Overview of the role

Carrying out quality control and welding inspections for the nuclear industry, to ensure the safety and robustness of nuclear sites.

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Standard in development
L4: Nuclear welding inspection technician
Version 1.1

Title of occupation

Nuclear welding inspection technician

UOS reference number

ST0292

Core and options

No

Level of occupation

Level 4

Occupational maps data

Route: Engineering and manufacturing
Pathway: Engineering, Manufacturing, Process and Control
Cluster: Manufacturing, Plant and Process Technologist

Typical duration of apprenticeship

48 months

Target date for approval

01/01/0001

Resubmission

No

Would your proposed apprenticeship standard replace an existing framework?

No

Does professional recognition exist for the occupation?

Yes

Regulated occupation

Is this a statutory regulated occupation?

No

Occupation summary

This occupation is found in the nuclear sector. A nuclear welding inspection technician performs a quality control and welding inspection role for the nuclear industry and facilities. A nuclear welding inspection technician meets the exacting quality requirements specified in nuclear industry regulations, specifications, standards and detailed engineering documents. These are unique to the sector, hence the knowledge, skills and behaviours required to deploy this role are specific for the nuclear industry.

The broad purpose of this occupation is to perform inspection work for nuclear related fabrications, checking the safety and integrity of the construction on nuclear licensed sites undertaking waste management, decommissioning, construction and operational nuclear plants. They also perform inspection work in manufacturing facilities which supply the nuclear industry. Nuclear welding activities can generate various types of waste. A nuclear welding inspection technician manages and handles nuclear welding inspection consumables by following appropriate disposal procedures, ensuring their safe containment, and minimising any potential harm to the environment.

In their daily work, a nuclear welding inspection technician works individually or interacts with an inspection team. They operate in a challenging environment where quality standards are paramount and safety is the overriding priority. This work will involve carrying out detailed observations, making detailed records, giving technical feedback and providing challenge throughout the manufacturing process. Working conditions may involve wearing specialist safety equipment, shift working and working on sites and facilities running 365-day operations.

A nuclear welding inspection technician is responsible for the quality and accuracy of the work they undertake. They need to be able to work with minimum supervision and in a professional

manner, for example, complying with environmental regulations to ensure that all welding inspection activities minimise any potential environmental impact.

Typical job titles

Nuclear safety inspectors **Nuclear welding inspection technician** **Quality assurance technicians**

Are there any statutory/regulatory or other typical entry requirements?

No

Occupation duties

DUTY	KSBS
Duty 1 Comply with nuclear legislation and regulations, policy, standards and procedures.	K1 K2 K3 K4 K10 K11 K12 K14 K15 K17 K19 S1 S2 S3 S4 S5 S7 S8 S10 S11 S12 S13 S14 S16 S17 S18 S19 S20 S21 B1 B3 B4 B5 B6
Duty 2 Comply with health and safety, and environmental and sustainability regulations and guidance in accordance with the nuclear environment.	K1 K2 K3 K4 K10 K11 K12 K13 K15 S1 S2 S3 S4 S5 S6 S7 S8 S9 S10 S11 S12 S13 S14 S17 S18 S20 B1 B4 B5 B6
Duty 3 Receive, read, and interpret engineering data and documentation.	K5 K6 K7 K9 K10 K11 K12 K13 K20 S4 S5 S6 S7 S9 S10 S11 S12 S13 S17 S18 S20 B5
Duty 4 Carry out inspection and surveillance of welded products to verify compliance with the appropriate	K1 K2 K3 K4 K5 K6 K7 K8 K9 K10 K11 K12 K13 K14 K16 K20 S1 S2 S3 S4 S5 S6 S8 S9 S10 S11 S12 S13 S14 S15 S17 S18 S20 S21 S22 B1 B2 B3 B4 B5 B6

DUTY	KSBS
specifications, procedures, drawings, and inspection and test plans.	
Duty 5 Follow the process of managing non-conformances on items that do not meet the specified quality requirements.	K1 K3 K4 K7 K8 K11 K12 K14 K19 K20 S1 S2 S3 S4 S6 S10 S11 S12 S13 S14 S16 S17 S18 S19 S20 S21 S22 B1 B4
Duty 6 Verify that the correct, defined and calibrated measurement and test equipment is used.	K4 K9 K10 K11 K12 K19 K20 S1 S2 S5 S6 S7 S8 S9 S10 S11 S12 S13 S14 S17 S18 S20 S22 B1 B4
Duty 7 Produce accurate and timely inspection reports.	K4 K12 K14 K15 K18 K19 K20 S1 S3 S4 S5 S6 S10 S11 S12 S13 S14 S16 S17 S18 S19 S20 S21 S22 B2 B4
Duty 8 Act as a mentor to other nuclear welding inspection apprentices.	K2 K3 K4 K5 K6 K7 K10 K12 K13 K15 K16 K17 K18 K20 S3 S4 S5 S6 S7 S8 S9 S10 S11 S12 S13 S14 S15 S16 S17 S18 S19 S20 S21 S22 B1 B2 B3 B4 B5 B6
Duty 9 Resolve problems that occur within the activity using a structured and controlled approach. For example, unexpected technical or process issues, team related issues, escalating as required.	K1 K2 K3 K4 K10 K12 K14 K15 K16 K17 K18 K20 S4 S5 S6 S7 S8 S9 S10 S11 S12 S13 S14 S15 S17 S18 S19 S20 S21 S22 B1 B2 B4 B5 B6
Duty 10 Participate in continuous	K20 S3 S4 S6 S10 S11 S12 S13 S15 S17 S18 S19 S20 S22 B1 B4 B5 B6

DUTY	KSBS

improvement activities including continued professional development.

KSBs

Knowledge

K1: Regulatory and legislative guidance: Nuclear Installations Act (NIA); Ionising Radiation Regulations (IRR); Radiation (Emergency Preparedness and Public Information) Regulations (REPPIR).
K2: Health and safety: nuclear environment safety culture, safe working practices, risk assessments, control measures for associated radiation sources and hazards. Confined spaces, Health and safety at work act. Control of Substances Hazardous to Health (COSHH). Manual handling. Personal Protective Equipment (PPE). Respiratory Protection Equipment (RPE). Slips, trips and falls. Safety equipment: guards, signage, fire extinguishers. Working at height.
K3: Environment and sustainability regulations and guidance. Types of pollution and control measures in the nuclear sector, including spills and waste. Waste reduction and waste streams. Recycling and reuse. Sustainable use of equipment and materials.
K4: Human performance and human factors and their effect on nuclear safety culture.
K5: British standards for engineering representations, drawings, and fabrication and dimensional requirements.
K6: Engineering standards and regulations for the nuclear industry, relevant to the occupation and technician's responsibilities. British Standards (BS). International Organisation for Standardisation standards (ISO). European Norm (EN).
K7: Material science: properties, characteristics, composition, failure mechanisms, and behaviours of metal types for selection of welding processes for nuclear applications.
K8: Destructive testing methods (DTM): fundamental techniques, point of failure analysis of materials.
K9: Weldability and joining methods: weldability of material, welding consumable selection, joining dissimilar materials, heat treatment and effects on metallurgical structure.
K10: Welding practices: welding information, representation and terminology, standards and abbreviations. Welding procedures. Welder approval process, documentation and records.
K11: Tools and equipment used in welding and welding inspection, processes and parameters for their use.
K12: Approved nuclear industry quality control requirements before, during and after welding, and categorisation of weld defects: Material and welding equipment storage, condition and certification. Welding process, consumables and approved procedures.
K13: Non-destructive testing techniques: liquid penetrant testing and inspection (LPI), magnetic particle inspection (MPI), radiographic testing (RT) and ultrasonic testing (UT). Suitable selection of test method. Advantages and limitations of their use.
K14: Documentation and recording information: methods of inspection reporting, and verification of certification data.
K15: Business operational considerations: business efficiency, customer satisfaction, technical support, competitiveness, minimising risks to operation, finance, business ethics and licenses.
K16: Principles of team working.
K17: Principles of equity, diversity, and inclusion in the workplace and the impact on their work.

K18: Verbal and written communication techniques.
K19: Digital systems and information technology: management information systems, spreadsheets, presentation, document production, email and messaging systems, virtual communication and learning platforms. General data protection regulation. Cyber security.
K20: Workplace training and development activities: continual professional development (CPD).

Skills

S1: Comply with nuclear regulatory and legislative guidance.
S2: Comply with health and safety and industry regulations, procedures, and guidance.
S3: Comply with environmental and sustainability regulations and procedures. For example, identify and segregate resources for reuse, waste reduction, recycling, and disposal.
S4: Apply human performance and human factors nuclear culture.
S5: Receive, read and interpret engineering data and information for welding processes, procedures and inspections. For example, interrogate engineering drawings, fabrication and dimensional requirements.
S6: Comply with nuclear engineering standards and regulations. For example, British Standards (BS), International Organisation for Standardisation standards (ISO), European Norm (EN).
S7: Read, interpret, and record welding information and technologies. For example, welding abbreviations and terminology and relevant weld procedures, welder approval processes.
S8: Confirm and validate tools and welding equipment used in the welding process.
S9: Select and use welding inspection tools.
S10: Validate materials, equipment and consumables storage, condition and certification and the welding process is in accordance with an approved procedure. Verify qualified status of welder and check weld fit up and weld faces.
S11: Carry out process and parameter monitoring and verification. For example, check current, voltage, heat and travel speed are in accordance with the welding procedure and inspect the weld root and verify inter run.
S12: Carry out visual inspection, non-destructive testing techniques, for example, liquid penetrant testing (LPI), magnetic particle inspection (MPI), for weld appearance and identification checks.
S13: Check subsequent repairs are completed and recorded and test post-weld heat treatment.
S14: Produce welding inspection reports, and verification of certification data, recording information and the results on paper or electronically.
S15: Apply business improvement techniques. For example, identify areas for improvement, resolve business problems, business efficiencies.
S16: Record or enter information - paper based or electronic. For example, job sheets, handover documents and manufacturers' documentation, work sheets, checklists, waste environmental records.
S17: Apply team working principles.
S18: Apply and promote policies and practices to support equity, diversity and inclusion.
S19: Communicate verbally with colleagues and stakeholders.
S20: Communicate in writing with colleagues and stakeholders.
S21: Use information technology. For example, for document creation, communication, and information management in line with breakdown, repair and maintenance activities. Comply with GDPR and other regulations relating to personal and commercial data.
S22: Carry out and record formal and informal workplace training and development activities, continual professional development (CPD).

Behaviours

B1: Commit to and promote safety in the nuclear industry for all stakeholders.
B2: Collaborate within teams, across disciplines and external stakeholders.

B3: Promote professional conduct, ethics, integrity, honesty and resilience.
B4: Support a diverse and inclusive culture.
B5: Consider human performance and human factors principles in the workplace.
B6: Seek learning and development opportunities, continual professional development (CPD).

Qualifications

English and Maths

Apprentices without level 2 English and maths will need to achieve this level prior to taking the End-Point Assessment. For those with an education, health and care plan or a legacy statement, the apprenticeship's English and maths minimum requirement is Entry Level 3. A British Sign Language (BSL) qualification is an alternative to the English qualification for those whose primary language is BSL.

Does the apprenticeship need to include any mandated qualifications in addition to the above-mentioned English and maths qualifications?

Yes

Other mandatory qualifications

CSWIP or PCN Level 2 in Dye Penetrant Inspections

Level: 2

Additional information: This is a NDT testing method. Qualifications are based on national and international standards and the levels highlighted are different to Ofqual levels.

CSWIP or PCN Level 2 in Magnetic Particle Inspection (MPI)

Level: 2

Additional information: This is a NDT testing method. Qualifications are based on national and international standards and the levels highlighted are different to Ofqual levels.

BTEC L4 Higher National Certificate in Engineering

Level: 4

Additional information: https://qualifications.pearson.com/content/dam/pdf/BTEC-Higher-Nationals/General-Engineering/2024/specification-and-sample-assessments/btec-hncd-engineering-2024.pdf

CSWIP 3.1 or PCN Level 2 Welding Inspector

Level: 2

Additional information: This is a NDT testing method. Qualifications are based on national and international standards and the levels highlighted are different to Ofqual levels.

Professional recognition

This standard aligns with the following professional recognition:

- The Welding Institute for Engineering technician (EngTech)
- British Institute of Non-Destructive Testing for Engineering technician (EngTech)

Consultation

Progression Routes

A Nuclear welding inspection technician can progress to a Nuclear welding inspector at a higher level. Further study and experience can lead to specialist roles, for example NDT subject matter expert (SME), welding engineer.

Supporting uploads

Mandatory qualification uploads
ST0292_standard_hard_sift_evidence_PCNGENZ1.pdf
Mandated degree evidence uploads
Professional body confirmation uploads

Involved employers

Altrad Babcock Ltd, Bendalls Engineering, Bureau Veritas UK, Cavendish Nuclear Ltd, Costain Limited, EDF Energy, Hargreaves Ductwork Ltd, Jacobs, Morgan Sindall, National Nuclear Laboratory, Nuclear Restoration Services, Nuclear Waste Services, Nuvia Ltd, Sellafield Ltd, Stork Technical Services, TSP, West Cumberland Engineering Ltd, Westinghouse Springfields Fuels Ltd

Subject sector area

4.1 Engineering