

**EM117** Carry out fault diagnosis on engineered systems within food and drink operations

**SQA Unit Code**

**HD5M 04**

**Level 3**

**SCQF Level 6**

**Credit value 58**

**Unit Summary**

This standard identifies the competences you need to carry out fault diagnosis on engineered systems used within food and drink operations, in accordance with approved procedures. You will be required to diagnose faults on an engineered system involving two of the following interactive technologies: mechanical, electrical, fluid power or process controller, at sub-assembly/component level. You will be expected to use a variety of fault diagnosis methods and techniques, and to utilise a number of diagnostic aids and equipment. From the evidence gained, you will be expected to identify the fault and its probable cause, and to suggest appropriate action to remedy the problem. Food and drink operations is a term used in this standard to cover the following sub sectors of Meat, Drinks, Confectionery, Fresh Produce, Bakery, Seafood and Dairy.

You will be expected to work with minimal supervision, taking personal responsibility for your own actions and for the quality and accuracy of the work that you carry out.

In order to be assessed as competent you must demonstrate to your assessor that you can consistently perform to the requirements set out below. Your performance evidence must include at least one observation by your assessor.

You must be able to:	You need to show: Evidence must be work-based, simulation alone is only allowed where shown in <b><i>bold italics</i></b>
<p>1. Carry out fault diagnosis on engineered systems within food and drink operations</p> <p>This means you:</p> <p>Work safely at all times, complying with health and safety and other relevant food and drink regulations, directives and guidelines</p> <p>Review and use all relevant information on the symptoms and problems associated with the products or assets</p> <p>Investigate and establish the most likely causes of the faults</p>	<p>Evidence of carrying out fault diagnosis on engineered systems within food and drink operations as part of your role in accordance with workplace procedures and within the limits of your own responsibilities.</p>

<p>Select, use and apply diagnostic techniques, tools and aids to locate faults</p> <p>Complete the fault diagnosis within the agreed time and inform the appropriate people when this cannot be achieved</p> <p>Determine the implications of the fault for other work and for safety considerations</p> <p>Use the evidence gained to draw valid conclusions about the nature and probable cause of the fault</p> <p>Record details on the extent and location of the faults in an appropriate format</p>	
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You need to know and understand:

Evidence of knowledge and understanding should be collected during observation of performance in the workplace. Where it cannot be collected by observing performance, other assessment methods should be used.

1. the health and safety requirements of the area in which you are carrying out the fault diagnosis activities and the responsibility these requirements place on you not to compromise food safety
2. the specific safety precautions to be taken when carrying out the fault diagnosis of the particular engineered system
3. the isolation and lock-off procedures or permit-to-work procedure that applies, including the critical control points
4. the requirements of the British Retail Consortium (BRC) guidelines and standards in relationship to the fault finding activities
5. the specific requirements of your customer/client specifications in relationship to the fault finding activities
6. your responsibilities in relationship to Hazard Analysis and Critical Control Points (HACCP, TACCP and VACCP) during the fault finding activities
7. the importance of wearing protective clothing and other appropriate safety equipment (PPE) during the fault diagnosis activities, the type of safety equipment to be used and where to obtain it
8. hazards associated with carrying out fault diagnosis on engineered systems (such as handling fluids, stored pressure/force/temperature, electrical contact, process controller interface, using faulty or damaged tools and equipment, using practices and procedures that do not follow laid-down procedures), and how to minimise these and reduce any risks
9. what constitutes a hazardous voltage and how to recognise victims of electric shock
10. how to reduce the risks of a phase to earth shock (including insulated tools, rubber mating and isolating transformers)

11. the procedures and precautions to be adopted to eliminate electrostatic discharge (ESD) hazards
12. where to obtain, and how to interpret, drawings, circuit diagrams, specifications, manufacturers' manuals and other documents needed for the fault diagnosis activities
13. the basic principles of how the system functions, and the working purpose of the various integrated systems
14. the principles of the equipment's design features for safe operation in a food or drink environment such as minimising the chance of contaminants or foreign bodies in the final product
15. the various fault finding techniques that can be used, and how they are applied (including half-split, input/output, emergent problem sequence, six point technique, functional testing, unit substitution, injection and sampling techniques, and equipment self-diagnostics)
16. how to evaluate the various types of information available for fault diagnosis (including operator reports, monitoring equipment, sensory inputs, machinery history records, and condition of the end product)
17. how to evaluate sensory information from sight, sound, smell, touch
18. the procedures to be followed to investigate faults, and how to deal with intermittent conditions
19. how to use the various aids and reports available for fault diagnosis
20. the types of equipment that can be used to aid fault diagnosis (including mechanical measuring instruments, electrical measuring instruments, test rigs, and pressure and flow devices), and how to check the equipment is calibrated or configured correctly for the intended use, and that it is free from damage and defects
21. the application of specific fault finding methods and techniques that are best suited to the problem
22. how to analyse and evaluate possible characteristics and causes of specific faults/problems
23. the processes in place to segregate the tools and equipment used into high or low risk areas
24. the checks required to ensure that all tools, materials and components are all accountable before operating the equipment
25. the cleaning requirements/policies in place before returning the equipment into full operational production
26. how to make use of previous reports/records of similar fault conditions
27. how to evaluate the likely risk of running the equipment with the displayed fault, and the effects the fault could have on the overall process
28. how to prepare a report which complies with the company policy on fault diagnosis
29. the extent of your own authority and to whom you should report if you have problems that you cannot resolve

Evidence of performance may employ examples of the following assessment:

- observation
- written and oral questioning;
- evidence from company systems (e.g. Food Safety Management System)
- reviewing the outcomes of work
- checking any records of documents completed
- checking accounts of work that the candidate or others have written

