

Customer information sheet

Electrical testing and fault finding for gas engineers

NICEIC package includes:

- training materials
- PowerPoint
- assessment materials.

Code	Core assessments	Practical provisions page(s)
ET&FFFGE1	Electrical testing and fault finding for gas engineers Modules: 1 , 2, 3, 4.	See page 3.

Introduction

All NICEIC paperwork is designed to offer maximum flexibility, maintain ease and fluidity of the assessment process and to minimise the amounts of paperwork required.

Each centre is unique in the way it presents its practical provision; as a result the paperwork may not be ideally formatted with regard to running order or task content. It is acceptable for the running orders to be altered slightly to 'better suit' the provision and layout at an individual centre; such changes must be minimal and alterations made only with the **written permission of NICEIC Certification** (this excludes any appliance identification numbers and so on which may be added to the paperwork without permission being sought).

Certificate of competence

A certificate of competence will be issued if a candidate can meet the requirements laid down within this document. Certificates of competence will be valid for the time period specified on.

Electrical testing and fault finding for gas engineers

Modern gas appliances, such as boilers and the control equipment associated with them, have developed radically over the years; from the relatively simple S and Y plan systems to the more complex controls and components associated with combination boilers and remote heating controllers/thermostats.

The learner guides, presentations and associated course assessment is intended to introduce a level of knowledge & understanding for gas engineers regarding their ability to work safely on electrical equipment, safely fault find and complete the relevant documentation.

This training and assessment programme is suitable for competent gas engineers who are already working in the industry and wish to enhance their knowledge and understanding of electrical systems related to gas appliances and control systems.

The course does not cover the installation of electrical equipment but does cater for fault finding, repair and/or control and component exchange.

Programme aims and objectives

The aims are as follows:

- Module 1 - Give an overview of basic electrical knowledge
- Module 2 - Give an overview of how appliance control systems work
- Module 3 - Give an overview of health, safety and safe isolation
- Module 4 - Give an overview of fault finding and component exchange.

Limitations of the programme

This four modular programme is designed to give gas engineers the ability to appreciate the safety requirements when fault finding on different types of electrical systems.

This course is not intended to train gas engineers to become electricians, this is not possible in such a short time, but it is possible to give gas engineers the knowledge to work safely on electrical systems and fault find issues without putting themselves or others at risk.

If there is any doubt as to an electrical safety issue always defer to a suitably skilled and competent electrical professional.

Module 1: Basic electrical knowledge and understanding

This module is designed to give the learner the fundamental basic knowledge and understanding in relation to electrical legislation, standards, electrical science, materials, equipment, earthing systems, bonding, circuit protective conductors, protection devices and basic circuit design.

Module 1 is a prerequisite module along with module 3 and should be completed along with assessment attainment before progressing to modules 2 and/or 4. It is recommended that learners complete modules 1 and 3 together if not undertaking all four modules at once.

A learner guide for module 1 is provided along with a PowerPoint presentation for the training delivery. Module 1 is evaluated with a theory assessment which requires the learner to achieve 100% to attain the required standard. The learner will be allowed three attempts to attain the 100% requirement.

Module 2: How systems work

This module is designed to give the learner the knowledge and understanding in relation to electrical controls, components, wiring diagrams and sequences of operation for wet central heating boilers, systems, combination boilers, gas cookers and ducted air heaters.

Module 1 and 3 attainments are prerequisites for module 2. It is recommended that learners complete module 2 before progressing to module 4 if not completing the four modules as one programme.

A learner guide for module 2 is provided along with a power-point presentation for the training delivery. Module 2 is evaluated with a theory assessment which requires the learner to achieve 100% to attain the required standard. The learner will be allowed three attempts to attain the 100% requirement.

Module 3: Health, safety and safe isolation

This module is designed to give the learner the knowledge and understanding in relation to safe working practice and precautions associated with working live, testing, regulatory and standard requirements, guidance and the procedure to be adopted when safely isolating equipment.

Module 3 and 1 attainments are prerequisites for module 2 and 4. It is recommended that learners complete module 3 along with module 1 before progressing to modules 2 and/or 4 if not completing the four modules as one programme.

A learner guide for module 3 is provided along with a PowerPoint presentation for the training delivery. Module 3 is evaluated with a practical assessment which requires the learner to achieve the task without error to attain the required standard. The learner will be allowed three attempts to attain the required standard.

Module 4: Fault finding, control and component exchange

This module is designed to give the learner the knowledge and understanding in relation to safe working practice and logical methods associated with fault finding techniques. The appliance range consists of wet central heating system boilers, combination boilers and their controls and components. This extends to system plans and wireless controls. Gas cookers, ducted air heaters and their control systems are also included in module 4.

Module 1, 2 and 3 attainments are prerequisites for module 4. It is recommended that learners complete module 4 along with module 2 if possible. If taken in isolation module 2 should be attained before progressing to module 4 if not completing the four modules as one programme.

A learner guide for module 4 is provided along with a PowerPoint presentation for the training delivery. Module 4 is evaluated with three theoretical and one practical assessment which will require the learner to achieve 100% for the theory tasks. The practical task is "without error" to attain the required standard. The learner will be allowed three attempts to attain the required standard.

Recommended durations

NICEIC Certification recommends the following durations for each module:

- Module 1 and 3 – 1 day (based on a 7 hour day)
- Module 2 – 1 day (based on a 7 hour day)
- Module 4 – 1 day (based on a 7 hour day).

Completing all four modules is a three day programme. Learners and approved centres can tailor the delivery model but require submitting their plan of delivery to NICEIC Certification prior to the running of the EGE programme.

Approved centre provisions

The following guidance outlines the general provisions required by a provider to set up to operate the NICEIC electrical testing and fault finding for gas engineers training and assessment programme.

It is recommended that this guidance be used in conjunction with the relevant training module prior to commencement.

Each provider will be unique in the way it presents its practical provision and as a result the programme guides and presentations may not be ideally tailored with regard to the provider's style of delivery. It is acceptable for the sequence of course content to be delivered in a way that "suits" the actual provision/layout at an individual provider's facility. However, such changes must be minimal and any major alterations made only with the written permission of NICEIC Certification.

- The classroom or resource room shall be in a suitable and quiet location with adequate space and layout that befits and encourages a conducive learning environment
- There should be appropriate space between learners when undertaking tests
- A clock should be in full view
- Adequate lighting levels (minimum 500 lux) must be provided
- Adequate heating and environmental comfort levels
- Teaching aids to include NICEIC learner guides, NICEIC module presentations, flip charts, pen boards, projectors and reference materials
- Risk assessed for health, safety and environment conformance.

Practical provision

The practical training will require the provision of electrical, gas and water services. Sufficient quantity and range of live gas appliance installations and equipment as follows:

At least two fan assisted room sealed system boilers with hot water and radiator circuits or heat sinks. The systems must contain a mixture of programmers, room thermostats, cylinder thermostats and motorised valves	✓
At least two combination boilers preferably with external controls	✓
Wireless controls on at least one system	✓
Double pole fused spur units must be RCD protected	✓
3 pin plug connections must also be RCD protected	✓
A mixture of controls and components for learners to examine and test such as gas valves, thermistors, thermostats, motorised valves, programmers, air pressure switches, fans, flow switches, spark ignition units	✓
Pre-wired control boards of Y and S Plan control systems protected by RCDs	✓
The pre-wired boards must be sufficient in number for group sizes	✓

An appropriate number of EFLI test meters Note: The meter depicted in the presentation is not mandatory. Centres can use their own make and models provided the instruments are appropriate calibrated and approved	✓
An appropriate number of digital multi-meters. The multi-meters must be of an approved make and model. This also applies to test leads and probes	✓
Appropriate tools for electrical fault finding and control/component exchange	✓
At least two gas cooker installations with electrical controls and components protected by RCDs. One cooker must have automatic timing for the oven	✓
At least two ducted air heater installations protected with RCDs. One ducted air heater must be a modular air flow model	✓
The practical area shall have suitable number of fire exits, extinguishers and emergency lighting backup should mains lighting fail	✓
All practical areas shall be well lit (minimum 500 lux), have some means of fan extraction, adequate natural ventilation and have a carbon monoxide detector	✓
A clock shall be in clear sight of all learners when undertaking assessments	✓
The electrical supply to all equipment shall be made through an earth leakage circuit breaker designed to operate at 30mA	✓
The safety cut-off shall isolate the electrical and gas supply but not the room lighting	✓

Practical assessments

1. One appliance (recommend central heating boiler) to be prepared for safe isolation of the electrical supply. The boiler is to be supplied from a switched fused connection unit, for the learner to check that it is safe to work on.
2. Two pre-wired S and Y system plan boards to be prepared for the fault finding assessment.
3. The S plan system is to have a direct short circuit to neutral or earth. It is recommended this is as realistic as possible and not clearly visible. The boards fused spur connection unit must be safely isolated, locked off, labelled and a blown fuse available.
4. The Y plan system is to have a faulted control or component. This could be a programmer not switching, an open circuit motor on a motorised valve or a thermostat not switching. It is recommended the provider uses real faulted components. Do not use techniques such as snipping wires.