
Overview

This standard identifies the competences you need to carry out visual inspections and specific tests on electrical products, in accordance with approved procedures. You will be required to carry out pre-test inspections and tests of electrical products such as motors, transformers, power or control equipment, white goods, brown goods and electrical panels, to establish that they are safe and to specification. You will be required to use a range of electrical test instruments to carry out the necessary measurements.

Your responsibilities will require you to comply with organisational policy and procedures for the inspection and 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 personal responsibility for your own actions and for the quality and accuracy of the work that you carry out.

Your underpinning knowledge will provide a sound understanding of your work, and will provide an informed approach to applying test procedures to electrical products. You will understand the equipment being worked on, the test equipment to be used, and the various test procedures, in adequate depth to provide a sound basis for carrying out the activities to the required specification. In addition, you will be expected to review the outcome of the tests, to compare the results with appropriate standards, to determine the action required, and to record and report the results in the appropriate format.

You will understand the safety precautions required when carrying out the inspection 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:

1. work safely at all times, complying with health and safety legislation and other relevant regulations, directives and guidelines
2. follow the appropriate procedures for use of tools and equipment to carry out the required tests/inspections
3. set up and carry out the tests/inspections using the correct procedures and within agreed timescales
4. carry out all required test/inspections as specified
5. identify any defects/flaws or variations from the specification
6. record the results, and complete inspection documentation in the appropriate format
7. deal promptly and effectively with problems within your control and report those that cannot be solved

Knowledge and understanding

You need to know and understand:

1. the specific safety precautions to be taken when inspecting and testing electrical products (such as specific legislation or regulations governing the activities or work area, safe working practices and procedures to be adopted, general workshop safety practice, erection of protective barriers, displaying of warning notices)
2. the health and safety requirements of the work area where you are carrying out the testing activities, and the responsibility these requirements place on you
3. the hazards associated with inspecting and testing electrical products, and how they can be minimised
4. the importance of wearing protective clothing and other appropriate safety equipment (PPE) during the electrical inspection and testing activities
5. the equipment isolation and lock-off procedure that applies to the testing activities
6. what constitutes a hazardous voltage and how to recognise victims of electric shock
7. how to reduce the risks of a phase to earth shock (such as insulated tools, rubber mating and isolating transformers)
8. protection techniques for electrical systems (to prevent burn or fire risk)
9. how to obtain and interpret drawings, circuit and physical layouts, charts, specifications, manufacturers' manuals, history/maintenance reports, graphical electrical symbols, current wiring regulations, and other documents needed in the testing activities
10. the use of relevant standards in determining if components and products are fit for purpose
11. the general principles of quality assurance systems and procedures
12. preparations to be undertaken before the product is inspected and tested
13. types of test equipment to be used, and their selection for particular types of tests
14. how to ensure that the test equipment is maintained and correctly calibrated, in accordance with the appropriate organisational procedures
15. how to connect the appropriate test equipment for the measurement of resistance, current, voltage, power, capacitance, inductance, frequency, power factor, and protective device disconnection/trip times

16. the various testing methods and procedures, as recommended in approved electrical codes of practice, and how to apply them to different operating conditions
17. why sampling is used, and when it is an effective means of quality assurance
18. displaying/recording test results, and the documentation to be used
19. how to interpret the value and significance of the test readings
20. how to analyse test results using tables in approved electrical codes of practice, and how to use comparison and sequential techniques
21. the importance of ensuring that test equipment is used only for its intended purpose and within its specified range and limits
22. the typical defects and variations that can be found on electrical products, and how to identify them
23. problems or errors that could occur and which may affect the test results, and how they can be avoided
24. the environmental control and company operating procedures relating to the testing activities
25. the importance of completing inspection documentation, what needs to be recorded and where records are kept
26.
the procedure to be followed when inspected products are out of specification
27.
the extent of your own authority, and whom you should report to if you have problems that you cannot resolve

Scope/range

1.

Carry out all of the following during the inspection and testing activities:

- 1.1 obtain and use the correct issue of company and/or manufacturers' drawings and testing documentation
- 1.2 adhere to risk assessment, COSHH and other relevant safety standards
- 1.3 check that test equipment is correctly calibrated and appropriate for test(s) to be carried out
- 1.4 provide safe access and working arrangements for the testing area
- 1.5 carry out the inspection and testing activities, using appropriate techniques and procedures
- 1.6 operate test equipment within its specification range
- 1.7 apply adjustment of inspection results for temperature correction (where applicable)
- 1.8 identify and record out-of-specification features, in the appropriate format
- 1.9 report and investigate the possibility of gaining a concession for out-of-specification products
- 1.10 place products in the correct location on completion of the inspection activities (in and out of specification)
- 1.11 leave the work area in a safe and tidy condition on completion of the activities

2.

Carry out tests on two of the following types of electrical equipment:

- 2.1 rotating equipment (such as motors, alternators)
- 2.2 emergency power equipment
- 2.3 power equipment (such as transformers/inductors)
- 2.4 electrical plant
- 2.5 control equipment (such as switchgear, distribution equipment)
- 2.6 alarm equipment
- 2.7 bus bar systems
- 2.8 process control equipment
- 2.9 electrical panels
- 2.10 communication equipment
- 2.11 fans/blowers
- 2.12 wiring looms/harnesses
- 2.13 heating equipment
- 2.14 vehicle control equipment
- 2.15 portable tools/equipment
- 2.16 power supplies
- 2.17 white goods
- 2.18 brown goods
- 2.19 other specific electrical equipment

3.

Inspecting and testing electrical products

Carry out two of the following inspection procedures:

- 3.1 first/one-off
- 3.2 in-process/sample
- 3.3 final inspection

4.

Carry out visual inspection of electrical products, to include ensuring all of the following:

- 4.1 all manufacturing/assembly procedures are complete
- 4.2 all components are correctly orientated, positioned and secured
- 4.3 all connections are mechanically secure
- 4.4 products are free from damage or obvious defects

5.

Carry out tests using four of following:

- 5.1 oscilloscope
- 5.2 insulation resistance tester
- 5.3 ohmmeter
- 5.4 loop impedance tester
- 5.5 ammeter
- 5.6 specialist test equipment
- 5.7 voltmeter (such as 2-pole voltage detector)
- 5.8 current injection tester
- 5.9 torque tester
- 5.10 residual current device (RCD) tester
- 5.11 flash tester
- 5.12 portable appliance tester (PAT)
- 5.13 multimeter
- 5.14 EMC meter

6.

Use the relevant test equipment to measure and check five of the following:

- 6.1 protective resistance values
- 6.2 polarity
- 6.3 insulation resistance values
- 6.4 capacitance
- 6.5 current levels
- 6.6 frequency values
- 6.7 voltage detection/levels
- 6.8 inductance
- 6.9 continuity
- 6.10 safety device trip speed
- 6.11 power rating
- 6.12 specialised tests (such as speed, sound levels, temperature, interference)
- 6.13 resistance

7.

Check that the electrical products meet one of the following quality and accuracy

standards:

- 7.1 BS or ISO standards and procedures
- 7.2 customer standards and requirements
- 7.3 statutory regulations
- 7.4 organisation standards and procedures
- 7.5 specific system requirements

8.

Complete the relevant documentation, using one of the following, and pass it to the appropriate person:

- 8.1 inspection report
- 8.2 customer specific documentation
- 8.3 concession report
- 8.4 job card

Developed by Enginuity

Version Number 3

Date Approved 30 Mar 2021

Indicative Review Date 01 Mar 2024

Validity Current

Status Original

Originating Organisation Enginuity

Original URN SEMETS315

Relevant Occupations Engineering, Engineering and Manufacturing Technologies,
Engineering Technicians

Suite Engineering Technical Support Suite 3

Keywords engineering; technical; support; inspecting; testing; electrical;
products; motors; transformers; control systems
