SEMEEE314

Processing electronic components within the manufacturing system

Overview

This standard identifies the competences you need to process discrete electronic components through various stages of the company's manufacturing system, in accordance with approved procedures. In particular, you will be expected to carry out general preparatory activities, obtain and interpret work instructions from appropriate sources, conduct specific preparations on materials, components and equipment, carry out the production processes, monitor your work and record its completion. The electronic components produced will include capacitors, resistors, inductors, interconnection devices, sensors, optical devices, visual display screens, switching components, microwave components, spark gaps and a variety of charge coupled devices.

Your responsibilities will require you to comply with organisational policy and procedures for the processing activities undertaken and to report any problems with these activities that you cannot personally resolve, or are outside your permitted authority, to the relevant people. You will be expected to work with a minimum of supervision, taking full responsibility for your own actions and for the quality and accuracy of the work that you undertake.

Your underpinning knowledge will provide a good understanding of your work and will provide an informed approach to applying electronic component manufacturing procedures. You will understand the particular manufacturing process used and the organisation's requirements and procedures for processing the electronic components, in adequate depth to provide a sound basis for carrying out the activities to the required specification.

You will understand the safety precautions required when working in the electronic component-processing environment and with the associated equipment. You will be required to demonstrate safe working practices throughout and will understand the responsibility you owe to yourself and others in the workplace.

Performance criteria

You must be able to:

P1 work safely at all times, complying with health and safety and other relevant regulations, directives and guidelines

P2 ensure the materials to be processed are prepared for the processing operations to be carried out

P3 check and monitor that the processing equipment is set up and maintained at satisfactory operating conditions throughout the processing operations

P4 process components in accordance with operating procedures and the workpiece specification requirements

P5 check that the processed workpiece achieves the required characteristics and meets the processing specification

P6 deal with problems within your control and report those that cannot be solved

P7 complete and store all relevant documentation in accordance with organisational requirements

P8 leave the work area in a safe condition on completion of the activities, as per organisational requirements

Knowledge and understanding

You need to know and understand:

K1 how to work safely at all times, complying with health and safety and other relevant regulations, directives and guidelines

K2 the importance of wearing the appropriate personal protective equipment (PPE), and of keeping the work area clean and tidy

K3 what constitutes a hazardous voltage and how to reduce the risks of a phase to earth shock

K4 how to use and extract information from engineering drawings and related specifications (to include symbols and conventions to current industry standard and codes of practice)

K5 how to effectively deal with emergency situations in relation to electric shock and safe isolation

K6 how to interpret the company's information for the appropriate manufacturing assembly/processing stage (to include diagrams, drawings and specifications, information from computer-based files)

K7 the relevant assembly/manufacturing processing techniques, their ordering and how they are applied

K8 how to recognise defects/issues

K9 the component types being processed/assembled and the different values and ratings of the components used

K10 how to set up/programme and use the tooling and equipment for the relevant assembly/process stages

K11 the quality control procedures to be followed during the processing operations

K12 how to check the accuracy, position, security, function and completeness of the processed component

K13 how to deal safely and effectively with any waste/surplus materials and chemicals from the processing

K14 the extent of your own responsibility and to whom you should report if you have problems that you cannot resolve

K15 how to access, use and maintain information to comply with organisational requirements and legislation

Scope/range related to performance criteria

1. Carry out all of the following activities during the processing of the electronic components:
    1.1 obtain any permission/work permits for the processing operations to be conducted
    1.2 adhere to health and safety regulations, systems and procedures to realise a safe system of work
    1.3 follow clean work area protocols, where appropriate
    1.4 prepare materials and components, in line with organisational procedures
2. Obtain and interpret work instructions for electronic component processing operations, for one type of component from the following:
    2.1 capacitors (such as ceramic disc, multi-layer ceramic, surface mount, trimmer disc, connector filtering)
    2.2 resistors (such as oxide film, surface mount, wirewound)
    2.3 inductors (various types including, surface mount)
    2.4 interconnection devices (such as edge connectors, test points, insulated chassis connectors)
    2.5 sensor devices (such as used for process control and environmental monitoring applications)
    2.6 optical devices (such as optical fibre, optical waveguides, optical backplanes, optical interconnection)
    2.7 visual display screens (such as used for PC screens)
    2.8 switching components (such as klystrons, thyratrons)
    2.9 microwave components (such as magnetrons, travelling wave tubes, other microwave components)
    2.10 spark gaps (such as is used in electromagnetic pulse surge protection and high energy switching applications)
    2.11 charge coupled devices (such as is used in image detection type applications)
    2.12 other type of component (specify
3. Use appropriate sources to access work related instructions, to include three of the following:
    3.1 assembly route cards
    3.2 assembly/process stage instructions
    3.3 disc based multimedia packages
    3.4 written instructions
    3.5 diagrams/drawings
    3.6 other electronic means
4. Obtain and prepare materials, component parts and equipment for processing, to including carrying out all of the following:
    4.1 receive or requisition kits of parts and/or materials for assembly/processing
    4.2 obtain, prepare or modify standard parts as needed
    4.3 prepare assembly jigs/aids
    4.4 set out components for efficient working

4.5 prepare production equipment for assembly/process (such as set parameters, temperature profiles, times, speeds, pressures, vacuum, test settings)
4.6 obtain chemicals as required (such as solders/fluxes, plating solutions)

5. Process electronic components, to include completing two of the following:
5.1 follow stage-by-stage instructions for the assembly/process recipe stages involved
5.2 hand assemble/join/interconnect parts
5.3 use automated assembly/processing equipment
5.4 plate on combinations of nickel/silver/gold to form component terminations
5.5 ink screens to prepare component layers and cut, release and fire components (where appropriate)
5.6 apply coatings/glazes to seal/finish the components
5.7 tape and reel components into standardised cassette receptacles
5.8 pump vacuums to required specification and seal the component
5.9 seal component housings

6. Monitor the components, during and on completion of the processes and carry out two of the following:
6.1 conduct basic functional/dimensional/security checks, in line with procedures
6.2 sample check the work at each stage
6.3 conduct self-generated, ad-hoc inspection checks
6.4 apply quality improvement controls and techniques (such as statistical process control (SPC), failure mode effect analysis (FMEA))
6.5 check vacuum levels

7. Carry out the processing of electronic components, to meet one of the following quality and accuracy standards:
7.1 company standard and procedures
7.2 current industry standards, codes of practice and procedures
7.3 other international standard
7.4 customer standards and requirements

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