SEMTS211

Checking and testing electronic products

Overview

This standard identifies the competences you need to carry out visual checks and specific tests on electronic products, in accordance with approved procedures. You will be required to carry out checks and tests on electronic products, such as electronic assemblies, printed circuit board assemblies, power supplies, motor control equipment, signal processing equipment, alarm and protection equipment, motor vehicle, aeronautical and marine/yacht and boat equipment to establish that it is safe and functioning to specification. You will be required to use a range of electronic test instruments to measure and check that the equipment is to specification.

Your responsibilities will require you to comply with organisational policy and procedures for the checking and testing activities undertaken, and to report any problems with the electronic product you cannot personally resolve, or that are outside your permitted authority, to the relevant people. You will be expected to ensure that all tools and equipment used to check and test the product are returned to the correct location on completion of the activities. You will be expected to work to instructions, either alone or in conjunction with others, taking personal responsibility for your own actions and for the quality and accuracy of the work that you carry out.

Your underpinning knowledge will be sufficient to provide a sound basis for your work, and will provide an informed approach to applying appropriate checking and test procedures to electronic products. You will understand the electronic product being checked, the test equipment being used, and the various test procedures, 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 carrying out the checking and testing activities, especially those for isolating the equipment and for taking the necessary safeguards to protect yourself and others against direct and indirect electric shock. 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 follow the appropriate procedures for use of tools and equipment to carry out the required checks/tests

P3 set up and carry out the checks/tests following procedure within agreed timescales

P4 complete and store all relevant documentation in accordance with organisational requirements

P5 review the results and carry out further tests if required

Knowledge and understanding

You need to know and understand:

K1 how to work safely at 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 the clean work area protocols that should be used, in appropriate cases

K4 how to obtain the necessary job instructions and other documents needed in the checking and testing activities

K5 the preparations to be undertaken before the product is tested

K6 the type of test equipment to be used, and how it is to be connected to the product under test

K7 how to check that the test equipment is within current calibration dates, and is in a safe and usable condition

K8 the importance of ensuring that test equipment is used only for its intended purpose, and within its specified range and limits

K9 the importance of using the appropriate test points in the circuit, and how these are identified

K10 the types of test used to verify the correct functioning of the electronic equipment

K11 how to interpret the value and significance of the test readings

K12 issues or errors that could occur and which may affect the test results, and how they can be avoided

K13 recording the test results, and the documentation to be used

K14 the typical defects and variations that can be found on the electronic products, and how to identify them

K15 the procedure to be followed when the products are out of specification

K16 the extent of your own responsibility and to whom you should report if you have problems that you cannot resolve

Scope/range related to performance criteria

1. Carry out all of the following during the testing of the electronic products:
   1.1 obtain all the necessary information to carry out the checking and testing activities (such as job instructions and testing documentation)
   1.2 follow clean work area protocols, where appropriate
   1.3 obtain the appropriate test equipment, and check that it is within current calibration dates, and is in a safe and usable condition
   1.4 carry out the checking and testing activities, using the specified techniques and procedures
   1.5 use grounded wrist straps and other electrostatic (ESD) precautions, as appropriate
   1.6 identify and record the test results in the appropriate format
   1.7 place products (in and out of specification) in the correct location on completion of the checking and testing activities
   1.8 leave the work area in a safe and tidy condition on completion of the activities
2. Test one of the following manufactured electronic products:
   2.1 printed circuit board assemblies
   2.2 motor vehicle/leisure vehicle equipment
   2.3 visual displays/screens
   2.4 marine/yacht and boat equipment
   2.5 microwave components
   2.6 alarms and protection devices
   2.7 electronic assemblies
   2.8 ADC and DAC hybrid circuits/equipment
   2.9 electronic modules/sub-assemblies
   2.10 aeronautical electronic equipment
   2.11 power supplies (such as switched mode, series regulation, parallel regulation)
   2.12 motor control systems (such as closed loop servo and proportional control, solid state inverter control)
   2.13 sensor/actuator equipment (such as linear, temperature, photo-optic, flow, rotational, level, pressure, mass/weight)
   2.14 digital devices (such as process control, microprocessor-based, logic devices, display devices)
   2.15 signal processing equipment (such as frequency modulating/demodulating, oscillators, amplifiers, filters)
   2.16 other specific electronic product
3. Carry out one of the following checks:
   3.1 First/one-off
   3.2 in-process/sample
   3.3 final check
4. Carry out visual check of electronic products, to include checking all of the following:
   4.1 all manufacturing/assembly procedures are complete

4.2 joints are free from excess solder and flux residue
4.3 all components are correctly assembled and orientated
4.4 products are free from damage or obvious defects
4.5 all connections are mechanically secure

5. Carry out the tests using one of the following types of test equipment:
   5.1 oscilloscope
   5.2 ammeter
   5.3 signal generator
   5.4 Q meter
   5.5 multimeter
   5.6 signal tracer
   5.7 continuity tester
   5.8 automatic test equipment
   5.9 measuring instrument or gauge
   5.10 pulse sequencing analyser
   5.11 computer aided diagnostic equipment
   5.12 spectrum analyser
   5.13 recording devices (such as shock, vibration, humidity, temperature)
   5.14 network analyser
   5.15 computer-aided diagnostic equipment
   5.16 logic probe/analyser
   5.17 special purpose testing equipment
   5.18 non-contact wafer testing
   5.19 other specific test equipment
6. Carry out two of the following tests:
   6.1 function test
   6.2 insulation resistance
   6.3 soak test
   6.4 clock/timer switching
   6.5 continuity, open and short circuit tests
   6.6 shock and vibration withstand tests
   6.7 67 DC voltage/current levels
   6.8 heat dissipation
   6.9 AC voltage/current levels
   6.10 pulse train sequencing and pulse width/rise time
   6.11 logic states
   6.12 waveform shape, frequency and amplitude checks
   6.13 frequency modulation/demodulation
   6.14 signal noise/interference levels
   6.15 environmental tests (such as humidity, temperature)
   6.16 component value tests (such as resistance, capacitance, inductance)
   6.17 other product-specific tests
7. Carry out tests in compliance with one of the following standards:
   7.1 BS or ISO standards and procedures
   7.2 customer standards and requirements
   7.3 organisational standards and procedures
   7.4 other international standards

7.5 statutory regulations
7.6 specific system requirements

8. Complete the relevant paperwork, using one of the following:
   8.1 inspection report
   8.2 customer specific documentation
   8.3 job card

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