

Highfield Level 3 End-Point Assessment for ST0189 Fire, Emergency and Security Systems Technician

End-Point Assessment Kit



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EPA-Kit

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How to Use this EPA Kit

Welcome to the Highfield End-Point Assessment Kit for the Fire, Emergency and Security Systems Technician Apprenticeship Standard.

Highfield is an independent end-point assessment organisation that has been approved to offer and carry out the independent end-point assessments for the Level 3 Fire, Emergency and Security Systems Apprenticeship Standard. Highfield internally quality assures all end-point assessments in accordance with its IQA process, and additionally all end-point assessments are externally quality assured by the relevant EQA organisation.

The EPA kit is designed to outline all you need to know about the end-point assessments for this standard and will also provide an overview of the on-programme delivery requirements. In addition, advice and guidance for trainers on how to prepare apprentices for the end-point assessment is included. The approaches suggested are not the only way in which an apprentice may be prepared for their assessments, but trainers may find them helpful as a starting point.

Key facts

Apprenticeship standard:	Fire, Emergency and Security Systems Technician
Level:	3
On Programme Duration:	36 months
End-Point Assessment Window:	3 months
Grading:	Pass/distinction
End-Point Assessment methods:	Knowledge test Practical skills test Professional discussion

In this kit, you will find:

- an overview of the standard and any on-programme requirements
- a section focused on delivery, where the standard and assessment criteria are presented in a suggested format that is suitable for delivery
- guidance on how to prepare the apprentice for gateway
- detailed information on which part of the standard is assessed by which assessment method
- suggestions on how to prepare the apprentice for each part of the end-point assessment
- a section focused on the end-point assessment method where the assessment criteria are presented in a format suitable for carrying out 'mock' assessments.

Introduction

Standard overview

Fire, Emergency and Security Systems Technicians can design, install, commission and maintain electronic systems. They will work both in and outside simple and complex premises to protect individuals, homes and properties from risk and danger.

The systems they operate with include fire, security and emergency systems to detect intrusion, provide surveillance, monitor and control access to buildings, properties and sites or to detect fire and emergencies.

Skills include interconnection of equipment, programming, verifying performance/fault finding and testing and maintaining. Technicians will carry out planned jobs to install new systems, modify and maintain existing systems as well as respond to call-outs to repair faulty systems where they will utilise their problem-solving skills.

They will take a professional approach to customer service skills which include being presentable, tidy and respectful as they can often find themselves working in and outside customers' homes as well as in and outside business premises.

The role of a Fire, Emergency and Security Systems Technician incorporates independent working but importantly they also need to be able to work as part of a team. They will use their knowledge and skills to ensure systems have been appropriately selected and installed and maintained to a professional industry standard, often without any supervision, and done so in a safe, efficient and economical manner to minimise waste.

On-programme requirements

Although learning, development and on-programme assessment is flexible, and the process is not prescribed, the following is the recommended baseline expectation for an apprentice to achieve full competence in line with the Fire, Emergency and Security Systems Technician's Apprenticeship Standard.

The on-programme assessment approach will be agreed between the training provider and employer. The assessment will give an ongoing indication of an apprentice's performance against the final outcomes defined in the standard. The training provider will need to prepare the apprentice for the end-point assessment, including preparation for a knowledge test, practical skills test and a professional discussion.

The training programme leading to end-point assessment should cover the breadth and depth of the standard using suggested on-programme assessment methods that integrate the knowledge, skills and behaviour components, and which ensure that the apprentice is sufficiently prepared to undertake the end-point assessment.

It is a requirement that the on-programme training includes:

- Compliance with a range of mandatory regulations and standards, including safety and working with electrical components and emergency equipment, on behalf of clients for safety and insurance purposes.
- Critical health and safety knowledge for the achievement of the Electrotechnical Certification Scheme (ECS) card (CSCS affiliated) for employment purposes, with regular assessment to ensure deep and thorough understanding, with a clear demonstration of competence before being allowed to attempt the end-point assessment.
- Completion of a portfolio through which the apprentice gathers evidence of their progress

Throughout the period of learning and development, and at least every 2 months, the apprentice should meet with the on-programme assessor to record their progress against the standard. At these reviews, evidence should be discussed and recorded by the apprentice. The maintenance of an on-programme record is important to support the apprentice, on-programme assessor and employer in monitoring the progress of learning and development and to determine when the apprentice has achieved full competence in their job role and is therefore ready for end-point assessment.

The portfolio must be accompanied by a portfolio matrix. This can be downloaded from our website. The portfolio matrix must be fully completed, including a declaration by the employer and the apprentice to confirm that the portfolio is valid and attributable to the apprentice.

The portfolio of evidence must be submitted to Highfield at gateway. It is not directly assessed but underpins the professional discussion.

Use of Artificial Intelligence (AI) in the EPA

Where AI has been used as part of the apprentice's day-to-day work and forms part of a project report, presentation, or artefact, it should be referenced as such within the work. AI must not be used to produce the report or portfolio.

Where AI has been used as part of a portfolio that underpins an interview or professional discussion or any other assessment method, it should be fully referenced within the portfolio.

Additional relevant on-programme requirements

There is one on-programme pre-requisite that allows apprentices to progress to the end-point assessment gateway:

- completion of the ECS Health & Safety Assessment test for the Electrotechnical Certification Scheme (ECS) card (CSCS and its affiliated schemes that have been deemed by the CLC (Construction Leadership Council) under BIS, to be mandatory for access to public procurement / major infrastructure projects), as well as the recommended combined knowledge and workplace units of achievement.

Readiness for end-point assessment

In order for an apprentice to be ready for the end-point assessments:

- the apprentice must have achieved level 2 English and maths
- the line manager (employer) must be confident that the apprentice has developed all the knowledge, skills and behaviours defined in the apprenticeship standard and that the apprentice is competent in performing their role. To ensure this, the apprentice must attend a formal meeting with their employer to complete the gateway readiness report.
- the apprentice and the employer should then engage with Highfield to agree a plan and schedule for each assessment activity to ensure all components can be completed within a 3-month end assessment window. Further information about the gateway process is covered later in this kit.
- a portfolio to underpin the professional discussion

If you have any queries regarding the gateway requirements, please contact your EPA Customer Engagement Manager at Highfield Assessment.

Order of end-point assessments

Assessment components can be taken in any order.

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The Highfield Approach

This section describes the approach Highfield has adopted in the development of this end-point assessment in terms of its interpretation of the requirements of the end-point assessment plan and other relevant documents.

Documents used in developing this end-point assessment

Standard (2016)

<https://www.instituteforapprenticeships.org/apprenticeship-standards/fire-emergency-and-security-systems-technician-v1-0>

End-point assessment plan (2016 ST0189/AP02)

<https://www.instituteforapprenticeships.org/media/2498/final-published-fire-emergency-and-security-systems-assessment-plan-v2.pdf>

Specific considerations

All of the assessment criteria used within the end-point assessment have been written by Highfield and are based on the Fire, Emergency and Security Systems Technician Standard and assessment plan. There is no carry-over of assessment criteria between assessment methods.

Timescales of assessments

The assessment plan, on page 2, states that the professional discussion is undertaken at the same time as the practical skills test. On page 3 it states that the practical skills test will take place over 2 days. Furthermore, on reviewing the occupational brief and the tasks involved in the practical skills test, it is not possible to split the practical skills test into core and pathway specific tasks.

Due to inconsistencies in the assessment plan and occupational brief and for practical reasons, Highfield will assess the practical skills test through a series of tasks likely to be over a 2-day period.

Additionally, it has been agreed with the external quality assurance body that the assessments can be taken in any order.

Portfolio of Evidence

Page 9 of the assessment plan states “All applied knowledge and behaviours will be assessed in this component using a wide range of evidence sources including scenario based questioning and the candidate self assessment”. Highfield have interpreted “a wide range” of sources as giving the apprentice the opportunity to submit various types of

evidence in a portfolio format and have therefore agreed with the regulator and mandated that every apprentice submit at least one piece of evidence to support their professional discussion. Furthermore, Highfield have agreed that this evidence won't count towards their assessment but will be used to support the planning of the professional discussion.

Practical skills test duration

The assessment plan does not stipulate the duration of the practical skills test. Having reviewed the tasks required from the occupational skills brief (referred to on page 8 of the assessment plan) Highfield will allocate a maximum of 10.5 hours to complete the practical skills test. This ensures a fair and consistent approach for all learners as well as to maintain the security and integrity of the assessment.

Assessment criteria and grading for the practical skills test

Highfield has developed suitable assessment criteria, in line with the skills of the standard and the tasks stated in the occupational skills brief.

Highfield has developed assessment criteria with marking points for each assessment task to be demonstrated. Apprentices will need to achieve all the safety related and safety critical criteria AND achieve 60% of the criteria within each task in order to gain a pass. To gain a distinction, learners will need to achieve all the safety related and safety critical criteria AND achieve 80% average across all tasks. Please note in all situations scores are rounded **up** to the nearest whole number to ensure the minimum is achieved. This has been agreed with the regulator as consistent with the other EPAOs and to allow for a sectionalised resit on any failed task rather than the practical skills test in its entirety.

Knowledge test requirements

Highfield will allow apprentices the use of a manual calculator should they feel one is required during the knowledge test.

Coverage of the professional discussion

Highfield have agreed with the regulator to assess the behaviours of the standard within the professional discussion, in order to prevent over-assessment.

No assessment criteria have been provided for this assessment method within the assessment plan, these have therefore been developed by subject matter experts in line with the behaviours within the standard.

The assessment plan contained no guidance on the grading of the assessment. Therefore, Highfield have developed assessment criteria which must be achieved for a pass and distinction.

Use of the self-assessment and other evidence in the professional discussion

The assessment plan, on page 10, states that evidence sources for the professional discussion includes the self-assessment and other reference material, supervisor, line manager and other workplace evidence, service user testimony and a sample of standardised learner questions. This evidence should be collated in the form of a portfolio to support the professional discussion.

Highfield will not use these documents as evidence for this component and the portfolio will not be assessed, however, they will be used to help inform and tailor the questions for the professional discussion. The learner may bring in evidence to the professional discussion to refer to.

The self-assessment document will not be used as a gateway requirement as the gateway readiness report contains the learner, employer, and training provider feedback on competence against areas of the standard.

Overall grading

The assessment plan, on page 3, states that the assessment methods will be weighted to determine the overall grade: the knowledge test (20%), practical skills test (60%) and professional discussion (20%). However, on page 11 it states that to gain an overall distinction the learner must gain a distinction in the knowledge test and the practical skills test.

Highfield will follow the guidance on page 11 of the assessment plan to determine the overall grade.

Grading of the professional discussion

The assessment plan, on page 10, states that the EPAO will determine the criteria for the award of a pass and a distinction. Pages 9 and 10 state that acceptable achievement equals a pass and outstanding achievement equals a distinction. There is no further guidance in the assessment plan.

Highfield has developed a set of assessment criteria which reflect the behaviors within the standard. There will be a distinct set of pass criteria and distinction criteria and learners will need to achieve 60% of criteria to gain a pass, and an average of 80% across all pass and distinction criteria to gain a distinction.

Fails and resits

Marginal (non-fail) failures in non-safety critical aspects during the practical skills test are permitted as long as the assessor is satisfied that the apprentice is competent and works safely to an acceptable standard. These failures therefore do not automatically result in a fail grade and the assessor can explore the issues further during the professional discussion.

The marginal fail approach **will not apply** to any criteria which are “safety-critical”, these will still result in an instant termination and a fail on the practical skills test.

A marginal fail is defined as 1 mark less than the pass mark or where 1 of the safety-related criteria have not been met (up to 1 mark). This means that across the three tasks, a marginal fail could mean that up to 3 marks (up to 1 from each task) can be achieved in the professional discussion through additional questioning.

Scenario-based questions will be used to test the apprentice’s competence against the relevant assessment criteria where it is not possible to revisit the system used for the practical skills test itself. Should the apprentice not meet the criteria again in the professional discussion, therefore not achieving the mark(s), the task will be confirmed as a fail and the apprentice will fail the practical skills test.

For the purpose of grading and resits, even though the additional 3 marks can be explored in the professional discussion, they will still be attributed to the relevant task in the practical skills test.

For the practical skills test specifically, learners will only need to reattempt the tasks within the assessment where they have failed to achieve at least 60% or failed to achieve the safety related and safety critical criteria. This has been agreed with the regulator as consistent with other EPAOs and to allow for a sectionalised resit on any failed task rather than the practical skills test in its entirety.

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Gateway

How to prepare for gateway

After apprentices have completed their on-programme learning, they should be ready to pass through 'gateway' to their end-point assessment.

Gateway is a meeting that should be arranged between the apprentice, their employer and training provider to determine that the apprentice is ready to undertake their end-point assessment. The apprentice should prepare for this meeting by bringing along work-based evidence, including:

- customer feedback
- recordings
- manager statements
- witness statements

As well as evidence from others, such as:

- mid and end-of-year performance reviews
- feedback to show how they have met the apprenticeship standards while on-programme

In advance of gateway, apprentices will need to have:

- achieved level 2 English
- achieved level 2 maths
- completed the ECS Health & Safety Assessment test for the Electrotechnical Certification Scheme (ECS) card
- a portfolio to underpin the professional discussion

Therefore, apprentices should be advised by employers and providers to gather this evidence and undertake these qualifications during their on-programme training. It is recommended that employers and providers complete regular checks and reviews of this evidence to ensure the apprentice is progressing and achieving the standards before the formal gateway meeting is arranged.

The gateway meeting

The gateway meeting should last around an hour and must be completed on or after the apprenticeship on-programme end date. It should be attended by the apprentice and the relevant people who have worked with the apprentice on-programme, such as the line manager/employer or mentor, the on-programme trainer/training provider and/or a senior manager (as appropriate to the business).

During the meeting, the apprentice, employer and training provider will discuss the apprentice's progress to date and confirm if the apprentice has met the full criteria of the apprenticeship standard during their on-programme training. The **Gateway Readiness Report** should be used to log the outcomes of the meeting and agreed by all 3 parties. This report is available to download from the Highfield Assessment website.

The report should then be submitted to Highfield to initiate the end-point assessment process. If you require any support completing the Gateway Readiness Report, please contact your EPA Customer Engagement Manager at Highfield Assessment.

Please note: a copy of the standard should be available to all attendees during the gateway meeting.

Reasonable adjustments and special considerations

Highfield Assessment has measures in place for apprentices who require additional support. Please refer to the Highfield Assessment Reasonable Adjustments Policy for further information/guidance.

ID requirements

Highfield Assessment will need to ensure that the person undertaking an assessment is indeed the person they are claiming to be. All employers are therefore required to ensure that each apprentice has their identification with them on the day of the assessment so the end-point assessor can check.

Highfield Assessment will accept the following as proof of an apprentice's identity:

- a valid passport (any nationality)
- a signed UK photocard driving licence
- a valid warrant card issued by HM forces or the police
- another photographic ID card, e.g. employee ID card, travel card, etc.

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Fire, Emergency and Security Systems Technician Apprenticeship Standard

The following pages contain the Fire, Emergency and Security Systems Technician apprenticeship standard and the assessment criteria in a format that is suitable for delivery.

Health and safety and Working Safely	
Knowledge	Skills
WS Understand health and safety legislation, codes of practice and safe working practices	WSS Operate in a safe working manner by adhering to health and safety legislation, codes of practice and applying safe working practices
Knowledge Test	
Criteria covered in knowledge test	
WSK1 Outline health and safety legislation and relevant regulations applicable to fire emergency and security systems	
WSK2 Outline codes of practice relevant to fire emergency and security systems	
WSK3 Describe requirements of safe working practices applicable to fire emergency and security systems	
Safety Critical / Working safely- Practical skills test	
Criteria covered in practical skills test	
Isolates mains electricity safely**	
Works with a viable loop circuit**	
Demonstrates correct use of PPE	
Demonstrates safe operating practices and adherence to regulations *	
Carries out dynamic risk assessment and mitigates possible hazards*	
Amplification and Guidance	
**Safety critical items include isolation of mains electricity and working with a viable loop circuit	
*Safety related items	

Note: The above criteria assessed by the practical skills test are contextualised to each task and are assessed within the most appropriate task. Therefore, all criteria are not assessed in every task but are assessed across all tasks.

Isolates mains electricity safely:

- It is best practice to either:
 - ask permission to turn off the supply
 - verbalise that they are turning off the supply

Health and safety legislation, including:

- Health and Safety at Work Act etc. 1974 - employer and employee responsibilities
- Risk Assessment and Method Statement (RAMS) recording of risks associated with a job and detail how they will be managed
- Appropriate Person Protective Equipment (PPE), for example, suitable workwear, eye protection, ear defenders, gloves
- Work at Height Regulations 2005 - applies to all work at height where there is a risk of injury from falling and falling objects - employer responsibilities
- Health and Safety Executive (HSE) guidelines – provide guidance, regulations and rules on workplace health and safety

Relevant regulations, including:

- Construction Design and Management Regulations 2015 – ensures that health and safety issues are appropriately considered during the development of construction projects.
- Electricity at Work Regulations 1989 – isolation of from all sources of electricity before starting work on electrical systems.
- Control of Substances Hazardous to Health Regulations 2002 – assess, prevent and control exposure to substances and provide information, instruction and training.
- Workplace (Health, Safety and Welfare) Regulations 1992 – to provide facilities that improve the health, wellbeing and safety of employees.
- Control of Noise at Work Regulations 2005 – requires employers to prevent or reduce risks to health and safety from exposure to noise at work, including action values and limit values. Requires hearing protection to be used when noise exposure reaches and exceeds 85 dBA.

Codes of practice, including:

- National Security Inspectorate (NSI)
- British Security Industry Association (BSIA):
 - BS EN 50131 (Intruder alarms)
 - BS EN 62676 / BS EN 50132 (CCTV)
 - BS EN 60839-11-1 (Access control)
 - BS 7671 (wiring/cables)
 - BS 5839 (fire)
- Health & Safety Executive (HSE) GS38 guidance on electrical test equipment on low voltage electrical systems and equipment

Fire:

- BS 9999: Code of practice for fire safety
- Building Regulations 2010 – Fire safety

Safe working practices, their purposes and objectives, including:

- Handling of situations and materials
- Working at height processes
- Housekeeping (reducing of slips and trips)
- Isolation of electrical supplies before starting work on electrical systems
- Safe use of tools and equipment on site, including an insulation test meter, the correct voltage of power tools, cabling and metal
- Identifying hazards and reducing the risk of them causing harm through appropriate risk assessments
- Wearing personal protective equipment (PPE) to control the exposure to hazardous substances
- Complete risk assessments to identify hazards and minimise them
- Risk Assessment and Method Statement (RAMS) document

- Safe Systems of Work (SSOW) procedures
- The use of personal protective equipment (PPE) and the requirements of different situations and environments
- Health and safety site induction and adequate training to use equipment
- A permit to work – to enable certain jobs to be carried out safely under controlled conditions
- Technician’s should not operate machinery that they have not been trained to use, they should politely decline if they are asked to do so

Core systems and core systems techniques

Knowledge	Skills
CS Understand fundamental design criteria, installation, commissioning, handover and maintenance of fire, emergency lighting, security systems and components.	CST Contribute to the application of design, planning, installation, testing, commissioning, maintenance, fault diagnosis, service and repair and electrical and electronic techniques on fire, emergency and security systems
Knowledge Test	
Criteria covered in knowledge test	
CSTK1 Identify fundamental design criteria for fire, emergency lighting, security systems and components CSTK2 Describe requirements for installation of fire, emergency lighting, security systems and components CSTK3 Outline principles for commissioning of fire, emergency lighting, security systems and components CSTK4 Outline how to handover fire, emergency lighting, security systems and components CSTK5 Describe requirements for maintenance of fire, emergency lighting, security systems and components	
Core systems techniques – Practical skills test	
Criteria covered in practical skills test	
Identifies faults and non-compliances during takeover process Identifies recommendations to non-compliances during takeover process Rectifies faults during takeover process	

Records rectifications during takeover process
Applies understanding of design and planning of fire, security or emergency lighting systems
Demonstrates installation techniques of fire, security or emergency lighting systems
Completes installation efficiently

Amplification and Guidance

Note: The above criteria assessed by the practical skills test are contextualised to each task and are assessed within the most appropriate task. Therefore, all criteria are not assessed in every task but are assessed across all tasks.

Types of units, cabling and electrical resistance will be assessed:

Fundamental design criteria:

- looking to meet the clients' needs and requirements
- designing using the standards to the best quality
- conducting risk assessments when designing fire and security systems to reduce the likelihood of fire and security incidents
- identifying the potential risks of the building

Installation:

- components installed in appropriate places and zones
- ensure work is carried out within the specification and standards
- steps before installing any fire, emergency or security systems, including carrying out a site survey
- regulations that must be followed, including BS 7671 when installing cabling and containment
- understanding the voltage requirements of the tools that are used
- understanding how to use the testing equipment
- choosing the appropriate cables and wires for the system and environment
- understanding the different types of cables such as shielded cables, alarm cables and PVC cables
- different materials will be used dependent on the system and environment, for example, when installing trunking in an external environment galvanised steel should be used

Commissioning:

- systems to be in accordance with codes of practice and current legislations
- ensuring that the system operates as designed and meets all safety and regulatory requirements

Handover:

- explaining the operation to the customer thoroughly, including the system itself and how it works, and ensure they are able to activate the system themselves
- providing customer training on the systems of operation and false alarm management
- completing the logbook on handover
- providing the voltage information of the system

Maintenance:

- systems must be checked on regular basis to ensure the system is operating correctly and reliably
- standby batteries are up to specification and replace them if required
- if you notice something isn't up to specification, notify the customer and note in logbook

Electrical and electronic principles

Knowledge

EEP. Installation and testing techniques for electrical and electronic components, equipment and control systems for fire, emergency and security systems.

Knowledge Test

Criteria covered in knowledge test

EEP1 Outline **Installation and testing techniques** for electrical and electronic components, equipment and control systems for fire, emergency and security systems.

Amplification and Guidance

Installation and testing techniques:

- Emphasis on testing and commissioning
- Connection to control panels
- British Standards, such as BS 7671
- Calibration certificates
- SI Unit for electrical current – A (Ampere)
- Connection of ammeters to a circuit
- Electromagnetic interference
- Calculating voltage (V) - resistance (R) times current (I)
- Testing resistance in a circuit
- The resistance of cables
- The function of a diode
- The use of a diode in a circuit to manage flow of a current
- Temperature cut-out devices
- The connection of ammeters in a circuit
- The reset requirements for temperature cut out devices
- The purpose of a residual current device (RCD)

- Calculating resistance (R) – voltage (V) divided by current (I)

Practices and procedures	
Knowledge	
PPK. Understand fundamental principles and quality processes associated with industry and company codes of practices	
Knowledge Test	
Criteria covered in knowledge test	
PPK1 Outline the fundamental principles associated with industry and company codes of practice PPK2 Outline the quality processes associated with industry and company codes of practice	
Amplification and Guidance	
<p>Fundamental principles, including:</p> <ul style="list-style-type: none"> • using Risk Assessment Method Statements (RAMS) to manage risks • knowing the British Standards that are associated with what is being fitted • understanding certification • following internal quality standards • using industry codes of practice to standardise expectations and service quality <p>Quality processes should be followed to maintain high-quality customer service and a good reputation, some of these include:</p> <ul style="list-style-type: none"> • Relevant quality manual 	

- Sign off for design and commissioning
- Understanding certification
- Metrics to assess quality, including customer satisfaction and resolution times
- Service Level Agreements (SLAs) to outline standards and expectations
- The role of legislative bodies, including carrying out quality audits
- Communication with customers, including dealing with complaints correctly

System technologies	
Knowledge	Skills
STK Understand how to store, retrieve, manipulate, transmit or receive data/information electronically in a digital form across a range of ICT applications (e.g. personal computers, digital transmission over IP, email, mobile communication technology)	STS. Operate a range of ICT equipment and systems to store, retrieve, manipulate, transmit or receive digital data and electronic information in applications and environments applicable to the role
Knowledge Test	
Criteria covered in knowledge test	
STK1 Identify how to store, retrieve, and manipulate data and information electronically in a digital form across a range of ICT applications STK2 Identify how to transmit and receive data and information electronically in a digital form across a range of ICT applications	
Practical skills test	
Criteria covered in practical skills test	
Operates programming and control equipment effectively	
Amplification and Guidance	

Note: The above criteria assessed by the practical skills test are contextualised to each task and are assessed within the most appropriate task. Therefore, all criteria are not assessed in every task but are assessed across all tasks.

Store data:

- Save digital information on devices or remotely, including:
 - Personal Digital Assistant (PDA)
 - Cloud
 - External Hard Drive
 - CD
 - DVD
 - USB flash drive
 - NAS (network-attached storage) drive
 - Encrypted Files, these are the most secure way to store sensitive data

Retrieve data:

- obtaining data from a database management system, including:
 - two-factor authentication

Manipulate data:

- changing digital data in a storage device, including:
 - cleansing data
 - rearranging data
 - restructuring data

Transmit data

- Transferring data from one point to another, including:
 - Sending data
 - Receiving data
 - Wireless transmission

- Compressing (.zip) files for transfer
- Communication protocols, including RS485
- Internet Protocol (IP)
- Wide Area Network (WAN)
- Bandwidth
- RS485 can be used to transmit data over long distances in access control systems

Receive data:

- serial transmission of data over the internet

ICT applications, including:

- personal computers
- digital transmission over IP
- email
- mobile communication technology
- mesh topology, this is a network set up where each computer and network device is interconnected with one another, this creates more dependable communication
- capabilities of smart technology, including optimisation, automation, control and monitoring

Communication

Knowledge

CK. Understand different communication styles, how to communicate in a clear, articulate and appropriate manner and how to adapt communication styles to suit different situations

Knowledge Test

Criteria covered in knowledge test

CK1 Outline different **communication styles**

CK2 Describe how to **communicate in a clear, articulate and appropriate manner**

CK3 Describe how to **adapt the communication style** to suit different situations in the fire emergency and security systems sector

Amplification and Guidance

Communication styles, including:

- assertive
- passive
- aggressive
- submissive
- manipulative

Communicate in a clear, articulate and appropriate manner:

- use active listening
- pay attention
- give feedback
- refrain from judgement
- avoid using negative body language
- good personal presentation

Adapt the communication style:

- ensure you don't use technical terms when speaking with a client, as they may not fully understand what you mean
- vary your volume depending on the type of client to fit the situation
- use different communication styles to fit the needs of the customer, for example, those with hearing impairments
- if communicating online, try to avoid too many back-and-forth messages by getting as much information over as early and clearly as possible

Commercial awareness	
Knowledge	
CAK Understand commercial risks and responsibilities	
Knowledge Test	
Criteria covered in knowledge test	
CAK1 Describe commercial risks and responsibilities applicable to fire emergency and security systems	
Amplification and Guidance	
Risks, including: <ul style="list-style-type: none">• deadlines to meet• penalty clauses• disruption of system functionality• increased financial costs	
Responsibilities, including: <ul style="list-style-type: none">• managing time	

- resource and job planning for economy
- business and client convenience
- sound business principles
- maintaining third party certification

Customer service

Knowledge

CSK. Understand the principles of high-quality customer service and the needs of others

Knowledge Test

Criteria covered in knowledge test

CSK1 Describe principles of **high quality customer service** applicable to the fire emergency and security sector
 CSK2 Describe the **specific needs** of others when working within the fire emergency and security sector

Amplification and Guidance

High quality customer service, including:

- building and maintaining relationships
- managing conflict and dispute
- offering sound and mutually productive information
- advice and guidance
- monitoring customer problems
- avoiding the use of jargon
- clearly explaining necessary information
- following the General Data Protection Regulation (GDPR)

Specific needs, including:

- speaking clearly
- not using technical terms/jargon as the client may not understand
- keeping in mind GDPR and data protection
- remembering general customer service
- accommodating diverse needs
- meeting the needs of specific customers, such as:
 - the elderly
 - hearing-impaired individuals
 - sight-impaired individuals

Environmental principles

Knowledge

EPK. Understand the importance of compliance with environmental legislation and the impact of processes and technologies associated with fire, emergency and security systems.

Knowledge Test

Criteria covered in knowledge test

EPK1 Describe how to comply with **environmental legislation**

EPK2 Describe the impact of environmental legislation on processes and technologies associated with fire, emergency and security systems.

Amplification and Guidance

Environmental legislation - Including culture of re-use and recycle

WEEE Regulations (Waste electrical electronic equipment):

- UK WEEE regulations 2013 and EU WEEE regulations 2012. Offer facilities that you can return/recycle electronic items, usually dealt with by the distributor.
- Producers must retain a record of all WEEE activities for at least 4 years

Dangers of asbestos:

- if the material containing asbestos is damaged, it can release a fine dust that contains asbestos fibres.
- when this dust is breathed in, the fibres enter the lungs which, over time, could lead to lung damage.
- however, it would take long-term exposure to the asbestos fibres, usually over many years, before the possibility of developing asbestosis.

Supervisory	
Skills	
S. Take responsibility for own work and safety and welfare of others. Oversee and organise the programme of work and work environment. Carry out work and manage resources in an environmentally friendly manner.	
Core Supervisory - Practical skills test	
Pass criteria covered in practical skills test	
Complete work tasks in a timely manner Carry out work tasks in an environmentally friendly manner Works with maximum efficiency during all tasks	
<p>Note: The above criteria assessed by the practical skills test are contextualised to each task and are assessed within the most appropriate task. Therefore, all criteria are not assessed in every task but are assessed across all tasks.</p>	

Behaviours

Professional discussion

Pass criteria covered in the professional discussion

- B1 Develop and retain trust with customers and colleagues by undertaking responsibilities in an ethical and empathetic manner
- B2 Show commitment through being punctual, reliable, diligent and professional
- B3 Take responsibility for own judgements and actions to achieve quality focussed outcomes
- B4 Demonstrate drive and flexibility in fulfilling requirements of role
- B5 Take responsibility and fulfil own development and the needs of others
- B6 Keep up to date with best practice
- B7 Maintain continuous professional development
- B8 Work productively and engage with colleagues, clients, other trades, suppliers and the public
- B9 Take responsibility for promoting a healthy and safe working environment
- B10 Give consideration to appropriate use of resources and own actions taking into account the impact on environmental, social and economic factors

Distinction criteria covered in the professional discussion

- B11 Use initiative to seek continuous professional development opportunities*
- B12 Show willingness to work above and beyond what is required*
- B13 Share best practice with colleagues*

Option 1: Fire

Option 1: Fire	
Knowledge and Skills	
FK. Understand the relationship of fire detection and alarms to the fire industry, the principles and features for design criteria and the methods of surveying new and existing systems. The Planning and project management for system installation, commissioning and handover (including zone charts). The preventative and corrective maintenance of fire detection and alarm systems, emergency systems and components.	FS. Apply and implement system design, planning, installation, testing, commissioning and handover. Carry out preventative and corrective maintenance, diagnosis and repair faults, of fire detection and alarm and other emergency systems and components
Knowledge Test	
Criteria covered in knowledge test	
FK1 Describe the relationship of fire detection and alarms to the fire industry FK2 Outline the principles and features for design criteria and the methods of surveying new and existing systems . FK3 Describe the planning and project management for system installation, commissioning and handover (including zone charts). FK4 Outline the preventative and corrective maintenance of fire detection and alarm systems, emergency systems and components	
Pathway - Practical skills test	
Criteria covered in practical skills test	
Completes takeover documentation accurately Completes documentation in detail Selects and uses compliant ancillary equipment to meet specification Carries out installation of cables correctly and in a compliant manner Completes functionality testing accurately to industry standards to ensure system operation* Identifies non-compliances and variations during commissioning	

Completes electrical testing during commissioning
Completes commissioning documentation accurately

Note: The above criteria assessed by the practical skills test are contextualised to each task and are assessed within the most appropriate task. Therefore, all criteria are not assessed in every task but are assessed across all tasks.

Amplification and Guidance

Fire detection and alarms:

- the main function of a fire detection system is to alert people to the presence of a fire
- fire alarm systems should be maintained by a responsible person
- the main types of smoke detectors include:
 - ionisation
 - photoelectric
 - a combination of ionisation and photoelectric
- a combination ionisation and photoelectric detector is the recommended type of smoke detector to install in a UK home
- a smoke detection system detects fires early
- automatic fire detectors (AFDs) are able to detect the earliest signs of fire and alert the building's occupants without human intervention
- to minimise unwanted alarms, a manual call point is fitted with a plastic cover
- the sensing element of heat detectors is commonly known as the thermistor
- the required detection system will be dependent on the area such as a heat detector will be required in a kitchen
- flame detectors use thermal imaging to detect fires
- the main types of flame detectors include:
 - ultraviolet
 - infrared
 - ultraviolet and infrared
 - multi-spectrum infrared
 - visual flame imaging

Design criteria:

- the main types of fire alarm systems include:
 - conventional
 - addressable
 - wireless
 - analogue
- fire alarm systems range from grade A through to F (Grade B and E systems are no longer recognised), and commercial systems often belong to one of the following categories:
 - category M (systems are labelled 'M' if they are manual systems)
 - category L1 (systems are labelled 'L' if they are designed to protect life)
 - category L2
 - category L3
 - category L4
 - category L5
 - category P1 (systems are labelled 'P' if they are designed to protect property)
 - category P2
- in buildings, manual call points are typically sited at escape routes and exits
- no one should have to travel more than 45m to access a call point unless the route is undefined, then the maximum travel distance is 30m
- at a minimum, 25% of monitored fire alarm systems must be tested quarterly
- monitored system maintenance visits should not exceed six months, with 100% of devices tested within the 12 month period
- BS 5839-6:2019+A1:2020 covers all domestic properties
- cables connecting the final low voltage mains supply to a fire alarm must be fire resistant
- a fire alarm control panel integrates with an access control door entry system via a changeover relay

Surveying new and existing systems:

- the first step of designing a new system is conducting a site survey
- existing systems should be evaluated during a survey to assess the compatibility of new additions
- the process of upgrading an existing system to meet current safety standards is known as retrofitting

Planning and project management:

- within the project planning phase, a timeline should be established, and resources allocated
- milestones and deadlines should be included in the project timeline
- zone charts are used to identify areas of detection

Installation, including:

- wireless technology
- alarm transmission systems and aspirating systems
- the installation of cables, conduits and back boxes is typically referred to as a first fix
- the resistance of a cable is measured using a test meter that is set to measure ohms across a closed circuit
- a low smoke fume (LSF) cable should be used for fire alarm installations
- when a linear heat detection cable is used it provides detection for the entire length of the cable
- fire alarm zones are specific areas of a building, and each zone is separated by fire walls and fire doors, and a small building, for example, will be a single zone

Commissioning:

- the commissioning stage is focused around ensuring that the system functions as designed
- the commissioning process must be carried out by a competent person, which is someone that has the necessary skills, knowledge and experience

Preventative and corrective maintenance:

- system maintenance is regularly carried out to ensure that the system is performing and functioning as expected
- the British Standard BS 5839 recommends that maintenance visits for a fire alarm system should be conducted at least every 6 months
- preventive maintenance is scheduled to help prevent unexpected failures in the future
- corrective maintenance is unplanned and carried out to repair a faulty system or component

- maintenance should be arranged by a responsible person
- the fire alarm logbook provides information for maintenance engineers
- a systematic schematic allows engineers to quickly understand how equipment is connected
- fire detection systems should be tested weekly
- control equipment should be visually inspected daily
- an Inspection and Servicing certificate should be completed after the maintenance visit in compliance with British Standard 5839-1

Option 2: Security

Option 2: Security	
Knowledge and Skills	
SK. Understand the requirement and implementation of security risk assessments, the principles, functions and operation for design criteria. The planning and project management for system installation, commissioning and handover	SS. Apply and implement system design, planning, installation, testing, commissioning and handover. Carry out preventative and corrective maintenance, diagnosis and repair faults, of Intruder and holdup alarms, Access Control, video surveillance (CCTV) and other electronic security systems and components
Knowledge Test	
Criteria covered in knowledge test	
SK1 Describe the requirement for and implementation of security risk assessments	
SK2 Outline the principles, functions and operation for design criteria.	
SK3 Outline the planning and project management for system installation, commissioning and handover.	
Pathway - Practical Skills Test	
Criteria covered in the Practical skills test	

Completes takeover documentation accurately
Completes documentation in detail
Selects and uses compliant ancillary equipment to meet specification
Carries out installation of cables correctly and in a compliant manner
Completes functionality testing accurately to industry standards to ensure system operation
Identifies non-compliances and variations during commissioning
Completes electrical testing during commissioning
Completes commissioning documentation accurately

Note: The above criteria assessed by the practical skills test are contextualised to each task and are assessed within the most appropriate task. Therefore, all criteria are not assessed in every task but are assessed across all tasks.

Amplification and Guidance

The preventative and corrective maintenance of Intruder and hold up alarms will always be assessed in the knowledge test. Additionally, Access Control, video surveillance (CCTV) and other electronic security systems and components will be assessed.

Security risk assessments:

- Ensure you install the correct kit. Intruder alarms are rated from grade 1 to 4 and the different types of kit included in each grade.
 - Grade 1 – low level of risk
 - Grade 2 – low to medium level of risk (a 2e system is audible only)
 - Grade 3 – medium to high level of risk
 - Grade 4 – high level of risk
- Systems are required to be serviced. For instance, BS 9263 states that grade 1 systems must be visited once a year.
- They are influenced by complexity, the size of the property and the risk level.
- Organisations should review and update their risk assessment every year.
- A risk assessment should be completed before the job is started and the results should be received by the installer.
- They are carried out to identify vulnerabilities and threats so that they can be minimised.

- Changes in a building's layout will require a new risk assessment to be carried out.

Principles for design criteria:

- meet customer requirements and what they are looking for, what the risk is.
- ensure it is cost-effective for the customer, so they are not paying for kit they don't need.

Functions and operation for design criteria:

- A passive infrared (PIR) and microwave (radar doppler effect) are commonly combined to make up a dual-tech sensor
- 2 PIRs cannot be sited where the range of coverage would overlap
- According to BS 5839, manual call points must be mounted at 1.4m (+/-300mm)
- GPRS is commonly used by monitored signalling devices
- Shielded cables should be used if the environment is subject to electrical noise
- Anti-masking features enable the system to detect if an intruder has attempted to defeat the detector by blocking it
- In the UK, the standard operating mains frequency for CCTV is 50 Hz
- BS EN 50131 states that:
 - motion sensors must have anti-masking features for grade 3 and above systems
 - the tamper detection of grade 2 wire-free systems should be opened by normal means and removed from the mount
 - it is recommended that a class IV detector is installed outdoors
- BS 8243 states that:
 - alarm confirmation technology must be in place to confirm intrusions
 - the alarm should be reset if a confirmed alarm signal is not received within the confirmation period
- The confirmation window between the first detection zone activating and the second detection zone activating that triggers a confirmed alarm condition is 30 to 60 minutes
- The maximum permitted entry time varies between systems

- Monitored communication signalling devices may include dual-path communicators, radio communicators and digital communicators
- An ingress protection (IP) rating is suitable for externally mounted equipment
- Power over Ethernet cameras have the ability to receive both power and data through a single ethernet cable
- If a hold-up alarm system requires sequential verification the time window between triggering the first and the second alarm will be 8 to 20 hours
- A pan tilt zoom camera is used to cover a large area or to follow movement

Planning and project management:

- ensure what you do is fit for purpose, you make sure it is within the budget of the client, identify all risk and hazards and mitigate them, complete within a timely manner as agreed within your plan
- use an organisational chart and a Gantt chart to plan
- the project manager is responsible for defining the project scope
- user requirements can be identified by talking to them about what the system is intended for

System installation:

- before installing a system, a site survey should have been carried out
- door entry panels and readers must be installed at different heights
- on new installations, when the system is activated, the audible side of an external warning device should operate for 15 minutes

Commissioning:

- the main purpose of commissioning is to ensure that the system functions as required

- this should be completed after the system is installed

Handover:

- effective communication is essential with all stakeholders during this stage
- a customer must understand how to locate a detection device installed on the system
- the engineer should provide the customer with a complete circuit list of device locations with a marked drawing
- once handover has been completed, the system should be maintained in line with its requirements

Option 3: Fire and emergency lighting

Option 3: Fire and emergency lighting	
Knowledge and Skills	
FLK. Understand the relationship of fire detection and alarms to the fire industry, the principles and features for design criteria, and the methods of surveying new and existing systems. The Planning and project management for system installation, commissioning and handover. The preventative and corrective maintenance of fire detection and alarm systems, emergency lighting, emergency systems and components. The installation of electrical circuits, selecting correct protective devices, testing and certifying to current standards.	FLS. Apply and implement system design, planning, installation where required, testing, commissioning and handover. Carry out preventative and corrective maintenance, diagnosis and repair faults, of fire detection and alarm, emergency light systems and other emergency systems and components.
Knowledge Test	
Criteria covered in knowledge test	

FLK1 Describe the relationship between fire detection and alarms to the fire industry
FLK2 Outline the principles and features for design criteria, and the methods of surveying new and existing systems.
FLK3 Outline planning and project management for systems **installation**, commissioning and handover.
FLK4 Outline preventative and corrective maintenance of fire detection and alarm systems, emergency lighting, emergency systems and components.
FLK5 Outline installation of electrical circuits, selecting correct protective devices, testing and certifying to current standards.

Pathway - Practical Skills Test

Criteria covered in the Practical skills test

Completes takeover documentation accurately
Completes documentation in detail
Selects and uses compliant ancillary equipment to meet specification
Carries out installation of cables correctly and in a compliant manner
Completes functionality testing accurately to industry standards to ensure system operation*
Identifies non-compliances and variations during commissioning
Completes electrical testing during commissioning
Completes commissioning documentation accurately

Note: The above criteria assessed by the practical skills test are contextualised to each task and are assessed within the most appropriate task. Therefore, all criteria are not assessed in every task but are assessed across all tasks.

Amplification and Guidance

Installation including:

- Wireless technology
- Alarm transmission systems and aspirating systems

Option 4: Fire and security

Option 4: Fire and security	
Knowledge and Skills	
FSK. Understand the relationship of fire detection and security alarms to the fire & security industry and the requirement and implementation of security risk assessments, the principles features, functions and operation for design criteria, and the methods of surveying new and existing systems. The Planning and project management for systems installation, commissioning and handover. The preventative and corrective maintenance of fire detection and alarm systems, emergency systems and components, Intruder and hold up alarms, Access Control, video surveillance (CCTV) and other electronic security systems and components.	FSS. Apply and implement system design, planning, installation, testing, commissioning and handover. Carry out preventative and corrective maintenance, diagnosis and repair faults, of fire detection and alarm, and other emergency systems and components, Intruder and holdup alarms, Access Control, video surveillance (CCTV) and other electronic security systems and components.
Knowledge Test	
Criteria covered in knowledge test	
FSK1 Describe the relationship between fire detection and security alarms to the fire & security industry FSK2 Outline the requirement and implementation of security risk assessments FSK3 Outline the principles, features, functions and operation for design criteria , and the methods of surveying new and existing systems . FSK4 Outline planning and project management for systems installation , commissioning and handover. FSK5 Outline preventative and corrective maintenance of fire detection and alarm systems, emergency systems and components, intruder and hold up alarms, Access Control, video surveillance (CCTV) and other electronic security systems and components.	
Pathway - Practical Skills Test	
Criteria covered in the Practical skills test	
Completes takeover documentation accurately	

Completes documentation in detail
Selects and uses compliant ancillary equipment to meet specification
Carries out installation of cables correctly and in a compliant manner
Completes functionality testing accurately to industry standards to ensure system operation*
Identifies non-compliances and variations during commissioning
Completes electrical testing during commissioning
Completes commissioning documentation accurately

Note: The above criteria assessed by the practical skills test are contextualised to each task and are assessed within the most appropriate task. Therefore, all criteria are not assessed in every task but are assessed across all tasks.

Amplification and Guidance

Fire detection and security alarms:

- the installation of fire alarms is governed by British Standard 5839
- fire detection and security alarm systems can be interconnected in all settings
- it is more difficult to ensure that interconnected systems comply with industry standards
- wireless technology decreases installation costs and the complexity of systems
- the British Standards Institute (BSI) is responsible for creating and publishing industry standards, along with providing certification and testing services
- technological advancements have led to more interconnected systems

Requirements and implementation:

- the property's insurance value helps to determine which grade of system is required
- installers and insurers are responsible for determining which grade of system is required

Security risk assessments:

- a security risk assessment is used to identify the type of system that is required
- they focus on identifying vulnerabilities and evaluating security systems

- the risk assessment should be conducted before the system is designed
- the employer is responsible for ensuring that security risk assessments are conducted in the workplace
- the recommended steps for conducting risk assessments can be found in the British Standard
- a location survey should be included in the assessment
- a cross-functional team with security expertise is usually involved in the implementation of security risk assessments
- technicians should have awareness of local building regulations when conducting assessments

Design criteria:

- when determining the placement of surveillance cameras, the exposure to direct sunlight should be considered
- access control systems are designed to regulate entry
- 433 MHz and 868 MHz are the radio frequencies that are used in the industry

Surveying new and existing systems:

- existing systems should be evaluated during a survey to assess the compatibility of new additions
- the process of upgrading an existing system to meet current safety standards is known as retrofitting
- cable routes should be identified during a survey to ensure practical maintenance can be carried out
- vulnerability assessment phases are included in system surveys

Planning and project management:

- project scope refers to what the project aims to achieve
- when planning, a Gantt chart can be used to create a project timeline and to schedule activities
- in the planning stage, having a plan drawn for a building is useful
- unforeseen circumstances in contingency planning includes things such as bad weather, unplanned downtime and data breaches
- the project schedule should consider the requirements of the stakeholders
- during the final stage of the project, a handover checklist should be completed
- the final acceptance test during the handover of the project is completed by an independent third-party certifier

Installation, including:

- wireless technology
- alarm transmission systems and aspirating systems
- following the Building Regulations Approved Document B

Preventative and corrective maintenance:

- corrective maintenance is unplanned and carried out to repair a faulty system or component
- preventive maintenance is scheduled to help prevent unexpected failures in the future
- it is important to conduct regular functional tests on emergency systems to correct any issues before an emergency occurs
- a maintenance log is used to document routine inspections
- monitored intruder alarm systems should be serviced twice a year
- routine maintenance of access control systems should take place every 12 months
- during the maintenance of video surveillance systems, the back focus may need adjusting
- failover testing is conducted to ensure system reliability and functionality in case of failure

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Assessment Summary

The end-point assessment for the Fire, Emergency and Security Systems Technician Apprenticeship Standard is made up of 3 components:

1. Knowledge test consisting of 60 multiple-choice questions of 90 minutes duration
2. Practical skills test consisting of simulated practical tasks taken over 2 days (8.5 to 10.5 hours)
3. Professional discussion of no more than 45-minutes duration

As an employer/training provider, you should agree a plan and schedule with the apprentice to ensure all assessment components can be completed effectively.

Each component of the end-point assessment will be assessed against the appropriate criteria laid out in this kit and a grade allocated. The overall grade will be determined using the combined grades.

Knowledge test

The knowledge test consists of 60 multiple-choice questions and the total marks available are 60.

- To achieve a **pass**, apprentices will score at least 40 out of 60
- To achieve a **distinction**, apprentices will score at least 50 out of 60
- **Unsuccessful** apprentices will have scored 39 or below

The test will be undertaken online, under controlled conditions with a time limit applied.

Practical skills test

Mandatory Requirement

There are two safety-critical skills that **MUST** be satisfactorily achieved at all times during the practical skills test. Failure to maintain satisfactory achievement during the test will result in an instant termination of the assessment and a mandatory fail requiring the practical skills test to be retaken in full.

1. Failure to isolate mains electricity (SC1)
2. Failure to establish a viable loop circuit (SC2)

All involved in this apprenticeship must be aware of this mandatory requirement.

The practical skills test consists of a simulated practical assessment taking between 8.5 to 10.5 hours over a two-day period.

- In order to achieve a **Pass**, apprentices must:
 - pass all safety related* and safety critical criteria** within each task
 - achieve at least 60% of the assessment criteria for each task
 - achieve an average of between 60% and 79% across all tasks.
- In order to achieve a **Distinction**, apprentices must achieve:
 - an **average** of 80% across all sections of the PST
 - pass all safety related* and safety critical criteria** within each task
- **Unsuccessful** apprentices will have achieved less than 60% in any task and/or less than 60% average across the tasks or have not met the safety related* and safety critical criteria** within each task.

Marginal Fails

Marginal (non-fail) failures in non-safety critical aspects during the practical skills test are permitted as long as the assessor is satisfied that the apprentice is competent and works safely to an acceptable standard. These failures therefore do not automatically result in a fail grade and the assessor can explore the issues further during the professional discussion.

A marginal fail is defined as 1 mark less than the pass mark or where 1 of the safety-related criteria have not been met (up to 1 mark). This means that across the three tasks, a marginal fail could mean that up to 3 marks (up to 1 from each task) can be achieved in the professional discussion through additional questioning.

The marginal fail approach will not apply to any criteria which are “safety-critical”, these will still result in an instant termination and a fail on the practical skills test.

Professional discussion

The professional discussion will last no more than 45-minutes.

- To achieve a **pass**, apprentices must achieve all pass criteria.
- To achieve a **distinction**, apprentices must achieve all pass and all distinction criteria.
- **Unsuccessful** apprentices will not have met all pass criteria.

Grading

The learner will be required to complete and achieve a minimum of a pass in all three of the end-point assessment components in order to achieve an overall Pass. Any component not passed will result in an overall Fail. The grading thresholds are summarised as:

Knowledge test	Practical skills test	Professional discussion	Overall grade
Pass	Pass	Pass	Pass
Pass	Distinction	Pass	Pass
Pass	Pass	Distinction	Pass
Pass	Distinction	Distinction	Pass
Distinction	Pass	Pass	Pass
Distinction	Pass	Distinction	Pass
Distinction	Distinction	Pass	Distinction
Distinction	Distinction	Distinction	Distinction

Retakes and resit information

Should an apprentice fail the **Knowledge test** on the first attempt and have achieved a score of between 25 and 39 correct answers, they may automatically retake the assessment within three months. Learners achieving less than 25 correct answers, or those unsuccessful in a resat test, will not be allowed to retake the assessment until after completing a professional review of performance with their employer, after feedback from the independent assessor. This being a retake. If a **retake** is chosen, the apprentice will require a period of further learning and will need to complete a retake checklist.

For the Practical Skills Test, it must be noted that unsatisfactory performance in either of the two safety critical areas will result in a mandatory fail for the practical assessment and the termination of the assessment. All involved in the apprenticeship must be aware of this requirement. The two areas are:

- 1. Isolation of mains electricity when undertaking any activity and**
- 2. The identification of, and working with, a viable loop circuit.**

Some elements of the assessment will be regarded as *safety-critical***. Failure to meet the required standard in those areas identified as safety critical will result in an immediate failure of the component. Safety critical elements will be identified during on-programme training and assessment, and will include areas such as electrical isolation, aspects of health and safety and compliance with legally enforced regulations.

Apprentices receiving a failure in these safety-critical circumstances will need to have a review of performance before being allowed through the assessment gateway for another attempt at the end-point assessment. This will be a retake.

Apprentices receiving a Fail grade in the practical skills test for any other reason than safety-critical circumstances or the professional discussion will be allowed to attempt the end-point assessment. The decision of whether it is a resit or a retake will be made by the apprentice, training provider and employer collectively.

Apprentices are only required to reattempt the tasks in the practical skills test where they have failed to achieve 60% or have not achieved the safety critical** or safety related* criteria. The exception being where apprentices have failed task 2, they will also be required to resit task 3.

Any apprentice reattempting any assessment can still achieve pass and distinction grades for any components retaken.

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Assessing the Knowledge Test

The following knowledge areas of the Fire, Emergency and Security Systems Apprenticeship Standard will be assessed by a 90-minute knowledge test consisting of 60 multiple-choice questions with a pass mark of 67% (40 out of 60).

It is acceptable to use a calculator for the knowledge test should the apprentice require one.

The topics covered within the test are listed below:

Core Knowledge

- Health and Safety
- Core Systems
- Electrical and electronic principles
- Practices and Procedures
- System technologies
- Communication
- Commercial awareness
- Customer service
- Environmental principles

Options Knowledge

The knowledge questions for each pathway will be structured using the following template:

- Design criteria (the design of a system)
- The plan for design and installation
- Risk Assessment Method Statement (RAMS)
- Installation issues and procedures
- Commissioning a system
- Handover of a system
- Maintenance of a new or existing system, including periodic, fault diagnosis, network outages or faults and system age-related maintenance.

The 4 options for the Fire, Emergency and Security Systems Technician apprenticeship include:

1. Fire
2. Security
3. Fire and emergency lighting
4. Fire and security

The apprentice must be assessed against the core and 1 of the four options.

In each paper, questions will cover each of the areas above, however not every aspect of every area will be covered in every test.

Before the assessment

The employer/training provider should:

- brief the apprentice on the areas that will be assessed by the knowledge test
- in readiness for end-point assessment, set the apprentice a mock knowledge test. A test is available to download from the Highfield Assessment website. The mock tests are available as paper-based tests and also on the mock e-assessment system.

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Knowledge Test Criteria – Core Skills

Health and safety	
WS Understand health and safety legislation, codes of practice and safe working practices	WSK1 Outline health and safety legislation and relevant regulations applicable to fire emergency and security systems
	WSK2 Outline codes of practice relevant to fire emergency and security systems
	WSK3 Describe requirements of safe working practices applicable to fire emergency and security systems

Core Systems	
CSK Understand fundamental design criteria, installation, commissioning, handover and maintenance of fire, emergency lighting, security systems and components.	CSK1 Identify fundamental design criteria for fire, emergency lighting, security systems and components
	CSK2 Describe requirements for installation of fire, emergency lighting, security systems and components
	CSK3 Outline principles for commissioning of fire, emergency lighting, security systems and components
	CSK4 Outline how to handover fire, emergency lighting, security systems and components
	CSK5 Describe requirements for maintenance of fire, emergency lighting, security systems and component

Electrical and electronic principles	
EEPK Installation and testing techniques for electrical and electronic components, equipment and control systems for fire, emergency and security systems.	EEPK1 Outline Installation and testing techniques for electrical and electronic components, equipment and control systems for fire, emergency and security systems

Practices and procedures	
PPK. Understand fundamental principles and quality processes associated with industry and company codes of practices	PPK1 Outline the fundamental principles associated with industry and company codes of practice
	PPK2 Outline the quality processes associated with industry and company codes of practice

System technologies	
STK Understand how to store, retrieve, manipulate, transmit or receive data/information electronically in a digital form across a range of ICT applications (e.g. personal computers, digital transmission over IP, email, mobile communication technology)	STK1 Identify how to store, retrieve, and manipulate data and information electronically in a digital form across a range of ICT applications
	STK2 Identify how to transmit and receive data and information electronically in a digital form across a range of ICT applications

Communication	
CK Understand different communication styles, how to communicate in a clear, articulate and appropriate manner and how to adapt communication styles to suit different situations	CK1 Outline different communication styles
	CK2 Describe how to communicate in a clear, articulate and appropriate manner
	CK3 Describe how to adapt the communication style to suit different situations in the fire emergency and security systems sector

Commercial awareness	
CAK Understand commercial risks and responsibilities	CAK1 Describe commercial risks and responsibilities applicable to fire emergency and security systems

Customer service	
CSK Understand the principles of high-quality customer service and the needs of others	CSK1 Describe principles of high quality customer service applicable to the fire emergency and security sector
	CSK2 Describe the specific needs of others when working within the fire emergency and security sector

Environmental principles	
EPK Understand the importance of compliance with environmental legislation and the impact of processes and technologies associated with fire, emergency and security systems	EPK1 Describe how to comply with environmental legislation
	EPK2 Describe the impact of environmental legislation on processes and technologies associated with fire, emergency and security systems.

Option 1: Fire

Option 1: Fire	
FK. Understand the relationship of fire detection and alarms to the fire industry, the principles and features for design criteria and the methods of surveying new and existing systems. The Planning and project management for system installation, commissioning and handover (including zone charts). The preventative and corrective maintenance of fire detection and alarm systems, emergency systems and components.	FK1 Describe the relationship of fire detection and alarms to the fire industry
	FK2 Outline the principles and features for design criteria and the methods of surveying new and existing systems.
	FK3 Describe the planning and project management for system installation, commissioning and handover (including zone charts).
	FK4 Outline the preventative and corrective maintenance of fire detection and alarm systems, emergency systems and components

Option 2: Security

Option 2: Security	
SK. Understand the requirement and implementation of security risk assessments, the principles, functions and operation for design criteria. The planning and project management for system installation, commissioning and handover	SK1 Describe the requirement for and implementation of security risk assessments
	SK2 Outline the principles, functions and operation for design criteria.
	SK3 Outline the planning and project management for system installation, commissioning and handover.

Option 3: Fire and emergency lighting

Option 3: Fire and emergency lighting	
FLK. Understand the relationship of fire detection and alarms to the fire industry, the principles and features for design criteria, and the methods of surveying new and existing systems. The Planning and project management for system installation, commissioning and handover. The preventative and corrective maintenance of fire detection and alarm systems, emergency lighting, emergency	FLK1 Describe the relationship between fire detection and alarms to the fire industry
	FLK2 Outline the principles and features for design criteria, and the methods of surveying new and existing systems.
	FLK3 Outline planning and project management for system installation, commissioning and handover.
	FLK4 Outline preventative and corrective maintenance of fire detection and alarm systems, emergency lighting, emergency systems and components.
	FLK5 Outline installation of electrical circuits, selecting correct protective devices, testing and certifying to current standards.

Option 3: Fire and emergency lighting

systems and components. The installation of electrical circuits, selecting correct protective devices, testing and certifying to current standards.

Option 4: Fire and security

Option 4: Fire and security

FSK. Understand the relationship of fire detection and security alarms to the fire & security industry and the requirement and implementation of security risk assessments, the principles features, functions and operation for design criteria, and the methods of surveying new and existing systems. The Planning and project management for systems installation, commissioning and handover. The preventative and corrective maintenance of fire detection and alarm systems, emergency systems and components, Intruder and hold up alarms, Access Control, video surveillance (CCTV) and other electronic security systems and components.

- FSK1 Describe the relationship between fire detection and security alarms to the fire & security industry
- FSK2 Outline the requirement and implementation of security risk assessments
- FSK3 Outline the principles, features, functions and operation for design criteria, and the methods of surveying new and existing systems.
- FSK4 Outline planning and project management for systems installation, commissioning and handover.
- FSK5 Outline preventative and corrective maintenance of fire detection and alarm systems, emergency systems and components, intruder and hold up alarms, Access Control, video surveillance (CCTV) and other electronic security systems and components

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Assessing the Practical Skills Test

During the on-programme period, the apprentice will have been practising the planning for design and installation, commissioning and handover of a system along with maintenance of a new or existing system, along with other important skills needed to undertake the role of a fire emergency and security system technician.

The assessment plan states that the apprentice will attend an assessment centre, to undertake a standardised skills test in controlled conditions. The apprentice will be provided with task briefs on the day of the assessment. All equipment and tools will be provided.

The skills test will assess the core elements of the standard as well as the learner's chosen option:

The 4 options for the fire, emergency and security systems apprenticeship include:

1. Fire
2. Security
3. Fire and emergency lighting
4. Fire and security

The practical skills test will take place at an approved assessment centre and last for up to 10.5 hours. The tasks are broken down as follows:

Fire

Task	Maximum time	Area
Task 1	1 hour 30 mins	Takeover and repair
Task 2	5 hours	Installing additions
Task 3	2 hours	Commissioning

Security

Task	Maximum time	Area
Task 1	1 hour 30 mins	Takeover and repair (3 systems)
Task 2	5 hours	Installing additions (3 systems)
Task 3	2 hours	Commissioning (3 systems)

Combined

Task	Maximum time	Area
Task 1	3 hours	Takeover and repair (Fire – Non addressable & Addressable) (Security – 3 systems)
Task 2	5 hours 30 mins	Installing additions

		(Fire – Non addressable) (Security – 2 systems)
Task 3	2 hours	Commissioning (Fire – Non addressable) (Security – 2 systems)

Highfield would encourage the employer/training provider and the apprentice to plan for the practical skills test by familiarising themselves with the skills criteria that will be assessed and reflect on their experience in a fire emergency and security systems role.

Before the assessment:

Employers/training providers should:

- ensure the apprentice knows the date, time and location of the assessment
- ensure the apprentice knows which fire emergency and security systems criteria will be assessed (outlined below)
- encourage the apprentice to reflect on their experience and learning on-programme to understand what is required to meet the standard
- be prepared to provide clarification to the apprentice, and signpost them to relevant parts of their on-programme experience as preparation for this assessment

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Practical skills test

It is the employer/training provider's responsibility to prepare apprentices for their end-point assessment, and Highfield recommends that the apprentice experiences a mock practical skills test in advance of the end-point assessment with the training provider/employer giving feedback on any areas for improvement.

In designing a mock assessment, the employer/training provider should include the following elements in its planning:

- the practical skills test should take place in a suitable location.
- supply the learner with a mock set up of a current system as follows:
 - Fire – addressable and non- addressable system set up with 3 devices on each
 - Security – intruder, CCTV and access control systems set up with 2-3 devices on each
 - Fire and emergency lighting – conventional self-contained and central battery sealed lead acid systems
 - Combined – addressable or non addressable system set up for fire and 2-3 systems set up for security with 2-3 devices on each
- ask the learner to carry out a takeover of the above systems, then provide 2-3 devices to be installed in addition and then commission the whole system.
- an 8.5-10.5-hour time slot should be available for the skills test, if it is intended to be a complete mock practical test covering the tasks above.
- consider a video or audio recording of the mock test and allow it to be available to other apprentices, especially if it is not practicable for the employer/training provider to carry out a separate mock test with each apprentice.
- ensure that the apprentice's performance is assessed by a competent trainer/assessor, and that feedback is shared with the apprentice to complete the learning experience. Mock assessment sheets are available to download from the Highfield Assessment website and may be used for this purpose.

Practical skills test criteria

Throughout the practical skills test, the assessor will review the apprentice's competence in the criteria outlined below.

Apprentices should prepare for the skills test by considering how the criteria can be met and reflecting on their past experiences.

Fire pathway

Task 1 – Takeover and repair

Ref	Assessment Criteria
	Core: Safety critical
SC1.1	Isolates mains electricity safely**
SC1.2	Works with a viable loop circuit**
	Core: Working safely
WS1.1	Demonstrates correct use of PPE*
WS1.2	Demonstrates safe operating practices and adherence to regulations during takeover process*
WS1.3	Carries out dynamic risk assessment during takeover process and mitigates possible hazards*
	Core: Core systems techniques
CST1.1	Identifies faults and non-compliances during takeover process
CST1.2	Identifies recommendations to non-compliances during takeover process
CST1.3	Rectifies faults during takeover process
CST1.4	Records rectifications during takeover process
	Core: Supervisory
S1.1	Completes work tasks in a timely manner
S1.2	Works with maximum efficiency during all tasks
	Pathway
P1.1	Completes takeover documentation accurately
P1.2	Completes documentation in detail

Task 2 – Installing additions

Ref	Assessment Criteria
	Core: Safety critical
SC2.1	Works with a viable loop circuit**
	Core: Working safely
WS2.1	Demonstrates safe operating practices and adherence to regulations during installation process*
WS2.2	Carries out dynamic risk assessment during installation and mitigates possible hazards*
	Core: Core systems techniques
CST2.1	Applies understanding of design and planning of fire, security or emergency lighting systems
CST2.2	Demonstrates installation techniques of fire, security or emergency lighting systems
CST2.3	Completes installation efficiently
	Core: System technologies
ST2.1	Operates programming and control equipment effectively
	Core: Supervisory
S2.1	Completes work tasks in a timely manner
S2.2	Carries out work tasks in an environmentally friendly manner
	Pathway
P2.1	Selects and uses compliant ancillary equipment to meet specification
P2.2	Carries out installation of cables correctly and in a compliant manner

Task 3 – Commissioning

Ref	Assessment Criteria
	Core: Safety critical
SC3.1	Works with a viable loop circuit**
	Core: Working safely
WS3.1	Demonstrates safe operating practices and adherence to regulations during commissioning process*
WS3.2	Carries out dynamic risk assessment during commissioning and mitigates possible hazards*
	Core: Supervisory
S3.1	Completes work tasks in a timely manner
S3.2	Carries out work tasks in an environmentally friendly manner
	Pathway
P3.1	Completes functionality testing accurately to industry standards to ensure system operation*
P3.2	Identifies non-compliances and variations during commissioning
P3.3	Completes electrical testing during commissioning
P3.4	Completes commissioning documentation accurately
P3.5	Completes documentation in detail

Security pathway

Task 1 – Takeover and repair – Access control, intruder alarm, CCTV

Ref	Assessment Criteria
	Core: Working safely
WS1.1	Demonstrates correct use of PPE*
WS1.2	Demonstrates safe operating practices and adherence to regulations during takeover process*
WS1.3	Carries out dynamic risk assessment during takeover process and mitigates possible hazards*
	Core: Core systems techniques
CST1.1	Identifies faults and non-compliances during takeover process
CST1.2	Identifies recommendations to non-compliances during takeover process
CST1.3	Rectifies faults during takeover process
CST1.4	Records rectifications during takeover process
	Core: Supervisory
S1.1	Completes work tasks in a timely manner
S1.2	Works with maximum efficiency during all tasks
	Pathway
P1.1	Completes takeover documentation accurately
P1.2	Completes documentation in detail

Task 2 – Installing additions – Access control, intruder alarm, CCTV

Ref	Assessment Criteria
	Core: Safety critical
SC2.1	Isolates mains electricity safely**
SC2.2	Works with a viable loop circuit**
	Core: Working safely
WS2.1	Demonstrates safe operating practices and adherence to regulations during installation process*
WS2.2	Carries out dynamic risk assessment during installation and mitigates possible hazards*
	Core: Core systems techniques
CST2.1	Applies understanding of design and planning of fire, security or emergency lighting systems
CST2.2	Demonstrates installation techniques of fire, security or emergency lighting systems
CST2.3	Completes installation efficiently
	Core: System technologies
ST2.1	Operates programming and control equipment effectively
	Core: Supervisory
S2.1	Completes work tasks in a timely manner

Ref	Assessment Criteria
S2.2	Carries out work tasks in an environmentally friendly manner
	Pathway
P2.1	Selects and uses compliant ancillary equipment to meet specification
P2.2	Carries out installation of cables correctly and in a compliant manner

Task 3 – Commissioning – Access control, intruder alarm, CCTV

Ref	Assessment Criteria
	Core: Safety critical
SC3.1	Works with a viable loop circuit**
	Core: Working safely
WS3.1	Demonstrates safe operating practices and adherence to regulations during commissioning process*
WS3.2	Carries out dynamic risk assessment during commissioning and mitigates possible hazards*
	Core: Supervisory
S3.1	Completes work tasks in a timely manner
S3.2	Carries out work tasks in an environmentally friendly manner
	Pathway
P3.1	Completes functionality testing accurately to industry standards to ensure system operation
P3.2	Identifies non-compliances and variations during commissioning
P3.3	Completes electrical testing during commissioning
P3.4	Completes commissioning documentation accurately
P3.5	Completes documentation in detail

Fire and Security combined pathway

Task 1 – Takeover and Repair – Fire and Security

Ref	Assessment Criteria
	Core: Safety critical
SC1.1	Isolates mains electricity safely**
SC1.2	Works with a viable loop circuit**
	Core: Working safely
WS1.1	Demonstrates correct use of PPE*
WS1.2	Demonstrates safe operating practices and adherence to regulations during takeover process*
WS1.3	Carries out dynamic risk assessment during takeover process and mitigates possible hazards*
	Core: Core systems techniques
CST1.1	Identifies faults and non-compliances during takeover process
CST1.2	Identifies recommendations to non-compliances during takeover process
CST1.3	Rectifies faults during takeover process
CST1.4	Records rectifications during takeover process
	Core: Supervisory
S1.1	Completes work tasks in a timely manner
S1.2	Works with maximum efficiency during all tasks
	Pathway
P1.1	Completes takeover documentation accurately
P1.2	Completes documentation in detail

Task 2 – Installing additions – Fire and Security

Ref	Assessment Criteria
	Core: Safety critical
SC2.1	Works with a viable loop circuit**
	Core: Working safely
WS2.1	Demonstrates safe operating practices and adherence to regulations during installation process*
WS2.2	Carries out dynamic risk assessment during installation and mitigates possible hazards*
	Core: Core systems techniques
CST2.1	Applies understanding of design and planning of fire, security or emergency lighting systems
CST2.2	Demonstrates installation techniques of fire, security or emergency lighting systems
CST2.3	Completes installation efficiently
	Core: System technologies
ST2.1	Operates programming and control equipment effectively
	Core: Supervisory
S3.1	Completes work tasks in a timely manner
S3.2	Carries out work tasks in an environmentally friendly manner
	Pathway
P2.1	Selects and uses compliant ancillary equipment to meet specification
P2.2	Carries out installation of cables correctly and in a compliant manner

Task 3 – Commissioning – Security – Intruder alarm, CCTV

Ref	Assessment Criteria
	Core: Safety critical
SC3.1	Works with a viable loop circuit**
	Core: Working safely
WS3.1	Demonstrates safe operating practices and adherence to regulations during commissioning process*
WS3.2	Carries out dynamic risk assessment during commissioning and mitigates possible hazards*
	Core: Supervisory
S3.1	Completes work tasks in a timely manner
S3.2	Carries out work tasks in an environmentally friendly manner
	Pathway
P3.1	Completes functionality testing accurately to industry standards to ensure system operation
P3.2	Identifies non-compliances and variations during commissioning
P3.3	Completes electrical testing during commissioning
P3.4	Completes commissioning documentation accurately
P3.5	Completes documentation in detail

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Assessing the Professional Discussion

The 45-minute professional discussion will focus on all behaviours and will draw on a wide range of evidence sources including scenario-based questioning within the professional discussion and the learner's portfolio of evidence.

It will be led by the end-point assessor and should be appropriately structured to draw out the best of the apprentice's energy, enthusiasm, competence and excellence.

The professional discussion will draw questions and amplifications from the learner's written portfolio containing evidence such as supervisor, line-manager and other workplace evidence, service user testimony and learner self-assessment. The written portfolio must be submitted to Highfield at least 2 days before the professional discussion. The submission **must** be accompanied by a fully completed and signed matrix document available to download from our website. For more information about written submission, see our Guide to Written Submissions, available to download from our website.

The professional discussion will assess the behaviours outlined in the Fire, Emergency and Security Systems apprenticeship standard, including:

- Honesty and integrity
- Dependable and responsible
- Positive can-do attitude
- Openness to learning
- Maintain continuous professional development
- Work with others
- Safe and sustainable working

The professional discussion may be conducted either in person or remotely using web conferencing facilities.

- To achieve a **pass**, apprentices must achieve all pass criteria.
- To achieve a **distinction**, apprentices must achieve all pass and all distinction criteria.
- **Unsuccessful** apprentices will not have met all pass criteria.

Before the assessment:

Employers/training providers should:

- plan the professional discussion to allow the apprentice the opportunity to demonstrate each of the required standards
- ensure the apprentice knows the date, time and location of the assessment

- ensure the apprentice knows which criteria will be assessed (outlined below)
- encourage the apprentice to reflect on their experience and learning on-programme to understand what is required to meet the standard
- be prepared to provide clarification to the apprentice, and signpost them to relevant parts of their on-programme experience as preparation for this assessment

Professional Discussion Mock Assessment

It is the employer/training provider's responsibility to prepare apprentices for their end-point assessment, and Highfield recommends that the apprentice experiences a mock professional discussion in preparation for the real thing. The most appropriate form of mock professional discussion will depend on the apprentice's setting and the resources available at the time.

In designing a mock assessment, the employer/training provider should include the following elements in its planning:

- the mock professional discussion should take place in a suitable location.
- a 45-minute time slot should be available to complete the professional discussion, if it is intended to be a complete professional discussion covering all relevant standards. However, this time may be split up to allow for progressive learning.
- consider a video or audio recording of the mock professional discussion and allow it to be available to other apprentices, especially if it is not practicable for the employer/training provider to carry out a separate mock assessment with each apprentice.
- ensure that the apprentice's performance is assessed by a competent trainer/assessor, and that feedback is shared with the apprentice to complete the learning experience. Mock assessment sheets are available to download from the Highfield Assessment website and may be used for this purpose.
- use structured 'open' questions that do not lead the apprentice but allows them to express their knowledge and experience in a calm and comfortable manner.

Professional Discussion Criteria

Throughout the 45-minute professional discussion, the assessor will review the apprentice's responses against the following pass and distinction assessment criteria.

- To achieve a **pass** for this component, apprentices must achieve all pass criteria.
- To achieve a **distinction** for this component, apprentices must achieve all pass and all distinction criteria.

Behaviours	
Pass criteria covered in the professional discussion	
B1	Develops and retains trust with customers and colleagues by undertaking responsibilities in an ethical and empathetic manner
B2	Shows commitment through being punctual, reliable, diligent and professional
B3	Takes responsibility for own judgements and actions to achieve quality focussed outcomes
B4	Demonstrates drive and flexibility in fulfilling requirements of role
B5	Takes responsibility and fulfils own development and the needs of others
B6	Keeps up to date with best practice
B7	Maintains continuous professional development
B8	Works productively and engages with colleagues, clients, other trades, suppliers and the public
B9	Takes responsibility for promoting a healthy and safe working environment
B10	Gives consideration to appropriate use of resources and own actions taking into account the impact on environmental, social and economic factors
Distinction criteria covered in the professional discussion	
<i>B11</i>	<i>Uses initiative to seek continuous professional development opportunities</i>
<i>B12</i>	<i>Shows willingness to work above and beyond what is required</i>
<i>B13</i>	<i>Shares best practice with colleagues</i>

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