PLATE WELDER

PLATE WELDER

Reference Number: ST0852

Details of standard

Occupation summary

This occupation is found in a wide range of sectors associated with the Fabrication, Construction and upgrade of major capital plant items and facilities. This will include Structural Steel fabrication and construction (e.g. Buildings, Stadia, Bridges, Piers, Jetties etc.), Marine fabrication, construction and upgrade (Ships, Submarines, Wind Turbine Towers), Defence fabrication (armoured vehicles), Process Plant (structures and storage tanks), Engineering Construction (Lifting Beams, Cranes, Construction Vehicles etc.), Mining & Mineral Processing (Shuttering, Structural Supports, Wear Plates, Chutes, Mills, Pulverisers), Transport (Aerospace, Rail and Automotive), and Manufacturing of machinery & equipment. Plate Welders may be employed in any size of organisation from small companies to large multi-national organisations.

The broad purpose of the occupation is to manually weld plate and structural components to high standards of quality. This will involve fabrication, construction or repair of fabricated plate assemblies, extrusions and structural components (e.g. Channel, H-Beams, i-Beams etc.) used often used to fabricate larger components and assemblies. Plate welders will weld to internationally recognised quality standards using more than one manual arc welding process from Tungsten Inert Gas (TIG), Plasma Arc Welding (PAW), Manual Metal Arc (MMA), Metal Inert Gas (MIG)/Metal Active Gas (MAG) and Flux Cored Arc Welding (FCAW) on more than one material group from Carbon Steel, Low Alloy Steel, High Alloy Ferritic/Martensitic Steel, Austenitic Stainless Steel, Nickel & Nickel Alloys, Aluminium & Aluminium alloys, Titanium & Titanium Alloys, Copper & Copper Alloys. For example, a Plate Welder might use Manual Metal Arc (MMA) and Flux Cored Arc Welding (FCAW) to join both Carbon Steel and Low Alloy Steel materials. The occupation requires production of welds in plate and structural components covering three plate welding positions which must include Vertical (either upward or downward progression) and Overhead, and the three main joint configurations (Single or Double Sided Butt, Single or Double Sided T-Butt & Fillet). Each welding process requiring significantly different welding equipment, assemblies, controls, skills and techniques, and represents an individual production process. Each material type requires specific controls and techniques to achieve a satisfactory weld. Plate welding contributes to the UK economy through the fabrication, construction and upgrade of major infrastructure projects, defence assets and exported goods. Plate welders are employed by the supply chain organisations or the direct owner/operator.

In their daily work, an employee in this occupation interacts with a wide range of people and organisations including Platers, Metal Fabricators, Erectors, Riggers, Stores Operatives, Supervisors, Engineers, Inspectors, Non-Destructive Technicians and Quality personnel. Plate welders may need to work shifts and flexible work patterns. They can work in organisations ranging from multi-national organisations to very small businesses. They work in a range of environments across the world including Fabrication Shops, Assembly Yards, Construction/Building Sites, Factories and Operational Facilities requiring maintenance & upgrade. This occupation may involve working at height, and beside or over water. Plate welders' work will be regularly assessed to ensure continued quality of welding and overall integrity of the component being welded, as specified in the applicable component design code. This could include visual inspection, non-destructive testing and destructive testing of production test pieces.

An employee in this occupation will be responsible for the safety, quality and accuracy of their own work whilst ensuring it conforms to a relevant plate welding specification. They work autonomously, or on occasion as part of a wider team, reporting to a workplace supervisor.

Typical job titles

Typical job titles include Plate Welder, Structural Welder, Class B Welder, Coded Multi-positional Plate Welder

Occupation duties

Duty

Duty 1 Plan and prepare for the welding of plate, structural components before commencing work

KSBs

K1 K2 K3 K4 K5 K6 K7 K8 K9 K10 K11 K12
K13 K14 K16 K18 K19 K20
S1 S2 S3 S4 S5 S6 S7 S9 S10
B1 B2 B3 B4 B5 B6 B7 B8

Duty 2 Check materials conform to the specified grades, dimensions and thicknesses.

KSBs

K1 K8 K9 K10 K11 K12 K13 K14 K16 K18
K19 K20
S1 S2 S3 S5 S7 S9
B1 B2 B3 B4 B5 B6 B7

Duty 3 Inspect weld preparations, surface conditions and cleanliness

KSBs

K1 K2 K5 K7 K8 K9 K10 K11 K14 K16 K18
K19 K20
S1 S2 S3 S9
B1 B2 B3 B4 B5 B6 B7

Duty 4 Assemble and position plate and structural components to be welded, including attachment of bracings, strong-backs, alignment aids, run-on and run-off tabs and backing materials (e.g. ceramic, metallic etc.).

KSBs

K1 K2 K4 K5 K6 K7 K8 K9 K10 K11 K12 K13
K14 K16 K18 K19 K20
**Duty 5** Assemble equipment to be used in the preparation and welding of plate and structural components and check its performance and condition, including any component heating and monitoring equipment.

**Duty 6** Adjust and maintain the equipment to be used during the welding of plate and structural components.

**Duty 7** Interpret technical specifications & drawings to establish detailed welding process controls, consumable selection, and dimensional limitations imposed to control distortion.

**Duty 8** Make the joints to specified dimensional accuracy using appropriate welding techniques.

**Duty 9** Identifying areas for improving the production process where possible through the monitoring of performance

**Duty 10** Monitor associated parameters throughout the welding of plate and structural components (e.g. Preheat, Interpass Temperature, Heat Input).

**Duty 11** Remove material using manual powered and non-powered hand tools, before and during welding to remove defects within the preparation and weld deposit.

**Duty 12** Visually inspect alignment and distortion of component and apply techniques to ensure compliance with specification.

**Duty 13** Visually inspect completed weld and component geometry

**Duty 14** Remove and dress bracings, strong-backs, run-on/run-off tabs and alignment aids, and dress finished external weld surfaces using manual powered and non-powered hand tools

**Duty 15** Restore the work area and equipment to a safe and reliable condition on completion of welding including the remediation and recycling of bracings, strong-backs and alignment aids.

**Duty 16** Monitor the use of consumables and adjust quantities issued, and return unused consumables for re-conditioning, re-use or disposal.
Duty 17 Complete production documentation and reporting at the appropriate stages of the work activity

**KSBS**

**Knowledge**

K1: Dimensional and mechanical properties (strength, toughness, thermal expansion etc.) of materials to be welded.

K2: Fundamentals of welding metallurgy (weld solidification and Heat Affected Zone) and how this can affect the weldability of materials and final joint integrity.

K3: Common manual arc welding processes and the relative merits for a given application, including Manual Metal Arc (MMA), Metal Inert Gas (MIG), Metal Active Gas (MAG), Flux Cored Arc Welding (FCAW), Tungsten Inert Gas (TIG), Plasma Arc Welding (PAW).

K4: Common joint types associated with welding plate and structural components (Fillet, Butt, T-Butt, Corner/Lap; Single-Sided, Double-Sided, Metallic Backed, Ceramic Backed).

K5: Welding positions and progressions associated with plate and structural components and their international designations including Flat; Horizontal-Vertical; Horizontal; Vertical (upward and downward progressions); Overhead.

K6: The major components of welding equipment, ancillary equipment, cabling and their assembly, including Power Source, Wire Feed System, TIG & PAW Arc Initiation Systems, interconnecting communications cables, torches, tongs, gas equipment etc.

K7: Set, modify and monitor welding controls (e.g. Current, Arc Voltage, Wire Feed Speed, Gas Flow Rates, Polarity) and secondary controls (e.g. Heat Input, Interpass Temperature).

K8: Welding Procedure Specification requirements, contents, and information derived to establish specific production information.

K9: The relative merits, applications and limitations of material preparation methods and manual material removal processes including powered and non-powered tools.

K10: Performance success factors in production, inspection reporting, productivity including time and duration, dimensional, Non-Destructive Examination, defect rates etc.

K11: Causes and detection of typical welding defects and how their occurrence can be reduced.

K12: Types and functions of welding consumables, fluxing systems and the requirement for correct identification, storage, conditioning, handling, recycling and disposal.

K13: Requirements for correct storage, handling and segregation of materials and tooling to prevent cross contamination.

K14: Organisational quality documentation, reporting systems, procedures and their role within the overall quality process.

K15: Continuous improvement processes, performance review and how this is undertaken within their organisation.

K16: The importance of only using approved processes, procedures, documentation and the potential implications for the organisation if this is not followed.

K17: Non-destructive testing reports and radiographs to identify particular defect types and the associated improvements to process and technique needed to prevent recurrence.

K18: Risks and mitigation measures associated with welding and the working environment, and the organisational risk management processes.

K19: The importance of complying with statutory, quality, organisational and health, safety and environmental regulations.

K20: Typical problems that may arise within their normal work activities/environment.

**Skills**

S1: Work safely at all times, comply with health, safety and environmental legislation, regulations and organisational requirements.

S2: Can obtain, check and use appropriate documentation (such as job instructions, drawings, quality control documentation).

S3: Plan and prepare welding activities before commencing the work.

S4: Obtain, position and assemble welding equipment and associated safety protection needed for activity.

S5: Prepare, check and protect materials and work areas ready for welding.

S6: Inspect assembly to be welded and undertake remedial work to comply with specification, or implement quality steps if rejected.

S7: Receive, inspect, condition and maintain consumables.

S8: Set, test and monitor key welding parameters as detailed within the Welding Procedure Specification.

S9: Deal promptly and effectively with problems within the limits of their responsibility using approved diagnostic methods and techniques and report those which cannot be resolved to the appropriate personnel.

S10: Use manual processes and equipment to remove material (powered and non-powered).

S11: Achieves a quality of work to meet international standards e.g. ISO5817, ISO9606, ASME IX, AWS D1.1 for dimensional, surface inspection (e.g. Visual, Magnetic Particle, Dye Penetrant) and volumetric inspection (e.g. Radiography, Ultrasonic inspection).
S12 Complete progressive and final checks on the weld prior to release for formal inspection and report into the production control system at the appropriate stages of the work activity.

S13 Restore the work area on completion of the activity and where applicable return any resources and consumables to the appropriate location.

S14 Produce welds in plate and/or structural components using two welding processes from TIG, PAW, MMA, MIG/MAG, FCAW.

S15 Produce welds in plate and/or structural components using two materials from Carbon Steel, Low Alloy Steel, High Alloy Ferritic/Martensitic Steel, Austenitic Stainless Steel, Nickel & Nickel Alloys, Aluminium & Aluminium alloys, Titanium & Titanium Alloys, Copper & Copper Alloys.

S16 Produce welds in plate and/or structural components covering three plate welding positions which must include Vertical (either upward or downward progression) and overhead.

S17 Produce plate welds in 3 main joint configurations (Single or Double Sided Butt, Single or Double Sided T-Butt & Fillet)

Behaviour

B1: Takes responsibility for decision-making, without autonomy and within the guidelines of the work instruction, for their workplace, the application of welding processes, and for their productivity.

B2: Enquires and to seeks guidance, in order to understand the processes and associated industrial applications.

B3: Committed to maintaining competence through Continuing Professional Development planning, preparation and reflection to ensure safety, quality and production and ensuring Continuing Professional Development goals are achieved.

B4: Intervene and challenge poor practices and have confidence to channel feedback to the appropriate authorities to implement change.

B5: Consistently and reliably delivers in accordance with expectations in safety, production, quality, ethics and self-development.

B6: Encourages and supports the development of others and completes point of work risk assessments.

B7: Follows the specified procedures and controls and be personally responsible and accountable for their production work and personal development.

B8: Reflects on current and past performance and provide information and recommendations for continuous improvements in efficiency and effectiveness of working practices, and training and development requirements.

Qualifications

English and Maths qualifications

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.

Professional recognition

The Welding Institute / Engineering Technician

Additional details

Occupational Level: 3
Duration (months): 36

Review

This standard will be reviewed after three years.

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