FDQ Level 3 End-point Assessment for Food and Drink Maintenance Engineer ST0195 V1.1 610/3092/2

Food and Drink Maintenance Engineer Guide to EPA

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Document History

This document replaces all previous versions. The Guide to EPA is subject to regular revision and is maintained and version controlled electronically.

Previous changes were recorded separately and are held by the Quality and Operational Assurance Director.

Date	Change
27/07/2021	Project submission, use of anti-plagiarism software.
03/08/2021	Addition of detailed project structure.
12/07/2023	Updated for V1.1 assessment plan.
01/03/2024	All guides redesigned and condensed down to suit apprentices, employers and training providers.
04/09/2024	OQ and IPE sections - Updated with additional guidance.
17/01/2025	Review of the guide



WHAT IS AN END-POINT ASSESSMENT?

The EPA is the final part of your apprenticeship. It is important so prepare well for it! It is designed to confirm you have the skills, knowledge and behaviours needed to become a qualified Food and Drink Maintenance Engineer.

Getting ready for your EPA:

To enter gateway you will need to have the following requirements:

- Level 1 English and Maths
- A declaration form that confirms all knowledge, skills and behaviours in the Food and Drink Maintenance Engineer Standard have been evidenced.
- A certificate of completion for a Level 3 Diploma in Food and Drink Engineering Maintenance.
- Gateway declaration completed and signed by the training provider, centre and apprentice.
- A portfolio of evidence, to be underpin the Interview component.

Reasonable adjustments:

Your employer must inform FDQ if you need any reasonable adjustments for your EPA. For example, extra reading time or instructions in larger font. Make the request for adjustments when your employer requests your EPA test. FDQ is committed to provide equality throughout all our EPAs.

The FDQ Arrangements for reasonable adjustment policy can be found at www.fdq.org.uk

EPA Itinerary:

FDQ will send details of the date and time of your EPA to your employer and yourself. This will be sent by our operations team when they have confirmation from the relevant EPA manager. Apprentices have 12 weeks to complete their EPA once they have entered the FDQ gateway.

What happens after your EPA day?

FDQ will confirm the final results, including a grade for the EPA to your training provider. This takes around 21 working days from your final EPA date. If you pass your EPA, the Education and Skills Funding Agency (ESFA), on behalf of the Institute of Apprenticeships will send your Apprenticeship certificate to your employer. Your certificate should then be passed onto you!

What happens if you don't pass your EPA?

If you don't pass your EPA there is always an option to resit/retake. Please read page 36 for more information.

End-point Assessment Day:

What to expect on the day of your EPA

You should arrive at least 30 minutes prior to start time of your EPA. This will enable yourself to prepare for the assessment, allowing preparation time for Personal Protective Equipment (PPE) to be put on and for any required tools and equipment to be obtained. The Independent examiner will arrive and in preparation for the EPA days to commence.



	Component	Time allowed	Questions	Graded
1	Written Knowledge Test	120 minutes	15 long response written questions.	Fail Pass
2	Multiple Choice Test	60 minutes	60 minutesThere are 40 multiple- choice questions	
3	Observations with Questions	4 hours allowed, + 24 minutes to finish a task or question.	A minimum of 5 questions	Fail Pass Distinction
4	Interview underpinned by portfolio of evidence	The IPE will take 90 minutes, + 9 minutes to finish a question.	12 questions against 12 themes	Fail Pass Distinction

3.0 ABOUT THE EPA



Site visit from EPA Manager

This will be conducted by an EPA Manager to introduce the service and meet all parties involved. This includes the employer, training provider and the apprentice, to assess and agree readiness of the apprentice for EPA. The visit from the EPA Manager can be in person or remote. The visit will:

- Review the suitability of the venue for EPA and that minimum requirements are met. Wherever possible, the EPA will take place in the apprentice's workplace. However, if this is not possible, FDQ may agree to an alternative venue.
- Ensure that the apprentice is not disadvantaged in any way and is assessed in a fair, safe and robust environment.
- Agree a suitable date and time for the EPA and agree an outline of the day's events.
- Agree a suitable format for the Practical Observation to enable the apprentice to demonstrate the required activities, as well as a quiet area/room for assessing Portfolio of Evidence, answering mandatory questions and conducting the Professional Dialogue and Interview.

Fees for the EPA:

FDQ is required to have a transactional agreement with the training provider for the EPA services that are commissioned for the apprentice. FDQ will act on behalf of the apprentice's employer and at the point of entering the gateway the EPA fee will be discussed and agreed with all parties. FDQ has a fees policy for all our standards.

When the apprentice has entered the gateway and the EPA date is set, FDQ will issue a contract & payment schedule to the training provider who will sign and return within 10 days. An invoice will normally be issued to the training provider prior to appointed date of the EPA with a 30-day payment expectation.



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WHAT KNOWLEDGE IS ASSESSED THROUGH EACH COMPONENT?

Standard Reference	Knowledge to be assessed	WKT	мст	ΟQ	IPE
К	Food and drink sector awareness. The industry's regulator: The Food Standards Agency. Types of organisations: branded and non-branded, and high and low care sites. Types of food and drink products: ambient, frozen, fresh, chilled, confectionery, and liquid. End-to-end supply chain. Customers and consumers. Customer specifications: purpose and consequences of non- compliance. Implications of product shelf life.		·		
К2	Food and drink maintenance engineer's role. Limits of autonomy. Different teams and functions involved in production. Business operation considerations: efficiency, customer satisfaction, competitiveness, minimising risks to production, and ethical practices.				·
КЗ	Principles of quality management systems and processes in the food and drink industry and impact on customer requirements. Customer and food trade association standards for example, British Retail Consortium, Retailer standards. Internal and external audits and impact on maintenance.		•		
К4	Food science and technology - fundamentals of how engineering is used in food and drink production: aseptic filling and processing, chilling, freezing, heat processing, modified atmosphere packaging (MAP), preservation, and packaging.		•		
К5	Food safety regulations awareness and their impact on food and drink engineering: Food Safety Act, Hazard Analysis and Critical Control Points (HACCP), Threat Analysis of Critical Control Points (TACCP), and Vulnerability Assessment of Critical Control Points (VACCP).	·			

K6	Food safety: control of contamination hazards (microbiological, physical, and chemical). The risk of contamination and impact on product integrity and health of consumers. Allergens. The importance and impact of temperature and process control measures. Regulatory information and date code responsibilities. Hygienic engineering design of food premises and equipment, and hygiene requirements of operators. Cleaning and disinfection principles, procedures, and methods: Cleaning in place (CIP), cleaning out of place, and chemical impact. Pest control.		•	
К7	Properties of food and drink, packaging materials and sealing techniques and impact on engineering tasks.	•		
K8	Health and safety regulations awareness and their application to food and drink engineering: Health and Safety at Work Act, Control of Substances Hazardous to Health (CoSHH), Working in confined spaces, Working at Height, Lone working, Provision of Work Equipment Regulations (PUWER), Lifting Operations and Lifting Equipment Regulations (LOLER), Dangerous Substances and Explosive Atmospheres (DSEAR), Pressure Equipment Directive (PED), Electricity at work regulations, Noise regulation, L8 Legionella, Display Screen Equipment, The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR), and Construction Design Management regulations. Slips trips and falls. Types of incidents: fire, accidents, and near-misses. Mitigation methods. Incident management. Near miss reporting.		·	
К9	Health and safety practice: risk assessments and method statements, manual handling, Personal Protective Equipment (PPE), and signage and barriers.			
K10	Safe isolation of process fluids, gases, electricity, and stored energy: Lockout, tagout (LOTO).			
K11	Environmental regulations and requirements awareness and their application to food and drink engineering. Environmental Protection Act. Sustainability. Waste Electrical and Electronic Equipment Directive (WEEE). Hazardous waste regulations. Waste management. Recyclable materials and waste disposal procedures. Energy monitoring. Data logging to optimise energy performance. The Climate Change Agreements. Carbon Reduction Commitment (CRC). Renewable and alternative energy sources. Energy reduction. Types of pollution and control measures: noise, smells, spills, and waste. Efficient use of resources. Environmental permits.		·	

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K12	Types of food and drink equipment and their application: pumps, valves, gauges, temperature controls, mixers, conveyors, depositors, sealers, safety systems, pressure systems and transmitters, human machine interface, and handheld devices. The importance of set points.	•			
К13	Spares and services considerations: availability, stock lead times, correct handling, the identification of equipment and parts, function and specification of parts, spares, and components, stock value, faulty stock, returns, salvageability of parts to be removed.	•			
K14	Maintenance tools: selection, correct use, maintenance, storage requirements. Restrictions in food and drink industry and designated areas.			•	
K15	Engineering standards and regulations awareness and their application to food and drink engineering: British Standards (BS), International Organisation for Standardisation standards (ISO), European Norm (EN), and Atmospheres and Explosives (ATEX). Manufacturers' manuals: what they are and how to use them.		·		
K16	Standard operating and quality assurance procedures (SOP): what they are and how to use them.			·	
K17	British standards for engineering representations, drawings, and graphical information.				
K18	British standards for engineering representations, drawings, and graphical information.	•			
К19	Engineering materials and their properties: impact on use in a food environment (food safe).	•			
K20	Maintenance strategies and best practice: run to failure (breakdown maintenance), preventive (scheduled) maintenance, Predictive Maintenance (PdM), and Reliability Centered Maintenance (RCM).	•			
K21	Reliability techniques - critical tools: condition monitoring, oil sampling, thermography, vibration analysis, and ultrasound. How they are used to reduce breakdowns, failures, and operational losses.				

K22	Food safety engineering: food grade oils, greases, cleaning fluids, and safe use of tools and equipment.		·	
K23	Equipment performance measures: data and how to use it. Terminology: mean time between failure, and overall equipment effectiveness (availability).	•		
K24	Mechanical principles. Types of mechanical drives, belts, chains, and gears: alignment, and how to identify wear. Types of bearings: application, alignment, and fit.	·		
K25	Principles of down-hand (flat) TIG (Tungsten Inert Gas) welding techniques in food environment: butt and tee. Awareness of MMA (Manual Metal Arc) and MIG (Metal Inert Gas) welding practices and when they need to be used.			•
K26	Component manufacturing uses and requirements. Turning and milling, grinding, drilling, bench fitting techniques. Preparation for the food and drink environment. Threads, fit, finish, joining techniques, measurement and tolerance, and material selection considerations.			
K27	Pneumatic and hydraulic system principles: transfer of energy inside fluid power systems in the food and drink industry.	·		
K28	Basic engineering theory and thermodynamic principles on heat transfer used in the food and drink industry: how it works and maintenance requirements.	·		
K29	Electrical principles. Basic electrical theory: LV (Low Voltage), HV (High Voltage), current, resistance, symbols and terminology. Electrical first aid. Alternating current (AC) and direct current (DC) systems. Testing equipment. Electrical circuit theory, electrical machines, electrical safety systems, and smart solutions.	·		
K30	Control circuits principles. Basic components (switches, relays, contactors, overloads, circuit breakers), power supplies, and calibration.	•		
К31	Safety circuits: safety system categories, safety system architecture and components, characteristics of safety system components. What they do and why they are important (legality and performance).	•		

К32	Types of motors and control systems and how they work: mechanical and electrical properties, programming of variable speed drives and parameters, soft starts.	·			
К33	Electrical instrumentation and control installation, commissioning and decommissioning practices and techniques to standards required for food and drink industry. Ingress Protection (IP) and ATEX ratings. Testing and fault finding approved instrument requirements. Arc flash protection requirements.				
К34	Automation. Instrumentation and calibration techniques for systems: thermo, weights, and flow. Robotics and data acquisition (SCADA) and smart network systems. Communication systems: Profinet, Ethernet, Profibus, CANopen, and DeviceNet.		·		
К35	Types of Programmable Logic Controllers (PLC). How they work, system maintenance and architecture. Digital, analogue inputs, outputs, and IOT. Hardware interface and field wiring.		·		
К36	Sensors and motion control. Types of sensors and how they work: digital, analogue, pressure level, probes, inductive and smart. Encoders and position control: selection procedures.		•		
K37	Awareness of services and utilities in the context of food safety importance and impact: water supply and systems, boiler control, electrical distribution system, air compressors, steam boilers, refrigeration system, building management, ventilation and air conditioning (HVAC) controls, access control systems, effluent and waste, and chilled water systems.		·		
K38	Principles of factory digitalisation (Industry 4.0).		•		
K39	Problem solving techniques: root cause analysis, 6 thinking hats, DMAIC (Define, Measure, Analyse, Improve, Control), and PDCA (Plan Do Check Act).				•
К40	Fault finding techniques: root cause analysis, 5 Whys, fishbone, and half-split. Diagnostic tools and equipment.				•
K41	Continuous improvement techniques: lean, 6- sigma, KAIZEN, 5S (Sort, set, shine, standardise and sustain), and SMED (Single- Minute Exchange of Dies).				·
				PA	GE 11

K42	Information technology: Management Information Systems (MIS), spreadsheets, presentation, word processing, email, virtual communication and learning platforms. General Data Protection Regulation (GDPR). Cyber security requirements.			·
K43	Maintenance work recording and documentation requirements.		•	
К44	Organisation techniques: planning, time management, workflow, and work scheduling and prioritisation.			
К45	Communication techniques: verbal, written, and electronic. Adapting style to audience. Engineering terminology.		•	
К46	Report writing techniques.			•
K47	Team working techniques: how to work as part of a team, understanding the importance of establishing and meeting the requirements of different roles.			•
K48	Workplace training and buddying techniques: how to pass on knowledge and skills to others.			•
К49	Equality, diversity, and inclusion in the workplace: what it means and why it is important.			•
	Skills to be as	sessed		
51	Read and interpret task related information and data. For example, work instructions, SOPs, quality control documentation, Service Level Agreements, specifications, engineering representations, drawings, and graphical information, work instructions, and operation manuals.		•	
S 2	Plan work. Identify and organise resources to complete tasks.		•	
53	Plan work. Identify and organise resources to complete tasks.		•	
S 4	Comply with food safety regulations and procedures.		·	

S5	Comply with health and safety regulations and procedures.
56	Comply with environment and sustainability regulations and procedures: safe disposal of waste, re-cycling or re-use of materials and efficient use of resources.
57	Select, check the condition, and safely use maintenance tools and equipment. Store tools and equipment. Complete or arrange maintenance of tools and equipment including calibration where required.
S 8	Follow standard operating procedures and quality procedures.
S9	Follow site isolation and lock off procedures (lockout, tagout) and re-instatement of equipment with system checks and handover.
S10	Apply mechanical and fluid power system maintenance practices and techniques. For example, check levels, parts wear, pressure, and sensors, grease and lubricate parts, replace, fit components, and calibrate equipment.
S11	Apply electrical and control maintenance practices and techniques including use of electrical testing equipment and instruments. For example, panel risk assessment, fixed wire installation testing, fault finding, thermographic surveys, and checking protection settings.
S12	Apply reliability engineering techniques to prevent or reduce the likelihood or frequency of failures. For example, condition monitoring, oil sampling, thermography, vibration analysis, and ultrasound.
S13	Install and configure instrumentation or process control systems.
S14	Install and configure electrical systems. For example, add distribution boards to circuits, single and three phase motors (AC and DC).
S15	Assemble, position and fix equipment or components. Complete commissioning checks.



S16	Disconnect and remove equipment or components. Complete storage measures to prevent deterioration.			
S17	Read and interpret equipment performance data.	•		
S18	Fabricate, drill, and join to produce basic parts, spares or components to measurement and tolerance specification.			
519	Apply down-hand (flat) TIG welding techniques: butt and tee.			
520	Apply mathematical techniques to solve engineering problems.	•		
S21	Produce and amend electrical and mechanical engineering representations, drawings, and graphical information. For example, for new component parts or change in circuit diagram or panel.			
522	Apply fault-finding and problem-solving techniques for example, using PLC data to diagnose issues and locate faults on industrial network.			
523	Apply continuous improvement techniques to understand current performance; collect and record data. Devise suggestions for improvement.			
524	Restore the work area on completion of activity.		·	
S25	Resolve or escalate issues.		•	
526	Use information technology. For example, for document creation, communication, and information management. Comply with GDPR. Comply with cyber security.			
S27	Record work activity. For example, asset management records, work sheets, checklists, waste environmental records, and any business or legal reporting requirements.		•	

528	Communicate verbal and written. For example, with colleagues and stakeholders. Use engineering terminology where appropriate.		•	
S29	Produce reports for example, equipment performance reports.			•
S 30	Provide guidance or training to colleagues or stakeholders.			•
	Behaviours to be	assessed		
B1	Prioritise health and safety, food safety, and the environment and sustainability.		·	
B2	Promote health and safety, food safety, and the environment and sustainability.			•
B3	Take ownership for own work and accountability for quality of work.		·	
В4	Apply a professional approach.		·	
В5	Team-focus to meet work goals: respectful to others, builds relationship with others, and positive inclusion.			•
B6	Respond and adapt to work demands.			•
B7	Committed to Continued Professional Development (CPD) to maintain and enhance their competence.			•

Written Knowledge Test (WKT)

- The WKT will be carried out under FDQ's assessment conditions.
- The WKT may be taken as a paper based or online test. This will be agreed with the employer/training provider at the initial visit. Online tests will be subject to FDQ's requirements for online testing and invigilation.
- If there are two or more apprentices ready for EPA they may sit the test as a group, under FDQ's assessment conditions.
- The identity of the apprentice will be checked before the test starts.
- Apprentices are permitted to use calculators for the test.

Time

The apprentice will be given 120 minutes to complete the test.

Question Styles

There are 15 long response written questions (LRQs) in the test. Apprentices should expect to write approximately 100 words in their answers for each question.

Venue

The WKT must take place in a quiet area, away from distractions and under FDQ's assessment conditions.



Sample Questions

Sample questions are available on FDQ awards. FDQ recommend for apprentices to undertake sample exams online however paper-based sample exams are also available.

WRITTEN KNOWLEDGE TEST (WKT)





WRITTEN KNOWLEDGE TEST ASSESSMENT SPECIFICATION

Standard reference		Pass Descriptor	No of LRQ's in each exam	Marks available
K5	Food safety regulations	Awareness of food safety regulation(s) and their impact on food and drink engineering: Food Safety Act, Hazard Analysis and Critical Control Points (HACCP), Threat Analysis of Critical Control Points (TACCP), and Vulnerability Assessment of Critical Control Points (VACCP).	1	5
K7	Properties of food and drink, packaging materials and sealing techniques	Understands the properties of given food and drink, packaging material or sealing technique and its impact on given engineering task.	1	5
K12	Food and drink equipment	Understands types of food and drink equipment and their application: pumps, valves, gauges, temperature controls, mixers, conveyors, depositors, sealers, safety systems, pressure systems and transmitters, human machine interface, and handheld devices. The importance of set points.	1	5

К13	Spares and services considerations	Understands spares and services considerations: availability, stock lead times, correct handling, the identification of equipment and parts, function and specification of parts, spares, and components, stock value, faulty stock, returns, salvageability of parts to be removed.	1	5
K18, S2O	Mathematical and scientific principles	Applies mathematical and scientific principles to complete given task.	1	5
K19	Engineering materials	Understands engineering materials and their properties and impact on use in a food environment (food safe)	1	5
K2O	Maintenance strategies	Understands maintenance strategies and best practice: run to failure (breakdown maintenance), preventive (scheduled) maintenance, Predictive Maintenance (PdM), and Reliability Centered Maintenance (RCM).	1	5
K23, S17	Equipment performance measures	Reads and interprets equipment performance data, understanding equipment performance terminology	1	5
K24	Mechanical principles	Understands mechanical principles. Types of mechanical drives, belts, chains, and gears: alignment, and how to identify wear. Types of bearings: application, alignment, and fit	1	5
K27	Pneumatic and hydraulic system principles	Understands pneumatic and hydraulic system principles: transfer of energy inside fluid power systems in the food and drink industry	1	5
K28	Basic engineering theory and thermodynami c principles	Understands basic engineering theory and thermodynamic principles on heat transfer used in the food and drink industry: how it works and maintenance requirements	1	5

K29	Electrical principles	Understands electrical principles. Basic electrical theory: LV (Low Voltage), HV (High Voltage), current, resistance, symbols and terminology. Electrical first aid. Alternating current (AC) and direct current (DC) systems. Testing equipment. Electrical circuit theory, electrical circuit theory, electrical machines, electrical safety systems, and smart solutions	1	5	
K3O	Control circuit principles	Understands control circuits principles. Basic components (Switches, relays, contactors, overloads, circuit breakers), power supplies, and calibration	1	5	
K31	Safety circuits	Understands safety circuits: safety system categories, safety system architecture and components, characteristics of safety system components. What they do and why they are important (legality and performance).	1	5	
K32	Motors and control systems	Understands types of motors and control systems and how they work: mechanical and electrical properties, programming of variable speed drives and parameters, soft starts.	1	5	
		Total	15	75	



Grading Criteria & Marks

The test is graded fail or pass. This mark contributes to the final grade.

Grade	Score
Fail	51 marks or less out of 75
Pass	52 marks or more out of 75

Multiple Choice Test (MCT)

- The MCT will be carried out under FDQ's assessment conditions, usually following the WKT.
- The MCT may be taken as a paper based or online test. This will be agreed with the employer/training provider at the initial visit. Online test will be subject to FDQ's requirements for online testing and invigilation.
- If there are two or more apprentices ready for EPA they may sit the test as a group, under FDQ's assessment conditions.

Time

Apprentices are allowed 60 minutes to complete the test, which will be carried out under FDQ's assessment conditions.

Question Styles

There are 40 multiple-choice questions (MCQs) in the test. Each question has 4 possible answers with one correct answer.

Venue

The MCT must take place in a quiet area, away from distractions and under FDQ's assessment conditions.



Sample Questions

Sample questions are available on FDQ awards. FDQ recommend for apprentices to undertake sample exams online however paper-based sample exams are also available.

AULTIPLE CHOICE TEST (MCT)





MULTIPLE CHOICE TEST ASSESSMENT SPECIFICATION

Standard reference		Knowledge Statement	No of MCQs	Total number of MCQs
	K1.1	Food and drink sector awareness. The industry's regulator: The Food Standards Agency. Types of organisations: branded and non-branded, and high and low care sites.	1	
К1	K1.2	Types of food and drink products: ambient, frozen, fresh, chilled, confectionery, and liquid. End-to-end supply chain.	1	3
	K1.3	Customers and consumers. Customer specifications: purpose and consequences of non-compliance. Implications of product shelf life.	1	
	K3.1	Principles of quality management systems and processes in the food and drink industry and impact on customer requirements.	1	
КЗ	K3.2	Customer and food trade association standards for example, British Retail Consortium, Retailer standards. Internal and external audits and impact on maintenance.	1	2
К4	K4.1	Food science and technology - fundamentals of how engineering is used in food and drink production: aseptic filling and processing, chilling, freezing, heat processing, modified atmosphere packaging (MAP), preservation, and packaging.	3	3
				PAGE

	K6.1	Food safety: control of contamination hazards (microbiological, physical, and chemical). The risk of contamination and impact on product integrity and health of consumers. Allergens. The importance and impact of temperature and process control measures. Regulatory information and date code responsibilities.	3	
K6	K6.2	Hygienic engineering design of food premises and equipment, and hygiene requirements of operators.	1	3
	K6.3	Cleaning and disinfection principles, procedures, and methods: Cleaning in place (CIP), cleaning out of place, and chemical impact. Pest control.	1	
K8	K8.1	Health and safety regulations awareness and their application to food and drink engineering: Health and Safety at Work Act, Control of Substances Hazardous to Health (CoSHH), Working in confined spaces, Working at Height, Lone working, Provision of Work Equipment Regulations (PUWER), Lifting Operations and Lifting Equipment Regulations (LOLER), Dangerous Substances and Explosive Atmospheres (DSEAR), Pressure Equipment Directive (PED), Electricity at work regulations, Noise regulation, L8 Legionella, Display Screen Equipment, The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR), and Construction Design Management regulations.	4	6
	K8.2	Slips trips and falls. Types of incidents: fire, accidents, and near-misses.	1	
	K8.3 Miti manag	Mitigation methods. Incident management. Near miss reporting.	1	
K11	K11.1	Environmental regulations and requirements awareness and their application to food and drink engineering. Environmental Protection Act. Sustainability. Waste Electrical and Electronic Equipment Directive (WEEE). Hazardous waste regulations. Waste management. Recyclable materials and waste disposal procedures	2	
	K11.2	Energy monitoring. Data logging to optimise energy performance. The Climate Change Agreements. Carbon Reduction Commitment (CRC). Renewable and alternative energy sources. Energy reduction. Types of pollution and control measures: noise, smells, spills, and waste. Efficient use of resources. Environmental permits.	2	4

K15	K15.1	Engineering standards and regulations awareness and their application to food and drink engineering: British Standards (BS), International Organisation for Standardisation standards (ISO), European Norm (EN), and Atmospheres and Explosives (ATEX).	2	3
	K15.2	Manufacturers' manuals: what they are and how to use them.	1	
К34	K34.1	Automation. Instrumentation and calibration techniques for systems: thermo, weights, and flow. Robotics and data acquisition (SCADA) and smart network systems.	2	3
	K34.2	Communication systems: Profinet, Ethernet, Profibus, CANopen, and DeviceNet.	2	
K35	K35.1	Types of Programmable Logic Controllers (PLC). How they work, system maintenance and architecture.	2	
100	K35.2	Digital, analogue inputs, outputs, and IOT. Hardware interface and field wiring.	2	
K36	K36.1	Sensors and motion control. Types of sensors and how they work: digital, analogue, pressure level, probes, inductive and smart. Encoders and position control: selection procedures.	2	2
K37	K37.1	Awareness of services and utilities in the context of food safety importance and impact: water supply and systems, boiler control, electrical distribution system, air compressors, steam boilers, refrigeration system, building management, ventilation and air conditioning (HVAC) controls, access control systems, effluent and waste, and chilled water systems.	3	3
K38	K38.1	Principles of factory digitalisation (Industry 4.0).	2	2
		Total		10
		Total	40	40



Grading Criteria & Marks

The test is graded fail or pass. This mark contributes to the final grade.

Grade	Score
Fail	27 marks or less out of 40
Pass	28 marks or more out of 40

Observations with Questions (OQ)

The OQ takes place in the employer's workplace. Simulation is not permitted. The OQ aims to assess the apprentice's knowledge, skills and behaviours by completing naturally occurring tasks in a food, drink or packaging manufacturing setting. The OQ consists of an observation followed by a set of questions.

Time

The OQ is undertaken within a 4 hour timed period, with an additional 24 minutes available to complete a task or question. The OQ may be split into discrete sections, if necessary, held on the same day.

Questions

A minimum of 5 questions will be asked in an audio recorded session. In addition, if the IE decides that it has not been possible to judge competence on a particular criterion, then the IE will ask an appropriate question to make a judgement. Follow up questions may also be asked for clarification purposes.

Venue

The OQ should be scheduled when the apprentice is working in their normal place of work.

It is vitally important that the employer:

- informs the relevant managers and personnel that assessments are to be carried out
- ensures the apprentice is available and relieved from normal duties for the duration of the observations
- ensures that PPE is available, equipment and the necessary materials are available
- ensures that the assessment is not interrupted
- ensures a quiet area is provided for the question session, that is free from distraction.

Observations with Questions (OQ)





OBSERVATIONS WITH QUESTIONS ASSESSMENT SPECIFICATION

Activity:	The apprentice will be assessed holistically on the following activities and topics:
Activity 1 Work preparation S1, K44, S2	The apprentice will: •Read and interpret written information and data to plan and complete tasks •Plan work, identify and organize resources to complete tasks
Activity 2 Ensure availability and performance of maintenance tools and equipment K14 S7	The apprentice will: •Select maintenance tools for the task •Check the condition of tools and equipment •Complete or arrange maintenance of tools and equipment where required •Use maintenance tools and equipment in line with instructions and in line with restrictions in the food and drink industry •Store tools and equipment on completion of work
Activity 3 Conduct planned and predictive maintenance K9 S3 S4 S5 S6 S24 B1 K16 S8 S25 B3 K10 K22 S9 S10 S11 K45 S28 B4	The apprentice will: ·Identify hazards and implement control measures in line with company procedures ·Conduct work in line with food safety, and health and safety regulations and company procedures ·Conduct work in line with environment and sustainability regulations and procedures ·Follow site isolation and lock off procedures (lockout, tagout), system checks, and handover to safely re-instate equipment ·Apply mechanical, fluid power system, and electrical maintenance practices and techniques ·Complete work within limits of authority in compliance with company standard operating and quality procedures ·Identify, resolve issues or escalate issues outside of limits of authority ·Communicate using verbal and written techniques, using sector and industry terminology correctly ·Restore work area on completion of the activity
Activity 4 Complete engineering documentation related to work tasks - paper based or electronic, including a dynamic risk assessment K43 S27	The apprentice will: Complete work records required for tasks



Grading Criteria & Marks

The OQ will be graded fail, pass or distinction. The IE will provide a provisional mark.

The table below shows the grading criteria which will be used to grade the OQ. All Pass criteria must be achieved to successfully pass the EPA.

Theme KSB	Pass Apprentices must demonstrate all the pass descriptors	Distinction Apprentices must demonstrate all the pass descriptors and all of the distinction descriptors
Task information S1	Reads and interprets written information and data correctly to plan and complete tasks - for example, engineering representations, drawings, and graphical information. (S1)	
Organisation K44 S2	Plans work and identifies and organises resources to complete tasks using organisational techniques. (K44, S2)	Planning achieves efficiencies in the use of resources and mitigates against potential issues. (K44, S2)
Work environment K9 S3 S4 S5 S6 S24 B1	Identifies hazards and implements control measures in-line with company procedures. Conducts work in line with food safety, and health and safety regulations and Identifies hazards and implements control measures in-line with company procedures. Conducts work in line with food safety, and health and safety regulations and company procedures. (K9, S3, S4, S5) Conducts work in line with environment and sustainability regulations and procedures, including safe disposal of waste, recycling or re-use of materials and efficient use of resources. Prioritises health and safety, food safety, and the environment and sustainability over other factors for example time and cost. (S6, B1) Restores work area on completion of the activity. (S24)	Explains the importance of compliance with health and safety practice with reference to the impact on individuals and the workplace. (K9) Justifies how the applied control measure(s) minimise risks compared to others. (S3)

Tools and equipment K14 S7	Selects maintenance tools appropriate for the task. Checks the condition of tools and equipment ensuring they are safe for use. Completes or arranges maintenance of tools and equipment including calibration where required. Uses maintenance tools and equipment safely in line with their employer's or manufacturers' instructions and in line with restrictions in the food and drink industry and designated areas. Stores tools and equipment on completion of work. (K14, S7)	Explains the importance of undertaking pre- checks of maintenance tools and equipment in line with their employer's or manufacturers' requirements. (K14, S7)
Procedures K16 S8 S25 B3	Takes responsibility to complete work within limits of authority in compliance with company standard operating and quality procedures, identifying and resolving issues or escalating issues outside of limits of authority in line with company procedures. (K16, S8, S25, B3)	Explains the importance of completing tasks in line with standard maintenance procedures. (K16, S8)
Maintenance K10 K22 S9 S10 S11	Follows site isolation and lock off procedures (lockout, tagout), system checks, and handover to safely re-instate equipment. (K10, S9) Applies mechanical, fluid power system, and electrical maintenance practices and techniques in line with food safety engineering requirements to meet task requirements. (K22, S10, S11)	Ways of working achieves task efficiencies or effectiveness; for example, mitigates against potential errors (right first time), high quality finish, completes additional measures to add value. (S10, S11)
Communication K45 S28 B4	Applies a professional approach using verbal and written communication techniques suitable for the context, adapting style and use of terminology to suit the audience. Uses sector and industry terminology correctly. (K45, S28, B4)	
Documentation K43 S27	Completes work records required for tasks correctly, legibly and in full. (K43, S27)	

Interview underpinned by portfolio of evidence (IPE)

The IPE consists of a range of structured questions which the IE contextualises to the apprentice's role and environment, using the portfolio of evidence (PoE). The PoE must be submitted at least 2 weeks before the IPE date. Apprentices must have access to their portfolio of evidence during the interview. Apprentices can refer to and illustrate their answers with evidence from their portfolio of evidence. The portfolio of evidence is not directly assessed.

Time

The IPE will take 90 minutes, with an additional 9 minutes allowed to finish a question.

Questions

Apprentices will be asked a minimum of 12 questions against 12 themes which will stay the same for every apprentice. Follow-on questions are allowed.

Venue

The IPE will take place in a quiet, isolated area, away from distractions at a suitable venue agreed at the site visit. The IPE may alternatively take place remotely, subject to FDQ's requirements for remote assessment.



Interview Underpinned by Portfolio of Evidence (IPE)





Interview Underpinned by Portfolio of Interview (IPE) Assessment Specification

Activity:	The apprentice will be assessed holistically on the following activities and topics:
Food and drink maintenance engineer's role K2	The food and drink maintenance engineer's role including: ·limits of autonomy ·teams and functions within the department business operation considerations
Reliability techniques K21 S12	How and why the apprentice has applied a particular reliability technique to: •prevent or reduce frequency of breakdowns prevent or reduce failures and operational losses
Component manufacture K26 S18	how the apprentice has fabricated, drilled and joined to produce basic parts, spares or components
Welding K25 S19	how the apprentice has applied down-hand (flat) TIG welding techniques. why and when MMA and MIG approaches may be required
Problem solving and fault-finding K39 K4O S22	how the apprentice has applied fault finding and problem solving techniques to diagnose and resolve or escalate problems or issues
Continuous improvement K41 S23 B2	how the apprentice has applied continuous improvement techniques and devised suggestions for improvement
Installation, commission checks, and decommission K33 S13 S14 S15 S16	 how the apprentice has installed and configured instrumentation or process control systems and electrical systems in line with standards how the apprentice has applied practices and techniques to assemble, position, and fix equipment or components and complete commissioning checks how the apprentice has applied practices and techniques to disconnect and remove equipment or components and complete storage measures to prevent deterioration
Engineering representations, drawings, and graphical information K17 S21	how the apprentice has produced and amended electrical and mechanical engineering representations, drawings, and graphical information to British standards

Report writing K46 S29	outline different reports they have produced, and describes techniques applied to ensure suitability for audience
Information technology K42 S26	how the apprentice has used information technology for different purposes how the apprentice ensures compliance with general data protection regulations (GDPR) and cyber security
Team working K47 K49 B5 B6	how the apprentice has applied team working techniques to achieve work goals taking account of equality, diversity, and inclusion how the apprentice has responded and adapted to meet work demands
Training and development K48 S30 B7	•how the apprentice has provided guidance or training to colleagues or stakeholders •CPD the apprentice has undertaken and the benefits it has brought to the business



Grading Criteria & Marks

The IPE will be graded fail, pass or distinction.

The IE will make a holistic decision about the grade to be awarded for this component, and award a grade using the following guidelines:

Theme	Pass	Distinction			
KSB	Apprentices must demonstrate all the pass descriptors	Apprentices must demonstrate all the pass descriptors and all of the distinction descriptors			
Food and drink maintenance engineer's role K2	Explains their role identifying: ·limits of autonomy ·different teams and functions ·business operation considerations (K2)				
Reliability techniques K21 S12	Describes how they have applied reliability engineering techniques to prevent or reduce the frequency of breakdowns, failures, and operational losses in line with company procedures. (K21, S12)	Justifies why the applied reliability technique(s) was correct for the task compared to another. (K21, S12)			
Component manufacture K26 S18	Describes how they have fabricated, drilled, and joined to produce basic parts, spares, or components in line with measurement and tolerance specification. (K26, S18)				
Welding K25 S19	Describes how they have applied down- hand (flat) TIG welding techniques. Explains when MMA and MIG approaches may be required. (K25, S19)				
Problem solving and fault-finding K39 K40 S22	Describes how they have applied fault- finding and problem-solving techniques to diagnose and resolve, or escalate problems or issues, in line with company procedures. (K39, K40, S22)	Explains the value of specific fault-finding and problem-solving techniques they have used for different issues. K39, K40, S22)			
Continuous improvement K41 S23 B2	Describes how they have applied continuous improvement techniques and devised suggestions for improvement for the benefit of the organisation, customer, or work process, which also promote health and safety, food safety or the environment and sustainability. (K41, S23, B2)	Evaluates the actual or potential value of a specific improvement suggestion. (K41, S23)			

Installation, commission checks, and decommission K33 S13 S14 S15 S16	Describes how they have installed and configured instrumentation or process control systems and electrical systems in line with standards required for food and drink industry, regulations and requirements. (K33, S13, S14) Describes how they have applied practices and techniques to assemble, position, and fix equipment or components and complete commissioning checks for food and drink or packaging equipment in a food safe environment. (S15) Describes how they applied practices and techniques to disconnect and remove equipment or components and complete storage measures to prevent deterioration. (S16)	Explains the importance of completing installation in line with standards required for food and drink industry, regulations and requirements. (K33)
Engineering representations, drawings, and graphical information K17 S21	Describes how they have produced and amended electrical and mechanical engineering representations, drawings, and graphical information to British standards. (K17, S21)	
Report writing K46 S29	Outlines different reports they have produced, and describes techniques applied to ensure suitability for audience. (K46, S29)	
Information technology K42 S26	Describes how they have used information technology for different purposes (such as, MIS, spreadsheets, presentation, word processing, email, virtual communication, and learning platforms), explaining how they comply with general data protection regulations (GDPR) and cyber security. (K42, S26)	
Team working K47 K48 K49 S30 B5 B6 B7	Describes how they have applied team working techniques to achieve work goals taking account of equality, diversity, and inclusion. Describes how they have responded and adapted to meet work demands. (K47, K49, B5, B6) Describes how they have provided guidance or training to colleagues or stakeholders using different techniques to meet the identified need. (K48, S30)	Describes CPD they have undertaken and future plans for CPD to enhance competence. Explains what the impact of their CPD has been and how it has benefited others and the business. (B7)

4.0 The Final Grade

After completing all components of the EPA:

The IE will thank the apprentice for attending the EPA. The IE will complete their report containing the provisional mark and submit it to FDQ within 5 days of the EPA. (The IE will send any supporting photographic and digital recording evidence to FDQ with the report). FDQ will moderate the IE's decisions – this can sometimes delay the grading and certification process.

To achieve a pass, merit or distinction grade the apprentice must achieve a minimum of a pass in each assessment component.





Please read below for any extra information regarding the EPA or the process after the EPA has taken place.

Certification

On successful completion of the EPA the newly qualified apprentice will receive their grade from FDQ in a statement of results document. The Education and Skills Funding Agency (ESFA) manage the operational delivery of certificates for apprenticeships. The ESFA issue the final certificate to the employer.

Advice, support and guidance contacts

• FDQ EPA Manager for issues concerning EPA registration, arrangement of EPAs, results and certification. Please email epa@fdq.org.uk.

Unsuccessful apprentices

If an apprentice does not pass the EPA, the employer and apprentice have the following options.

Either:

• Apply to resit/re-take the EPA tests or

• Make an appeal to FDQ if you disagree with the result, see www.FDQ.org website for FDQ's appeals policy.

Resits/Retakes

Apprentices who fail one or more assessment method will be offered the opportunity to take a re-sit/re-take. A re-sit does not require further learning, whereas a re-take does. Confirmation of additional training/preparation is needed when applying for a retake. The apprentice's employer will need to agree that a resit/re-take is an appropriate course of action. Any assessment method re-sit/re-take must be taken within the maximum EPA period of 12 weeks, otherwise the entire EPA must be re-taken.

Re-sits/re-takes are not offered to apprentices wishing to move from pass to merit/distinction or merit to distinction. Under normal circumstances only a pass or merit are available to apprentices who have re-taken or re-sat part of their EPA.

Apprentices will complete a different WKT, WP/PO where variation allows and PDI interview questions when taking a re-sit/re-take. If the PO is re-sat or re-taken, Portfolio of Evidence originally submitted and assessed as a pass or outstanding, need not be reassessed and the original assessment decision on that evidence will be retained. The apprentice can however choose to submit new (replacement) Portfolio of Evidence with the agreement of their Independent Examiner. In the case of a resit/retake outside of the original maximum EPA period, Portfolio of Evidence must be current and will be assessed as part of the new Practical Observation. An additional fee is due each time an apprentice applies to re-sit or retake any or all of the EPA tests, so it is important that the apprentice is fully prepared before they try again.

Appeals and Complaints

FDQ is committed to providing the highest levels of service to its customers, including centres and apprentices.

- Complaints Policy
- Appeals Policy

Conclusion of EPA

We hope this handbook has been helpful and has given you an insight into the requirements for the Food and Drink Maintenance Engineer Standard and the End-point Assessment. If you have any further questions/queries, please contact FDQ where one of our experts will be able to help.

Email: epa@fdq.org.uk Tel: 0113 3970 395

Principles for safe and reliable submission of Portfolio of Evidence

Portfolio of Evidence

In addition to the practical observation and questioning, the Independent Examiner will assess up to 10 pieces of Portfolio of Evidence .

The overriding principles for safe and reliable submission of Portfolio of Evidence are:

1. Validity — the evidence presented demonstrates the apprentice has the skills and knowledge as stipulated in the standard

2. Sufficiency — the quality, quantity and relevance of evidence presented enables a judgement to be made on the apprentice's competency

3. Currency — the evidence presented is no older than 3 months

4. Authenticity — the evidence presented for assessment is the apprentice's own work and that no outside interference, whether intentional or not, is apparent.



The type of Portfolio of Evidence required for each activity is limited to certain tasks; the following tasks are precluded hand preparation, knife skills, food safety health and safety, customer service.

Types of Portfolio of Evidence Permissible

Apprentices must compile a portfolio of evidence during the on-programme period of the apprenticeship. It must contain evidence related to the KSBs that will be assessed by the Interview underpinned by Portfolio of Evidence assessment method (IPE) – the KSBs are detailed on Page26. The portfolio must comply with the requirements listed below:

- it will typically contain ten discrete pieces of evidence
- evidence should be mapped by the apprentice against the KSBs assessed by the interview
- evidence may be used to demonstrate more than one KSB; a qualitative as opposed to quantitative approach is suggested. FDQ recommends that each piece of evidence should be a maximum of 4 pages of A4

Evidence sources may include:

- workplace documentation, for example workplace policies/procedures, records
- witness statements
- annotated photographs
- video clips (maximum total duration 10 minutes); the apprentice should always be in view and identifiable

This is not a definitive list; other evidence sources are possible. Please note the following:

- it should not include any methods of self-assessment
- any employer contributions should focus on direct observation of performance (for example witness statements) rather than opinions
- the evidence provided must be valid and attributable to the apprentice; the portfolio of evidence must contain a statement from the employer and apprentice confirming this
- the portfolio of evidence must be submitted to FDQ at the gateway, preferably in electronic format and at least 14 days before the EPA day.

The portfolio is checked on receipt in gateway for validity but is not directly assessed. It underpins the interview and therefore it is not marked by FDQ. The Independent Examiner (IE) will review the portfolio in preparation for the interview but is not required to provide feedback after this review. A mapping document for the portfolio of evidence is found on Page 32.

Knowledge

K2: Food and drink maintenance engineer's role. Limits of autonomy. Different teams and functions involved in production. Business operation considerations: efficiency, customer satisfaction, competitiveness, minimising risks to production, and ethical practices.

K17: British standards for engineering representations, drawings, and graphical information.

K21: Reliability techniques - critical tools: condition monitoring, oil sampling, thermography, vibration analysis, and ultrasound. How they are used to reduce breakdowns, failures, and operational losses.

K25: Principles of down-hand (flat) TIG (Tungsten Inert Gas) welding techniques in food environment: butt and tee. Awareness of MMA (Manual Metal Arc) and MIG (Metal Inert Gas) welding practices and when they need to be used.

K26: Component manufacturing uses and requirements. Turning and milling, grinding, drilling, bench fitting techniques. Preparation for the food and drink environment. Threads, fit, finish, joining techniques, measurement and tolerance, and material selection considerations.

K33: Electrical instrumentation and control installation, commissioning and decommissioning practices and techniques to standards required for food and drink industry. Ingress Protection (IP) and ATEX ratings. Testing and fault finding approved instrument requirements. Arc flash protection requirements.

K39: Problem solving techniques: root cause analysis, 6 thinking hats, DMAIC (Define, Measure, Analyse, Improve, Control), and PDCA (Plan Do Check Act).

K40: Fault finding techniques: root cause analysis, 5 Whys, fishbone, and half-split. Diagnostic tools and equipment

K41: Continuous improvement techniques: lean, 6-sigma, KAIZEN, 5S (Sort, set, shine, standardise and sustain), and SMED (Single-Minute Exchange of Dies).

K42: Information technology: Management Information Systems (MIS), spreadsheets, presentation, word processing, email, virtual communication and learning platforms. General Data Protection Regulation (GDPR). Cyber security requirements.

K46: Report writing techniques.

K47: Team working techniques: how to work as part of a team, understanding the importance of establishing and meeting the requirements of different roles. K48: Workplace training and buddying techniques: how to pass on knowledge and

skills to others.

K49: Equality, diversity, and inclusion in the workplace: what it means and why it is important.

Skills

S12: Apply reliability engineering techniques to prevent or reduce the likelihood or frequency of failures. For example, condition monitoring, oil sampling, thermography, vibration analysis, and ultrasound.

S13: Install and configure instrumentation or process control systems.

S14: Install and configure electrical systems. For example, add distribution boards to circuits, single and three phase motors (AC and DC).

S15: Assemble, position and fix equipment or components. Complete commissioning checks.

S16: Disconnect and remove equipment or components. Complete storage measures to prevent deterioration.

S18: Fabricate, drill, and join to produce basic parts, spares or components to measurement and tolerance specification.

S19: Apply down-hand (flat) TIG welding techniques: butt and tee.

S21: Produce and amend electrical and mechanical engineering representations, drawings, and graphical information. For example, for new component parts or change in circuit diagram or panel.

S22: Apply fault-finding and problem-solving techniques for example, using PLC data to diagnose issues and locate faults on industrial network.

S23: Apply continuous improvement techniques to understand current performance; collect and record data. Devise suggestions for improvement.

S26: Use information technology. For example, for document creation, communication, and information management. Comply with GDPR. Comply with cyber security.

S29: Produce reports for example, equipment performance reports.

S30: Provide guidance or training to colleagues or stakeholders

Behaviours

B2: Promote health and safety, food safety, and the environment and sustainability. B5: Team-focus to meet work goals: respectful to others, builds relationship with others, and positive inclusion.

B6: Respond and adapt to work demands.

B7: Committed to Continued Professional Development (CPD) to maintain and enhance their competence.

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										Evidence Description
										K2
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