

T Level Technical Qualification in Building Services Engineering for Construction

**8710-353 Electrotechnical Engineering
Grade Standard Exemplification Material
Pass - Summer 2023**

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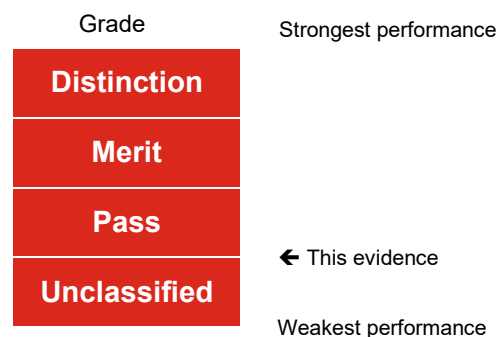
Introduction

Summer 2023 Results

This document is aimed at providers and learners to help understand the standard that was required in the summer 2023 assessment series to achieve a pass grade for the 8710-353 Electrotechnical Engineering Occupational Specialism (OS).

The aim of these materials is to provide examples of knowledge, skills and understanding that attested to pass competence in summer 2023. It is important to note that in live assessments a candidate's performance is very likely to exhibit a spikey profile and standard of performance will vary across tasks.

The Occupational Specialism is graded Distinction, Merit, Pass or Unclassified.



The pass grade boundary is based on a synoptic mark across all tasks. The materials in this Grade SEM are separated into two sections as described below. Materials are presented against a number of tasks from the assignment.

Task

This section details the tasks that the candidate has been asked to carry out. What needs to be submitted for marking and any additional evidence required including any photograph/video evidence. Candidate evidence that was or was not included in this Grade SEM has also been identified within this section.

In this Grade SEM there is candidate evidence from:

- Task 1 Planning the installation
- Task 2 Installation, commissioning and decommissioning
- Task 3 Carrying out maintenance

Candidate evidence

This section includes exemplars of candidate work, photographs of the work in production (or completed) and practical observation records of the assessment completed by centre assessors. This was evidence that was captured as part of the assessment and then internally marked by the provider assessor.

The Occupation Specialism brief and tasks can be downloaded from [here](#).

Important things to note:

- We discussed the approach to standard setting/maintaining with Ofqual and the other awarding organisations before awarding this year. We have agreed to take account of the newness of qualifications in how we award this year to recognise that students and teachers are less familiar with the assessments (Vocational and technical qualifications grading in 2023 – Ofqual blog), whilst also recognising the standards required for these qualifications.
- The evidence presented, as a whole, was sufficient to achieve the pass grade. However, performance across the tasks may vary (i.e. some tasks completed to a higher/lower standard than pass grade).

Grade descriptor

To achieve a pass (threshold competence), a candidate will be able to:

Demonstrate an acceptable performance that meets the requirement of the brief and that is required to enter the industry to begin to work in the occupational area.

Demonstrate the adequate technical skills for installing components that is in line with industry standards.

Interpret information, demonstrate planning, assess risk and follow safe working methods when applying practical skills to an acceptable standard as recognised by industry.

Demonstrate basic knowledge and understanding of the principles and processes required for Electrotechnical Engineering.

Work safely showing an understanding in the selection and use of tools and equipment and demonstrate a basic awareness of straightforward preparation and application processes.

Attempt some complex tasks and the level of performance mostly meets an acceptable level.

Identify causes of faults and have some knowledge and skills in how to locate and rectify them.

Mostly use industry terminology accurately in both written and verbal contexts.

Task 1 Planning the installation

Assessment number (eg 1234-033)	8710-353
Assessment title	Electrotechnical Engineering Occupational Specialism

Candidate name	<first name> <surname>
City & Guilds candidate No.	ABC1234

Provider name	<provider name>
City & Guilds provider No.	999999a

Task(s)	1
Evidence title / description	<ul style="list-style-type: none">• Completed design grid (Figure 3) and supporting calculations on a separate sheet• Completed maximum demand and diversity schedule (Figure 4)• Completed earth fault loop impedance schedule (Figure 5)• Completed materials take-off sheet (Figure 6)• Completed risk assessment (Figure 7)
Date submitted by candidate	DD/MM/YY

Task 1

Assessment themes:

- Health and safety
- Design and planning
 - Documentation
 - Technical information
- Systems and components
 - Installation
 - Decommissioning
- Reports and information

- a) Complete the design grid as in **Figure 3**. Any assumptions made in order to complete the design must be listed on a separate sheet with justifications.
- b) Complete the maximum demand and diversity schedule in **Figure 4** ensuring you give reasons and justifications for your application.
- c) Complete the earth fault loop impedance schedule in **Figure 5** based on the design drawings in **Figures 1 and 2**, and the installation design schedule in **Figure 3**.
- d) Complete the materials take off sheet in **Figure 6** based on the installation drawings in **Figures 1 and 2** and your design grid **Figure 3**.
- e) Complete the risk assessment in **Figure 7** for the installation.

Additional evidence of candidate performance that must be captured for marking:

- Tutor/assessor's notes of the candidates referencing and research describing the methods used to reference or research information and how information was used or processed.

Candidate evidence

Task 1 Figure 3 – Design Grid

Candidate name:

City & Guilds enrolment number:

Consumer unit located in cupboard in shop VOLTAGE DROP TO COMPLY WITH BS 7671	Nominal voltage (U/U ₀) 230 V			Earthing arrangement TN-C-S		External earth fault loop impedance (Z _e) 0.35 Ω		
Circuit	1	2	3	4	5	6	7	8
Description	Ring-final first floor sockets	Radial-final ground floor store/kitchen sockets	Radial-final ground floor shop sockets west side	Radial-final ground floor shop sockets east side	Electric cooker 11.5 kW	Lighting ground floor sales area	Lighting ground floor store, kitchen/toilet	Lighting first floor accommodation and staircase
Number of outlets	15	6	9	7	1	9	5	
Type of wiring	70 °C thermoplastic multi-core flat profile	70 °C thermoplastic single-core non-sheathed	70 °C thermoplastic single-core non-sheathed	70 °C thermoplastic single-core non-sheathed	70 °C thermoplastic multi-core flat profile	70 °C thermoplastic multi-core flat profile	70 °C thermoplastic multi-core flat profile	70 °C thermoplastic multi-core flat profile
Design current (I _b)	32 A	15 A	20 A	20 A	22 A	2.1 A	1.6 A	3.1 A
Type and nominal rating (I _n)	32 A B	20 A B	20 A C	20 A C	25 A	6 A B	6 A C	6 A B
Length (metres)	68 m loop	26 m	19.5 m	8	12 m	15 m	18 m	40 m
Installation method	102	B	B	B	102	B	B	101
Ambient temperature °C	25 °C	25 °C	25 °C	25 °C	30 °C	30 °C	30 °C	30 °C

Rating factor Ambient air temp. C_a	1.03	1.03	1.03	1.03	1	1	1	1
Total circuits in group	1	2	2	2	1	1	1	1
Rating factor grouping C_g	1	0.8	0.8	0.8	1	1	1	1
Minimum current capacity ($<I_i$)	31.07	$\frac{13.4}{1.03} = 13.01$	24.2	24.2	22	6	6	6
mV/A/m	6.4	29	11	11	18	29	29	29
Actual voltage drop	3.4816	11.31	4.29	1.25	4.753	0.9135	0.8352	3.596
Minimum conductor csa mm^2	6 mm^2	1.5 mm	4 mm	4 mm	2.5 mm^2	1 mm^2	1 mm^2	1 mm^2

Task 1 Figure 4 – Maximum Demand and Diversity Schedule

Candidate name:

City & Guilds enrolment number:

Circuit design current (A)	Diversity applied (% or factor)	Demand following diversity (A)	Reason for diversity application
1. 32 A	100%	32 A	Take 100% from the biggest circuit
2. 15 A	70%	10.5 A	$15 \times 0.7 = \cancel{10.5 A}$ 70% of other circuits $10.5 A$
3. 20 A	N/A	20 A	
4. 20 A	+70% 70%	14 A	$20 \times 0.7 = 14 A$
5. 22 A	N/A	22 A	

6. 2.1	90%	1.89 A	90 % of total current demand
7. 1.6 A	90%	1.44 A	90% of total current demand
8. 3.1 A 805.8	66%	2.046	66% = 2.046 60% of other circuits
Maximum demand (A)	115.8	Maximum demand after diversity (A)	103.876
Maximum demand (kVA)	26.643	Maximum demand after diversity (kVA)	103876

Task 1 Figure 5 – Earth Fault Loop Impedance Schedule

Candidate name:

City & Guilds enrolment number:

Circuit	Protective device	Circuit length	R ₁ +R ₂ at operating temperatures	Z _s	Maximum permitted Z _s (BS7671)	Calculations/comments
1. Ring final circuit first floor socket-outlets	32 A B Type BS EN 61009	68 m loop /4 = 17	3.4816 3.354128 3.35 $\frac{3.35 \times 1.20}{1000}$ $= 0.125664$	0.41	41.3 1.31Ω	6.4 $\frac{6.4 \times 17 \times 32}{1000} = 3.4816 + 0.35 = 3.8316$ COPPER = 6.16 6.16 $\frac{6.16 \times 32 \times 17}{1000} = 1.7312$ $\frac{6.16 \times 1.20 \times 17}{1000} = 0.125664$ $1.7312 + 0.125664 = 1.856864$ $1.856864 + 0.35 = 2.206864$


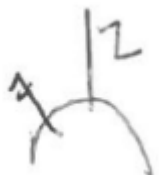


4. Radial -final groun d shop socket s east side	20 A C Type BS EN 61009	12 mm	$\frac{9.22 \times 1.20}{1000}$ $\frac{9.22 \times 1.20}{1000}$ $= 0.011064$	0.48	2.19-2 Table 4r	$4 = \text{CSA}$ $\text{COPPER} - 9.22$ 1.20 $\frac{11 \times 8 \times 20}{1000} = 1.76$ $1.76 + 0.35 = 1.795$ $\frac{9.22 \times 1.20}{1000}$ $= 1.4752$ $= 0.08$ $+ 0.35$ $= 0.435$
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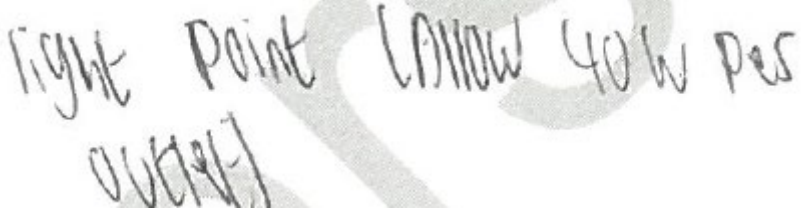

Task 1 - Figure 6 - Materials Take off Sheet (relating to Figures 1, 2 and 3)




This sheet may be reproduced as many times as necessary

Candidate name:

City & Guilds enrolment number:

Symbol	Description	Quantity
	1 gang 13 A un-switched socket-outlet for fridge-freezer controlled by FCO above worktop	1
	2 gang 13 A switched socket outlet	35
	Cord operate light switch	1
	Two way light switch	4

	<p>Multi-gang light switch</p>	<p>1</p>
	<p>1 gang light switch </p>	<p>7</p>
	<p>light point </p>	<p>8</p>
	<p>10 W recess LED luminaire</p>	<p>9</p>

	<p>3x18W 1200mm surface Modular Luminaires 1.2, 1mm sem down</p>	<p>9</p>
	<p>2x35W 1500mm LED button Luminaires</p>	<p>5</p>
	<p>Consumer unit</p>	<p>1</p>

Task 1 - Risk Assessment

This risk assessment form may be modified by adding items only

Candidate name:

City & Guilds enrolment number:

Activity: Design, planning, installation Location: Shop		Date: Position: Engineer					
SEVERITY (S): Degree of harm which may be caused (including numbers affected) 1 Minor Injury 2 Major Injury 3 Fatality					RISK RATING (RR): Severity x Likelihood 1-2 Low 3-5 Medium 6-9 High		
LIKELIHOOD (L): Probability that event will occur 1 Remote 2 Possible 3 Likely							
Item No:	Activity	Hazard	Persons at Risk	Existing Controls (Mitigation)	S 1-3	L 1-3	RR
1	Pulling out old cable	Asbestos from old walls	Worker	Make sure building is free of asbestos	2	2	4
2	Working at height	Falling, death	Worker/anyone below	Check ladders before use for any defects	3	2	6
3	Installing cables	Electrocution	Worker	Make sure the power is turned off	2	1	2
4	Testing	Electrocution	Worker	Make sure workers know how to test	1	1	1
5	Taking out chunking	Falling objects	Worker	Safety check if any loose objects	1	1	1

Completed PO Form

Practical Observation (PO) Form (Task 1)

8710-33 T Level Technical Qualification in Building Services Engineering for Construction

8710-353 Electrotechnical Engineering (Summer 2023)

Candidate name	<first name> <surname>
City & Guilds candidate No.	ABC1234
Date	14/03/2023

Provider name	<provider name>
City & Guilds Provider No.	999999a

Task 1 assessment themes:

- Health and safety
- Design and planning
 - Documentation
 - Technical information
- Systems and components
 - Installation
 - Decommissioning
- Reports and information

Record observation notes below to inform internal marking and external moderation. Notes must be detailed, accurate and differentiating which use terminology from the mark grid along with specific examples observed. Notes must identify areas of strength and weakness, distinguish between different qualities of performance and to facilitate accurate allocation of marks once all evidence has been submitted.


Assessment Themes	Assessor observation notes
Health and safety <ul style="list-style-type: none">•Risk assessment•Risk mitigation•Harm and probability factors•Adherence to health and safety	The learner has shown a good understanding for health and safety. This was shown in the risk assessment table.

<p>Design and planning (documentation)</p> <ul style="list-style-type: none"> • Quality of planning and design • Quality of documentation • Accuracy • Symbols, abbreviations and terminology • Adherence to industry standards 	<p>The learner was able to determine earth fault loop impedance.</p> <p>They designed and planned the project based on BS7671. The quality was good and they fairly documented the work. The accuracy was sound and the results fine. The symbols were fair as well for the abbreviations and terminology. The works shows that the learner has got the minimum understanding for design.</p> <p>The design was up to the industry standards.</p>
<p>Design and planning (technical information)</p> <ul style="list-style-type: none"> • Assessment of general characteristics • Link to installation drawings • Calculations • Understanding of BS 7671 • Selection of luminaires • Identification, descriptions and quantities of items • Diagrams • Calculations • Clarity of work 	<p>The learner was able to get a rough general characteristics assessment.</p> <p>The link to installation drawings was weak.</p> <p>The calculations are not clear on the step by step.</p> <p>The learner has shown basic knowledge and understanding of the BS7671</p> <p>The selection of luminaires was appropriate.</p> <p>The identification, description and quantities were fair yet poor. The learner has taken the take of sheet from a general perspective.</p> <p>The diagrams were sound.</p> <p>The calculations lead to an acceptable answer, yet they were not detailed.</p> <p>The work wasn't clear yet understandable.</p>
<p>Systems and components (installation)</p> <ul style="list-style-type: none"> • Adherence to industry standards • Sequencing • Component selection • Installation skills • Selection and use of tools • Reference to / follows manufacturer's instructions • Measurement • Adherence to design spec 	<p>The learner has shown a fair understanding of the information and it was processed to finish the task.</p>

Systems and components (decommissioning) <ul style="list-style-type: none"> • Sequencing • Damage to parts • Removal techniques • Designation and categorisation for disposal 	The learner briefly explained the different ideas about the decommissioning process. A fair process of the information has been noted.
Reports and information <ul style="list-style-type: none"> • Terminology • Explanations / reasoning • Accuracy of certification and schedules 	The learner was able to use the correct terminology.

Any other aspects

The learner has submitted a fair work overall.

Internal assessor signature	Date
	16/03/2023

If completing electronically, double click next to the 'X' to add an electronic signature once the record is **finalised**.

Task 2 Installation, commissioning and decommissioning

Assessment number (eg 1234-033)	8710-353
Assessment title	Electrotechnical Engineering Occupational Specialism

Candidate name	<first name> <surname>
City & Guilds candidate No.	ABC1234

Provider name	<provider name>
City & Guilds provider No.	999999a

Task(s)	2
Evidence title / description	Completed Electrical Installation Certificate and associated documents.
Date submitted by candidate	DD/MM/YY

Task 2

Assessment themes:

- Health and safety
- Systems and components
 - Documentation
 - Technical information
- Reports and information
- Inspecting and testing of systems and components
- Handover and communication

a) Installation

Candidates must:

- Complete the installation in accordance with the drawing (**Figure 8**) and to the dimensions agreed with your tutor/assessor.

All cables and wiring systems **must** be terminated and installed in accordance with BS 7671. All terminations, joints and couplings must be mechanically secure and electrically continuous where applicable. Wastage must be minimised as far as possible.

b) Inspection, testing and commissioning

Candidates must:

- Carry out safe isolation to the distribution board prior to commencement of the installation initial verification.
- Carry out an inspection and complete the inspection schedule for initial verification.
- Carry out the full range of applicable tests, in the correct sequence, to the completed installation. Permission must be obtained from the tutor/assessor before proceeding with any tests involving switching on the supply.
- Use instruments safely and in accordance with manufacturer's information and HSE GS38.
- Complete a schedule of test results for the results obtained.
- Compare results with BS 7671 and design criteria.
- Complete the Electrical Installation Certificate for this installation.
- Carry out a handover of the installation with the tutor/assessor as the client.

All work must be to current standards and carried out in accordance with all health and safety requirements. Any unsafe actions will result in termination of this assessment.

The tutor/assessor must be satisfied that the work complies with BS 7671 and is electrically safe prior to the circuits being energised and tested for function.

- Ensure the workspace is made good, including filling, sanding and painting any holes or damage to the building fabric.
- Following dismantling, consideration must be given to sustainability and recycling.

c) Decommissioning

Once the installation has been completed, checked and verified by the client (tutor/assessor) candidates must

- Decommission in a safe manner ensuring safe isolation.
- Ensure the workspace is made good, including filling, sanding and painting any holes or damage to the building fabric. This does not include the holes made in the plasterboard.
- Undertake a professional discussion with the client (tutor/assessor) on the correct methods for recycling or disposing of waste.

Additional evidence of candidate performance that must be captured for marking:

- Tutor/assessor feedback on performance
- Photographs showing the installed work clearly (not the candidate) taken at the following intervals:
 - **Installation:**
 - 2 hours
 - 4 hours
 - 6 hours
 - 10 hours and on completion
 - **Commissioning:**
 - During a test for Z_s for the distribution circuit (Z_{db}) at DB
 - **Decommissioning:**
 - On completion

Installed components are to be installed to required standards, with photographic evidence confirming accuracies and attention to details.

Candidate evidence

Completed Electrical Installation Certificate

Certificate No.:

PARTICULARS OF SIGNATORIES TO THE ELECTRICAL INSTALLATION CERTIFICATE			
Designer (No 1) Name: [REDACTED] Company: [REDACTED]		Address: [REDACTED] Postcode: [REDACTED] Tel No: [REDACTED]	
Designer (No 2) Name: [REDACTED] Company: [REDACTED]		(if applicable) Address: [REDACTED] Postcode: [REDACTED] Tel No: [REDACTED]	
Constructor Name: [REDACTED] Company: [REDACTED]		Address: [REDACTED] Postcode: [REDACTED] Tel No: [REDACTED]	
Inspector Name: [REDACTED] Company: [REDACTED]		Address: [REDACTED] Postcode: [REDACTED] Tel No: [REDACTED]	
SUPPLY CHARACTERISTICS AND EARTHING ARRANGEMENTS			
Earthing arrangements	Number and Type of Live Conductors	Nature of Supply Parameters	Supply Protective Device
TN-C <input type="checkbox"/> TN-S <input type="checkbox"/> TN-C-S <input checked="" type="checkbox"/> TT <input type="checkbox"/> IT <input type="checkbox"/>	AC <input checked="" type="checkbox"/> DC <input type="checkbox"/> 1-phase, 2-wire <input checked="" type="checkbox"/> 2-wire <input type="checkbox"/> 2-phase, 3-wire <input type="checkbox"/> 3-wire <input type="checkbox"/> 3-phase, 3-wire <input type="checkbox"/> Other <input type="checkbox"/> 3-phase, 4-wire <input type="checkbox"/> Confirmation of supply polarity <input type="checkbox"/>	Nominal voltage, U / U ⁽²⁾ <u>230</u> V Nominal frequency, f ⁽¹⁾ <u>50</u> Hz Prospective fault current, I _p ⁽²⁾ <u>0.998</u> kA External earth fault loop impedance, Z _e ⁽²⁾ <u>0.23</u> Ω <small>(Note: (1) by enquiry (2) by enquiry or by measurement)</small>	BS (EN) <u>60691-5</u> Type <u>B3</u> Rated current <u>63</u> A
Other sources of supply (as detailed on attached schedule) <input type="checkbox"/>			
PARTICULARS OF INSTALLATION REFERRED TO IN THE CERTIFICATE			
Means of Earthing Distributor's facility <input checked="" type="checkbox"/> Installation earth electrode <input type="checkbox"/>	Maximum Demand Maximum demand (load) <u>63</u> kVA / Amps (Delete as appropriate)		
	Details of Installation Earth Electrode (where applicable) Type (e.g. rod(s), tape etc) <u>N/A</u> Location <u>N/A</u> Electrode resistance to Earth		
Main Protective Conductors			
Earthing conductor	Material <u>COPPER</u> csa <u>6</u> mm ²	Connection / continuity verified <input checked="" type="checkbox"/>	
Main protective bonding conductors	Material <u>COPPER</u> csa <u>6</u> mm ²	Connection / continuity verified <input checked="" type="checkbox"/>	
To water installation pipes <input type="checkbox"/> To gas installation pipes <input checked="" type="checkbox"/> To oil installation pipes <input type="checkbox"/> To structural steel <input type="checkbox"/> To lightning protection <input type="checkbox"/> To other <input type="checkbox"/> Specify			
Main switch / Switch-fuse / Circuit-breaker / RCD			
Location BS (EN) <u>6069-1</u> No of poles <u>1</u>	Current rating <u>100</u> A Fuse / device rating or setting <u>100</u> A Voltage rating <u>230</u> V	If RCD main switch RCD Type <u>N/A</u> Rated residual operating current (I _{Δn}) mA Rated time delay ms Measured operating time ms	

Schedule of Inspections					
Item No.	Description	Outcome ✓ / N/A	Item No.	Description	Outcome ✓ / N/A
1.0	Condition of consumer's intake equipment (Visual inspection only)	✓	8.0	Circuits (Distribution and Final)	✓
			9.0	Isolation and switching	✓
2.0	Parallel or switched alternative sources of supply	N/A	10.0	Current-using equipment (permanently connected)	✓
3.0	Protective measure: Automatic Disconnection of Supply (ADS)	N/A			11.0
4.0	Basic protection	✓	12.0	Location(s) containing a bath or shower	✓
5.0	Protective measures other than ADS	✓	13.0	Other special installations or locations	N/A
6.0	Additional protection	✓	14.0	Prosumer's low voltage electrical installation(s)	N/A
7.0	Distribution equipment	✓			N/A

COMMENTS ON EXISTING INSTALLATION (in the case of an addition or alteration see Regulation 644.1.2):

.....

.....

.....

.....

.....

.....

SCHEDULES

This Certificate is valid only when Schedules of Circuit Details and Test Results are attached. (Enter quantities of schedules attached).

ELECTRICAL INSTALLATION CERTIFICATE
(REQUIREMENTS FOR ELECTRICAL INSTALLATIONS - BS 7671)

Certificate No.:

DETAILS OF THE CLIENT	
INSTALLATION ADDRESS	
DESCRIPTION AND EXTENT OF THE INSTALLATION	
Description of installation: 2 way lighting circuit, ringmain, Radial circuit	New installation <input checked="" type="checkbox"/>
Extent of installation covered by this Certificate: All	Addition to an existing installation <input type="checkbox"/>
(Use continuation sheet if necessary)	Alteration to an existing installation <input type="checkbox"/>
See continuation sheet No:	
FOR DESIGN	
I/We, being the person(s) responsible for the design of the electrical installation (as indicated by my/our signatures below), particulars of which are described above, having exercised reasonable skill and care when carrying out the design, hereby CERTIFY that the design work for which I/we have been responsible is to the best of my/our knowledge and belief in accordance with BS 7671:2018, amended to 2017 (date) except for the departures, if any, detailed as follows:	
Details of departures from BS 7671 (Regulations 120.3, 133.1.3 and 133.5):	
Details of permitted exceptions (Regulation 411.3.3). Where applicable, a suitable risk assessment(s) must be attached to this Certificate. Not applicable	
Risk assessment attached <input type="checkbox"/>	
The extent of liability of the signatory or signatories is limited to the work described above as the subject of this Certificate.	
For the DESIGN of the installation:** (Where there is mutual responsibility for the design)	
Signature: [Redacted]	Date: 29/05/23 Name (IN BLOCK CAPITALS): [Redacted] Designer No 1
Signature: [Redacted]	Date: 29/05/23 Name (IN BLOCK CAPITALS): [Redacted] Designer No 2**
FOR CONSTRUCTION	
I, being the person responsible for the construction of the electrical installation (as indicated by my signature below), particulars of which are described above, having exercised reasonable skill and care when carrying out the construction hereby CERTIFY that the construction work for which I have been responsible is to the best of my knowledge and belief in accordance with BS 7671:2018, amended to 2017 (date) except for the departures, if any, detailed as follows:	

- VII -

FOR INSPECTION AND TESTING

I, being the person responsible for the inspection & testing of the electrical installation (as indicated by my signature below), particulars of which are described above, having exercised reasonable skill and care when carrying out the inspection & testing hereby CERTIFY that the work for which I have been responsible is to the best of my knowledge and belief in accordance with BS 7671:2018, amended to.....(date) except for the departures, if any, detailed as follows:

Details of departures from BS 7671 (Regulations 120.3 and 133.5):

The extent of liability of the signatory or signatories is limited to the work described above as the subject of this Certificate.

For INSPECTION AND TESTING of the installation:

Signature: Date: 29/05/23 Name (IN BLOCK CAPITALS) Inspector

NEXT INSPECTION

I/We, the designer(s), recommend that this installation is further inspected and tested after an interval of not more than years/months.

GENERIC SCHEDULE OF CIRCUIT DETAILS

Certificate/Report No.:

Distribution board details
 DB reference: 1 Location: bay 8 Supplied from: mains
 Distribution circuit OCPD: BS (EN): 60047-3 Type: B Rating/Setting: 100 A
 SPD Details: Type(s)*: T1 T2 T3† N/A

CIRCUIT DETAILS

1 Circuit number	2 Circuit description	3 Conductor details					4 Overcurrent protective device					5 RCD			
		3 Type of wiring	4 Reference method†	5 Number of points served	6 Number & size		7 BS (EN)	8 Type	9 Rating (A)	10 Breaking capacity (kA)	11 Maximum permitted Z _s (Ω) [‡]	12 BS (EN)	13 Type	14 I _{Δn} (mA)	15 Rating (A)
					6 Live (mm ²)	7 cpc (mm ²)									
1	Ring main circuit	A	B	4	2.5	2.5	61009-1	B	32	6	1.37	X	B	30	32 A
2	Ring main circuit	A	B	4	2.5	2.5	61009-1	B	20	6	2.19	X	B	30	20 A
3	2 way lighting	A	B	3	1	1	61009-1	B	6	10	2.25	X	B	30	6 A

CODES FOR TYPES OF WIRING								
A	B	C	D	E	F	G	H	O
Thermoplastic insulated/ sheathed cables	Thermoplastic cables in metallic conduit	Thermoplastic cables in non-metallic conduit	Thermoplastic cables in metallic trunking	Thermoplastic cables in non-metallic trunking	Thermoplastic SWA cables	Thermosetting SWA cables	Mineral insulated cables	Other - please state

* SPD Type. Where a combined T1 + T2 or T2 + T3 device is installed, indicate by ticking both Type boxes.
 † Where a T3 SPD is installed to protect sensitive equipment, enter details in 'Remarks', column 31, of the Schedule of Test Results. (See Section 534 of BS 7671:2018+A2:2022.)
 ‡ See Table 4A2 of Appendix 4 of BS 7671:2018+A2:2022.
 § Where the maximum permitted earth fault loop impedance value stated in column 12 is taken from a source other than the tabulated values given in Chapter 41 of BS 7671:2018+A2:2022, state the source of the data in the appropriate cell for the circuit in the 'Remarks', column 31, of the Schedule of Test Results.

GENERIC SCHEDULE OF TEST RESULTS

Certificate/Report No.:

<p>Distribution board details</p> <p>DB reference: Z_{db} 0.32 Ω I_{μ} 0.75 kA</p> <p>Confirmed: Correct polarity <input type="checkbox"/> Phase sequence <input type="checkbox"/></p> <p>SPD: Operational status confirmed[¶] <input type="checkbox"/> N/A <input type="checkbox"/></p>	<p>Details of test instruments used (serial and/or asset numbers)</p> <p>Multifunction: MASJ85 MFB</p> <p>Continuity:</p> <p>Insulation resistance:</p> <p>Earth fault loop impedance:</p> <p>RCD:</p> <p>Earth electrode resistance:</p>
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TEST RESULT DETAILS

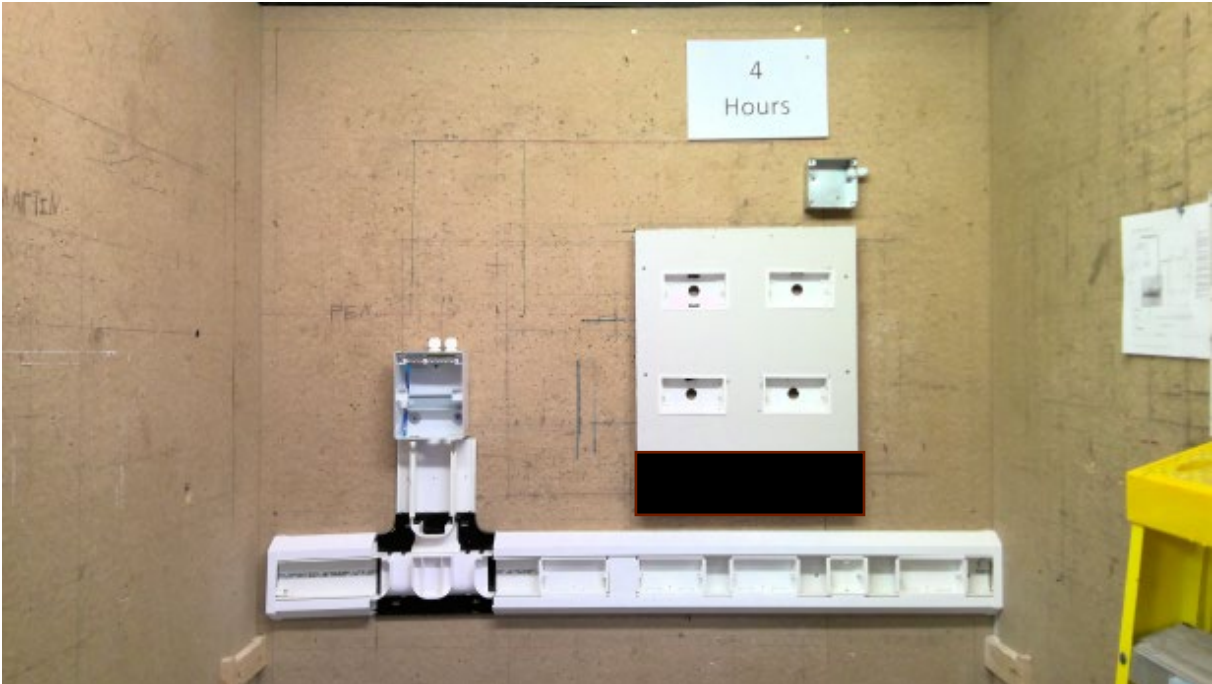
17 Circuit number	Continuity (Ω)					Insulation resistance			26 Polarity#	Z_s (Ω)		RCD		AFDD	31 Remarks Include details of circuits and/or installed equipment vulnerable to damage when testing (continue on a separate sheet if necessary)
	Ring final circuit			$(R_1 + R_2)$ or R_2		23 Test voltage (V)	24 Live - Live (M Ω)	25 Live - Earth (M Ω)		27 Maximum measured	28 Disconnection time (ms)**	29 Test button operation	30 Manual test button operation		
	18 r_1 (line) (Ω)	19 r_n (neutral)	20 r_2 (opc)	21 $(R_1 + R_2)$	22 R_2										
1	0.01	0.01	0.05	0.31	N/A	500	>999	>999	✓	0.33	28.3	✓		Zs (calculated on all circuits)	
2	N/A	N/A	N/A	0.01	N/A	500	>999	>999	✓	0.33	28.2	✓			
3	N/A	N/A	N/A	0.01	N/A	500	>999	>999	✓	0.33	1.9	✓			

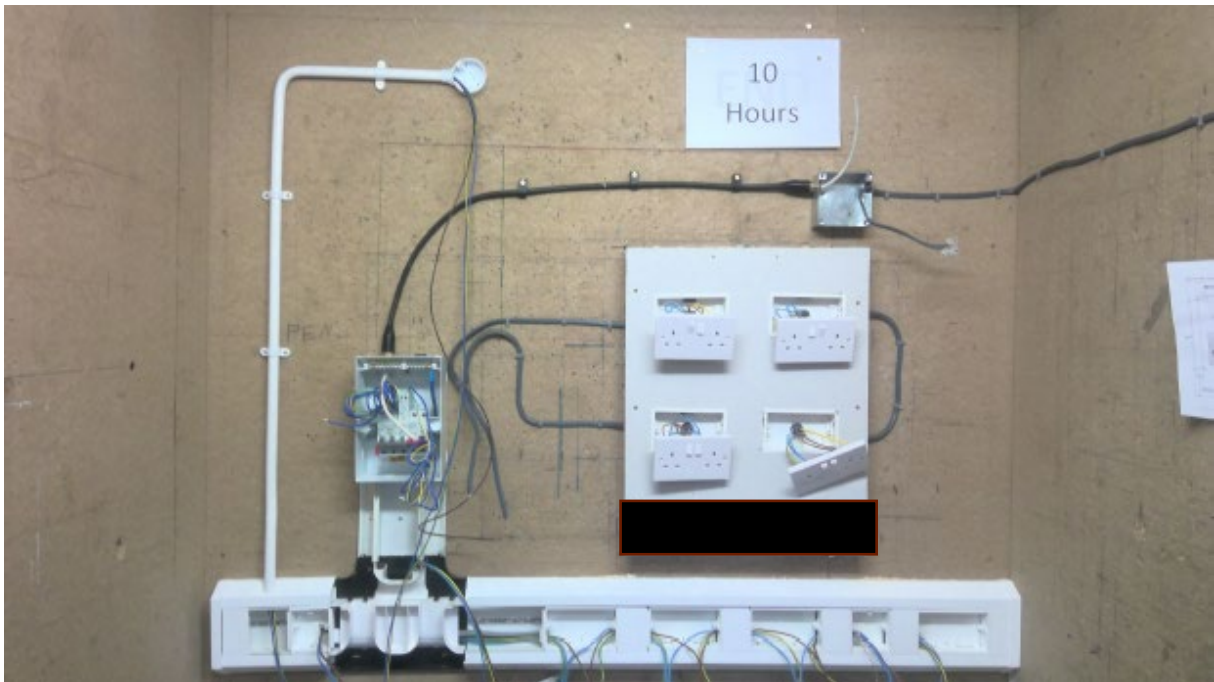
Tested by name (Capitals): [Redacted]

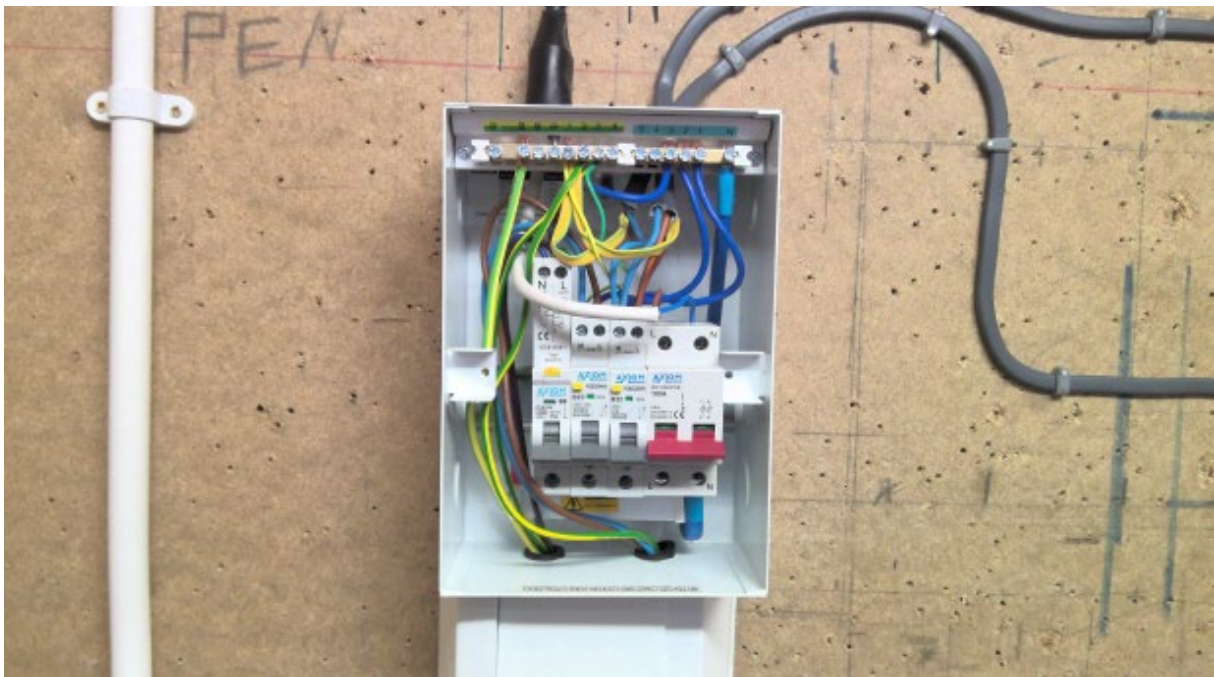
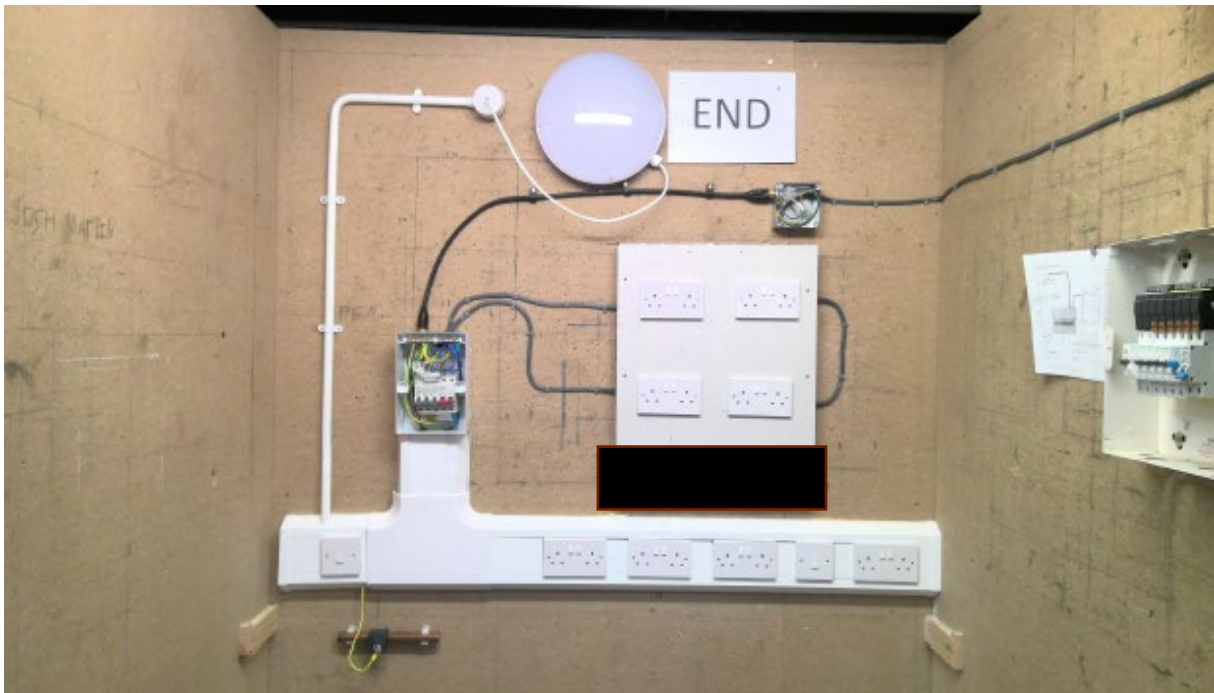
Signature: [Redacted] Date: 29/03/2022

¶ Not all SPDs have visible functionality indication.
 # An 'X', denoting incorrect polarity, cannot be entered on to this schedule when issued with an Electrical Installation Certificate.
 ** RCD effectiveness is verified using an alternating current test at rated residual operating current ($I_{\Delta n}$).

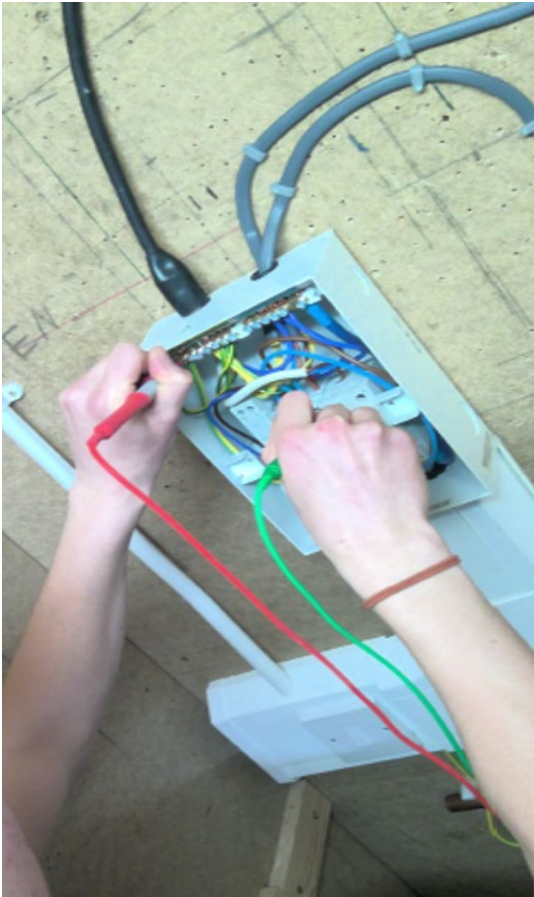
Photographic evidence











Completed PO Form

Practical Observation (PO) Form (Task 2)

8710-33 T Level Technical Qualification in Building Services Engineering for Construction

8710-353 Electrotechnical Engineering (Summer 2023)

Candidate name	<first name> <surname>
City & Guilds candidate No.	ABC1234
Date	21/03/2023

Provider name	<provider name>
City & Guilds Provider No.	999999a

Task 2 assessment themes:

- Health and safety
- Systems and components
 - Documentation
 - Technical information
- Reports and information
- Inspecting and testing of systems and components
- Handover and communication

Record observation notes below to inform internal marking and external moderation. Notes must be detailed, accurate and differentiating which use terminology from the mark grid along with specific examples observed. Notes must identify areas of strength and weakness, distinguish between different qualities of performance and to facilitate accurate allocation of marks once all evidence has been submitted.

Assessment theme	Assessor observation notes
Health and safety <ul style="list-style-type: none">• Risk assessment• Risk mitigation• Harm and probability factors• Adherence to health and safety	Health and safety were taken seriously during the installation, inspection and testing. Correct PPE used through the whole task Identification of the source and checking the safety of operation using the correct equipment.

<p>Systems and components (Installation)</p> <ul style="list-style-type: none"> • Installation procedure • Appropriate component selection • Confidence and competence displayed in installation process • Ability to use appropriate tools • Following manufacturer's instructions 	<p>The installation procedure was logical. Terminations were secure and fitted safely Some of the connections needed some further work and that was addressed in the inspection and testing phase (Earthing connections) The learner was confident and asked minimum questions Good selection of tools and equipment for the installation. Only the gland plier was missing from the initial tools list. Good use of the appropriate tools. The learner has shown a good level in using tools and equipment Some of the measurements were tolerated what lead to repetition and wastage Manufacturer's instructions were followed appropriately All components were fitted aesthetically pleasant. The finishing was a passing level.</p>
<p>Systems and components (Decommissioning)</p> <ul style="list-style-type: none"> • Consideration of implications of sequence • Salvage of materials for recycling • Designation and categorisation for disposal 	<p>Decommissioning was done in a clean and logical way. The place was clean and tidy and all components were disposed correctly.</p>
<p>Reports and information</p> <ul style="list-style-type: none"> • Technical language / industry terminology • Accuracy and detail of certification and schedules 	<p>The learner was able to understand and communicate technical terminology. The certification and associated documents were accurate.</p>
<p>Inspecting and testing of systems and components</p> <ul style="list-style-type: none"> • Knowledge and understanding of electrical principles and processes • Guidance required • Interpretation of information • Planning • Risk assessing • Safety • Inspection techniques 	<p>The learner has shown a basic understanding for electrical knowledge and how to implement it in installation then inspection and testing (earthing connections) Guidance was moderate through the whole procedure. The information gathered was understood and the learner was able to briefly explain it. The plan for the inspection and testing was good taking into consideration all the risks. Safety was considered during the dead test and the live one. Inspection techniques were followed logically and sequentially. The technical and practical skills have shown to be limited yet good.</p>

<ul style="list-style-type: none"> • Reference to / follows manufacturer's instructions • Technical/practical skills • Sequencing • Links between knowledge and practical • Tolerances / quality • Use of tools and plant • Testing sequence 	<p>The link between the knowledge and practical was experimented and the learner has shown a moderate understanding</p> <p>The quality of work was good. The tolerances were good, and all the values were acceptable.</p> <p>The learner knew the different tools and equipment and in most of the settings used to do the testing</p> <p>The testing sequence was logical, in the right order. The learner was straightforward with it.</p>
<p>Handover and communication</p> <ul style="list-style-type: none"> • Detail / explanations • Consideration of client perspective • Communication style • Customer care skills 	<p>The explanation was limited yet beneficial.</p> <p>The client consideration was taken into consideration. The communication was fair and straightforward.</p> <p>The customer care skills were alright. The learner had the basic skills to explain, communicate and negotiate with the customer.</p> <p>The handover process covered briefly the maintenance schedule and next time to test the installation.</p>

Any other aspects

The learner has shown a good level in practical work, however communication and handover was challenging and very limited.

Internal assessor signature	Date
	29/03/2023

If completing electronically, double click next to the 'X' to add an electronic signature once the record is **finalised**.

Task 3 Carrying out maintenance

Assessment number (eg 1234-033)	8710-353
Assessment title	Electrotechnical Engineering Occupational specialism

Candidate name	<first name> <surname>
City & Guilds candidate No.	ABC1234

Provider name	<provider name>
City & Guilds provider No.	999999a

Task(s)	3
Evidence title / description	Six completed report cards.
Date submitted by candidate	DD/MM/YY

Task 3

Assessment themes:

- Health and safety
- Systems and components
 - Documentation
 - Technical information
- Reports and information
- Handover and communication
- Working with faults

Candidates must carry out the following for a **minimum** of **six** faults. All work must be undertaken with the installation fully isolated.

Fault tables for this task can be found in the Assessor Guide to Test Rigs document. This document must not be shared with candidates.

For each fault, candidates must:

- Select a job card from the range offered by the tutor/assessor
- Copy the job card reference number onto the blank report sheet in **Figure 9**
- Identify from the range of equipment given, necessary items that will be required in order to prepare and diagnose the fault description provided
- Carry out checks to test equipment prior to using it
- Locate the fault, using a logical process
- Complete the report sheet to evidence the following:
 - Description of work done to find the fault
 - Tests carried out to locate the fault (if any)
 - The nature of the fault
 - Brief description of actions required, including materials and time required to rectify the fault
 - Further actions required to ensure rectification is suitable.

All work **must** be to current standards and carried out in accordance with **all** health and safety requirements. Any unsafe actions will result in termination of assessment.

Additional evidence of candidate performance that must be captured for marking:

- Tutor/assessor feedback on performance of diagnostic techniques
- Tutor/assessor observations.

Candidate evidence

Figure 9 - Fault Report Sheet

Task 3 Fault Report Sheet	
Job card reference number: 1	
Candidate name:	Date of assessment:
Description of work done/ tests carried out to locate fault (if any) Continuity test between consumer unit and light	
The nature of the fault Broken neutral	
Brief description including materials required to fix the fault New neutral	
Actions required to ensure rectification is suitable Install a new neutral cable	

Task 3 Fault Report Sheet

Job card reference number: 2

Candidate name:

Date of assessment:

Description of work done/ tests carried out to locate fault (if any)

Continuity test of main earth boiler

The nature of the fault

Break in main
earth between boiler room and house

Brief description including materials required to fix the fault

New main earth cable

Actions required to ensure rectification is suitable

Replace main earth boiler to main consumer unit

Task 3 Fault Report Sheet

Job card reference number: 3

Candidate name:

Date of assessment:

Description of work done/ tests carried out to locate fault (if any)

Continuity testing

The nature of the fault

RCD wouldn't reset because earth and line are touching

Brief description including materials required to fix the fault

New cable

Actions required to ensure rectification is suitable

Reset RCBO

Task 3 Fault Report Sheet

Job card reference number: 4

Candidate name:

Date of assessment:

Description of work done/ tests carried out to locate fault (if any)

Continuity between 2 main
earths

The nature of the fault

Break in the main earthing cable

Brief description including materials required to fix the fault

New main earth cable

Actions required to ensure rectification is suitable

Replace the main earth

Task 3 Fault Report Sheet

Job card reference number: 5

Candidate name:

Date of assessment:

Description of work done/ tests carried out to locate fault (if any)

Continuity test

The nature of the fault

Voltage drop

Brief description including materials required to fix the fault

Bigger cable needs to be installed

Actions required to ensure rectification is suitable

Replace cable

Task 3 Fault Report Sheet

Job card reference number: 6

Candidate name:

Date of assessment:

Description of work done/ tests carried out to locate fault (if any)

Continuity between earth and pipe

The nature of the fault

Break in earth bonding

Brief description including materials required to fix the fault

New earth cable installed

Actions required to ensure rectification is suitable

Connect earth

Completed PO Form

Practical Observation (PO) Form (Task 3)

8710-33 T Level Technical Qualification in Building Services Engineering for Construction

8710-353 Electrotechnical Engineering (Summer 2023)

Candidate name	<first name> <surname>
City & Guilds candidate No.	ABC1234
Date	10/5/2023

Provider name	<provider name>
City & Guilds Provider No.	999999a

Task 3 assessment themes:

- Health and safety
- Systems and components
 - Documentation
 - Technical information
- Reports and information
- Handover and communication
- Working with faults

Record observation notes below to inform internal marking and external moderation. Notes must be detailed, accurate and differentiating which use terminology from the mark grid along with specific examples observed. Notes must identify areas of strength and weakness, distinguish between different qualities of performance and to facilitate accurate allocation of marks once all evidence has been submitted.

Assessment theme	Assessor observation notes
Health and safety <ul style="list-style-type: none">• Risk assessment• Risk mitigation• Harm and probability factors• Adherence to health and safety	The learner wearing partial PPE. Started working directly.

Systems and components (Installation) <ul style="list-style-type: none"> • Installation procedure • Appropriate component selection • Confidence and competence displayed in installation process • Ability to use appropriate tools • Following manufacturer's instructions 	The learner picked the right tools when needed.
Reports and information <ul style="list-style-type: none"> • Technical language / industry terminology • Accuracy and detail of certification and schedules 	Not confident in technical language and reporting. The reports submitted were fair and acceptable. Not detailed.
Handover and communication <ul style="list-style-type: none"> • Detail / explanations • Consideration of client perspective • Communication style • Customer care skills 	The learner provided short explanation. Fair Communication style Poor customer skills
Working with faults <ul style="list-style-type: none"> • Fault finding technique • Reference to / follows manufacturer's instructions • Rectification of faults 	The learner showed a fair understanding of the fault-finding techniques. The learner needed brief explanation of the cases when working with faults. Brief description of the rectification of faults

Any other aspects	

Internal assessor signature	Date
	10/5/2023

If completing electronically, double click next to the 'X' to add an electronic signature once the record is **finalised**.

Get in touch

The City & Guilds Quality team are here to answer any queries you may have regarding your T Level Technical Qualification delivery.

Should you require assistance, please contact us using the details below:

Monday - Friday | 08:30 - 17:00 GMT

T: 0300 303 53 52

E: technical.quality@cityandguilds.com

W: <http://www.cityandguilds.com/tlevels>

Web chat available [here](#).

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