

T Level Technical Qualification in Building Services Engineering for Construction

8710-353 Electrotechnical Engineering
Grade Standard Exemplification Material
Distinction - Summer 2023

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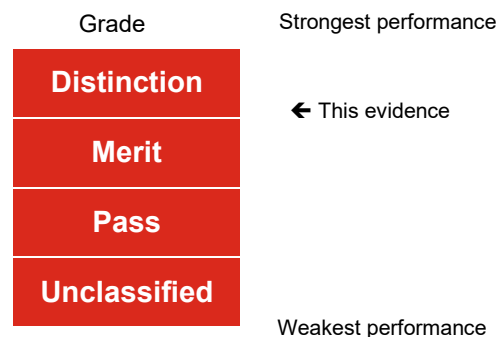
Introduction

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 distinction 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 distinction 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 distinction 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 distinction grade. However, performance across the tasks may vary (i.e. some tasks completed to a higher/lower standard than distinction grade).

Grade descriptor

To achieve a distinction, a candidate will be able to:

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

Demonstrate exemplary technical skills for installing components that is in line with industry standards. They will also demonstrate relevant and comprehensive knowledge and understanding of principles and processes through the tasks completed.

Work safely and make informed and appropriate use of tools, materials and equipment within the environments that they are working in. They will competently and independently interpret information and apply the technical skills to practical tasks and procedures to an exemplary standard as recognised by industry, producing an excellent quality of work that meets acceptable tolerances, regulations and standards.

Confidently attempt some complex tasks and the level of performance meets an exemplary level.

Locate and identify faults, diagnose their causes and have a thorough understanding and the skills to be able to repair and rectify them.

Consistently use accurate industry terminology 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

Figure 1 – Proposed shop layout

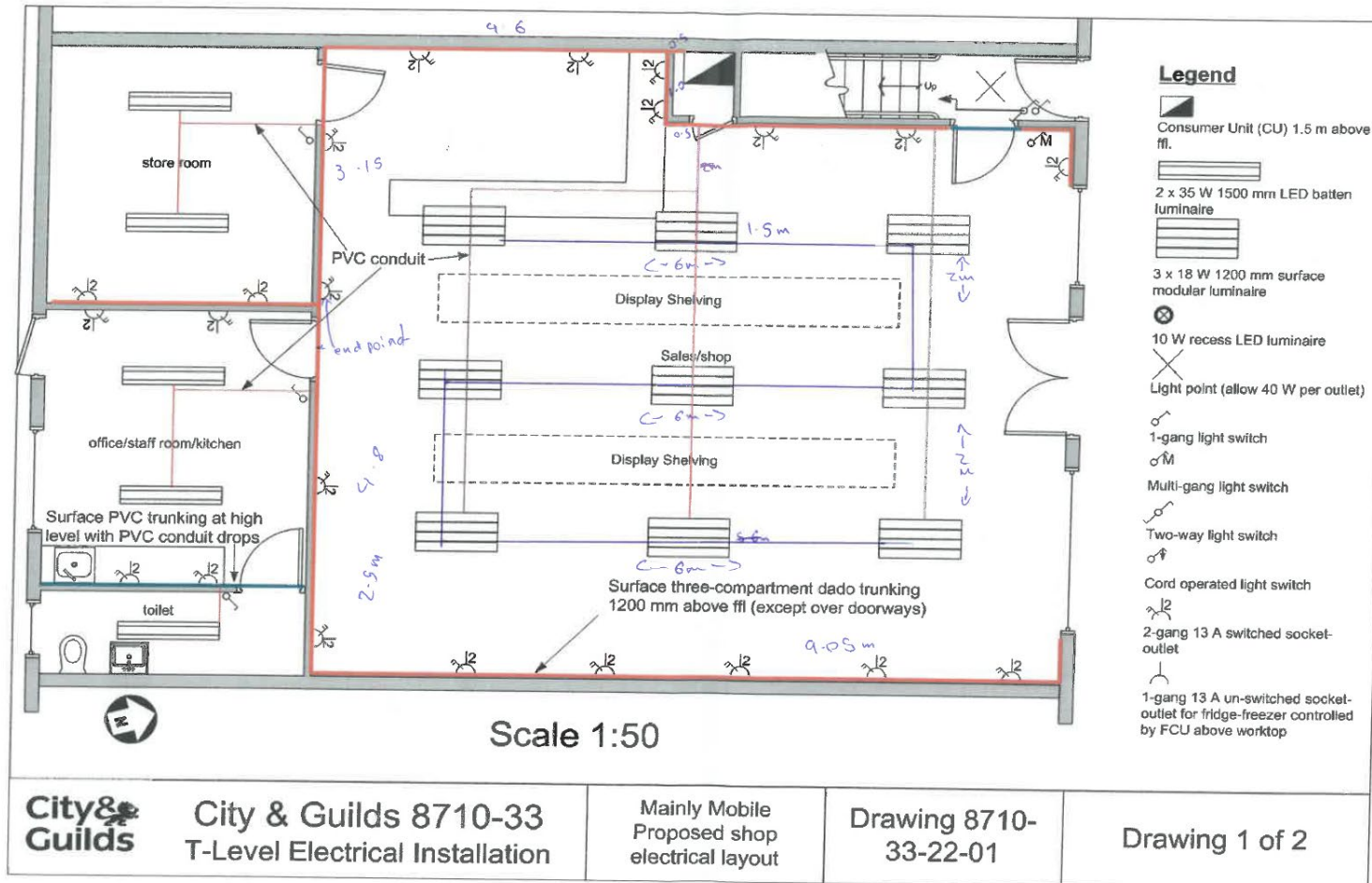
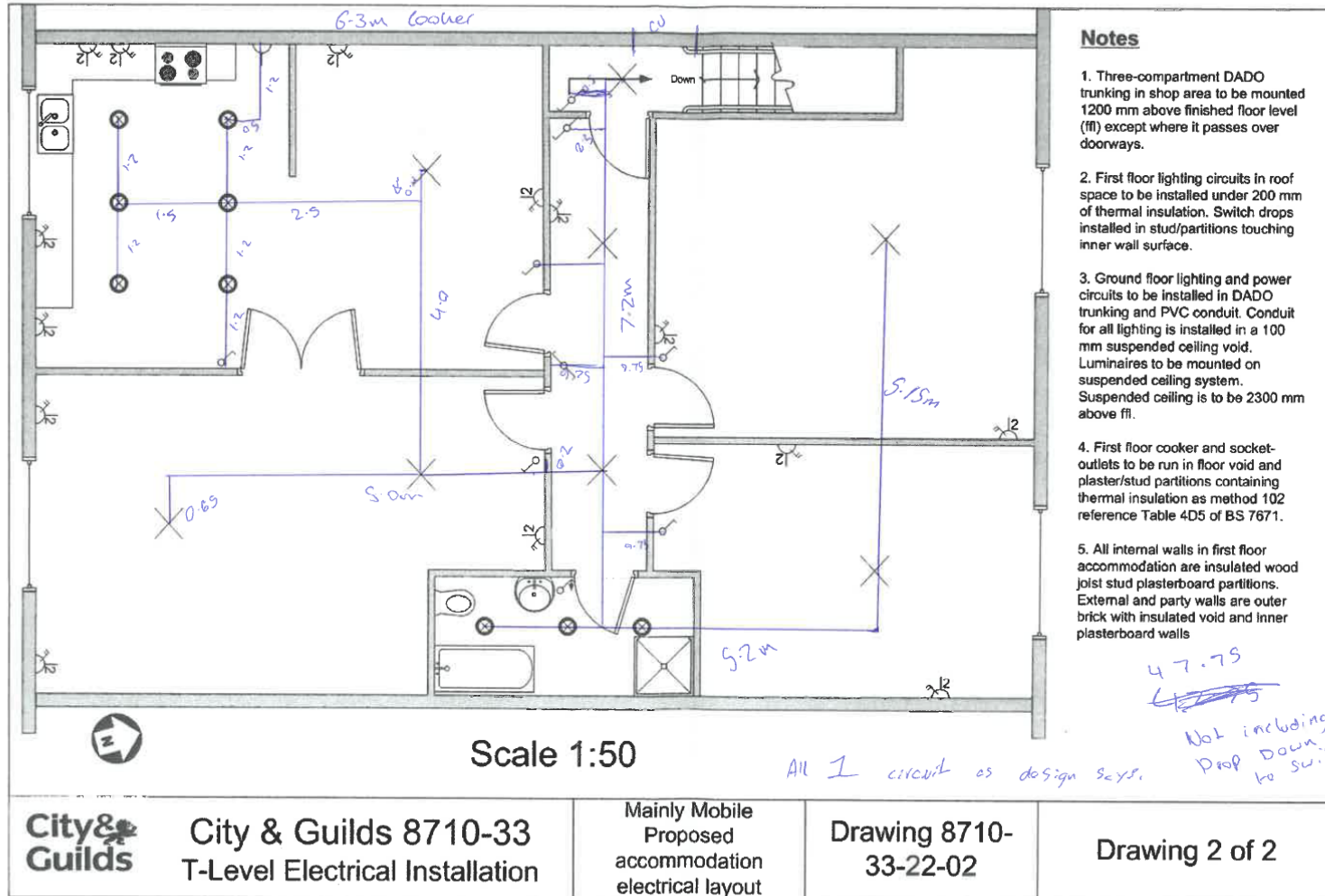


Figure 2 – Accommodation layout



Task 1 Figure 3 – Design Grid

Candidate name:

City & Guilds enrolment number:

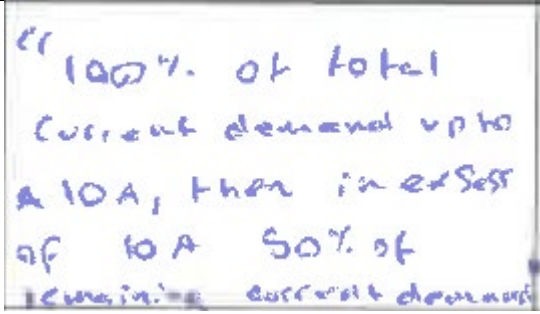
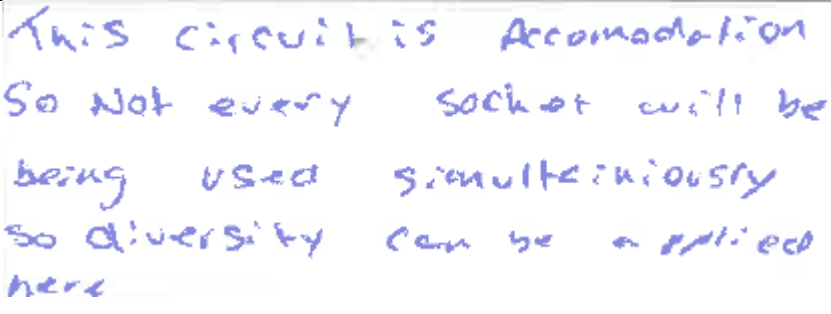
Consumer unit located in cupboard in shop VOLTAGE DROP TO COMPLY WITH BS 7671		Nominal voltage (U/U ₀) 230 V		Earthing arrangement TN-C-S		External earth fault loop impedance (Z _e) 0.35 Ω		
Circuit	1	2	3	4	5	6	7	8
Description	Ring-final first floor sockets	Radial-final ground floor store/kitchen sockets	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	50 A	2.11 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	50 A B	6 A B	6 A C	6 A B
Length (metres)	68 m loop	26 m	25.95 m	26.9 m	7.1 m	26 m	18 m	47.75
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 ($<I_t$)	31.1 A	24.27	24.27	24.27	60.96 A	6 A	6 A	6 A
mV/A/m	7.3	11	11	11	02.8	44	44	44
Actual voltage drop	7.94 v	4.29 v	5.709 v	5.891 v	0.994 v	2.41 v	1.267 v	6.51 v
Minimum conductor csa mm ²	6 mm ²	4 mm ²	4 mm ²	4 mm ²	16 mm ²	1.5 mm ²	0.78 mm ²	1.5 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. 31.1 A		20.55 A	
2. 24.27 A	No diversity applied	24.27 A	This is a kitchen/store room and the appliances change many times so diversity shouldn't be applied
3. 24.27 A	No diversity applied	20 A	This is a large store open area that will use all available sockets for long periods of time – no diversity
4. 24.27 A	No diversity applied	24.27 A	This is the same as circuit 4. Diversity should not be applied.

5. 60.86 A	" 10A + 30% of other current demand + SA if socket attached"	25.26 A	A cooker is never used at its full use for extended periods of time so diversity is allowable.
6. 6 A	90 % of total current demand	5.4 A	Whilst stores use lights for long periods at night they aren't occupied so lights are turned off.
7. 6 A	90 % of total current demand	5.4 A	Stores don't use lights after closing so diversity can be applied.
8. 6 A	66% of total current demand	3.96 A	Stores during working hours accommodations don't use lights and diversity can be applied
Maximum demand (A)	182.77 A	Maximum demand after diversity (A)	133.38 A
Maximum demand (kVA)	0.183 kA	Maximum demand after diversity (kVA)	0.133 A

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	10.49	1.2 Ω	1.37	Complies $< 1.37 \Omega$ less than 1.37 Ω
4. Radial-final ground shop sockets east side	20 A C Type BS EN 61009	26.9 m	16.71	0.88 Ω	1.09 Ω	Complies less than 1.09 Ω .


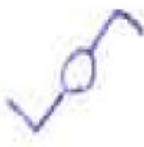



Task 1 - Figure 6 - Materials Take off Sheet (relating to Figures 1, 2 and 3)

This sheet may be reproduced as many times as necessary

Candidate name:

City & Guilds enrolment number:

Symbol	Description	Quantity
	Consumer unit	1
	2 x 35 W LED Batton luminaire	5
	3 x 18 W surface modular luminaire	9
	10 W recess luminaire LED	9
	40 W light point	9
	1 gang light switch	10

	Multi gang light switch	1
	Two way light switch	3
	Cord operated light switch	1
	Z gang 13 A switched socket outlet	35
	1 gang 13 A switched socket outlet for fridge freezer	1

Task 1 - Risk Assessment

This risk assessment form may be modified by adding items only

Candidate name:

City & Guilds enrolment number:

Activity: Practical assessment		Date:						
Location:		Position: Employee						
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		
LIKELIHOOD (L): Probability that event will occur 1 Remote 2 Possible 3 Likely						1-2 Low 3-5 Medium 6-9 High		
Item No:	Activity	Hazard	Persons at Risk	Existing Controls (Mitigation)	S 1-3	L 1-3	RR	
1	Walking around workshop	Slips, trips, falls	Worker/Public	Tidy up, good housekeeping, sections for cutting etc	1	3	3	
2	low hanging socket boxes	Hitting head	Worker	Hard hat, be vigilant	1	2	2	
3	clipping cable Drove	Hitting hand with hammer	Worker	Gloves, training, competency	1	1	1	
4	Carrying dado trunking	Dropping object on foot	Worker	Steel toe cap boots	1	1	1	

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	24/04/2023

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	Risk mitigation methods are detailed and have been clearly identified for all potential risks. Potential for harm and probability factors have been identified throughout. Consideration given to potential for harm and probability factors. Health and safety is followed during preparation and throughout tasks and all work completed safely

Design and planning (documentation) <ul style="list-style-type: none"> • Quality of planning and design • Quality of documentation • Accuracy • Symbols, abbreviations and terminology • Adherence to industry standards 	<p>General planning and design work undertaken is comprehensive with a high attention to detail. Efficient use of research materials and a good understanding of technical documents.</p> <p>Links made between drawing and practical situations with excellent assumptions made where information lacked.</p> <p>Provides a high level of accuracy in reports and written detail consistently ensuring and checking for accuracies with reference made to manufacturers' instructions and regulations.</p> <p>Terminology is used generally correctly throughout.</p>
Design and planning (technical information) <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>Links all areas of the assessment of general characteristics to the installation and makes informed decisions as to relevance and impact.</p> <p>Calculations accurate and well researched showing good understanding of technical information in BS 7671 as well as confident navigation.</p> <p>Accurate calculations to determine luminaire output but selection may not consider all factors such as aesthetics, practical installation and suitability.</p> <p>All items identified using provided resources with good technical descriptions and accurate quantities. Able to understand all aspects of drawing and understands the associated accessories needed rather than the basic accessories shown on drawings.</p> <p>Diagrams accurate and meets the installation specification.</p> <p>Calculations are accurate but there are gaps in workings that does not clearly show that all factors have been considered. Some units are not specified. Presentation of work is mostly clear.</p>
Systems and components (installation) <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>Installation to industry standards and is completed in a timely manner.</p> <p>Component selection appropriate and clearly links to the quality of finished installation.</p> <p>Confidence and competence displayed in the installation process with levels of skills shown in the quality of the finished installation.</p> <p>Use of tools is excellent resulting in a near high-quality installation.</p> <p>Candidate follows manufacturer's instructions at most stages of the installation.</p> <p>Measurement wiring and associated components is to a sound standard with clear attempts to meet industry levels, resulting in an install that has few errors from the proposed installation plan.</p>

Systems and components (decommissioning) <ul style="list-style-type: none"> • Sequencing • Damage to parts • Removal techniques • Designation and categorisation for disposal 	<p>Consideration of implications of sequence for dismantling, minimising damage to parts that could be recycled.</p> <p>Use of removal techniques to salvage as much materials as possible for recycling.</p> <p>All removed materials and equipment suitably designated and categorised for disposal as required.</p>
Reports and information <ul style="list-style-type: none"> • Terminology • Explanations / reasoning • Accuracy of certification and schedules 	<p>Consistently use industry terminology appropriately in both written and verbal contexts.</p> <p>Certification and schedules completed with minimal but accurate detail in all aspects.</p>

Any other aspects

All tasks were to a good standard. Clipping of PVC/PVC cable was good, but not clipped to batten as shown in the drawing.

Internal assessor signature	Date
	28/04/2023

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

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

Certificate No.: 1

DETAILS OF THE CLIENT [REDACTED]	
INSTALLATION ADDRESS [REDACTED]	
DESCRIPTION AND EXTENT OF THE INSTALLATION Description of installation: <u>Practical Assessment Build</u>	New Installation <input checked="" type="checkbox"/>
Extent of installation covered by this Certificate:	Addition to an existing installation <input type="checkbox"/>
(Use continuation sheet if necessary) See continuation sheet No:	Alteration to an existing installation <input type="checkbox"/>
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 (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. 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: Date: Name (IN BLOCK CAPITALS): Designer No 1 Signature: Date: Name (IN BLOCK CAPITALS): 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 <u>1.1.22</u> (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 CONSTRUCTION of the installation: <u>Assessment Build</u> Signature: [REDACTED] Date: <u>26.4.23</u> Name (IN BLOCK CAPITALS): [REDACTED] Constructor	
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 <u>1.1.22</u> (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: <u>Assessment Build</u> Signature: [REDACTED] Date: <u>26.4.23</u> Name (IN BLOCK CAPITALS): [REDACTED] Inspector	
NEXT INSPECTION I/We, the designer(s), recommend that this installation is further inspected and tested after an interval of not more than <u>5 years</u> years/months.	

Certificate No.: 1

PARTICULARS OF SIGNATORIES TO THE ELECTRICAL INSTALLATION CERTIFICATE					
Designer (No 1)	Name:	Company:			
	Address:	Postcode:	Tel No:		
Designer (No 2) (if applicable)	Name:	Company:			
	Address:	Postcode:	Tel No:		
Constructor	Name:	Company:			
	Address:	Postcode:	Tel No:		
Inspector	Name:	Company:			
	Address:	Postcode:	Tel No:		
SUPPLY CHARACTERISTICS AND EARTHING ARRANGEMENTS					
Earthing arrangements	Number and Type of Live Conductors		Supply Protective Device		
TN-C <input type="checkbox"/>	AC <input checked="" type="checkbox"/>	DC <input type="checkbox"/>	BS (EN) Type Rated current A		
TN-S <input type="checkbox"/>	1-phase, 2-wire <input checked="" type="checkbox"/>	2-wire <input type="checkbox"/>			
TN-C-S <input checked="" type="checkbox"/>	2-phase, 3-wire <input type="checkbox"/>	3-wire <input type="checkbox"/>			
TT <input type="checkbox"/>	3-phase, 3-wire <input type="checkbox"/>	Other <input type="checkbox"/>			
IT <input type="checkbox"/>	3-phase, 4-wire <input type="checkbox"/>				
Confirmation of supply polarity <input type="checkbox"/>		(Note: (1) by enquiry (2) by enquiry or by measurement)			
Other sources of supply (as detailed on attached schedule) <input type="checkbox"/>					
PARTICULARS OF INSTALLATION REFERRED TO IN THE CERTIFICATE					
Means of Earthing		Maximum Demand			
Distributor's facility <input checked="" type="checkbox"/>		Maximum demand (load) kVA / Amps (Delete as appropriate)			
Installation earth electrode <input type="checkbox"/>		Details of Installation Earth Electrode (where applicable)			
		Type (e.g. rod(s), tape etc) Location Electrode resistance to Earth			
Main Protective Conductors					
Earthing conductor	Material C.V.	CBS 2.5	mm ² Connection / continuity verified <input checked="" type="checkbox"/>		
Main protective bonding conductors	Material C.V.	CBS 10	mm ² Connection / continuity verified <input checked="" type="checkbox"/>		
To water installation pipes <input type="checkbox"/> To gas installation pipes <input 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 20A 2-pole unit	Current rating 100 A	If RCD main switch			
BS (EN) 130	Fuse / device rating or setting 100 A	RCD Type SA			
No of poles 2	Voltage rating 230 V	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)	N/A	8.0	Circuits (Distribution and Final)	✓
2.0	Parallel or switched alternative sources of supply	N/A	9.0	Isolation and switching	✓
3.0	Protective measure: Automatic Disconnection of Supply (ADS)	✓	10.0	Current-using equipment (permanently connected)	✓
4.0	Basic protection	✓	11.0	Identification and notices	✓
5.0	Protective measures other than ADS	N/A	12.0	Location(s) containing a bath or shower	N/A
6.0	Additional protection	✓	13.0	Other special installations or locations	N/A
7.0	Distribution equipment	✓	14.0	Prosumer's low voltage electrical installation(s)	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).					

GENERIC SCHEDULE OF CIRCUIT DETAILS

Certificate/Report No.:1.....

Distribution board details DB reference: <u>201</u> Location: <u>Store Room</u> Supplied from: <u>Store Room DB</u> Distribution circuit OCPD: BS (EN): <u>1361</u> Type: <u>1C</u> Rating/Setting: <u>C Type 63</u> A SPD Details: Type(s)*: T1 <input type="checkbox"/> T2 <input type="checkbox"/> T3† <input type="checkbox"/> N/A <input checked="" type="checkbox"/>	
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CIRCUIT DETAILS															
1 Circuit number	2 Circuit description	Conductor details					Overcurrent protective device					RCD			
		3 Type of wiring	4 Reference method†	5 Number of points served	Number & size		8 BS (EN)	9 Type	10 Rating (A)	11 Breaking capacity (kA)	12 Maximum permitted Z_s (Ω)‡	13 BS (EN)	14 Type	15 $I_{\Delta n}$ (mA)	16 Rating (A)
					6 Live (mm²)	7 cpc (mm²)									
1	Ring Final	A	C	4	2.5	1.5	60898	B	32	6	1.1	01008	N/A	30	80
2	Radial	E	B	4	2.5	2.5	60898	D	20	6	1.75	01008	N/A	30	60
3	Light	E	B	1	1.5	1.5	60898	D	6	6	5.07	01008	N/A	30	80
4	Spare														
								</							

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.

398

Certificate/Report No.:

†† RCD effectiveness is verified using an alternating current test at rated residual operating current (I_{nR}).



2hours



4 hours



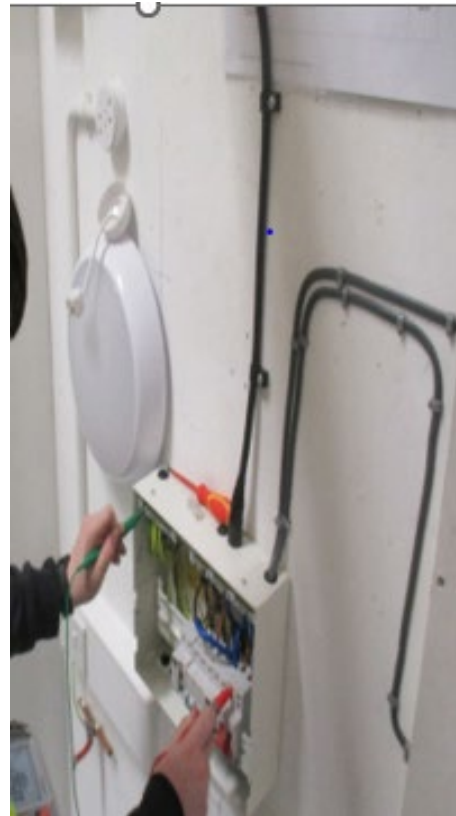
6 hours



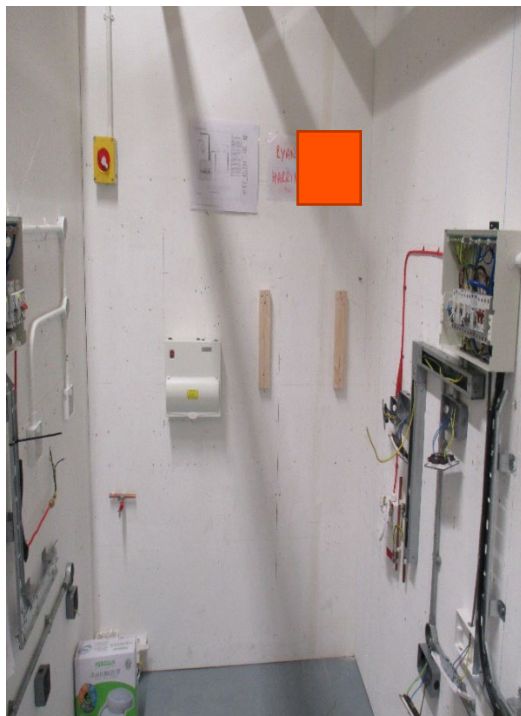
10 hours



Completed Installation



Commissioning



Completed Decommissioning

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	25/04/2023

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	Risk mitigation methods identified for some of the potential risks, but not all. Consideration given to potential for harm and probability factors. Health and safety is followed during preparation and throughout tasks and all work completed safely
Systems and components (Installation) <ul style="list-style-type: none">• Installation procedure• Appropriate component selection• Confidence and competence	Installation to industry standards and is completed in a timely manner. Component selection appropriate and clearly links to the quality of finished installation. Confidence and competence displayed in the installation process with levels of skills shown in the quality of the finished installation. Use of tools is excellent resulting in a near high-quality installation. Candidate follows manufacturer's instructions at most stages of the installation.

<p>displayed in installation process</p> <ul style="list-style-type: none"> • Ability to use appropriate tools • Following manufacturer's instructions 	<p>Measurement wiring and associated components is to a sound standard with clear attempts to meet industry levels, resulting in an install that has few errors from the proposed installation plan.</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>Consideration of implications of sequence for dismantling, minimising damage to parts that could be recycled.</p> <p>Use of removal techniques to salvage as much materials as possible for recycling.</p> <p>All removed materials and equipment suitably designated and categorised for disposal as required.</p>
<p>Reports and information</p> <ul style="list-style-type: none"> • Technical language / industry terminology • Accuracy and detail of certification and schedules 	<p>Consistently use industry terminology appropriately in both written and verbal contexts.</p> <p>Certification and schedules completed with minimal but accurate detail in all aspects.</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 • Reference to / follows manufacturer's instructions • Technical/practical skills • Sequencing 	<p>Demonstrates relevant and comprehensive knowledge and understanding of Electrical principles and processes.</p> <p>Can competently and independently interpret information. Can demonstrate excellent planning, assess risk and follow safe working methods.</p> <p>All safety aspects considered, and correct safe isolation procedures undertaken before dismantling commences.</p> <p>Demonstrates good, consistent skills, which meets industry standards. Work is well planned following a logical sequence and is completed in a timely manner. Works within tolerances.</p> <p>Complex situations are attempted well and mostly effectively.</p> <p>Regularly confirms outcomes with use of good supporting reference materials.</p> <p>Good links between knowledge and practice giving consideration to aspects such as the number of cores required.</p> <p>Follows correct testing sequence with no prompting.</p>

<ul style="list-style-type: none"> • Links between knowledge and practical • Tolerances / quality • Use of tools and plant • Testing sequence 	
Handover and communication <ul style="list-style-type: none"> • Detail / explanations • Consideration of client perspective • Communication style • Customer care skills 	Handover considered and well organised/ structured and all elements explained. Consideration of client perspective and requirements, confirmation of understanding sought.

Any other aspects

Good quality of work throughout, showing confidence and ability.

Internal assessor signature	Date
	28/04/2023

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: WK9	
Candidate name:	Date of assessment:
<p>Description of work done/ tests carried out to locate fault (if any)</p> <p>Continuity test (PWB to End), Visual inspection Earth is correct Neutral is correct Break in the Line conductor leading to No reading.</p> <p>The nature of the fault</p> <p>After testing between consumer unit and both switches there was a continuity, testing between switch to light there was no continuity meaning there is a fault on switch line to light.</p> <p>Brief description including materials required to fix the fault</p> <p>Rewiring of line conductor from switch to light, 1.5 mm single core, other conductors do not need to be required as no faults on any tests to suggest they are damaged/need replacing.</p> <p>Actions required to ensure rectification is suitable</p> <p>Continuity, earth fault loop impedance and insulation resistance tests after work is carried out.</p>	

Task 3 Fault Report Sheet

Job card reference number: WK5

Candidate name:

Date of assessment:

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

Low ohms / continuity test carried out: No fault present,
insulation resistance test ~~failed~~ Light, Short between live and earth after the switch
Visual - inspection

The nature of the fault

Live & Earth conductors have come into contact in the circuit leading to the low / incorrect insulation resistance test.

Brief description including materials required to fix the fault

This circuit is in Non-metallic conduit meaning the wiring is inaccessible, I would suggest a rewiring in 1.5mm² Single core cables, this would be the correct way to fix the fault as there were no faults when visual inspection was carried out.

Actions required to ensure rectification is suitable

Retest (full) is required after the circuit works have been completed.

Task 3 Fault Report Sheet

Job card reference number:
QA1

Candidate name:

Date of assessment:

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

Continuity of earth between main consumer unit and workshop consumer unit, showing no result.

The nature of the fault

No continuity between main consumer unit and workshop consumer unit.

Brief description including materials required to fix the fault

Earth 6mm needs replacing

Actions required to ensure rectification is suitable

Continuity test between consumer unit (main) and workshop consumer unit after works.

Task 3 Fault Report Sheet

Job card reference number: QA1

Candidate name:

Date of assessment:

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

Continuity of Earth, Neutral, Line,
error on line conductor, tested from
CU to Switch then CU to light then
Switch to light

The nature of the fault

Break in the line conductor from consumer unit to switch resulting in no continuity.

Brief description including materials required to fix the fault

Replace line from consumer unit to switch.

Actions required to ensure rectification is suitable

Continuity test after work completed.
Insulation resistance and EFL impedance.

Task 3 Fault Report Sheet

Job card reference number: 13HS

Candidate name:

Date of assessment:

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

Continuity of All conductors to light.

No Neutral Continuity

Visual inspection

The nature of the fault

No neutral continuity from board to light

Brief description including materials required to fix the fault

Neutral rewire in 1.5 mm single core cable because all other wiring was correctly tested.

Actions required to ensure rectification is suitable

Continuity test on neutral conductor after work completed.

Task 3 Fault Report Sheet

Job card reference number: QA3

Candidate name:

Date of assessment:

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

continuity of L1 and L2 strappers
resulting in incorrect connection of
strappers

The nature of the fault

incorrect connection of strappers

Brief description including materials required to fix the fault

Reconnect correctly, L1 and L2 in correct positions

Actions required to ensure rectification is suitable

Continuity test after works.

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	27/04/2023

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 	Risk mitigation methods identified for some of the potential risks, but not all. Consideration given to potential for harm and probability factors. Health and safety is followed during preparation and throughout tasks and all work completed safely
Systems and components (Installation) <ul style="list-style-type: none"> • Installation procedure • Appropriate component selection • Confidence and competence displayed in 	Installation to industry standards and is completed in a timely manner. Component selection appropriate and clearly links to the quality of finished installation. Confidence and competence displayed in the installation process with levels of skills shown in the quality of the finished installation. Use of tools is excellent resulting in a near high-quality installation. Candidate follows manufacturer's instructions at most stages of the installation.

installation process <ul style="list-style-type: none"> • Ability to use appropriate tools • Following manufacturer's instructions 	Measurement wiring and associated components is to a sound standard with clear attempts to meet industry levels, resulting in an install that has few errors from the proposed installation plan.
Systems and components (Decommissioning) <ul style="list-style-type: none"> • Consideration of implications of sequence • Salvage of materials for recycling • Designation and categorisation for disposal 	Consideration of implications of sequence for dismantling, minimising damage to parts that could be recycled. Use of removal techniques to salvage as much materials as possible for recycling. All removed materials and equipment suitably designated and categorised for disposal as required.
Reports and information <ul style="list-style-type: none"> • Technical language / industry terminology • Accuracy and detail of certification and schedules 	Consistently use industry terminology appropriately in both written and verbal contexts. Certification and schedules completed with minimal but accurate detail in all aspects.
Handover and communication <ul style="list-style-type: none"> • Detail / explanations • Consideration of client perspective • Communication style • Customer care skills 	Handover considered and well organised/ structured and all elements explained. Consideration of client perspective and requirements, confirmation of understanding sought.
Working with faults <ul style="list-style-type: none"> • Fault finding technique • Reference to / follows manufacturer's instructions • Rectification of faults 	Fault-finding techniques carried out systematically and logically displaying accurate knowledge of faultfinding techniques. Candidate follows manufacturer's instructions at most stages of the task. Rectification of faults follows logical process and systems is operational.

Any other aspects

Good fault-finding techniques showing the confidence and ability required.

Internal assessor signature**Date**

28/04/2023

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: technicals.quality@cityandguilds.com

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

Web chat available [here](#).

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