning and qualification of new equipment or processes |
| 1,2,3 | B4 | Understand the principles which underpin the manufacture of formulated products and demonstrate practical experience of one or more techniques including: |
| | | <ul style="list-style-type: none"> • comminution, crystallisation, granulation, fluidisation |
| | | <ul style="list-style-type: none"> • powder and liquid mixing technologies |
| | | <ul style="list-style-type: none"> • suspension and dispersion techniques |
| | | <ul style="list-style-type: none"> • powder and liquid handling and storage |
| | | <ul style="list-style-type: none"> • flow through packed beds and porous media |
| | | <ul style="list-style-type: none"> • solid-liquid separation processes |
| | | <ul style="list-style-type: none"> • compaction and mechanical properties of solid products |
| 1,2,3 | B5 | Understand the principles of process control and instrumentation including: |
| | | <ul style="list-style-type: none"> • measurement terminology; variables controlled and measured |
| | | <ul style="list-style-type: none"> • powder or liquid flow measurements |
| | | <ul style="list-style-type: none"> • use of computer software relevant to process control |
| | | <ul style="list-style-type: none"> • temperature, humidity & pressure measurement |
| | | <ul style="list-style-type: none"> • process measurements such as viscosity, friability, pH, solid fraction |
| 11 | B6 | Understand the principles of process operation including: |
| | | <ul style="list-style-type: none"> • critical step analysis and in-process controls |
| | | <ul style="list-style-type: none"> • impact of formulation design on process equipment |

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Science manufacturing technician – Process + 1st Line Maintenance

| Std Ref | C | SMT – Process + 1 st Line Maintenance |
|----------|----|--|
| 1,2,3 | C1 | Demonstrate practical knowledge of the following: |
| | | <ul style="list-style-type: none"> • safely use all necessary equipment to complete the maintenance activity |
| | | <ul style="list-style-type: none"> • prepare the work area for maintenance of plant, systems or components |
| | | <ul style="list-style-type: none"> • carry out planned and unplanned maintenance activities |
| | | <ul style="list-style-type: none"> • deal with variations and defects efficiently |
| | | <ul style="list-style-type: none"> • utilise diagnostic techniques to identify faults in plants, systems and components |
| | | <ul style="list-style-type: none"> • reinstate the work area after completing the maintenance of plant, systems and components |
| | | <ul style="list-style-type: none"> • conduct safe and effective hand over of plant and equipment to others and accept and confirm responsibility for the control of the plant and equipment within the work area isolation boundary |
| | | <ul style="list-style-type: none"> • identify obsolescence and end-of-life issues |
| 1,2,3 | C2 | Understand 1 st line maintenance documentation including: |
| | | <ul style="list-style-type: none"> • how to read and extract information from engineering drawings, specification diagrams and maintenance manuals |
| | | <ul style="list-style-type: none"> • technical details relating to the individual’s specialist discipline (mechanical, electrical, instrumentation) |
| optional | C3 | The individual may require competence in a number of specialist operations including: |
| | | <ul style="list-style-type: none"> • hot working fire watch |
| | | <ul style="list-style-type: none"> • asbestos awareness |

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Science Manufacturing Technician – Chemical/Petrochemical

| Std Ref | D | SMT – Chemical/Petrochemical |
|---------|----|--|
| 6 | D1 | A theoretical knowledge of the regulatory requirements and business environment for manufacture of industry specific chemicals/petrochemicals |
| 11 | D2 | A theoretical knowledge of the scientific and technical aspects for manufacture of chemicals/petrochemical products for secondary downstream applications |
| 10 | D3 | Understand and be able to contribute to the use of one or more specific techniques used within the industry such as: <ul style="list-style-type: none"> • perform simple quality control (qc) by sampling plant chemicals or products and conducting standard analytical tests according to industry norms or international standards (e.g. ISO) • interpret the results from simple quality control (qc) and standard analytical tests • make decisions on how to modify the control of plant processes based on the interpretation of the process or quality data • apply the principles of process problem solving techniques • assist in the response to process upsets to achieve steady state operation |
| 1,2,3 | D4 | Understand the principles which underpin the manufacture of chemical/petrochemical products and demonstrate practical experience of one or more techniques including: <ul style="list-style-type: none"> • distillation • electrolysis • refrigeration • reaction • gas compression • heat exchange • furnaces/boilers • flammable liquid/gas handling • corrosive liquid/gas handling • toxic liquid/gas handling |
| 1,2,3 | D5 | Understand the principles of process control and instrumentation including: <ul style="list-style-type: none"> • measurement terminology; variables controlled and measured • liquid or gas flow measurements • use of computer software relevant to process control • temperature, level & pressure measurement • process measurements such as viscosity, conductivity, pH, density |

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| Std Ref | D | SMT – Chemical/Petrochemical |
|---------|----|--|
| 11 | D6 | Understand the principles of process operation including: |
| | | <ul style="list-style-type: none">• critical step analysis and in-process controls |
| | | <ul style="list-style-type: none">• impact of equipment operation and maintenance on process reliability |
| | | <ul style="list-style-type: none">• techniques of valve operation on pressurised process systems |

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Science Manufacturing Technician - Polymers

| Std Ref | E | SMT - Polymers |
|---------|----|---|
| 6,11 | E1 | A theoretical knowledge of: <ul style="list-style-type: none"> • the regulatory requirements and business environment for manufacture of industry specific polymer materials and products • the scientific and technical aspects for design and manufacture of polymer products for the specific industry sector |
| 10 | E2 | Understand and be able to carry out tasks specific to the polymer industry such as: <ul style="list-style-type: none"> • measurement and charting techniques • problem solving techniques • workplace organisation and systems • continuous improvement techniques |
| 7 | E3 | Understand and be able to contribute to the use of one or more specific techniques used within the industry such as: <ul style="list-style-type: none"> • perform simple quality control sampling and standard testing on polymer materials/products according to industry norms or international standards • interpret the results from simple quality control and standard test procedures • make decisions on how to modify the polymer process based on the interpretation of the process or quality/test data • apply the principles of experimental design/process improvement • assist in commissioning and qualification of new equipment or processes |
| 11 | E4 | Understand the principles which underpin the manufacture of polymer materials/products and demonstrate practical experience/knowledge of three or more techniques/characteristics including: <ul style="list-style-type: none"> • polymer materials technology, material types, structure, characteristics and processing requirements • semi crystalline/amorphous polymers and effects of morphological structure on products and processing • relevance of material transitions (Tg/Tm) and phase changes on processing • cross linking of polymer products and materials for use as elastomers, thermosets or composite materials • polymerisation techniques for polymer materials e.g. addition, condensation reactions, catalysts and reactive agents • preparation of materials for processing e.g. formulations, drying, weighing, conveying, mixing, blending and colouring of polymers • rheological aspects/considerations in polymer processing |

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| Std Ref | E | SMT - Polymers |
|---------|----|---|
| 11 | E5 | Understand the principles which underpin the processing of polymer materials/products and demonstrate practical experience/knowledge of three or more techniques/processes including: |
| | | <ul style="list-style-type: none"> • polymerisation techniques |
| | | <ul style="list-style-type: none"> • polymer compounding |
| | | <ul style="list-style-type: none"> • injection moulding |
| | | <ul style="list-style-type: none"> • extrusion |
| | | <ul style="list-style-type: none"> • blow moulding |
| | | <ul style="list-style-type: none"> • blown film |
| | | <ul style="list-style-type: none"> • compression moulding |
| | | <ul style="list-style-type: none"> • rotational moulding |
| | | <ul style="list-style-type: none"> • processing of polyurethane |
| | | <ul style="list-style-type: none"> • thermoforming |
| | | <ul style="list-style-type: none"> • internal mixing of polymer compounds |
| | | <ul style="list-style-type: none"> • milling (two roll mill) |
| | | <ul style="list-style-type: none"> • calendaring |
| | | <ul style="list-style-type: none"> • manual and automated layup techniques for elastomers and composites |
| | | <ul style="list-style-type: none"> • other processes |

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Science Manufacturing Technician – Aseptic Pharmaceuticals

| Std Ref | F | SMT – Aseptic Pharmaceuticals |
|-----------|----|--|
| 6 | F1 | A theoretical knowledge of the regulatory requirements, legislation and standards that govern the pharmaceutical manufacturing industry |
| 40, 41 | F2 | GMP - Demonstrate theoretical and practical knowledge of Good Manufacturing Practice and explain its implications in the pharmaceutical manufacturing unit |
| 5, 37 | F3 | QA/QC - Demonstrate theoretical and practical knowledge of the following: |
| | | <ul style="list-style-type: none"> • process validation |
| | | <ul style="list-style-type: none"> • documentation |
| | | <ul style="list-style-type: none"> • SOPs |
| | | <ul style="list-style-type: none"> • DRFs |
| | | <ul style="list-style-type: none"> • CAPA |
| | | <ul style="list-style-type: none"> • audits |
| | | <ul style="list-style-type: none"> • releasing |
| | | <ul style="list-style-type: none"> • investigations |
| | | <ul style="list-style-type: none"> • environmental monitoring |
| | | <ul style="list-style-type: none"> • ICH Q9 Quality Risk Management |
| | | <ul style="list-style-type: none"> • ICH Q10 Guidance on pharmaceutical quality system |
| 4 | F4 | Personnel - Demonstrate theoretical and practical knowledge of the following: |
| | | <ul style="list-style-type: none"> • personal hygiene |
| | | <ul style="list-style-type: none"> • hand washing |
| | | <ul style="list-style-type: none"> • PPE & gowning |
| | | <ul style="list-style-type: none"> • cleanroom behaviors |
| 11 | F5 | Premise & Equipment - Demonstrate theoretical and practical knowledge of the following: |
| | | <ul style="list-style-type: none"> • microbiology - types of microbes found in clean rooms, implications of contamination, microbial control/monitoring |
| | | <ul style="list-style-type: none"> • physical air quality monitoring, limits and testing schedules |
| | | <ul style="list-style-type: none"> • cleanrooms – design, maintenance, cleaning & sanitization, air handling, environmental monitoring |
| | | <ul style="list-style-type: none"> • LAFcs, Isolators, Biological Safety Cabinets - design, maintenance, cleaning & sanitization, air handling |
| 1,2,3 | F6 | Production: Sterile Manufacture - Demonstrate theoretical and practical knowledge of the following: |
| | | <ul style="list-style-type: none"> • transfer procedures/material flow – spray & wipe, transfer hatches, sanitization processes, controlled and uncontrolled spaces |
| | | <ul style="list-style-type: none"> • assembly, reconciliation, inspection & checking |

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| Std Ref | F | SMT – Aseptic Pharmaceuticals |
|---------|-----------------------|---|
| | | <ul style="list-style-type: none"> preparation of sterile products; syringes, infusors, small volume & large volume infusions, eye drops, topical preparations knowledge of various types of sterilization |
| | | <ul style="list-style-type: none"> preparation of non-sterile products - solid dose forms, topical solutions, internal solution, semi solids (creams, ointments, pessaries, suppositories, and lotions) |
| 8 | F7 | Production: Planning and Scheduling - Demonstrate theoretical and practical knowledge of the following: |
| | | <ul style="list-style-type: none"> materials management – receiving, checking, ordering, packing, stock rotation, quarantine, shipping (good store keeping practice) |
| | | <ul style="list-style-type: none"> planning scheduling – order receipt and logging, label generation & worksheets, start-up approvals, transcribing, stock control, archiving, calculations |
| 11 | F8 <i>Optional</i> | Radiopharmacy - Demonstrate theoretical and practical knowledge of the following: |
| | | <ul style="list-style-type: none"> types of radiation, radiation safety, operator protection and special precautions |
| 6 | F9 <i>Optional</i> | GCP - Demonstrate theoretical and practical knowledge of the following: |
| | | <ul style="list-style-type: none"> GCP practices, documentation, training, clinical trials |

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Science Manufacturing Technician - Coatings

| Std Ref | G | SMT - Coatings |
|------------|----|---|
| 5, 6, 9 | G1 | A knowledge of the regulatory requirements and business environment for the manufacture of industry specific coatings products e.g. ISO Standards |
| 11 | G2 | A knowledge of the scientific and technical aspects for the manufacture of coatings products and intermediates for secondary downstream applications |
| 5, 11 | G3 | Understand the principles of compatibility, cleanliness, contamination and plant hygiene |
| 5, 7, 10 | G4 | Understand and be able to contribute to the use of one or more specific techniques used within the industry such as: |
| | | <ul style="list-style-type: none"> • Perform required quality control (qc) by sampling product and conducting standard analytical tests according to industry norms or international standards and Interpret |
| | | <ul style="list-style-type: none"> • Make decisions on how to modify the control of plant processes and/or product based on the interpretation of the process or quality/test data |
| 1, 2,3, 11 | G5 | Understand the principles which underpin the manufacture of coatings products and demonstrate practical experience of all applicable techniques from the following: |
| | | <ul style="list-style-type: none"> • Dispersion |
| | | <ul style="list-style-type: none"> • Mixing and blending |
| | | <ul style="list-style-type: none"> • Heat processes/temperature control |
| | | <ul style="list-style-type: none"> • Filling, packing, and labelling |
| | | <ul style="list-style-type: none"> • Volumetric, gravimetric and other measuring methodology |
| | | <ul style="list-style-type: none"> • Sampling of materials |
| | | <ul style="list-style-type: none"> • Storage and handling |
| | | <ul style="list-style-type: none"> • Manual handling techniques and limitations |
| | | <ul style="list-style-type: none"> • Understanding of the specific safe systems of work (SSOW) |
| 1, 2, 3, 7 | G6 | Understand the principles of process control and instrumentation, for example: |
| | | <ul style="list-style-type: none"> • Process capability, variation and impact on quality and/or health and safety |
| | | <ul style="list-style-type: none"> • Measurement and interpretation of e.g. viscosity, rheology, specific gravity, surface appearance, colour measurement, colour standards and colour specification |
| 4, 5 | G7 | Personnel: Demonstrate theoretical and practical knowledge of the following: |
| | | <ul style="list-style-type: none"> • Personal hygiene |

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| Std Ref | G | SMT - Coatings |
|-----------------------|-----|---|
| | | <ul style="list-style-type: none"> • Hand washing |
| | | <ul style="list-style-type: none"> • PPE |
| | | <ul style="list-style-type: none"> • Cleanliness |
| 1, 2, 3 (2,4, 7,9) | G8 | Production: Materials management - Demonstrate theoretical and practical knowledge, if applicable, of one or more of the following: receiving, checking, ordering, packing, stock rotation, quarantine, shipping (good store keeping practice) |
| 8 | G9 | Production: Planning scheduling - Demonstrate theoretical and practical knowledge, if applicable, of one or more of the following: order receipt and logging, label generation and worksheets, start-up approvals, transcribing, stock control, archiving, calculations |
| 4, 12 | G10 | Personnel: understand limits of autonomy and when to refer, and to whom, within the industry workplace |
| 1, 2, 3, 7, 10 | G11 | Assist in the commissioning and qualification of new equipment or processes |

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Science Manufacturing Technician - Bulk Liquid Storage Terminals

| Std Ref | G | SMT - Bulk Liquid Storage Terminals |
|-------------------------|----|--|
| 1, 2, 3, 5, 7, 11 | H1 | <p>Understand the principles which underpin the storage, treatment and transfer of bulk liquid products to or from a storage tank including:</p> <ul style="list-style-type: none"> • Route • Ullage • Product • Transfer rates • Simple process operations, e.g. blending |
| 1, 2, 3 | H2 | <p>Demonstrate practical experience in one or more of the following, as applicable:</p> <ul style="list-style-type: none"> • Bulk transfer to / from ship • Bulk transfer via pipeline • Bulk transfer to / from road tanker • Bulk transfer to / from rail tanker • Bulk transfer tank to tank |
| 4 | H3 | <p>Understand the principles which govern and maintain a safe working environment:</p> <ul style="list-style-type: none"> • The importance of personal hygiene • Major accident hazards (MAH) at a bulk liquid storage terminal • Safety critical tasks and equipment • Lone working • Safe systems of work (SSoW) • Role in mitigating the impact of major accident (e.g. Emergency Response) |
| 5, 6, 7 | H4 | <p>Understand and demonstrate simple quality control sampling and standard testing on bulk liquid products, including:</p> <ul style="list-style-type: none"> • Product quality documentation and procedures • Sampling and dipping techniques • Sample analysis and reporting • Contamination control |
| 1, 2, 3, 7 | H5 | <p>Understand the importance of asset utilisation in bulk liquid storage</p> <ul style="list-style-type: none"> • Selection and appropriate effective use of plant equipment (Why and how best to use the equipment and plant in process/operation) |

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| Std Ref | G | SMT - Bulk Liquid Storage Terminals |
|---------|----|--|
| 4, 7 | H6 | Understand the principles and operation of: <ul style="list-style-type: none"> • Safety Instrumented Systems (SIS) and functional safety • Emergency Shut-Down systems (ESD) |
| 8 | H7 | Demonstrate theoretical and practical knowledge if applicable of one or more of the following: <ul style="list-style-type: none"> • Ship to shore checklist • Product movement sheets • Stock control • Labelling and Bill of Laden (BOL) • Planning & product scheduling • Shift handover |
| 4, 9 | H8 | Understand the importance of leadership in process safety, performance indicators, learning and sharing information. |

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Behaviours Evaluation Assessment Criteria

| | Does not meet Expectation <i>Apprentice failed to demonstrate an acceptable level of behaviour. Improvement is required</i> | Meets Expectation <i>Apprentice demonstrated acceptable level of behaviour and meets the minimum level of behaviour expected</i> | Exceeds Expectation <i>Apprentice demonstrated consistent and positive behaviours in this area that reflect those expected of outstanding apprentices</i> |
|---------------------------------|---|--|---|
| Personal Responsibility: | <i>Demonstrate personal responsibility towards safety systems (incl. risk management and environment)</i> | | |
| Assessment criteria | Little evidence of personal responsibility to safety systems. | Good personal responsibility towards safety systems. | Exhibits high standards of personal responsibility toward safety systems. Seeks to influence the behaviour of others. |
| | Tries to play down incidents in which they are involved. | Responds positively to suggestions for own improvements in personal responsibility for safety issues. | Actively monitor the safety of self and others, challenging and making suggestions where appropriate. |
| Communication: | <i>Communicate effectively using a full range of skills: speaking; listening; writing; body language; presentation</i> | | |
| Assessment criteria | Misinterprets or is slow to comprehend oral and/or written instructions. | Readily comprehends oral and/or written instructions when first presented. | Superior comprehension of oral and/or written instructions. Checks back to avoid any misunderstanding. |
| | Communications are vague or poorly written or spoken. Difficulty conveying meaning to others. | Passes on information both verbal and written, in a way that is easily understood | Is able to adapt both verbal and written communication to be understood by different audiences (e.g. peer, supervisor, senior manager, and visitor). |
| | Will not ask questions and demonstrates little willingness to listen. | Listens and will question and challenge appropriately to enhance own understanding. | Listens and questions to enhance own and others understanding. Supports and acknowledges contributions from others. |

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| | Does not meet Expectation <i>Apprentice failed to demonstrate an acceptable level of behaviour. Improvement is required</i> | Meets Expectation <i>Apprentice demonstrated acceptable level of behaviour and meets the minimum level of behaviour expected</i> | Exceeds Expectation <i>Apprentice demonstrated consistent and positive behaviours in this area that reflect those expected of outstanding apprentices</i> |
|---|---|--|---|
| | Unable to effectively present personal viewpoint. | Able to effectively present personal viewpoint. | Able to influence others to see personal viewpoint. |
| | Unwilling to see other people's point of view. | Receptive to other people's point of view. | Ability to reason from different points of view. |
| Team Work | <i>Work and interact effectively within a team</i> | | |
| Assessment criteria | Unwilling to contribute during team discussions/problem solving. | Makes a useful contribution during team discussions/problem solving. | Contributes and willing to lead team based discussions/problem solving. |
| | Can reduce morale and enthusiasm within the team. | A good team member gets on well with colleagues. | Builds working relationships between team and other groups. Seeks to diffuse conflict situations where they arise. |
| | Exhibits negative behaviour concerning team/organisational mission. | Demonstrates knowledge and understanding of team/organisation mission. | A strong team player helps bind the team together to achieve team/organisation mission. |
| | Does not accept responsibility for own impact on team performance. | Works cooperatively with others to achieve overall team goals. | Puts team goals ahead of personal achievement and recognition. |
| Independence and Responsibility: | <i>Work independently and take responsibility for initiating and completing tasks</i> | | |
| Assessment criteria | Inclined to wait for direction on work tasks. | Normally does not need to be told what to do next, can be trusted to complete tasks. | Looks ahead and progresses work in areas of the job. |
| | Regularly needs to be told what to do or how to do it. | Identifies obstacles to achieving work assigned and escalates. | Will seek to resolve obstacles to achieving work assigned themselves before escalating. |

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| | Does not meet Expectation <i>Apprentice failed to demonstrate an acceptable level of behaviour. Improvement is required</i> | Meets Expectation <i>Apprentice demonstrated acceptable level of behaviour and meets the minimum level of behaviour expected</i> | Exceeds Expectation <i>Apprentice demonstrated consistent and positive behaviours in this area that reflect those expected of outstanding apprentices</i> |
|------------------------|---|--|---|
| | Supervision required to progress work. | Can be relied on to manage their work with little supervision. | Holds themselves accountable for their own performance. |
| | Over reliance on supervisor for motivation. | Self-motivated and deals with work/learning balance in a positive way. | Maintains motivation and encourages others to do the same. |
| Impact of work: | <i>Understand impact of work on others, especially where related to diversity and equality</i> | | |
| Assessment criteria | Others feel the need to recheck their work or have to finish off the job after them. Work rarely makes a contribution to team quality. | Works to the required standard of accuracy, neatness and thoroughness. Often makes valued contributions to team quality. | Has a reputation within the work group for doing jobs right first time, every time. Consistently makes a valued contribution to team quality. |
| | Little respect for the values of others. | Respects the value of others. | Actively encourages work group to respect the values of others |
| | Has difficulty being tactful, considerate and respectful in dealing with others. | Usually tactful, considerate and respectful in dealing with others. | Always tactful, considerate and respectful in dealing with others. |
| | | | |
| Time management | <i>Accepts responsibility for managing own time and workload within a given plan to complete work to schedule</i> | | |
| Assessment criteria | Does not deliver consistently and can waste time on non-essentials. | Continually demonstrates efficient use of work time. | Continuously strives for improved productivity. |
| | Unreliable timekeeping | Timekeeping complies with company protocols. | Encourages others to comply with company timekeeping protocols. |

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| | Does not meet Expectation <i>Apprentice failed to demonstrate an acceptable level of behaviour. Improvement is required</i> | Meets Expectation <i>Apprentice demonstrated acceptable level of behaviour and meets the minimum level of behaviour expected</i> | Exceeds Expectation <i>Apprentice demonstrated consistent and positive behaviours in this area that reflect those expected of outstanding apprentices</i> |
|---------------------------|---|--|---|
| | Not fully prepared in advance holds up group activities. | Always prepares in advance ready to participate in group activities. | Encourages others to prepare in advance for group activities |
| Change Management: | <i>Ability to handle change and respond to change management processes</i> | | |
| Assessment criteria | Has difficulty adjusting to changes in workload or assignments. | Is flexible, willing and able to respond to changes in work situations and/or learn new skill. | Capable of supporting others with change in work situations and/or learning new skill. |
| | Resists change or innovation or takes a “wait and see” approach. | Works hard to implement successful change in areas of responsibility as directed by supervisor. | Recommends changes to improve own work and work of others and implements as agreed with supervisor. |
| | Does not value own contribution. | Able to demonstrate examples of situations when they have changed practice or personal behaviour. | Evidence of influencing change of practice or personal behaviour by others. |