



**City & Guilds Level 3
Technical Occupational
Entry in Electrical
Installations (Diploma)
(2366-03)**

Version 1.3 (April 2026)

**Design assignment pack
(sample): 2366-354**

Version and date	Change detail	Section
V1.0 March 2025	Initial version	All
V1.1 May 2025	Candidate Recording form added	8
V1.2 September 2025	Information on resubmission of evidence added	2 and 5
	Candidate Record Form (CRF) updated to include resubmission evidence	8
V1.3 April 2026	Amendments in line with BS 7671 Amendment 4 2026	All

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1. Assessment overview

This guidance contains assessment documentation for the Level 3 Technical Occupational Entry in Electrical Installations (Diploma) (2366-03).

The assignment consists of a scenario followed by four tasks. Learners are required to: plan works, prepare a design, design an installation and carry out an initial verification of electrical works.

The assessment may be carried out over more than one session. Assessment evidence must be handed in at the end of each session.

Accessing the assignment material

The assignment is provided in a separate candidate pack.

The candidate pack must be downloaded from the City & Guilds website prior to the assessment taking place. The password can be found on the Walled Garden. The design assessment must be provided to a candidate only at the commencement of the assessment period.

Supervised assessment conditions

This is a controlled assessment taken under supervised conditions. When working under supervised conditions for longer sessions, breaks can be facilitated outside of the controlled conditions, ensuring the room is locked and all candidates have vacated once the break begins. All materials must be kept securely during the break.

Access arrangements and reasonable adjustments

Access arrangements are adjustments that allow candidates with disabilities, special educational needs and temporary injuries to access the assessment and demonstrate their skills and knowledge without changing the demands of the assessment. These arrangements must be made before the assessment takes place.

The Equality Act 2010 requires City & Guilds to make reasonable adjustments where a disabled person would be at a substantial disadvantage in undertaking an assessment.

It is the responsibility of the centre to ensure at the start of a programme of learning that candidates will be able to access the requirements of the qualification.

Please refer to the *JCQ access arrangements and reasonable adjustments and Access arrangements – when and how applications need to be made to City & Guilds* for more information. Both are available on the City & Guilds website:

<http://www.cityandguilds.com/delivering-our-qualifications/centre-development/centre-document-library/policies-and-procedures/access-arrangements-reasonable-adjustments>

2. Assignment guidance

General task guidance

Please read **all** information carefully before the assessment.

This assignment covers content from Unit 301 Scientific principles, Unit 302 Inspection, testing and commissioning of electrotechnical systems and equipment, Unit 304 Electrical design practices and procedures and Unit 305 Organising and overseeing electrical work activities in buildings.

For this assignment – **Level 3 Technical Occupational Entry in Electrical Installations (Diploma) (2366-03) – Assignment** candidates are required to complete all tasks.

Timings

The total time for completion of this assignment is **20 hours** and is broken down in the following timings:

- Task 1 Planning works – 2 hours
- Task 2 Design preparation – 4 hours
- Task 3 Design – 10 hours
- Task 4 Initial verification – 4 hours

Presentation of work

Presentation of work must be appropriate to the task, and evidence required for submission.

Candidates should make sure that each piece of evidence including any forms are clearly labelled with their name and the project reference.

All electronic files must be given a clear file name that allows the assessor to identify it as the candidate's work.

Written work may be word-processed or handwritten unless stated otherwise.

Resources

Candidates are required to use the reference materials detailed below:

- BS 7671
- On-Site Guide

Permitted resources

- Internet access
- IET Guidance Notes

The assessment is 'open book' and internet access for research should be encouraged.

This project should be undertaken in a classroom environment, on a computer with word processing software and internet access. As this assessment is taken under controlled conditions, the assessor must undertake sufficient control measures to ensure that the work provided is that of the candidate.

- This task must be undertaken by candidates individually under controlled conditions.
- Before the task commences, the tutor/assessor must ensure that candidates understand the task to be undertaken.
- Following the assessment, candidates will be required to sign a 'Candidate Declaration of Authenticity' to confirm work produced is their own.

Resit opportunities

Candidates must achieve a pass in all **four tasks** to achieve a pass for the assessment overall.

In cases where candidates fail a task and have not met conditions for the resubmission of evidence detailed below and within the grading section, they will be required to complete a further period of learning before then re-sitting fully, all tasks within a **different version** of the assessment.

Candidates can re-sit a different version of the assignment up to a maximum of **three** times before re-registration is required.

Resubmission of evidence

A candidate can resubmit evidence for specific grading criteria where they have not met the pass standard within a task, if the following conditions and guidance are met:

Centre assessor

Must ensure

- The candidate has met the deadlines for the completion of the assessments including where an extension has been agreed
- The resubmission of evidence does not take place until all tasks within the assessment have been completed and assessed
- The candidate is not provided with any feedback on how to improve their performance
- The resubmission of evidence takes place within 15 working days of the previous assessment outcome
- Evidence used for resubmission has been developed under replicated conditions and controls as set out in the original assessment
- Resubmitted evidence and assessor judgements are available for EQA review and that this is made clear in the assessment documentation
- The resubmission of evidence is approved by the IQA
- Evidence of formative assessment and coursework of the candidate is provided to the IQA
- The above process is carried out before any EQA sampling takes place and a grade submitted to City & Guilds.

Internal Quality Assurer (IQA)

Must ensure

- The resubmission of evidence is conducted fairly and in line with the conditions of the original assessment
- That the resubmission of the evidence has not given the candidate an unfair advantage over other candidates
- That no feedback has been given to the candidate to improve their performance
- Candidate and assessor records clearly identify the grading criteria that have not been met as well as assessment outcomes for the original assessment
- Resubmitted evidence is available for review by the EQA
- That the candidate's formative assessment materials have been sampled and made available
- That both the candidate and centre assessor have met the conditions and guidance set out in this process
- The resubmission form to document candidate eligibility is completed and retained for EQA sampling.

Please note that further information and guidance for centre assessors on the resubmission of evidence process can be found within the grading section of this assignment.

3. Assignment brief

Scenario

You are tasked with planning works, preparing a design, designing an installation and carrying out an initial verification of electrical works in a large care home.

Layout of the care home

The care home consists of a ground floor with:

- a large commercial sized kitchen
- large utility room consisting of commercial tumble dryers and five commercial washing machines
- a food hall with vaulted ceilings with exposed timbers and seating facing out onto the gardens
- a reception area with a lift to the first and second floors
- a caretaker's office.

There are two garages each with electric vehicle (EV) charging points positioned inside. Cars are charged there for approximately 6 hours per day. There is also a place to charge battery mobility-scooters.

The first and second floors consist of:

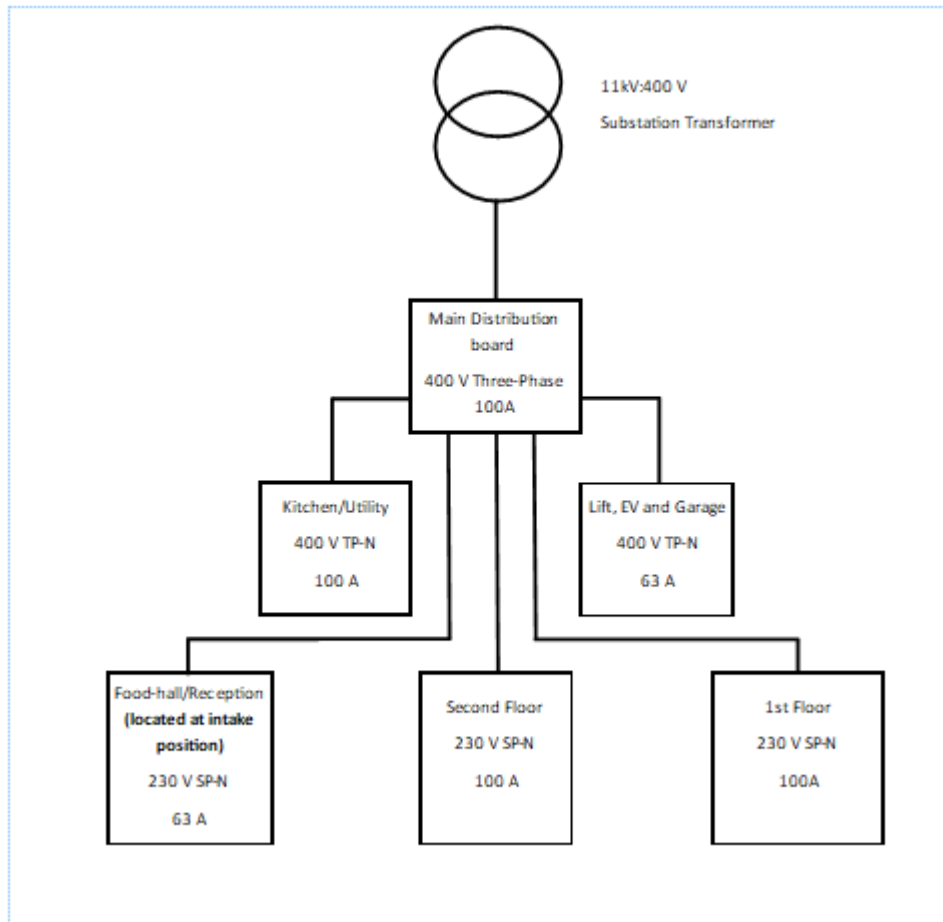
- bedrooms
- bathrooms
- smaller laundry rooms.

Electrical supply

The electrical supply is a three-phase and neutral TN-C-S 100 A per phase supply with a recorded $Z_e = 0.12 \Omega$ and a $I_{pf} = 3.3 \text{ kA}$. The incoming supply conductors are 35 mm^2 .

There are five sub-distribution circuits:

- single-phase 100 A distribution board to 1st floor
- single-phase 100 A distribution board to 2nd floor
- single-phase 63 A supplying the food hall, reception
- three-phase and neutral 63 A supplying the lift and EV and garages
- three-phase and neutral 100 A supplying the kitchen and utility rooms.



Job specification

You have been asked to plan the works, prepare a design, design an installation and carry out an initial verification of new circuits to supply the items below:

- a new three-phase mincing machine (8.5 kW) to replace a single-phase mincing machine
- a commercial three-phase dishwasher (12 kW)
- food holding unit (2 kW)
- electric grill (3 kW)
- lighting in the food hall.

4. Tasks

Task 1 Planning works

You have been given the following work schedule for one of the stages of the project:

- Day 1 – site preparation for plumbers and electricians in the kitchen.
- Day 2 – first-fix tasks for plumbers and electricians.
- Day 3 – first-fix tasks for plumbers, gas installers and electricians.
- Day 4 – installation of mincing machine and dishwasher by their manufacturer.
- Day 5 – connections and second-fix for plumbers, electricians and gas installers.
- Day 6 – commissioning of equipment and circuits.

You are concerned that there is insufficient time allocated in the programme for you to complete the first-fix preparations and that you would need another half day (four hours).

Produce a report that contains:

- an explanation of the implications of this proposed delay to tasks during the project
- the factors that can influence the completion times of the project
- how any changes to the timescale during construction need to be documented
- why any changes to the timescale need to be correctly documented and communicated.

Resources

- Internet access

Timing for task

- The time allocated for this task is **two hours** (including preparation and reading time).

Controlled conditions

- This assessment is to be carried out individually, under supervised conditions.
- You must not share or discuss your work with other candidates.
- You must only work on your task in the allocated time.
- You are required to use the reference materials detailed above in the resources section.

What must be produced for grading

- Report

Task 2 Design preparation

(a) During the design preparation of the project you have been asked to prepare a brief to help with the design process.

The energy bill for the site suggests a large amount of reactive power. A survey has found that the existing utilities and kitchen area had a power factor of 0.7.

The kitchen distribution board recorded the following currents during peak usage:

- $L_1 = 38 \text{ A}$
- $L_2 = 44 \text{ A}$
- $L_3 = 19 \text{ A}$

Produce a brief that:

- states the benefits of having a 400 V three-phase supply instead of a single-phase supply (this installation is a 100 A three-phase and neutral supply)
- identifies equipment that could cause the current to lag the voltage
- suggests ways of improving the power factor in the utilities and kitchen area
- describes the benefit of installing a mincing machine that is controlled via a direct-on-line starter
- explains how a direct-on-line starter is configured to provide undervoltage protection
- shows the calculation and the determination of the neutral current within the sub distribution circuit to the kitchen distribution board.

(b) You have been asked to help to explain the technical language used in relation to the refurbishment of the lighting in the food hall.

The existing lighting installation has halogen surface mounted directional spotlights with PAR30 lamps controlled by dimmer switches.

The manager has said they loved the light produced by these and described it as a 'warm glow'.

The manager also liked the smooth effect of the dimmer switches.

The proposal is to replace these with new LED fittings.

Produce a guide to:

- help understand the technical language, explaining any scientific principles behind the proposal, specifically luminance and luminous intensity
- give reasons for selecting the new LED fittings.

In the guide, you must consider:

- the relevant factors when selecting new LED fittings to achieve the same functions and light produced as the old PAR30 lamps

- whether the existing dimmers can be used with the new LED lighting and what problems may occur
 - how the fitting is selected to get the correct colour output of light
 - any other aspects that may help avoid glare
 - the calculations used to work out lux levels on surfaces in the room.
- c) It has been mentioned that the lighting in the caretaker's office currently works for a few minutes and then trips off.
Produce an email explaining which part of the RCBO device is most likely operating and a possible cause of the problem.

Resources

- Internet access

Timing for task

- The time allocated for this task is **four hours** (including preparation and reading time).

Controlled conditions

- This assessment is to be carried out individually, under supervised conditions.
- You must not share or discuss your work with other candidates.
- You must only work on your task in the allocated time.
- You are required to use the reference materials detailed above in the resources section.

What must be produced for grading

- Brief
- Guide
- Email

Task 3 Design

As part of the electrical works of the care home, you need to produce a design plan for the following aspects of the project:

- a. mincing-machine circuit, to conform to BS 7671
- b. standard circuits
- c. determine the maximum demand of the existing sub-distribution circuit for the second floor.

a. Mincing machine circuit, to conform to BS 7671

- The characteristics of the mincing machine are:
 - 400 V three-phase and neutral
 - 8.5 kW
 - Power factor of 0.88
- The circuit will be wired in SWA 70 °C thermoplastic clipped direct with no grouping factors and ambient temperature is 35 °C. One internal core of the SWA will be used as the CPC
- Z_{db} for the kitchen distribution board is 0.14Ω and I_{pf} at this board is 2.9 kA.
- The voltage drop for the sub-distribution circuit has been calculated at 1.40 V including the extra final circuit load.
- The cable will be installed horizontally on a concrete block wall from the distribution board, through the kitchen, at high level and will drop down vertically to a direct on-line starter, which will control the mincing machine.
- The length of this final circuit will be 18 m.

Design the circuit for the mincing machine in the kitchen. You should consider the following:

- suitable cable sizes, considering cost effectiveness
- circuit protective devices
- protection against shock risks
- load bearing and capacity of cable fixing
- manufacturers' recommendations
- accessibility for future maintenance
- bonding requirements for the installation
- selectivity between final circuit protective device and upstream circuit protection
- energy efficiency
- disposal of old mincing machine.

b. Standard circuits

In the food hall the proposal is to use standard circuits from the On-site Guide. The room dimensions are 15 m x 7 m with a vaulted wooden beam ceiling. The cables will be installed within the masonry walls using flat profile, 70 °C thermoplastic twin and CPC cable.

- Design one circuit you could use to supply each of the following:
 - lighting
 - socket-outlets
 - 3 kW bain-marie
 - fire alarm panel.
- Justify why you have chosen the specific circuits.

c. Determine the maximum demand of the existing sub-distribution circuit for the second floor.

The second-floor distribution board has the following circuits:

Circuit reference	Protective device rating	Circuit description
1L ₁	32 A	Ring final circuit bedrooms 1 to 4
1L ₂	32 A	Ring final circuit bedrooms 5 to 8
1L ₃	6 A	Lighting rooms 1 to 4 plus associated emergency lights
2L ₁	6 A	Lighting rooms 5 to 8 plus associated emergency lights
2L ₂	20 A	Panel heaters rooms 1 to 2
2L ₃	20 A	Panel heaters rooms 3 to 4
3L ₃	40 A	Panel heaters rooms 5 to 8

You must:

- calculate diversity using the On-Site Guide for this distribution board
- include the advantages and potential disadvantages of applying diversity factors, as given in the On-site Guide.

Required material

- BS 7671
- On-Site Guide

Permitted resources

- Internet access
- IET Guidance Notes

Timing for task

- The time allocated for this task **10 hours** (including preparation and reading time).

Controlled conditions

- This assessment is to be carried out individually, under supervised conditions.
- You must not share or discuss your work with other candidates.
- You must only work on your task in the allocated time.
- You are required to use the reference materials detailed above in the resources section.

What must be produced for grading

- Design plan showing all workings, calculations and referencing.

Task 4 Initial verification

The final stage of initial verification now needs to be completed.

- a. Produce a guide that explains how to complete the initial verification of the mincing machine circuit.

You should consider:

- the purpose of initial verification in conformity to BS 7671
- the relevant statutory and non-statutory documents that could be referenced whilst undertaking the initial verification
- the test sequence
- the confirmation of readings
- the testing methods.

In the guide, produce a completed table, based on the one below, identifying **five** items that need to be inspected and what the item is being checked for:

Items to be inspected	What the item is being checked for

Required materials

- BS 7671
- On-Site Guide

Permitted resources

- Internet access
- IET Guidance Notes

Timing for the task

- The time allocated for this task is **four hours** (including preparation and reading time).

Controlled conditions

- This assessment is to be carried out individually, under supervised conditions.
- You must not share or discuss your work with other candidates.
- You must only work on your task in the allocated time.
- You are required to use the reference materials detailed above in the resources section.

What must be produced for grading

- Guide

5. Grading

Task grading descriptors

Grading descriptors for each task are displayed below. Each table includes a descriptor of candidate evidence at minimum 'Pass' level and just below pass level ie Fail.

Included under each set of task grading descriptors is guidance on some of the indicative content that would likely be generated by **this version** of the task completion.

Task 1 Planning

Fail	Pass
<p>Planning contains inaccuracies and shows little consideration of the scenario.</p> <p>Explanations appear to be recalled or illogical connections with little ability to 'explain why'.</p> <p>Shows little consolidation of industry procedures and applies them with errors.</p> <p>Insufficiently concerned by poor outcomes with little attempt to improve.</p>	<p>Planning is generally accurate and shows reasonable consideration of the scenario.</p> <p>Logical explanations and can 'explain why' in familiar contexts.</p> <p>Shows consolidation of industry procedures and applies them with few errors.</p> <p>Aims for satisfactory outcomes but may not explore much further than this.</p>

Indicative content (what will be seen for **this version** of the task)

Task 1

Implications could include the following:

- Potential delay of installing the mincing machine and dishwasher.
- Delay of connections and 2nd fix for plumbers, electricians and gas installers.
- Delay for commissioning of equipment and controls.
- Potential delay for any non-programmed works relating to this programme such as decorating, kitchen staff training of new equipment, third party auditing assessments.

The half a day delay might not have a knock-on effect if the manufacturers do not need a full day for installation. By communicating with them it could be possible to complete their work in half a day or work alongside for the last part of 1st fixing. This would then keep the float on track and not delay the overall project.

There are many factors that can delay project and all of them need to be considered. Weather changes, staff sickness, hire delivery delays, material delivery delays, accidents on site, acts of terrorism, arson, crime including theft of materials.

(Accept any reasonable delay.)

Indicative content (what will be seen for this version of the task)

All changes to a programme need careful documentation and agreement from all effected parties. The changes also need communicating throughout the site with new drawings, emails or any other form of appropriate communication of the changes. This is usually in the form of a variation order document which needs the details of the change recorded along with the signature and date of all effected parties and client. The pricing terms of extras or variations are usually decided and agreed at the contract stage of the project, or the additional monies would be set out clearly on the variation order. Failure to be clear about this process would result in a potential breakdown of relationship between the effected contractor and client if disagreements occurred regarding costs in the future. During a large project if details are not recorded then it would be easy to forget what was agreed.

This would cause poor public relations so clearly communicating changes and costs are essential to avoid disagreements, further delays of the contract, any variations or extras also have a knock-on effect to the programme so clear communication is required so the project manager can reallocate time and resources to keep additional timescales down to a minimum.

Guidance for resubmission of evidence process

When a candidate does not meet the pass standard the candidate can rework and submit evidence for specific grading criteria that has not been met within this task. Re-submission of evidence for this task is permitted as follows:

What can be resubmitted as additional evidence for the task (using the same version of the assignment)

- All evidence for this task can be resubmitted.

What can be resubmitted, but the entire task would need to be retaken (using the same version of the assignment)

- Not applicable: All evidence for this task can be resubmitted.

What cannot be retaken, and a different version of the whole assignment must be used and all tasks retaken

- Not applicable: All evidence for this task can be resubmitted.

Task 2 Design preparation

Fail	Pass
<p>Recall shows weaknesses in breadth or inaccurate.</p> <p>Explanations appear to be recalled or illogical connections with little ability to 'explain why'.</p> <p>Shows little consolidation of scientific theory and applies them with errors.</p> <p>Insufficiently concerned by poor outcomes with little attempt to improve.</p>	<p>Recall is generally accurate and shows reasonable breadth.</p> <p>Logical explanations and can 'explain why' in familiar contexts.</p> <p>Shows consolidation of scientific theory and applies it with few errors.</p> <p>Aims for satisfactory outcomes but may not explore much further than this.</p>

Indicative content (what will be seen for this version of the task)

a) Benefits of installing a three-phase system instead of a single-phase system would be small cabling and switchgear to power the same loads, option of three phase or single-phase equipment, less stress on the local grid due to balancing opportunities.

Equipment that could cause current to lag would be anything with an inductor (mincing machine, dishwasher, tumble dryer, washing machines).

Most appliances have had their power factor corrected by the manufacturer already. If this was not the case for any reason, another option is to install a power factor correction bank system at the origin of the supply. However, this is usually utilised for industrial settings.

Benefits of installing a direct online starter include under voltage protection, instant start, high torque, emergency switching, functional switching.

Using a hold on contact, in parallel with the start button, creates a unique way of preventing sudden starting of the motor after a power-cut. The start button must be pressed again to power the hold on contact each time. Once the hold on contact is energised the start button has been bypassed and can be released.

Guidance -
$$\sqrt{\left((L_1^2 + L_2^2 + L_3^2) - (L_1 \times L_2) - (L_2 \times L_3) - (L_1 \times L_3) \right)}$$

$$\sqrt{\left((38^2 + 44^2 + 19^2) - (38 \times 44) - (44 \times 19) - (38 \times 19) \right)} = 22.61 \text{ A}$$

b) The manager is describing a warm white colour such as 2700 kelvin (K). This is quite common for older halogen/tungsten bulbs. The older dimmers would be very smooth in their action because they are controlling resistive loads which simply respond to voltage and to control the light output all we need to do is increase the resistance to reduce the voltage.

Indicative content (what will be seen for this version of the task)

Any new LED set-up would need to match the colour of 2700 K, and the dimmers would need replacing to get the same smooth action. The lamp and dimmer must operate on the same principle of clipping the sine wave. Either leading part of the wave or lagging part of the wave will need to be 'clipped' in unison to create the effect of dimming. New modern dimmers are switching the light output on and off very fast to create an illusion of smooth dimming our eyes cannot see.

If the dimmer switch and led lamp do not match, the lights will end up flickering at lower end of the dimmer and might only work on full output. It would be a good idea to record the current lux levels at the key points around the room. This will provide a target for selecting the new led fittings. If the dimmer switch and led lamp do not match, the lights will end up flickering at lower end of the dimmer and might only work on full output

The positioning of the lights and the beam angles are ways of reducing glare. Avoidance of pointing lamps at eye level of people that would be sitting in the room.

Software or basic calculations can be used to help calculate lux levels around the room. The lux level can be calculated either using the inverse square law or the cosine law to a fair accuracy for lux.

Glossary of scientific terms:

- Lumens:
The SI unit of luminous flux, equal to the amount of light emitted per second in a unit solid angle of one steradian from a uniform source of one candela.
- Lux:
The amount of luminous flux per unit area.
- Glare:
Visual conditions in which there is excessive contrast or an inappropriate distribution of light sources that disturbs the observer or limits the ability to distinguish details and objects. If this prevents someone from seeing correctly it becomes disabling glare.

c) The bimetallic strip is being heated up which slowly cause it to disconnect from the contacts. This is due to more current being pulled through the device than designed to. Usual causes could be:

- incorrect rating for circuit (poor design or incorrect rating)
- water ingress causing a small increase of current causing it to trip
- malfunction of a light fitting (depending on type).

Guidance for resubmission of evidence process

When a candidate does not meet the pass standard the candidate can rework and submit evidence for specific grading criteria that has not been met within this task. Re-submission of evidence for this task is permitted as follows:

What can be resubmitted as additional evidence for the task (using the same version of the assignment)

- All evidence for this task can be resubmitted.

What can be resubmitted, but the entire task would need to be retaken (using the same version of the assignment)

- Not applicable: All evidence for this task can be resubmitted.

What cannot be retaken, and a different version of the whole assignment must be used and all tasks retaken

- Not applicable: All evidence for this task can be resubmitted.

Task 3 Design

Fail	Pass
<p>Design is not in accordance with BS 7671 and On-Site Guide.</p> <p>Circuit design is applied but demonstrates calculation errors that change the overall outcome.</p>	<p>Design is in accordance with BS 7671 and On-Site Guide.</p> <p>Circuit design applied but may demonstrate minor calculation errors, but these do not change the overall outcome.</p>

Indicative content (what will be seen for this version of the task)

a) Mincing machine circuit, to conform to BS 7671

a) $\frac{8500}{(400 \times \sqrt{3} \times 0.88)} = 13.94 \text{ A}$

b) 16 A Type C BS EN 61009 incorporating Type A RCD

c) Method C

d) $C_a = 0.94$

e) $I_t \geq \frac{I_n}{C_a} = \frac{16}{0.94} = 17.02 \text{ A}$

Table 4D4A Column 3 for 1.5mm² states $I_t = 18 \text{ A}$ so OK

f) mV/A/m Table 4D4B Column 4 = 25 mV therefore $\frac{(25 \times 13.94 \times 18 \times 0.88)}{1000} = 5.52 \text{ V}$ plus submain 1.40 V = 6.92 V

g) CPC same CSA as live conductors due to being in an SWA, therefore:

$$(R_1 + R_2) = \frac{m\Omega/m \times L \times F}{1000} = \frac{24.20 \times 18 \times 1.2}{1000} = 0.52 \Omega$$

$$Z_s = Z_{ab} + (R_1 + R_2) = 0.14 + 0.52 = 0.66 \Omega$$

h) max Z_s for 16 A Type C = 1.37 Ω therefore OK

i) CPC conforms to Table 54.7, therefore earth fault thermal constraints satisfied.

Alternatively, using 543.1.3:

$$I_{pf} = \frac{U_0}{Z_s} = \frac{230}{0.66} = 348.5 \text{ A}$$

$$S = \frac{\sqrt{I^2 \times t}}{k} = \frac{\sqrt{348.5^2 \times 0.1}}{115} = 0.96 \text{ mm}^2$$

1.5 mm² CPC larger than 0.96 mm² so OK for thermal constraints.

Fixings to be used need to support the weight of the cable and be adequate against fire.

Main protective bonding might be required if utilities are metallic (bonding only required if extraneous-conductive-parts).

Old machine needs careful disposal under WEEE directive.

Need to consider working at height potentially.

b) Standard circuits:

Lighting – Table 7.1 OSG we could use most of the lighting standard circuits however, the 1 mm²/1 mm² protected by a 6 Amp BS EN 61009 Type B in method C with a maximum

Indicative content (what will be seen for this version of the task)

length of 68 m would be a more economical option than using 1.5 mm². If the length of circuit exceeded 68 m then we could use the 1.5 mm² option.

Small appliances: mobile phone chargers and table lamps – These small items could be powered using a ring final circuit or radial circuit. A ring final circuit would provide more capacity for the same size cable in terms of volt drop range and Z_s range so if length of radial was an issue, then the ring final circuit would be the preferred choice.

Table 7.1 Row 3 2.5 mm²/1.5 mm² with a max loop length of 106 m. AFDD to BS EN 62606 with integrated RCBO Type B should be used as per Reg 421.1.7 because this is a care home and therefore an AFDD is a 'shall' rule for socket-outlets with a current rating not exceeding 32 A, in method C.

This bain-marie could be part of the above ring final circuit. However, it is a critical system so to reduce any power losses due to faults on ring final circuit appliances, it would be better on its own circuit.

Table 7.1 OSG Radial circuits have again, lots of options here. Justifications could be made for using a 16 A Type B 2.5 mm²/1.5 mm² radial installed using methods 100, 101, 102, A or C with max length of 45 m. However, the loading is most likely very small so a smaller cable and protective device could be justified here.

Fire alarm- Table 7.1 OSG. This circuit is very similar to the one above in its use. However, there is another Standard (BS 5839) to be included here which states the supply to the switched fused connection unit must be of a fire protected cable standard and on its own dedicated circuit. This means that the standard circuits cannot be used as these are for the use of twin and CPC cabling. Although the protective device and cable sizes would be similar, the fire performance type cable would have its own characteristics to take into consideration. Any explanation similar to this with justifications would be acceptable.

c)

Circuit reference	Protective device rating A	Circuit description	Diversity allowance	Demand after diversity applied		
				A	L ₁	L ₂
1L1	32	Ring final circuit bedrooms 1 to 4	100% of F.L.	32		
1L2	32	Ring final circuit bedrooms 5 to 8	50% of F.L.		16	
1L3	6	Lighting rooms 1 to 4 plus associated emergency lights	75% of F.L.			4.5

2L1	6	Lighting rooms 5 to 8 plus associated emergency lights	75% of F.L.	4.5		
2L2	20	Panel heaters rooms 1 to 2	No diversity allowed		20	
2L3	20	Panel heaters rooms 3 to 4	No diversity allowed			20
3L3	40	Panel heaters rooms 5 to 8	No diversity allowed			40
Total				36.5	36	64.5
Applying diversity is beneficial when sizing sub-distribution circuit cables to avoid unnecessary additional cost. Using less copper is a responsible approach for an engineer, so ensuring cables are sized accurately to reflect expected circuit usage.						

Guidance for resubmission of evidence process

When a candidate does not meet the pass standard the candidate can rework and submit evidence for specific grading criteria that has not been met within this task. Re-submission of evidence for this task is permitted as follows:

What can be resubmitted as additional evidence for the task (using the same version of the assignment)

- All evidence for this task can be resubmitted.

What can be resubmitted, but the entire task would need to be retaken (using the same version of the assignment)

- Not applicable: All evidence for this task can be resubmitted.

What cannot be retaken, and a different version of the whole assignment must be used and all tasks retaken

- Not applicable: All evidence for this task can be resubmitted.

Task 4 Initial verification

Fail	Pass
<p>Initial verification not carried out in accordance with BS 7671, On-Site Guide and Guidance Note 3.</p> <p>Explanations appear to be recalled or illogical connections with little ability to 'explain why'.</p> <p>Shows little consolidation of industry procedures and applies them with errors.</p> <p>Insufficiently concerned by poor outcomes with little attempt to improve.</p>	<p>Initial verification carried out in accordance with BS 7671, On-Site Guide and Guidance Note 3.</p> <p>Logical explanations and can 'explain why' in familiar contexts.</p> <p>Shows consolidation of industry procedures and applies them with few errors.</p> <p>Aims for satisfactory outcomes but may not explore much further than this.</p>

Indicative content (what will be seen for this version of the task)

a) This content is not exhaustive but outlines the type of response and content a candidate could write about.

The purpose of initial verification is to ensure the installation has met the safety and regulation standards set out in BS 7671, it is safe for energising and use and is to the original design.

Equipment should be checked before using it. Checks would include looking for damage, leads are to GS38 and in good condition, batteries are charged, calibrated within last year.

It is important to always inspect before you test after all there is no point testing an incomplete or damaged installation, so these items need correcting before testing occurs. Attempting insulation resistance without all earthing connected could be dangerous.

IP codes are used as a way of classifying an enclosure's ability to resist dust and debris, moisture and sometimes fingers from entering an enclosure.

The use of an 'X' symbol simply means that part of the code is not required for that type of enclosure.

Typical electrical IP code is IP2X for front, sides and bottoms of **all** live enclosures and IP4X is required for top surfaces of **all** enclosures containing live low-voltage terminals.

It is important to have all the information you need to conduct the inspection and test correctly. The supply information is important as without that it is difficult to know whether your test readings are compliant or not. Items you would need to know could be:

- The nominal voltage of the supply
- Frequency of the supply
- Prospective short-circuit current at origin of installation
- The earth fault loop impedance at the origin of the installation (Z_e)
- Maximum demand of the installation
- Type and rating of the supplier's protective device (cut-out fuse)

Indicative content (what will be seen for this version of the task)

This list is not exhaustive.

Items to be inspected	What the item is being checked for
SWA cable	Securely fixed (Fire rated fixings, cleats applied)
DoL starter	Securely fixed
SWA cable	Not damaged
SWA cable	Supported at suitable distances
SWA cable	SWA correctly terminated (glanded)
DoL starter	Meets minimum IP rating (IP4X top horizontal surface IP2X all other surfaces)
Connections	Secure
Connections	Correctly identified/correct polarity/correct sequence
SWA armouring	SWA correctly connected to the earth terminal

The order of tests are as follows:

- 1) Continuity of CPC
- 2) Insulation resistance.
- 3) Polarity of new circuit/Live supply.
- 4) Earth fault loop impedance.
- 5) Phase sequence.

Bullets items 4 and 5 may be interchanged.

Tests are carried out in a particular order as the results of continuity might affect future results or give false impressions of the safety of the installation. If a circuit was incomplete for example, then an insulation resistance test might record a satisfactory figure which would be misleading. These tests will ultimately determine whether the protective devices are going to function if they need to, and whether the installation is safe to use.

If a Z_s reading is too high, then the consequence might be a slower trip time that does not conform to BS 7671, and this could result in a fire or a shock risk to the user. We always need to use our knowledge of electrical characteristics such as resistance and recognise things such as loose connections could increase resistance, heat could increase resistance, circuits being extended would increase resistance etc.

Using your senses when inspecting or testing is essential to the process. It is perfectly ok to use your eyes to determine things like polarity but good to confirm with a test instrument to prove good connections.

Polarity is generally important to check that single-pole circuit breaker and other protective devices are connected using the line conductor as are Edison Screw lamp holders (centre pin must be line, outside screw must be neutral) and single-pole switches are also switching the line conductor instead of the neutral.

The difference between measured resistance values and values that have been calculated at limiting temp. For example, BS 7671 max Z_s values are at limiting temp so to see what the max would be for a measured value we need to multiply the BS 7671 value by 0.8. Our

other option is to use either Guidance Note 3 or On-Site Guide values as they have been corrected. It must be clear on the schedule of the results sheet which values were used. By default, BS 7671 values for Max Z_s are expected.

Example for using BS 7671 Values for max Z_s : if 32 A Type B circuit breaker states its max Z_s as 1.37Ω in BS 7671 then the max Z_s measured value would be $1.37 \Omega \times 0.8 = 1.1 \Omega$.

Barriers, signage, good effective communication and following safety protocols are great ways of ensuring the safety of the building users whilst inspection and testing is being carried out.

Once everything is complete the paperwork would need to be handed over along with a discussion about when to next inspect the installation.

Guidance for resubmission of evidence process

When a candidate does not meet the pass standard the candidate can rework and submit evidence for specific grading criteria that has not been met within this task. Re-submission of evidence for this task is permitted as follows:

What can be resubmitted as additional evidence for the task (using the same version of the assignment)

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What cannot be retaken, and a different version of the whole assignment must be used and all tasks retaken

- Not applicable: All evidence for this task can be resubmitted.

6. Centre guidance

Guidance provided in this document supports the administration of this assessment.

This assessment is designed to require the candidate to make use of the knowledge, understanding and the knowledge skills they have built up over the course of their learning to tackle tasks/problems/challenges.

This approach to assessment emphasises to candidates the importance and applicability of the full range of their learning to practice in their industry area and supports them in learning to take responsibility for transferring their knowledge, understanding and skills to the practical situation, fostering independence, autonomy and confidence.

Candidates are provided with an assignment brief. They then have to draw on their knowledge and skills and independently select the correct processes, tools, equipment, materials and approaches to take, to complete the brief.

During the learning programme, it is expected that tutors will have taken the opportunity to set shorter, formative tasks that allow candidates to be supported to independently use the learning they have so far covered, drawing this together in a similar way, so they are familiar with the format, conditions and expectations of the assessment.

Candidates should be made aware during learning what the assessment will be measuring, and how the assessment will be marked. Learners should understand the level of performance that will be required as a minimum to demonstrate competence.

Candidates should not be entered for the assessment until the end of the course of learning for the qualification, so they are in a position to complete the assignment successfully.

Centres are required to rotate usage of assignment versions, which will be monitored by the External Quality Assurer (EQA).

Compliance with timings

Due to the nature of this assessment, the maximum time allowances provided for each task must be adhered to. They refer directly to assessment time, not any additional setting up times the centre needs to create an appropriate assessment environment.

It is the centre's responsibility to plan sufficient assessment sessions as stated in each of the tasks, under the appropriate conditions, within the assignment window, to allow candidates reasonable time to complete the assessment tasks.

Where candidates are required to plan their work, they should have their plans confirmed for appropriateness in relation to the time allocated for each task, to ensure their planning has not left them with too short a time to complete the tasks safely. Any planning that is not appropriate must be recorded on the assessor observation record form as part of the grading process.

Candidates should be allowed sufficient time to fully demonstrate the range of their skills, however this also needs to be reasonable and practicable. Candidates should be allowed to overrun their own planned timings in order for evidence of a range of their skills to be captured. If, however, the time required exceeds the maximum time allowance for the task, the centre must stop the assessment and base the grading on the evidence up to that point.

Any guidance or feedback relating to timings/planning should follow the guidance provided in the section Guidance and feedback below.

Preparation of candidates

Candidates should be aware of which aspects of their performance will give them good marks in assessment. This is best carried out through routinely pointing out good or poor performance during the learning period, and through formative assessment. Although candidates will not have access to the grading criteria during the assessment. Candidates should be made aware of what they need to do to achieve a pass by referring and formatively being assessed against grade standard as part of their formal learning programme.

During the learning programme, direct tutor instruction in how to approach tasks through modelling, support, guidance and feedback are critical. However, gradual removal of this support is necessary in preparation for summative assessment. This supported approach is not valid for summative assessment.

The purpose of summative assessment is to confirm the standard the candidate has reached as a result of participating in the learning process. Candidates should be encouraged to do the best they can and be made aware of the difference between these summative assessments and any formative assessments they have been subject to. Candidates will not have access to the grading grids.

Guidance on assessment conditions

The assessment conditions that are in place for this assignment are to:

- ensure the rigour of the assessment process
- provide fairness for candidates
- give confidence in the outcome.

They can be thought of as the rules that ensure that all candidates who take an assessment are being treated fairly, equally and in a manner that ensures their result reflects their true ability.

The conditions outlined below relate to the tasks within this assignment. These do not affect any formative assessment work that takes place, although it is advised that candidates are prepared for the conditions they will need to work under during summative assessment.

The evidence for the tasks that make up this assignment must be completed under the specified conditions. This is to ensure authenticity and prevent malpractice as well as to assess and record candidate performance for assessment. It is the centre's responsibility to ensure that local administration and oversight gives the assessor sufficient confidence to be able to confirm the authenticity of the candidate's work.

Security and authentication of candidate work

Candidate evidence must be kept secure to prevent unsupervised access by the candidate or others. Where evidence is produced over a number of sessions, the assessor must ensure learners and others cannot access the evidence without supervision. This might include storing written work or artefacts in locked cupboards and collecting memory sticks of evidence produced electronically at the end of each session.

Candidates are required to sign declarations of authenticity, as is the assessor. The relevant form is included in this assignment pack and must be signed after the production of all evidence.

Where the candidate or assessor is unable to or does not confirm authenticity through signing the declaration form, the work will not be accepted at verification and a mark of zero will be given. If any question of authenticity arises eg at verification, the centres may be contacted for justification of authentication.

Accessibility and fairness

Where a candidate has special requirements, assessors should refer to the *Access arrangements and reasonable adjustments* section of the City & Guilds website.

Assessors can support access where necessary by providing clarification to any candidate on the requirements or timings of any aspect of this assignment. Assessors should not provide more guidance than the candidate needs as this may impact on the candidate's grade, see the guidance and feedback section below.

All candidates must be provided with an environment, time frame and resources that allows them reasonable access to the full range of marks available.

Guidance and feedback

To support centres file management, assessors may specify a suitable file format and referencing format for evidence (unless otherwise specified eg if file naming is an assessment point for the assignment). Guidance must only support access to the assignment brief and must not provide feedback for improvement. The level and frequency of clarification and guidance must be taken into account along with the candidate's final evidence during grading.

Assessors must not provide feedback on the quality of the performance or how the quality of evidence can be improved. This would be classed as malpractice. However, this does not apply if the assessor asks questions as part of the assessment process. Such requirements will be specifically stated within task centres guidance.

Assessors should however provide general reminders to candidates throughout the assessment period to check their work thoroughly before submitting it, and to be sure that they are happy with their final evidence as it may not be worked on further after submission.

Candidates can rework any evidence that has been produced for each task during the time allowed.

Assessors should check and be aware of the candidates' plans and designs to ensure management of time and resources is appropriate, and so any allowed intervention can take place at an appropriate time.

The information on the guidance given and captured on the assessor observation record form is part of the evidence that must be considered along with the other evidence for the task when grading. It is up to the assessor to decide if the guidance the candidate has required suggests they are lacking in any performance outcome and consider the severity of the issue when applying the grading criteria. The assessor must record where and how guidance has had an impact on the marks given, so this is available should queries arise at external verification or appeal.

What is, and is not, an appropriate level of guidance

- An assessor should intervene with caution if a candidate has taken a course of action that will result in them not being able to submit the full range of evidence for assessment. However, this should only take place once the assessor has prompted the candidate to check that they have covered all the requirements. Where the assessor has to be explicit as to what the issue is, this is likely to demonstrate a lack of understanding on the part of the candidate rather than a simple error, and full details should be recorded on the CRF.
- The assessor should not provide guidance if the candidate is thought to be able to correct the issue without it, and a prompt would suffice. In other words, minimum

support should be provided to the candidate, since the more assessor guidance provided, the less of the candidate's own performance is being demonstrated and therefore the larger the impact on the marks awarded.

- The assessor must not provide guidance that the candidate's work is not at the required standard or how to improve their work. In this way, candidates are given the chance to identify and correct any errors on their own, providing valid evidence of knowledge and skills that will be credited during grading.
- The assessor must not produce any templates, pro-formas, work logs etc. If templates are provided by City & Guilds as part of the assignment, these should not be adapted but can be provided to candidates either electronically or paper based. Compliance of this requirement will be checked at external verification.

All specific prompts and details of the nature of any further guidance must be recorded on the relevant form and reviewed during grading and external verification.

7. Declaration of authenticity

Assessment ID	Qualification number

Candidate name	Candidate number

Centre name	Centre number

Additional Support

Has the candidate received any additional support in the production of this work?

No Yes (Please tick appropriate)

If yes, give details below (and on a separate sheet if necessary).

--

Candidate:

I confirm that all work submitted is my own, and that I have acknowledged all sources I have used.

Candidate signature	Date

Assessor:

I confirm that all work was conducted under conditions designed to assure the authenticity of the candidate's work, and am satisfied that, to the best of my knowledge, the work produced is solely that of the candidate.

Assessor signature	Date

Note: Where the candidate and/or assessor is unable to or does not confirm authenticity through signing this declaration form, the work will be returned to the centre and this will delay the grading process. If any question of authenticity arises, the assessor may be contacted for justification of authentication.

8. Candidate record form (CRF)

Candidate name	Candidate number
Centre name	Centre number

Assessor notes – Always refer to the relevant task grading section and make notes which describe the quality of the evidence and justification of how the grading descriptors have been met. Expand boxes as required.

Task	Notes and justification	Outcome
Task 1		Pass/Fail
Task 2		Pass/Fail
Task 3		Pass/Fail
Task 4		Pass/Fail

Assessor name	Date
Assessor signature	

Resubmission of evidence

Assessor to complete this section if any evidence has been resubmitted and to confirm if it meets / does not meet the standard.

Task	Detail of evidence resubmitted	Notes and justification	Outcome
Task 1			Pass/Fail
Task 2			Pass/Fail
Task 3			Pass/Fail
Task 4			Pass/Fail

Assessor name	Date
Assessor signature	

IQA to confirm.

Internal Quality Assurer (IQA) name	Date
Internal Quality Assurer (IQA) signature	

If sampled by EQA:

External Quality Assurer (EQA) name	Date
External Quality Assurer (EQA) signature	

Appendix 1 – Sources of General Information

The following documents contain essential information for centres delivering City & Guilds qualifications. They should be referred to in conjunction with the handbook. To download the documents and to find other useful documents, go to www.cityandguilds.com or click on the links below:

Centre handbook: quality assurance standards

This document is for all approved centres and provides guidance to support their delivery of our qualifications. It includes information on:

- centre quality assurance criteria and monitoring activities
- administration and assessment systems
- centre-facing support teams at City & Guilds/ILM
- centre quality assurance roles and responsibilities.

The centre handbook should be used to ensure compliance with the terms and conditions of the centre contract.

Centre assessment: quality assurance standards

This document sets out the minimum common quality assurance requirements for our qualifications that feature centre-assessed components.

It incorporates our expectations for centre internal quality assurance and the external quality assurance methods we use to ensure that assessment standards are met and upheld. It also details the range of sanctions that may be put in place when centres do not comply with our requirements or actions that will be taken to align centre marking/assessment to required standards. Additionally, it provides guidance on administering portfolios and controlled assessments, including a definition of supervised conditions.

Access arrangements: when and how applications need to be made to City & Guilds

This provides full details of the arrangements that may be made to facilitate access to assessments and qualifications for candidates who are eligible for adjustments in assessment.

The **centre document library** also contains useful information on such things as:

- conducting examinations
- registering learners
- appeals and malpractice.

Useful contacts

Please visit the **contact us** section of the City & Guilds website.

City & Guilds

For almost 150 years, we have worked with people, organisations and economies to help them identify and develop the skills they need to thrive. We understand the life-changing link between skills development, social mobility, prosperity and success. Everything we do is focused on developing and delivering high-quality training, qualifications, assessments and credentials that lead to jobs and meet the changing needs of industry.

We partner with our customers to deliver work-based learning programmes that build competency to support better prospects for people, organisations and wider society. We create flexible learning pathways that support lifelong employability because we believe that people deserve the opportunity to (re)train and (re)learn again and again – gaining new skills at every stage of life, regardless of where they start.

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