

FDQ - Qualification Specification

FDQ number	Qualification title	Qualifications Wales number	EQF Level	Review date
701-365	FDQ Level 3 Diploma in Food and Drink Engineering Maintenance (Wales)	C00/4839/9	4	31/03/2027

Qualification Purpose

This qualification is designed to develop the skills and knowledge of workers in the food and drink engineering and manufacturing sector. The qualification includes a wide range of units providing learners with the opportunity to demonstrate skills and knowledge required to work in highly automated and technical environment. The job roles that apply in this sector include :

- Food and drink maintenance engineer
- Food and drink multi-skilled engineer

This is a regulated qualification and meets purpose *B: Prepare for further learning or training and/or develop knowledge and/or skills in a subject area. Sub purpose B2. Develop knowledge and/or skills in a subject area.*

To take this qualification, learners must be at least 16 years old. They do not require any prior qualifications or food skills experience to take this qualification. The qualification may be assessed in both the learner's learning environment and workplace to allow flexibility during the programme.

All learners must complete a minimum of fourteen (14) mandatory skills and knowledge units. The main group (A) comprises 14 units associated with performing engineering operations and maintenance safely and efficiently.

In addition, learners must also complete **three mandatory units** from two distinct pathways for

- Mechanical (Group B Pathway)
- or
- Multi-skilled (Group C Pathway)

The selection of pathway (B or C) will depend on the learners primary working environment.

Learners may also select and complete 2 optional units. These units are **not** required to achieve the FDQ Level 3 Diploma in Food and Drink Engineering Maintenance (Wales). The optional units are value added to complement employer requirements for staff development or satisfy personal learning and development needs of learners.

See the list of units that make up the qualification and their credit value within the qualification (at the end of this specification).

This qualification could lead to

The qualification will support progression to further learning in:

1. Subject areas including.
 - Engineering and manufacturing
 - Food maintenance and technical management
 - Lead maintenance engineering
 - Electrical Engineering Technician

2. Qualifications including.
 - Level 4 Diploma in Food Technology and Management
 - Level 4 Maintenance Engineering Technician
 - Level 4 Higher National Certificate in Manufacturing Operations

3. This qualification may support employment in/into management level roles including.
 - Food engineering maintenance manager
 - Food processing and manufacture technician/manager

Qualification support

This qualification is supported by the Food and Drink Training and Education Council.

Further Information

Further information can be obtained from our website at: <http://www.fdq.org.uk>

Or by contacting FDQ:

Tel: 0113 859 1266

Email: fdq@fdq.org.uk

Assessment

Assessment evidence should be collected and presented in a portfolio of evidence.

Methods of assessment must be appropriate to the units and learning outcomes.

Practical skills should be assessed through assessor Observation and where appropriate supplemented by methods including:

- Practical demonstration/ assignments
- Professional discussion
- Presentation and questioning
- Coursework

Learners may include video recordings, witness testimony, workplace documentation and photographic evidence in their portfolio.

Knowledge and understanding should be assessed using methods including:

- Questioning
- Assignments
- Professional discussion
- Projects

Assessments will be marked by the centre and subject to centre internal quality assurance and external quality assurance by FDQ.

Assessment criteria are set out in individual units of assessment (see exemplar R/101/0004 Perform engineering maintenance operations in the food and drink sector) and FDQ's Qualification Handbook.

FDQ has in place a quality system comprising policies and procedures to ensure its qualifications are effectively developed and delivered and that they remain fit for purpose. FDQ externally quality assures all centre assessment and internal quality assurance arrangements.

Achievement outcome

The qualification outcome is either pass or fail.

Rules of Combination (RoC)

To achieve the FDQ Level 3 Diploma in Food and Drink Engineering Maintenance (Wales) learners must complete all 14 mandatory units (group A) plus 3 Units **from either** group B or group C.

The units in Group D are optional and may be taken but are not required for the qualification.

Learners must meet the rules of combination for one of the following pathways:

- Mechanical Pathway
- Multi-Skilled Pathway

FDQ Level 3 Diploma in Food and Drink Engineering Maintenance (Wales)	
Total Qualification Time (TQT)	2480
Guided Learning Hours	1355
Mechanical Pathway	
Group A- Mandatory units	14 units
Group B- Mechanical	3 units
Total number of units required for the qualification	17 units
Minimum credits required	248 credits

Multi-Skilled Pathway	
Group A- Mandatory units	14 units
Group C- Multi-Skilled (Pathway)	3 units
Total number of units required for the qualification	17 units
Minimum credits required	248 credits

List of units

Unit Ref	Unit Title	Level	Credit	GLH
A - Mandatory units				
R/101/0001	Principles of safety and environmental regulations in food and drink sector engineering	3	12	80
R/101/0002	Install, commission checks and decommission electrical equipment in food and drink sector engineering	3	30	140
R/101/0003	Perform mechanical engineering operations in the food and drink sector	3	22	106
R/101/0004	Perform engineering maintenance operations in the food and drink sector	3	30	140
R/101/0005	Weld replacement components for maintenance activities in food and drink sector engineering	3	30	150

Unit Ref	Unit Title	Level	Credit	GLH
R/101/0006	Principles of quality and continuous improvement in food and drink sector engineering	3	8	48
R/101/0007	Principles of maths and science in food and drink sector engineering	3	15	90
M/602/4498	Principles of using Information Communication Technology (ICT) and Management Information Systems (MIS) in food technology	3	3	23
L/601/2701	Principles of sustainability in food operations	3	4	34
A/602/4701	Control energy efficiency in food operations	3	3	13
H/602/1713	Maintain, promote and improve environmental good practice in food operations	3	2	10
J/504/7355	Contribute to project management in a food business	3	3	20
R/101/0008	Principles of using representations, drawings and graphs in food and drink engineering	3	12	75
R/101/0009	Principles of food and drink sector engineering	3	16	90
B - Mechanical Pathway – Mandatory Units				
R/101/0010	Welding techniques for food and drink sector engineering	3	8	72
R/101/0011	Produce replacement components for maintenance activities in food and drink sector engineering	3	38	180

Unit Ref	Unit Title	Level	Credit	GLH
R/101/0012	Monitoring mechanical maintenance for food and drink operations	3	12	80
C - Multi skilled Pathway – Mandatory Units				
R/101/0013	Principles of electrical installations BS7671 (2018)	3	5	40
R/101/0014	Principles of electrical engineering operations in the food and drink sector	3	41	212
R/101/0015	Automation in food and drink operations	3	12	80
D - Optional units				
F/601/2954	Principles of continuous improvement techniques (Kaizen) in food operations	3	3	15
R/101/0016	Principles of team working and self-development in food and drink sector engineering roles	3	8	58

Exemplar unit of assessment

Title	Perform engineering maintenance operations in the food and drink sector				
FDQ unit reference	R/101/0004				
Level	3	Credit value	30	GLH	140
Learning outcomes		Assessment criteria			
The learner will:		The learner can:			
1. Understand health and safety procedures for engineering maintenance in the food and drink sector		1.1 Describe the safe isolation procedures for the following systems: <ul style="list-style-type: none"> • fluid (hydraulic) • gas (pneumatic) • electricity • other stored energy such as tensioned springs 1.2 Explain the term Lockout, Tagout (LOTO) 1.3 Describe the process and requirements for a permit to work.			
2. Understand best practice maintenance strategies used in the food and drink sector		2.1 Describe the function and uses of the following maintenance strategies: <ul style="list-style-type: none"> • run to failure (breakdown maintenance) • planned preventive maintenance (PPM) • predictive maintenance (PdM) • reliability centred maintenance (RCM) 2.2 Evaluate the benefits and challenges of maintenance strategies 2.3 Describe types of engineered systems used in food and drink operations 2.4 Justify planned maintenance for a specified engineered system			

	<p>2.5 Explain the costs of maintenance for an engineered system</p> <p>2.6 Calculate maintenance costs for an engineered system</p> <p>2.7 Explain how the use of technology leads to efficiency and quality in maintenance</p> <p>2.8 Explain how to set up a line</p>
<p>3. Understand equipment performance measures used in the food and drink sector</p>	<p>3.1 Describe the purposes of measurement</p> <p>3.2 Explain the types of data used to measure performance</p> <p>3.3 Explain the terms 'mean time between failure' and 'overall equipment effectiveness' (OEE) availability</p> <p>3.4 Read and interpret equipment performance data</p> <p>3.5 Calculate failure rates for components and equipment</p> <p>3.6 Describe the effects of the environment on measurement</p> <p>3.7 Describe the effect of datum selection on measurement</p> <p>3.8 Describe the applications of measuring equipment</p> <p>3.9 Assess the suitability of measuring equipment for the required measurement</p> <p>3.10 Describe the importance of measuring equipment condition</p> <p>3.11 Explain the importance of sampling in measurement</p>

<p>4. Understand the types of tools used for maintenance in the food and drink sector</p>	<p>4.1 Explain the typical tools used in maintenance, their purposes and how to use them</p> <p>4.2 Explain how to maintain a range of maintenance tools</p> <p>4.3 Describe the storage requirements for maintenance tools in the food and drink sector</p> <p>4.4 Describe the relevant restrictions for maintenance tools and their use in food and drink sector</p> <p>4.5 Describe the meaning of 'designated areas'</p> <p>4.6 Describe the service considerations required when obtaining spare components.</p>
<p>5. Understand reliability techniques used in maintenance in the food and drink sector</p>	<p>5.1 Describe the following reliability techniques (critical tools):</p> <ul style="list-style-type: none"> • condition monitoring • oil sampling • thermography • vibration analysis • ultrasound <p>5.2 Describe how the following techniques (critical tools) are used to reduce breakdowns, failures, and operational losses:</p> <ul style="list-style-type: none"> • condition monitoring • oil sampling • thermography • vibration analysis <p>5.3 Describe factors affecting reliability of components and equipment</p>

<p>6. Understand the fundamental principles of pneumatic and hydraulic systems</p>	<p>6.1 Describe the uses of pneumatic and hydraulic systems in food and drink manufacturing</p> <p>6.2 Describe how hydraulics are typically use in the food and drink sector for the transfer of energy</p> <p>6.3 Compare the differences between pneumatic and hydraulic systems, considering the benefits and constraints of each system.</p>
<p>7. Demonstrate how to isolate, lock off (lockout, tagout) and re-instate equipment</p>	<p>7.1 Follow site isolation and lock off procedures for the following:</p> <ul style="list-style-type: none"> • fluid (hydraulic) • gas (pneumatic) • electricity • other stored energy such as tensioned springs <p>7.2 Re-instate equipment with system checks once the maintenance activity is complete</p> <p>7.3 Complete formal handover of equipment to the appropriate person(s) according to procedures.</p>
<p>8. Demonstrate how to use maintenance tools in the food and drink sector</p>	<p>8.1 Create a plan for maintenance activities including the selection of appropriate tooling</p> <p>8.2 Apply checks for the condition of the tooling</p> <p>8.3 Use tools safely during workplace maintenance activities, including:</p> <ul style="list-style-type: none"> • torque wrenches (types and uses) • Stilson wrenches • impact drivers • pulling devices (mechanical and hydraulic) • extractors • feeler gauges

	<ul style="list-style-type: none"> • greasing and lubrication equipment • cleaning equipment (de-greasing plant and steam cleaning) • thermal paints and crayons (Segar cones) • tachometers • stroboscopes • accelerometers • multimeters – voltage, resistance and current • power factor meters • insulation resistance meter • logic probes • oscilloscopes – signal amplitude and frequency • manometers • bourbon tube <p>8.4 Store tools and equipment in their correct location once the maintenance activity is complete</p> <p>8.5 Arrange for tooling and / or equipment calibration.</p>
<p>9. Understand the function of fluid power systems</p>	<p>9.1 Explain methods used to control food safety risks when maintaining fluid power systems</p> <p>9.2 Explain the causes and effects of contamination in fluid power systems</p> <p>9.3 Explain the importance of fluid hygiene in food and drink operations</p>

<p>10. Demonstrate how to maintain mechanical and fluid power systems</p>	<p>10.1 Follow maintenance schedules</p> <p>10.2 Prepare work area for fluid power system maintenance</p> <p>10.3 Interpret schematics</p> <p>10.4 Prepare equipment and consumables for fluid power system maintenance</p> <p>10.5 Document preparation activities</p> <p>10.6 Communicate planned activities to relevant stakeholders to meet organizational requirements</p> <p>10.7 Use maintenance procedures on mechanical systems</p> <p>10.8 Maintain mechanical and fluid power systems, by completing the following maintenance checks:</p> <ul style="list-style-type: none"> • check levels • parts wear • pressure • sensors • grease and lubricate parts • replace • fit components <p>10.9 Control food safety risks when carrying out fluid power systems maintenance</p> <p>10.10 Comply with requirements for maintenance activities</p>
<p>11. Understand electrical maintenance techniques</p>	<p>11.1 Explain methods used to control food safety risks when carrying out electrical maintenance activities</p> <p>11.2 Explain the implications of carrying out electrical maintenance activities within a food and drink operation</p>

	<p>11.3 Describe types of wiring enclosures and containment systems used in electrical maintenance</p> <p>11.4 Explain how to deal with system problems</p> <p>11.5 Explain procedures used to assess that components meet required specifications</p> <p>11.6 Explain techniques used to dismantle and assemble electrical equipment</p> <p>11.7 Describe problems that can occur with cutting</p> <p>11.8 Explain the causes of cutting defects</p> <p>11.9 Explain procedures used to identify system faults from displayed symptoms</p>
<p>12. Demonstrate electrical maintenance techniques</p>	<p>12.1 Perform electrical calculations for d.c. networks</p> <p>12.2 Determine electrical maintenance activities required</p> <p>12.3 Plan electrical maintenance activities to minimise disruption to food and drink production operations</p> <p>12.4 Communicate planned activities to relevant stakeholders to meet organisational requirements</p> <p>12.5 Plan how electrical maintenance activities will be undertaken to control food safety</p> <p>12.6 Select required tools and equipment for specified maintenance tasks.</p> <p>12.7 Select required materials for specified maintenance tasks</p> <p>12.8 Prepare work area for electrical maintenance activities</p> <p>12.9 Check condition of equipment and materials for electrical maintenance activities</p> <p>12.10 Document preparation activities</p> <p>12.11 Control food safety risks when carrying out electrical maintenance activities</p>

	<p>12.12 Apply safe working practices when carrying out electrical maintenance activities</p> <p>12.13 Apply electrical maintenance activities to a range of electrical equipment</p> <p>12.14 Ensure maintenance activities comply with requirements</p>
13. Demonstrate how to use engineering reliability processes to prevent or reduce the likelihood of failures	<p>13.1 Explain how frequency of maintenance affects production</p> <p>13.2 Describe procedures for use of equipment with fault diagnosis</p> <p>13.3 Prevent or reduce the likelihood or frequency of failures, by using the following techniques:</p> <ul style="list-style-type: none"> • condition monitoring • oil sampling • thermography • vibration analysis • ultrasound.
Purpose and assessment overview	
Unit purpose and aim(s)	The aim of the unit is to assess the learner's knowledge and skills in engineering maintenance operations (including use of pneumatic and hydraulic systems) for the food and drink sector.
Assessment requirements and guidance	Assessment requirements and guidance are set out in the Qualification Specification and Handbook.
Additional information about this unit	
Details of the relationship between the unit and relevant national	This unit is aligned to the KSBs within the Food and Drink Maintenance Engineer (ST0195) apprenticeship standard and has been mapped to relevant National

<p>occupational standards or other professional standards or curricula</p>	<p>Occupational Standards for Food and Drink Engineering Maintenance, where appropriate, to meet the requirements of the Welsh Food and Drink Apprenticeship Framework and approved by Welsh Government.</p>
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