SEMEEE321

Writing specifications for testing electronic components or circuits

Overview

This standard identifies the competences you need to write test specifications/processes for manufactured electronic components or circuits, in accordance with approved procedures. You will be expected to review the operating requirements of the electronic components or circuits, to decide which tests are needed and to specify the tests, the test equipment and facilities to be used and the order and conditions in which they are to be conducted. In addition, you will be expected to write test specifications in an approved format to a required standard.

Your responsibilities will require you to comply with organisational policy and procedures for writing the test specifications 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 carry out.

Your underpinning knowledge will provide a good understanding of your work and will provide an informed approach to applying procedures for writing test specifications for electronic products. You will understand the basic operating principles of the components and circuits for which the test procedures are specified, in adequate depth to provide a sound basis for carrying out this activity to the required standard.

The application of safe working practices will be a key issue throughout and you will understand the safety precautions required when working in an electronic component manufacturing and testing environment and with the associated equipment that is 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 and other relevant regulations, directives and guidelines

P2 follow work instructions and requirements for specifications

P3 write specifications that are clear, accurate and contain all relevant data

P4 produce specifications in formats that meet organisational and customer requirements for the testing of electronic components and circuits

P5 ensure that codes, and other references, used in the specifications follow agreed conventions

P6 pass specifications on to the appropriate people according to the agreed schedule

P7 make changes to specifications within agreed control procedures

P8 deal with problems within your control and report those that cannot be solved

P9 complete and store all relevant documentation in accordance with organisational requirements

P10 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 obtain the authority to conduct testing, the relevant work areas and any specific permit-to-work procedures required

K5 the types of tests that can be specified for manufactured electronic components and circuits

K6 how to obtain and use the organisation/customer specifications to determine the post-production tests required

K7 how to check the calibration status of authorised test facilities and test equipment

K8 how to set up and use the range of test equipment needed for the post-production tests

K9 the basic operating principles of the electronic components and circuits to be tested

K10 how to read and interpret circuit diagrams and related symbols

K11 how to recognise and read the values, tolerances and polarity of electronic components

K12 how the tests being specified will be analysed and evaluated

K13 the issues that can occur during the testing activities and how to specify the actions needed to deal with them

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 for the components or circuits to be tested:
   1.1 review the operating and set-up specification for the product
   1.2 check the working range or limits to be met (such as temperature, voltage/current/ impedance, boundary conditions for frequency, pulse rise times, amplitudes, minimum and maximum power supply limits)
   1.3 identify the testing methods, processes and procedures required to test the component or circuit's full function
   1.4 identify and schedule the logical order for conducting the tests
2. Review the operating requirements and prepare test specifications for one of the following:
   2.1 capacitors
   2.2 optical devices
   2.3 charge-coupled devices
   2.4 resistors
   2.5 visual displays/screens
   2.6 printed circuit board/assemblies
   2.7 inductors
   2.8 switching components
   2.9 thin film circuitries
   2.10 interconnection devices
   2.11 microwave components
   2.12 thick film circuitries
   2.13 sensor devices
   2.14 spark gaps
   2.15 flexible film circuitries
3. Write test specifications that require use of two of the following:
   3.1 circuit meters
   3.2 circuit self-diagnosis
   3.3 sensory input (such as sight, sound, smell, touch)
   3.4 test instrument measurements (such as multimeter, oscilloscope, logic probe, pulse sequencing analyser, signal generator/tracer)
   3.5 sensing/recording devices (such as for shock, vibration, humidity, temperature)
4. Produce test specifications for three of the following types of 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) in circuit
   4.4 component value tests (such as resistance, capacitance, inductance) out of circuit
   4.5 continuity, open and short circuit tests
   4.6 shock and vibration withstanding tests
   4.7 humidity, temperature and salt spray withstanding tests
   4.8 insulation resistance

5. Check that test specifications comply with one of the following standards:
    5.1 current industry standards, codes of practice and procedures
    5.2 company policy and procedures
    5.3 customer/client requirements
    5.4 industry/sector requirement
    5.5 other international standards

SEMEEE321

Writing specifications for testing electronic components or circuits

Developed by	Enginuity
Version Number	4
Date Approved	31 Mar 2026
Indicative Review Date	01 Apr 2029
Validity	Current
Status	Original
Originating Organisation	Enginuity
Original URN	SEMEEE3-21
Relevant Occupations	Engineering, Engineering and Manufacturing Technologies, Engineering Technicians, Maintenance Team Technician, Manufacturing Technologies, Production and Process Engineers
Suite	Electrical and Electronic Engineering Suite 3
Keywords	Engineering; electrical; electronic; write; test; specification; components; circuits; operating; requirements; equipment