Overview

This standard identifies the competences you need to carry out post-production tests on electronic components or circuits, in accordance with approved procedures. You will be required to carry out all preliminary essentials like obtaining risk assessment/permits to work, following clean work area protocols where appropriate. In addition, you will be expected to review and check the currency of the testing requirements, to set up and prepare the testing facilities for use, to conduct prescribed tests, to consider the implications of results obtained and to record and report your findings.

Your responsibilities will require you to comply with organisational policy and procedures for the testing activities undertaken and to report any problems with these activities or with the tools and equipment used, 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 carry out.

Your underpinning knowledge will provide a good understanding of your work and will provide an informed approach to applying test procedures for electronic components and circuits. You will understand the basic operating principles of the items being tested, their main parameters and their application, in adequate depth to provide a sound basis for carrying out the activities, recognising when circuits/components do not meet the required specification.

You will understand the safety precautions required when working in a test environment for electronic components and circuits and with the test equipment used. 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, environmental and other relevant regulations, directives and guidelines

P2 follow the appropriate procedures for use of tools and equipment to carry out the required tests

P3 set up and carry out the tests using the correct procedures and within agreed timescales

P4 record the results of the tests in the appropriate format

P5 review the results and carry out further tests if necessary
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Knowledge and understanding

You need to know and understand:

K1 the specific safety precautions to be taken to protect yourself and others when conducting the prescribed tests on particular categories of electronic components/circuits (such as the use of protective barriers, displaying of warning notices)

K2 the personal protective equipment (PPE) to be worn whilst carrying out the testing activities concerned, both for personal protection and protection of the components or circuits (such as protective clothing, eye and hearing protection, electrostatic discharge (ESD))

K3 the hazards associated with the tests being conducted (such as heat, radiation, chemicals, electrostatic discharge, high voltage points on equipment exposed to contact during tests, trapping points on equipment)

K4 how to obtain the necessary authority to conduct the testing, the relevant work areas and any specific permit-to-work procedures that are used

K5 how to recognise and deal effectively in the workplace with victims of electric shock (to include methods of safely isolating the power source and methods of first aid resuscitation)

K6 what constitutes a hazardous voltage and how to reduce the risks of a phase to earth shock (such as insulated tools, rubber matting and isolating transformers)

K7 the clean work area protocols that should be used, in appropriate cases

K8 how to obtain and use data/specifications for the post-production tests being undertaken

K9 how to read and interpret circuit diagrams and related symbols

K10 how to recognise and read component values and, where appropriate, the polarity of electronic components

K11 how to check the calibration status of authorised test facilities and equipment to be used

K12 how to set up and use the range of test equipment items for the post-production tests (such as logic and waveform analysis equipment, storage oscilloscopes, signal generators, sensing and measuring devices, current, voltage and resistance measuring instruments)

K13 the importance of using the appropriate test points in the circuit and how these are identified

K14 the types of test used to verify the correct functioning of electronic equipment

K15 the basic operating principles of the electronic components/circuits being tested

K16 how to analyse and evaluate the results of the testing carried out

K17 the problems that can occur during the testing activities and the actions needed to deal with them

K18 the reporting and documentation requirements relating to testing
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activities and how to use them

K19  the extent of your own responsibility and whom you should report to if you have problems that you cannot resolve
Additional Information

Scope/range related to performance criteria

You must be able to:

1. carry out all of the following during the testing of the electronic components and circuits:
   1.1 use the correct issue of drawings, test instructions and specifications
   1.2 follow risk assessment procedures and COSHH regulations
   1.3 follow clean work area protocols, where appropriate
   1.4 use grounded wrist straps and other electrostatic discharge (ESD) precautions, as appropriate
   1.5 provide safe access and working arrangements for the testing area
   1.6 carry out the testing activities in line with organisational procedures
   1.7 review the test results and store records, in accordance with appropriate procedures
   1.8 dispose of waste items in a safe and environmentally acceptable manner and leave the work area in a safe condition

2. test one of the following manufactured electronic components or circuits:
   2.1 capacitors
   2.2 optical devices
   2.3 charge-coupled devices
   2.4 resistors
   2.5 visual display screens
   2.6 printed circuit board/assembly
   2.7 inductors
   2.8 switching components
   2.9 thin film circuitry
   2.10 interconnection devices
   2.11 microwave components
   2.12 thick film circuitry
   2.13 sensor devices
   2.14 spark gaps
   2.15 flexible film circuitry
   2.16 other components or circuits (specify)

3. collect and review test information, using two of the following:
   3.1 test instrument measurements (such as from a multimeter, oscilloscope, logic probe, pulse sequencing analyser, signal generator/tracer)
   3.2 automatic optical inspection equipment
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3.3 automatic flying probes tester
3.4 functional test equipment
3.5 in circuit test equipment (such as bed of nails/probes)
3.6 circuit meters
3.7 circuit self-diagnosis
3.8 automated X-ray inspection equipment
3.9 recording devices (such as for shock, vibration, humidity, temperature)
3.10 sensory input (such as sight, sound, smell, touch)

4. carry out two of the following tests:
   4.1 pulse train sequencing and pulse rise time
   4.2 waveform shape, frequency and amplitude checks
   4.3 component value tests (such as resistance, capacitance, inductance)
   4.4 continuity, open and short circuit tests
   4.5 shock and vibration withstanding tests
   4.6 humidity, temperature and salt spray withstanding tests
   4.7 insulation resistance

5. carry out all of the following checks to ensure the accuracy and quality of the tests carried out:
   5.1 test equipment used is appropriate for the tests being carried out
   5.2 the test equipment is correctly calibrated
   5.3 any portable equipment is PAT tested
   5.4 test equipment is operated within its specified range
   5.5 test procedures to be used are up-to-date and follow laid-down procedures
   5.6 electrostatic discharge (ESD) precautions and procedures are applied

6. carry out tests which comply with one of the following standards:
   6.1 BS or ISO standards and procedures
   6.2 customer standards and requirements
   6.3 company standards and procedures
   6.4 other international standards (such as IPC)

7. record and report the test results, using one of the following:
   7.1 computer based format
   7.2 manual format
   7.3 company specific reporting procedure
   7.4 specific test report
   7.5 other appropriate media (such as web based tools)
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<th>SEMTA</th>
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<td><strong>Version number</strong></td>
<td>2</td>
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<tr>
<td><strong>Date approved</strong></td>
<td>February 2013</td>
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<tr>
<td><strong>Indicative review date</strong></td>
<td>February 2018</td>
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<tr>
<td><strong>Validity</strong></td>
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<td><strong>Original URN</strong></td>
<td>SEMEEE3-18</td>
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<tr>
<td><strong>Suite</strong></td>
<td>Electrical and Electronic Engineering Suite 3</td>
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<tr>
<td><strong>Key words</strong></td>
<td>Engineering; electrical; electronic; testing; post production; components; circuits; procedures; equipment; methods</td>
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